REPORTS OF THE NATIONAL CENTER FOR SCIENCE EDUCATION

DEFENDING THE TEACHING OF EVOLUTION IN THE PUBLIC SCHOOLS

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REPORTS OF THE
NATIONAL CENTER FOR SCIENCE EDUCATION
DEFENDING THE TEACHING OF EVOLUTION IN THE PUBLIC SCHOOLS
CONTINUES *NCSE REPORTS* & *CREATION/EVOLUTION*

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FROM THE EDITOR

This issue of *RNCSE* is the end of our tenth year since combining our earlier publications *NCSE Reports* and *Creation/Evolution.* In a future issue, we will carry a couple of retrospective articles about how the publication — and NCSE itself — has changed in the last decade. But one thing seems to remain constant: opposition to evolution keeps running into the same old roadblocks, and the response is to make superficial changes without addressing the core issues that cause the scientific community — and the courts — to reject it time after time. Nck Matzke's discussion in this issue of a new anti-evolution "textbook" illustrates the point well.

Our two main news notes in this issue report on very different Christian constituencies. Jim Lippard reports on the acrimonious schism between the Australian and US components of Answers in Genesis. It has all the markings of a hostile take-over. While we were preparing this issue, Answers in Genesis opened its "Creation Museum" in Petersburg, Kentucky. We carry a preliminary reaction, with more news and analysis to come in a future issue. But it is worth noting that the AiG museum is not the only such museum — or even the only one opening in 2007. A new creation museum is also opening in Canada, less than an hour's drive from Alberta's prestigious Royal Tyrell Museum of Paleontology.

Pope Benedict XVI recently presided at a conference that addressed issues of evolution and creation. His pronouncements certainly added to the confusion about the position of the Roman Catholic Church without actually saying anything that significantly contradicted the position taken in Pope John Paul II's address to the Pontifical Academy of Sciences in 1996. What is most remarkable — and perhaps worrisome — is the new pope's idea of what constitutes scientific inquiry and how we can carry out valid research in the historical sciences.

Most of this issue is taken up by book reviews. If nothing else, the creationism/evolution controversy seems to be good for the publishing industry. To help our readers plan their approach to these reviews, we have grouped them into general categories.

BOOKS PROMOTING CREATIONISM OR "INTELLIGENT DESIGN"

William A Dembski's festschrift for Phillip Johnson is called *Darwin's Nemesis*. Lawrence Lerner reviews this volume, which emanated from a conference at Biola University in April 2004. Dembski claims — all evidence to the contrary — that that the "intelligent design" movement is without any religious or sectarian agenda. Lerner recommends this book for those who want to learn about and understand the inner motivations of the "intelligent design" movement and its activists.

Anthony Latham's *The Naked Emperor* seeks to convince readers that "Darwinism" is unsustainable because of the weight of the unanswered challenges and contrary evidence. But reviewers Stephen B Hager and Bradley J Cosentino tell us that the real problem is the misinformation used to construct the argument.

The Discovery Institute's John West weighs in on the matter of how conservatives should view evolution in *Darwin's Conservatives*. Reviewer Kenneth J Blanchard Jr points out that West conflates evolutionary science with the social and political policies that people create in the name of evolutionary ideas. And the newest item in the anti-evolutionism arsenal is an *Intelligent Design vs Evolution* board game. Carrie Sager tells us that the game is full of errors, has a very limited number of questions with very predictable answers, and is, in a word, boring.

BOOKS WITH HISTORICAL PERSPECTIVES ON THE SCIENCES

Michael Buratovich reviews *Present at the Flood*, a book about the outpouring of new knowledge due to research in molecular biology. Martin JS Rudwick's *Bursting the Limits of Time* does much the same for the history of the geosciences. Kevin Padian reviews Donald R Prothero's *After the Dinosaurs*, which explores the emergence of mammals and their diversification after the Cretaceous. Kenneth S Saladin reviews John Kricher's *Galápagos: A Natural History*. Ken writes that this volume is a wonderful traveling companion, but more of a story book than a tour guide. For a good look at the history of and research developments in phylogenetics, Kevin Padian recommends *The Tree of Life*.

BOOKS WITH HISTORICAL THEMES

Closer to home, Ronald L Numbers's *The Creationists* has been updated, and Francis B Harrold tells us that the added chapters on "intelligent design" creationism are useful, but leave the rest of the book in need of more updating. Lyanda Haupt's *Pilgrim on the Great Bird Continent* uses Darwin's notebooks to show his maturation as a naturalist of substance through his experiences in South America. This volume shows that there was more to Darwin's story than the apocryphal Aha! in the Galápagos Islands.

There are many other interesting review in this issue. We bring you reviews of *Intelligent Thought: Science Versus the Intelligent Design Movement, Why Darwin Matters, The Top 10 Myths about Evolution, The Science of Evolution and the Myth of Creationism, The Scopes Trial: A Brief History With Documents,* and *Darwin Loves You: Natural Selection and the Re-Enchantment of the World.* Much to consider and many thought-provoking reviews lie ahead; just turn a few pages to begin the journey.

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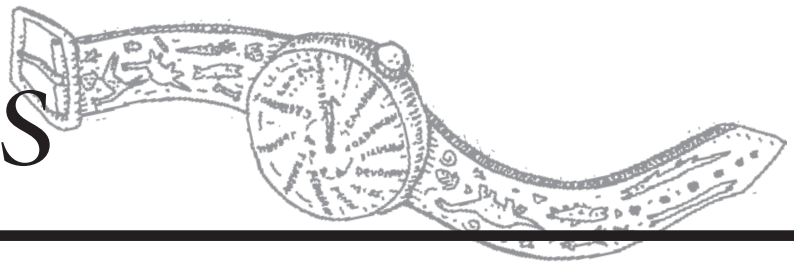
NEWS



Trouble in Paradise: Answers in Genesis Splinters

Jim Lippard

As of 2004, the US market for creationism was at least $22 million — as measured by adding up donations to and purchases of products and services from ten of the largest creationist groups. Of that amount, Answers in Genesis accounted for 59%, making it clearly the dominant player in US creationism (Lippard 2007). But in October 2005, Answers in Genesis (AiG) suffered a schism. This became public at the end of February 2006, when the groups in Australia, New Zealand, Canada, and South Africa that had operated under the AiG name rebranded as Creation Ministries International (CMI), while the US and UK groups continued as AiG. (As the naming gets complicated, I will refer to the different countries' groups as AiG–US, AiG–UK, and AiG–Australia to distinguish them from the overall AiG organization prior to the split.)

The reasons for this division were not entirely clear at the time to anyone but insiders — and may not have been clear to some who were insiders. Ronald L Numbers writes in the new expanded version of his book *The Creationists*, "Despite my best efforts, I was unable to pin down the exact cause of the split" (Numbers 2006: 558). As of November 20, 2006, however, through documents posted on CMI's website, the causes of the split have now become known — revealing Machiavellian maneuvering by Ken Ham and AiG–US as they fought measures to distribute power and add accountability (successfully), attempted to seize the assets of AiG–Australia (partly successfully), and tried to gain complete control of AiG–Australia (unsuccessfully). These documents also reveal surprising details of the Australian group's 1987 split with co-founder John Mackay, which include accusations of demonic possession and necrophilia.

There were a few clues available about the AiG/CMI split in early 2006 — on the groups' respective websites, in a mailing from CMI, and in the AiG–US Form 990 filings with the IRS, which I noted on my blog in a March 3, 2006, posting about the split (Lippard 2006a). The biggest change on the websites was that information critical of certain other creationists (such as Kent Hovind and Dennis Petersen) disappeared from the AiG website, but reappeared on the CMI website. The CMI mailing stated that "the US ministry withdrew themselves [*sic*] from the international ministry group (with the exception of the UK) with an expressed desire to operate autonomously, without e.g. website content being subject to an international representative system of checks/balances/peer review involving all the other offices bearing the same 'brand name'." The most notable change between the AiG–US's 2003 and 2004 Form 990 filings was the disappearance of several Australians from the board — Carl Wieland, Greg Peacock, and Paul Salmon. Also notable in hindsight is that Brandon Vallorani, AiG–US's Chief Operating Officer and second-in-command to Ken Ham, received a dramatic increase in salary between the 2003 and 2004 filings (more on this below).

These clues suggested that CMI was interested in distributing editorial powers internationally and in being able to criticize fellow creationists for inaccuracy, while AiG–US was interested in maintaining control of content, not being subject to peer review by its international brethren, and refraining from criticism of the work of other young-earth creationists — perhaps because it was selling copies of at least one such CMI-criticized work, Dennis Petersen's *Unlocking the Mysteries of Creation*.

Struggling for market share

The documents on the CMI website confirm that AiG–Australia was seeking a more equitable distribution of control over content published under the AiG name and distributed internationally, including website content, as well as a decentralization of power in AiG–US. A chronology of events on the CMI site (CMI 2006b) identifies the initial source of friction as a 2004 letter from AiG–Australia's CEO, Carl Wieland, to the AiG–US board, recommending that hiring and firing capability be taken out of the hands of Ken Ham and that he [Ham] be put into "a senior distinguished role as adviser/consultant/speaker, etc." (CMI 2006b: 1). Although Wieland volunteered to make the same change to his own role in Australia, this letter seems to have been taken as a direct personal assault by Ken Ham. AiG–US Chief Operating Officer Brandon Vallorani made the mistake of supporting the Wieland proposal in a letter to the AiG–US board, which Ham then showed to other AiG–US vice presidents. These VPs interpreted the letter as "treason" and "wanting to dethrone Ken", and Vallorani left the organization. According to the CMI chronology, "Brandon [Vallorani] is given a hefty payout, but on the condition that he sign [a confidentiality agreement]" (CMI 2006b: 2). AiG–US's Forms 990 confirm that Vallorani's salary went from $74 432 in 2003 to $90 344 in 2004, despite the fact that he worked less than nine months of 2004. He left the organization in September to become an executive vice president at American Vision, a Christian nonprofit devoted to "equipping and empowering Christians to restore America's biblical foundation."

Jim Lippard is a long-time critic of pseudoscience, including creationism. He blogs at <http://lippard.blogspot.com/>.

The documents show that this initial friction in 2004 was followed by a continuing refusal on the part of Ken Ham and AiG–US to interact with Carl Wieland, whom they apparently regarded as attempting to seize control of the US group, and by a growing number of conflicts between the groups over control of website and magazine content. AiG–Australia produced the magazine *Creation*, while AiG–US managed the website content, and expressed the desire to be able to change the on-line content without prior approval of the Australian (or other) authors. AiG–US (temporarily) abandoned this goal when AiG–Australia emphasized that it owned the copyrights. Intellectual property and US distribution became key points of contention — AiG–Australia owned the *Creation* magazine content, the domain name "answersingenesis.org", and the AiG trademarks in Australia, but AiG–US controlled the website and distribution of the magazine in the United States — the largest audience for AiG's content. As the groups contended over these issues, AiG–US attempted to register "*Creation*" as a US trademark in April 2005 without informing AiG–Australia.

As the conflict intensified, interactions between the AiG–Australia and the AiG–US boards increased, but without the participation of Wieland on the Australian side. The AiG–Australia board began to side with Ham's position, apparently fearing the loss of US distribution of the magazine and failing to recognize the value of the intellectual property rights they owned. At an AiG–Australia board and senior staff retreat in June 2005, the AiG–Australia board asked Wieland to step down as CEO in order to put an end to the conflict — with no corresponding offer by Ham to do the same in the US. But when many staff members at the retreat threatened to resign, the board withdrew the directive a day later. To bring the dispute to an end, Wieland and the senior staff agreed to withdraw in writing any recommendations, concerns, or interest in the internal operations of AiG–US.

This agreement was, however, to no avail. The chronology reports that when Wieland was able to interact directly with Ham in Australia, Ham stated "that there is no way that the US ministry will accept in principle *any* system of voting whereby other countries could outvote AiG–USA on anything" (CMI 2006b: 4). But Wieland and AiG–Australia's senior staff considered this a minimum requirement for a continued relationship with AiG–US. The AiG–Australia board, on the other hand, continued to want peace at any cost, leading to a crisis of confidence in the board on the part of the senior staff. When the AiG–Australia board prepared to travel to the US in October 2005, the group's staff provided directors with a letter, the content of which is on the CMI website (CMI 2005). This letter called for the creation of a class of independent non-director membership in the organization. These members would outnumber the board of directors and have the power to adjudicate any unresolvable disputes between the CEO and the board (a system that has been put in place today at CMI). The Australian board members stated that they would not sign anything in the US without first consulting the Australian staff, but proceeded to do just that.

The document the AiG–Australia board signed was an agreement that gave AiG–US the right to use the content produced by the Australians under the AiG name without cost and to modify it without author approval, and it further guaranteed that authors had consented to such modification (which consent CMI says had not been obtained). Furthermore, the agreement indemnified AiG–US if any author sued for infringement of copyright or moral rights, allowed all fees and charges for use of the respective groups' materials to be set unilaterally by AiG–US, gave ownership of the domain name "answersingenesis.org" (previously owned by AiG–Australia) to AiG–US without any compensation, and stipulated that the Australian trademark on "Answers in Genesis" be transferred to AiG–US if the Australian group were to rebrand (an interpretation asserted by AiG–US, but disputed by CMI).

Wieland and the Australian group's senior staff interpreted this agreement as having "sold the ministry down the river" (CMI 2006b: 5), while the directors on the Australian board saw it as the only way to separate amicably and have AiG–US continue to distribute *Creation* magazine in the United States. Wieland and senior staff requested a meeting with their board to discuss the matter, but instead, one of the board directors came to their offices on November 7, 2005, to inform Wieland that he had removed as CEO, and asked Wieland to give his approval for him (the director) to become the new CEO. Wieland asked for time to think about it, only to be told that he was immediately suspended from employment and required to leave the premises. The same director entered Don Batten's office and asked him to sign a written "unswerving oath of allegiance" (CMI 2006b: 6) to the new organization. Batten declined, and was likewise suspended and asked to leave. Speaker Peter Sparrow likewise declined such an oath and was suspended, as were several other of the organization's public speakers. Two part-time speakers, Mark Harwood and John Hartnett, contacted the director to ask why their colleagues had been suspended, and failing to get answers to their satisfaction, declined to participate in further work until their colleagues were reinstated. Similar actions were taken by the volunteer leaders of the organization in each Australian state.

In November 2005, Carl Wieland received a telephone call from AiG–Australia's attorney, who had met with the Australian board members and suggested that their best course of action was to offer their immediate resignations and hand control of the organization over to Wieland. At about the same time, Wieland learned that Ham family members in Brisbane had approached various persons to form a substitute board in order to hand over control to them. AiG–Australia's attorney, upon learning of this, spoke with the Australian chairman of the board and persuaded him and the rest of the board to go with his original handover proposal, in exchange for indemnification for their actions with respect to the one-sided agreement. This handover took place on November 14, 2005.

Meanwhile, however, AiG–US considered the agreement to be a

separation, and Ken Ham sent out a memo to that effect on November 1, 2006. The CMI chronology states: "in another email we were forwarded that was not intended for us, Ken Ham stated that henceforth only the UK AiG office would be regarded as a 'sister ministry' of AiG–USA, not the other four" (CMI 2006b: 5).

On November 30, AiG–US board chairman Don Landis responded to a letter from the new Australian board chairman Kerry Boettcher, stating that the October 2005 agreement is a "godly" agreement that will not be renegotiated, alleging that the Australian group has engaged in "gossip" and "rumors," and suggesting that the Australians "consider setting up [their] own website" (CMI 2006b: 7).

In December 2005, the Australians learned of a web survey of *Creation* magazine subscribers in the US conducted by AiG–US, stating that an "upgrade" of the magazine was being considered. The Australia, Canada, New Zealand, and South Africa boards of directors consulted with one another and decided to rebrand, effective on March 1, 2006, and drafted a legal letter announcing the decision. Their new name decision leaked out, however, and Paul Taylor of AiG–UK registered the names "CreationOnTheWeb" and "CreationMinistriesInternational" in both the .co.uk and .org.uk top-level domains in February — though he was apparently acting on his own, and he relinquished the domain names when CMI protested after learning of it in late 2006. CMI planned to put an offer of a free booklet, *15 Reasons to Take Genesis as History*, in the March 2006 issue of *Creation* in order to obtain e-mail addresses for US prospects. AiG–US thwarted this, however, by announcing in February that it has dropped *Creation* magazine and that it is "not possible" for them to distribute it, giving readers the impression that the magazine is no longer available in the United States. AiG–US started its own magazine in June 2006, calling it *Answers* after failing to get approval for a trademark of either "*Creation*" or "*Creation Answers*" in the US.

The lasting divide

The new Australian board made multiple efforts in 2006 to resolve its main concerns with the October 2005 agreement, but were rebuffed because AiG–US continued to refuse to have any interactions with Carl Wieland. In August 2006, AiG–US announced visits to Australia under the Answers in Genesis name, in violation of the Australian group's trademarks. Australian creationist John Mackay, who split from the Australian group when it was still run by Ken Ham in 1987, announced in his newsletter that "Ken Ham re-launches ministry in Australia." AiG–US issued a demand that CMI hand over the Australian trademarks for Answers in Genesis, while CMI issued a legal demand that AiG–US cease its infringement of them.

On November 1, 2006, AiG–US sent a letter to CMI indicating that they are ceasing all contact due to "factious and unbiblical conduct" and "spiritual problems" at CMI; a shorter version of the letter was also distributed by John Mackay in his newsletter. CMI asked AiG–US to withdraw this letter, but after getting no response, decided to go public with the dispute on November 21. CMI published on its website the following documents:

1. A letter dated November 15, 2006, from CMI to AiG–US complaining about the November 1 letter.
2. An e-mail of November 15, 2006, announcing that letter.
3. A summary of the October 2005 agreement, explaining how it disadvantages the Australian group and why it attempted to reject or renegotiate it.
4. An excerpt from the "Deed of Copyright License," which was signed as part of the October 2005 agreement, with comments pointing out the unreasonable terms.
5. A detailed chronology of events involving the split between the groups (CMI 2006b).
6. The text of the October 2005 letter (CMI 2005) given to the Australian board before its trip to the US, calling for the creation of a class of non-director members.
7. Several documents pertaining to John Mackay's departure from the Australian organization in 1987 (CMI 2006c), including a manuscript entitled "Salem Revisited" by Carl Wieland's wife, Margaret Buchanan, and a collection of letters from leaders of various Australian churches and other individuals regarding accusations made by John Mackay against her.

These last items, CMI contends, show that John Mackay had accused Margaret Buchanan, who at the time was Ken Ham's widowed personal secretary, of being a demonically possessed practitioner of witchcraft attempting to undermine the Australian organization and Mackay in particular, as well as of practicing necrophilia. Buchanan was placed on leave for several weeks as the organization initially took Mackay's claims seriously and ultimately rejected them, which led to Mackay's departure. CMI apparently regards AiG–US as now being willing to work with Mackay in order to rebuild its support in Australia, despite the fact that Ham had previously cut all ties with him over his accusations.

AiG and CMI do not appear to be close to a peaceful resolution of their dispute. AiG appears to have the upper hand in terms of resources and the content of the October 2005 agreement, but CMI appears to me to have the moral high ground. It remains to be seen how this schism and the subsequent public exposure of its details will affect the respective groups financially, but one thing that is clear is that creationism continues to evolve in fascinating ways.

[*As this issue was in layout, CMI released a detailed complaint against Ham and AiG–US, including its intended lawsuit. Details can be found at <http://www.creationontheweb.com/briese2>.*]

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Some copies of the July/August 2006 issue of *Reports of the NCSE* — with the mudskipper on the cover — were miscollated by the printer. Please check your copy to make sure that all 48 pages appear in order and with no repetitions. If you have a faulty copy, please let NCSE know, ideally by e-mailing oops@ncseweb.org with your name and address, and we will send you a replacement copy straightaway.

The Evolution Award at Ohio's State Science Day

Jeffrey K McKee

In 2006, the Ohio State chapter of Sigma Xi sponsored a first-of-its-kind award for projects focused on evolutionary science by students at Ohio's State Science Day. The award for "Science of Evolution" marks the first time that evolutionary theory had been singled out at State Science Day.

The prize is awarded to the best project that addresses a research question in evolutionary biology or tests an hypothesis within the broad framework of evolutionary theory. Students in grades 10, 11, and 12 are eligible to compete. There are two awards of $200, and winners also receive a certificate and plaque, and a one-year subscription to *American Scientist*. In our first year, with little advance notice, we offered two evolution awards. Three students applied in 2006, and one received the award. In May, 2007, we had four entries, all interesting, and two of which were clearly worthy of the prize. Interested readers can view the winning projects here: <http://home.insight.rr.com/jkmckee/ScienceDay.htm>. Sigma Xi invites the winners of our awards to its annual banquet, and the students are thrilled to mingle with scientists.

Getting involved in evolution education

Sigma Xi, the scientific research society, has long championed science education on many fronts. The Ohio State University Chapter of Sigma Xi saw an opportunity to promote science education in Ohio, and to give incentive for quality education in biological evolution under the new state K–12 educational standards. The Evolution Award joins the Interdisciplinary Research award as the second incentive from the OSU chapter of Sigma Xi for the best and brightest science students to display their research innovations at State Science Day, our state-wide competition.

So far our winners have been truly outstanding. From our first winner, who deftly analyzed hypotheses on dinosaur sleeping positions, to this year's winners, who studied the diverse topics of snake DNA phylogeography and behavioral aspects of facial expression in human communication, we see the breadth of the impact of evolutionary science on many realms of research. The students see it too.

We would strongly encourage other organizations to sponsor such awards for their district and state science fairs. It has been easy to raise the money from just a few donors who can use a meaningful tax deduction. But it is even more rewarding to judge the competitions and interact with students — who may have never even met an active scientist. We follow up our awards with an invitation to our annual Sigma Xi banquet, where the students dine with scientists, hear a talk on latest research, and are individually honored for their research. Two of last year's winners who came to the banquet sat with Ohio Academy of Science (OAS) CEO Lynn Elfner and will present their work at the 2007 OAS annual meeting

Compared to the amount of prize money given out at science fairs for physics, engineering, and other science and technology fields, the amount for evolutionary science is miniscule. We felt that it was time we changed that. Setting up an evolutionary science award through a local scientific organization or academic department is an easy first step. We at the OSU chapter of Sigma Xi are eager to share our experiences to help other groups and organizations interesting in setting up an evolution award for their own state and regional science days.

Jeffrey K McKee is Professor of Anthropology at the Ohio State University. His research interests are in human evolution, paleoanthropology, and human population biology. He is co-author with Frank E Poirier and W Scott McGraw of Understanding Human Evolution, *fifth edition (Upper Saddle River [NJ]: Prentice-Hall, 2004).*

Evolution education in Ohio has gone from complete obscurity — with not even a mention in the original Ohio educational guidelines — to being an important educational standard and an award-winning endeavor for Ohio's students. But good education goes well beyond mere politics and into action, and this is a manageable, concrete first step to highlighting evolutionary sciences in one place where science is celebrated throughout the state every year. Engineering, technology, medicine, nanotechnology, and biochemistry are in the forefront of these events; now it is time for us to be sure that evolution is there, too.

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The Latest on Evolution from the Pope

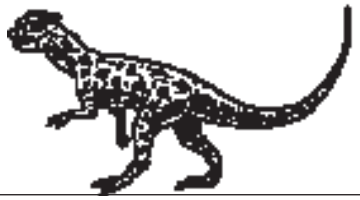
Pope Benedict XVI's views on evolution were back in the news, following the publication of *Schöpfung und Evolution* (Augsburg: Sankt Ulrich Verlag, 2007), the proceedings of a seminar on creation and evolution that he conducted at Castel Gandolfo, the papal summer residence, with his former doctoral students in 2006. Reuters (2007 Apr 11) reported that in his contribution to the book, the Pope "did not endorse creationist or 'intelligent design' views about life's origins," adding, "In the book, Benedict defended what is known as 'theistic evolution,' the view held by Roman Catholic, Orthodox and mainline Protestant churches that God created life through evolution and religion and science need not clash over this."

But Reuters also reported that the Pope regards evolution as unamenable to scientific proof; the Associated Press (2007 Apr 12) quoted him as saying, "the theory of evolution is not a complete, scientifically proven theory," in part because of the length of time involved: "We cannot haul 10 000 generations into the laboratory." Asked for comment by *Der Spiegel* (2007 Apr 12), the evolutionary biologist Josef Reichholf replied, "So there would be no history, too, since one can't completely reconstruct it either," citing archaeology as a historical discipline in which knowledge is attainable despite gaps in the archaeological record.

NCSE's executive director Eugenie C Scott commented, "The Pope giveth and the Pope taketh away." It was gratifying, she explained, that there were no signs of the Pope's embracing creationism in any form, and that he expressed such a high view of science. "But it is disquieting," she added, "that his reported comments manifest a misunderstanding of the scientific status of evolution. No scientific theory is 'complete' and 'scientifically proven', but scientists accept theories when the evidence is strong enough — and the evidence for evolution is overwhelming."

Similarly, Scott said that the Pope's reported criticism of evolution as not being replicable reflected a common misunderstanding of the nature of science: "Science is not limited just to the laboratory. Biology, like astronomy and geology, is largely a historical science, but it is no less a science for that." Scott emphasized that her reaction was based on reports from the press, and that she looked forward to reading the Pope's contribution to *Schöpfung und Evolution* to understand his view more completely.

UPDATES



Arkansas, Rogers: After the Rogers, Arkansas, school board voted to approve 21 science textbooks, Don Eckard complained that none of the textbooks provided evidence challenging evolution, which he claimed is required by a passage in the Arkansas Biology Science Curriculum Frameworks calling for students to "evaluate evolution". Eckard, a local dentist who served as a community representative on the textbook selection committee, presented the board with a set of proposed supplementary materials, including the DVD *Icons of Evolution* and a corresponding 36-page handout. The handout was primarily based on material from the Discovery Institute, but also included additional material by a local former science teacher who had objected to the science textbooks. NCSE member William J Etges, a professor of biology at the University of Arkansas, Fayetteville, told the *Arkansas Democrat-Gazette* (2006 Apr 18), "It's very clear to anyone who is paying attention that this is just another way of trying to introduce religion into the classroom." At its May 14, 2007, meeting, the school board listened to Eckard and a like-minded citizen, Mark Moore, press their case, but took no action, in effect rejecting the proposal. According to the Springdale *Morning News* (2007 May 15), a committee of science teachers reviewed the DVD and unanimously recommended that it not be approved. When Eckard asked the board why, its president "told Eckard his time to speak had expired and the school board was not there to debate with him." Evolution education in Rogers was in the news previously in 2003, when a local minister unsuccessfully lobbied for a policy allowing students to opt out of evolution (see

RNCSE 2003 May–Aug; 23 [3–4]: 5–10 and 2003 Sep–Dec; 23 [5–6]: 13–6).

Louisiana, Ouachita Parish: The Ouachita Parish School Board in West Monroe, Louisiana, voted unanimously on November 29, 2006, to allow teachers "academic freedom" in subjects such as cloning, global warming, evolution, and the origin of life. Because these are controversial issues, the policy states, "teachers shall be permitted to help students understand, analyze, critique and review in an objective manner the scientific strengths and weaknesses of existing scientific theories pertinent to the course being taught." The policy, which is supported by the conservative Christian Louisiana Family Forum, includes the language of the so-called Santorum amendment to the No Child Left Behind Act in its introduction. (For a discussion of creationist misuse of the Santorum amendment, see Glenn Branch and Eugenie C Scott, "The anti-evolution law that wasn't", *The American Biology Teacher* 2003; 65 [3]: 165–6.)

In response, biology professors from the University of Louisiana at Monroe sent a letter to the Monroe *News-Star* (2006 Dec 3), objecting to the new policy. It read in part:

> As university biology faculty we respectfully, but firmly, oppose the Ouachita Parish School Board's decision regarding the teaching of evolutionary theory. We believe that parish biology teachers should not be able to teach evolution and the so-called "evolution controversy" in any manner they choose. … Providing students with accurate information and the tools to pursue questions important to their lives is the real role of an educator. Educators should not create controversies nor should they create misinformation to support these controversies. Such actions only deny the students of Ouachita Parish the right to an honest education. … Ultimately, through discussion, we hope that the OPSB will reconsider its position on the teaching of evolution. Only then will area students be presented an accurate view of evolution in the biology curriculum. We believe that this goal can be accomplished without compromising students' own faith-based ideologies.

On December 1, 2006, the Discovery Institute also issued a statement about the policy, in which its representative Casey Luskin praised the board for "tak[ing] a stand protecting the academic freedom of teachers to answer student questions and discuss scientific issues in the classroom." NCSE is monitoring the situation.

Montana: House Joint Resolution 21 was introduced by Representative Robin Hamilton (D–District 92) on January 26, 2007, in the Montana House of Representatives and referred to the Committee on Education. If enacted, the bill would have expressed the Montana legislature's recognition of the importance of separation of church and state and supported the right of local school board trustees to adopt a science curriculum based on sound scientific principles. The resolution refers to "a number of national fundamentalist organizations seeking to force local schools to adopt a science curriculum that conforms to their particular religious beliefs and that includes theories commonly referred to as creationism, creation science, and intelligent design theory" and describes their efforts as undermining "a community's local control, a teacher's academic freedom, and a student's opportunity to receive quality science education" as well as the separation of church and state. A similar resolution, SJR 8, was introduced in the Montana Senate in 2005, but died in committee (see *RNCSE* 2004 Nov/Dec; 24 [6]: 15–20); HJR 21 was tabled in committee on February 21 and died there on April 27.

New Jersey, Kearney: A history teacher at a Kearney public school was caught telling his class that evolution and the Big Bang are unscientific, that there were dinosaurs on Noah's Ark, and that people who reject Jesus belong in hell. David Paszkiewicz is the teacher of an 11th-grade accelerated American history class at Kearney High School, as well as a youth pastor at Kearney Baptist Church. When he began lecturing about religious topics during the first week of class, student Matthew LaClair wanted to complain to administrators, but, fearing that he would not be believed if the teacher denied the charges, made audio recordings of the classes. LaClair's courage in confronting the administration about Paszkiewicz's proselytizing was widely praised in the press and on blogs, but LaClair was surprised by the negativity of the community's reaction, according to a story in *The New York Times* (2006 Dec 18). As a result of his actions, he lost friends and received at least one death threat via his MySpace page. When confronted with the recordings, Superintendent of Schools Robert Mooney said that "corrective action" would be taken, but declined to specify the nature of the action, citing privacy laws. Both he and high school principal Alfred Somma said, after the unspecified action was taken in November, that further action would be taken if necessary. Subsequently, the *Jersey Journal* (2007 Jan 27) reported that the school board is also instituting an in-service training program for all teachers in the district in order to ensure their understanding of the legal issues surrounding church/state separation. Amazingly, however, *The New York Times* reported (2007 Feb 1), "the board adopted a policy in mid-January that requires students to request permission from an instructor to record or videotape a class," which LaClair's father described as a policy that "sends all the wrong messages". With the support of the ACLU and People for the American Way, LaClair's parents filed a notice of claim — a necessary preliminary to a lawsuit — against the school district in February, alleging that Paszkiewicz repeatedly violated the Establishment Clause of the First Amendment by proselytizing in class and that the school and district administration allowed and condoned these violations (see *The* [Kearney] *Observer*, 2007 Feb 21). A settlement was reached before any lawsuit was filed, however; *The New York Times* (2007 May 10)

reported, "As part of the settlement, in which neither side admits wrongdoing, the New Jersey regional office of the Anti-Defamation League will start training teachers and students in September about keeping church and state separate in public schools, and about 'the distinction between the scientific theory of evolution and the religious doctrine of creationism.' Another part of the deal says the board will make a public statement commending Matthew for his 'courage and integrity,' and the LaClairs will issue a statement commending the board." Paszkiewicz's status at the school was not addressed by the settlement. LaClair told the *Times*, "I sincerely hope the board and everybody involved possibly learned something from this whole thing."

New Mexico: With the end of the legislative session on March 17, 2007, all four anti-evolution measures in the New Mexico legislature died. (The House of Representatives continued in a special session in order to deal with a handful of bills, but these included none of the anti-evolution measures.) During the legislative session, none of the bills seemed to have a strong chance of success, with House Joint Memorial 14 being tabled in committee in January and House Bill 506 being tabled in committee in February (see *RNCSE* 2006 Sep–Oct; 26 [5]: 14–15). After HJM 14 was tabled, the *Albuquerque Journal* (2007 Jan 30) reported that the vote "was a signal that the effort to inject intelligent design teaching into classrooms wouldn't get far." If enacted, HB 506 and its counterpart Senate Bill 371 would have required the state department of education to adopt rules allowing teachers "to objectively inform students of scientific information relevant to the strengths and weaknesses" of any "theory of biological origins" taught, and allowing students to "reach their own conclusions about biological origins." If enacted, HJM 14 and its counterpart Senate Joint Memorial 9 would have in effect asked the state department of education to comply with the requirements of HB 506 and SB 371, claiming (among other things) that "many credentialed scientists challenge certain aspects of evolutionary theory."

Before the measures died, Dave Thomas's op-ed "Intelligent design supporters find new, creative ways to get their message out" appeared in the March 13, 2007, issue of the *Albuquerque Tribune*. Thomas commented, "The measures would have also have given students the 'right and freedom to reach their own conclusions about biological origins.' We don't encourage students to 'reach their own conclusions' on how to add fractions. Why should we suddenly do so with the biosciences? Make no mistake, the only academic freedom involved in these measures is the freedom to teach creationism in science class," adding, "Creationists aren't going away. They're just getting sneakier."

Oregon, Sisters: Part-time probationary biology teacher Kris Helphinstine was fired from his job at Sisters High School — in Sisters, Oregon, a town of about 1500 people 150 miles southeast of Portland — after teaching that evolution is linked to Nazism, eugenics, and Planned Parenthood. He used lurid Powerpoint presentations alleging a connection between evolution and the Holocaust, which a member of the school board described as "pretty revolting stuff" (*Bend Weekly News* 2007 Mar 23). Local parents, alarmed by questions from their children about the material that Helphinstine was presenting, brought the matter to the attention of the principal of the high school, and turned out in force at the next meeting of the school board. There Superintendent Ted Thonstad recommended Helphinstine's dismissal, saying, "he exercised poor judgment and strayed into an area that causes a great deal of concern on the part of the people in the district," and the board agreed, voting 3–1 (with one abstention) to terminate his employment. The Sisters *Nugget* (2007 Mar 20) reported that Thonstad asked Helphinstine to resign, but he refused, "asserting that he had broken no laws and resigning would be contrary to his principles."

A detailed report in the *Bend Bulletin* (2007 Mar 25) described a handout that Helphinstine distributed as based on Ken Ham's essay "Did God create poodles?" (*Creation* 2003 Sep; 25 [4]: 19–22), in which Ham, the president of the young-earth creationist ministry Answers in Genesis, explained that "Dogs like poodles are the result of the Curse," since original sin is the cause of gene mutations. Helphinstine redacted overtly religious references from Ham's essay, but left a link to the ministry's website visible. He told the *Bulletin*, "It was no proselytizing ... It was, 'Here's what a worldview is, and here's how it affects you,'" but declined to answer the newspaper's questions about his own worldview. Cheryl Kleckner, a science education specialist with the Oregon Department of Education, referred to the state department of education's official policy statement, adopted in 2005:

> We have been getting a number of questions about the teaching of "creationism" and "intelligent design." Here's the state's position: The Oregon Science Content Standards adopted in April of 2001 clearly requires the teaching of evolution. All content standards are adopted through the legislative process and are required in the public schools in Oregon.

And Randy Harnisch, legal coordinator for the department, told the *Bulletin* that Helphinstine's firing might have been the first of its kind in the state.

Tennessee: Further reports about Tennessee's Senate Resolution 17 — which, if enacted, would request the commissioner of education to justify the fact that creationism is not taught in the state's public schools (see *RNCSE* 2006 Sep/Oct; 26 [5]: 14–5) — confirmed the intentions of its sponsor, Senator Raymond Finney (R–District 8). According to the Associated Press (2007 Mar 2), Finney, a retired physician, "wants the department to say there's no scientific proof for the theory of evolution and to let schools teach creationism or intelligent design"; he was quoted as saying, "We've hunted for almost 150 years and not found supporting evidence," adding, "let's don't teach something that's not supported by evidence as truth, as the only idea." The Associated Press added, "Scientists consider evolution a well-estab-

lished theory. A federal judge barred the Dover, PA, school system from teaching intelligent design, saying it was religion masquerading as science." Meanwhile, the *Bristol Herald Courier* (2007 Mar 1) offered its editorial opinion: "Finney is playing coy, but his true intent is obvious. He wants students in the state's public science classrooms taught [b]iblical creationism or its kissing cousin, intelligent design, along with evolution. This is the so-called 'teach the controversy' approach that creationists have adopted in an effort to make an end run around court rulings that prevent overt instruction in creationism in public schools." The editorial concluded, "The state education commissioner isn't in the business of answering theological questions. Senators should reject the resolution and maintain the separation between church and state. Vote no."

At the same time, the constitutionality of SR 17 was under scrutiny. The Associated Press (2007 Mar 1) reported that Senator Shea Flinn (D–District 30) asked the state's attorney general to investigate whether the bill would violate the United States constitution as well as the Tennessee constitution, which bans religious tests for public office holders. "The resolution in question requests our commissioner of the Department of Education to opine 'conclusively' on the origin of our universe and the existence of a Supreme Being," Flinn wrote in his request to the attorney general. In its March 13, 2007, opinion (available in PDF format at <http://www.attorneygeneral.state.tn.us/op/2007/OP/OP29.pdf>, the office of the attorney general replied, "Senate Resolution 17 violates neither the Establishment Clause Constitution, nor Article I, Section 4 of the Tennessee Constitution." The opinion noted that SR 17, if enacted, would neither establish any law or statute nor impose any sanctions or penalties; moreover, it identified no particular religious belief as desired or preferred. The opinion added, "there is no indication that the resolution is intended to attack the Commissioner of the Department of Education's qualifications for her position, nor any suggestion that the Commissioner's position is dependent upon responding to the questions in a specific manner." In passing, the opinion also observed, "the resolution clearly appears to constitute a rhetorical device designed to advocate the teaching of creationism as an alternative to the theory of evolution."

Despite the attorney general's opinion, Finney told the Associated Press (2007 Mar 14), "I'm not sure I'm going forward with that ... I'm probably going to reword it anyway. This may not be the time and place for that." Finney cited a heavy legislative workload, but also suggested that he worded the resolution infelicitously, saying, "I probably made a mistake in approaching it from a creation aspect, which raises red flags ... People get so sensitive about whether children might be exposed to any sort of religious thing." But in a story in the *Marysville Daily Times* (2007 Mar 14), he was quoted as saying, "It's not as extremist as you think it is ...What is clearly demonstrable is that evolution can be disproven using statistical methods. I can't prove religion, but evolution can be disproved."

[*NCSE thanks John R Nielsen for information used in this article.*]

Answers in Genesis Opens Creation Museum

With much fanfare and media attention, Answers in Genesis opened its long-awaited "Creation Museum" in Petersburg, Kentucky, on Memorial Day, May 29, 2007. Answers in Genesis posted an internet "walk through" for those interested in experiencing the flavor of the museum and design of some of the exhibits (<http://www.answersingenesis.org/museum/walkthrough/>).

Visitors to the museum's website (<http://www.creationmuseum.org/about>) will also learn about the museum's approach to science:

> The Creation Museum will be upfront that the Bible is the supreme authority in all matters of faith and practice, and in every area it touches upon.
>
> We'll begin the Museum experience by showing that "facts" don't speak for themselves. There aren't separate sets of "evidences" for evolution and creation — we all deal with the same evidence (we all live on the same earth, have the same fossils, observe the same animals, etc.). The difference lies in how we interpret what we study. We'll then explore why the Bible — the "history book of the universe" — provides a reliable, eye-witness account of the beginning of all things.
>
> After that, we'll take guests on a journey through a visual presentation of the history of the world, based on the "7 C's of History": Creation, Corruption, Catastrophe, Confusion, Christ, Cross, Consummation. Throughout this family-friendly experience, guests will learn how to answer the attacks on the Bible's authority in geology, biology, anthropology, cosmology, etc., and they will discover how science actually confirms biblical history.

It is interesting to note that the museum is open "Seven Days A Week" from Memorial Day through Labor Day. The only apparent concession to the commandment to observe the Sabbath is to delay the Sunday opening until noon (two hours later than the opening time on other days of the week).

Read about reactions to the museum on the NCSE website, as well as in a future issue of *Reports of the National Center for Science Education.*

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!

Troy Britain started his own on-line t-shirt store, Evo-T's, featuring t-shirts, in a variety of sizes and colors, with such pro-science slogans as "Nothing in biology makes sense except in the light of evolution," "Evolution is both a fact AND a theory. Creationism is neither," and "If you think evolution means dogs giving birth to cats ... then you're too ignorant to be criticizing it." Visit Evo-T's on the web at <http://www.spreadshirt.com/shop.php?sid=60456>.

In a letter to the editor of the *Montgomery Advertiser* (2006 Nov 25), **Jim Cargal** corrected a creationist correspondent who claimed that **Stephen Jay Gould** "proposed to substitute for Christianity and other religions, 'a far more stately mansion for the human soul ...' meaning Darwinism. Christianity out. Darwinism in." Cargal notes, "Hardin's characterization of what Gould wrote is flat out untrue." What Gould really wrote, in "Darwin's more stately mansion" (*Science* 1999; 284 [5423]: 2087), was, "Let us praise this evolutionary nexus — a far more stately mansion for the human soul than any pretty or parochial comfort ever conjured by our swollen neurology to obscure the source of our physical being, or to deny the natural substrate for our separate and complementary spiritual quest."

"Today, scientists were told that an epic battle is raging — and they must don their armor, head for the trenches and join the fight." Thus a report on *Nature*'s newsblog (2006 Dec 12; <http://blogs.nature.com/news/blog/2006/12/ascb_evolution_the_gloves_come.htm>) from the annual meeting of the American Society for Cell Biology, where **Barbara Forrest** and **Kenneth R Miller** were presented with Public Service Awards on December 10, 2006. The ACSB newsletter for July 2006 explained, "Miller was recognized for his outstanding dedication to, and defense of, science and science education against the threat of Intelligent Design. Forrest was selected for her dedication and tireless efforts to expose the motives behind the Intelligent Design movement. Both Forrest and Miller were also acknowledged for the critical roles they played in the landmark evolution case, *Kitzmiller v Dover*." *Nature*'s blogger described the talks that Forrest and Miller gave: Forrest "talked about the links between the intelligent design movement and the extreme Christian right" and Miller offered "some practical advice about how to talk to regular people — [that is,] non-scientists — about evolution and intelligent design." *Nature*'s blogger added that Miller and Forrest "coached scientists to keep a positive, friendly attitude at all times — or risk fulfilling the arrogant egghead stereotype that only fuels public distrust of science. For help on how to do this, scientists can turn to invaluable resources like the National Center for Science Education." Miller is a Supporter of NCSE and received its Friend of Darwin award in 2003; Forrest is a member of NCSE's board of directors and received a Friend of Darwin award in 1998.

George Gilchrist's work with fruit flies was profiled in the Fall 2006 issue of *ideation*, the semiannual publication of the College of William and Mary. Gilchrist's work with an international group of researchers — published in the September 2006 issue of *Science* — shows that global warming is causing genetic changes in wild populations of the fruit fly *Drosophila subobscura*. While the globally distributed *D subobscura* were previously known to mutate in particular ways based on their latitude, the 25-year study shows that the mutations also corresponded to average local temperatures, with flies in cooler regions showing mutations common to those closer to the equator as temperatures rose. Gilchrist is quoted as saying, "I'd like for people to think of these flies as just another canary in the coal mine. … Right now, the story looks pretty good. The climate's changing, the species are adapting — their genotypes are evolving and they seem to be able to keep up right now. How long will that keep up…and how about organisms that have longer generational times?" The paper, entitled "Global genetic change tracks global climate warming in *Drosophila subobscura*" (*Science* 2006; 313 [5794]: 1773–5), is coauthored by Joan Balanyá, Luis Serra, and Josep Oller of the University of Barcelona, and Raymond Huey of the University of Washington. Gilchrist is also the author of a widely cited article in *RNCSE*, "The elusive scientific basis of intelligent design theory," (*RNCSE* 1997 May/Jun; 17 (3): 14–5; available on-line at <http://www.ncseweb.org/resources/articles/6898_68_gilchrist_1997_the_elu_3_16_2001.asp>).

Matt Lowry gave a presentation on "Evolution, creationism, and the First Amendment" to the West Suburban Chicago chapter of Americans United for the Separation of Church and State on October 19, 2006. He reported, "In my lecture I briefly outlined the history of the creationist movement and how it has evolved into the modern variant of 'intelligent design'. A brief summary of some of the court rulings of the 20th century relevant to creationism were outlined as well, with considerable attention spent outlining the events that led up to and the subsequent ruling in the *Kitzmiller v Dover* trial in 2005. The conclusion of the talk focused on the motives and tactics of the creationists themselves, and this was the part that seemed to interest the audience the most. I mentioned that these are groups that

have total contempt for the mere concept of church–state separation and that all of us, whether we are religious or not, stand to lose a lot of liberty if they are successful in inserting their religious doctrine into science classes. To drive the point home, I quoted parts of the infamous 'Wedge Document' and even distributed copies to the audience — many were startled to see the sectarian agenda of the creationists laid bare in such an obvious and frightening manner. There was so much interest generated in the talk that it went beyond the intended 45 minutes to a full hour, and then the Q&A proceeded after that for another hour! I have already been asked to return for a follow-up talk and discussion in June, an invitation which I have happily accepted." The talk was covered in the *Naperville Sun* (2006 Oct 22). Lowry teaches physics and astronomy at Lake Forest High School and the College of Lake County; he organized a local group, called Darwin's Bulldogs, to promote evolution education and oppose anti-evolution activity in the North Shore region north of Chicago, Illinois (<http://tech.groups.yahoo.com/group/darwins_bulldogs/>).

Kenneth R Miller was elected a fellow of the American Association for the Advancement of Science. A Supporter of NCSE, Miller is the author of *Finding Darwin's God* (San Francisco: Cliff Street Books, 1999) and the co-author of three popular high school biology textbooks; he testified for the plaintiffs in *Kitzmiller v Dover*. According to a November 23, 2006, press release from Brown University, where he teaches biology, Miller was elected to the AAAS in recognition of "his leadership role in defending evolution and how it is taught in public schools as well as for his efforts to educate and encourage science teachers across the United States."

Randy Moore received the 2006 Carnegie Foundation for the Advancement of Teaching State Professor of the Year Award. Moore was honored along with 44 other recipients at a recent banquet in Washington DC. Sponsored by the Carnegie Foundation for the Advancement of Teaching and administered by the Council for Advancement and Support of Education, the awards recognize professors for their influence on teaching and their outstanding commitment to teaching undergraduate students. The program, created in 1981, is the only national initiative specifically designed to recognize excellence in undergraduate teaching and mentoring. A long-time member of NCSE, Moore is a professor at the University of Minnesota's College of Education and Human Development Department of Post Secondary Teaching and Learning and a former editor of *The American Biology Teacher*. His latest book, co-authored with Janice Moore, is *Evolution 101* (Westport [CT]: Greenwood Press, 2006).

Robert T Pennock was elected a fellow of the American Association for the Advancement of Science. A long-time NCSE member, Pennock is the author of *Tower of Babel: The Evidence against the New Creationism* (Cambridge [MA]: MIT, 1999) and the editor of *Intelligent Design Creationism and its Critics* (Cambridge [MA]: MIT, 2001); he testified for the plaintiffs in *Kitzmiller v Dover*. In a November 27, 2006, press release from Michigan State University, where he teaches philosophy, he was quoted as saying, "I feel very humbled to be honored for just doing what I love to do — studying philosophically and experimentally how science and evolution work, and helping teach about that process of discovery. ... Science is such an important way of understanding ourselves and our world; it deserves to be protected from those who would try to extinguish its light."

Stanley A Rice's *Encyclopedia of Evolution* — intended as a brief summary of all aspects of evolutionary science and related areas of study, rather than a reference work for experts — was published (as a hardcover, New York: Facts on File, 2006; and then in softcover, New York: Checkmark Books, 2007). (Look for a review of Rice's book in a future issue of *RNCSE*.) Rice recently presented a lecture entitled "If Darwin were alive today" at Cameron University for its annual Darwin Day celebration. For Evolution Sunday, he also spoke to adult education classes at Harvard Avenue Christian Church in Tulsa, Oklahoma, on the challenges posed to religious thought by the growth of evolutionary science. Rice teaches biology at Southeastern Oklahoma State University.

NCSE's executive director **Eugenie C Scott** was among a group of "key thinkers in science, technology, and medicine" surveyed by the on-line periodical *Spiked* in collaboration with the research-based pharmaceutical company Pfizer. They were asked the simple question: "What inspired you to take up science?" "I don't know," Scott began her reply, "maybe packs of feral dogs." A practical interest in canine territorial behavior, coupled with a chance exposure to a college-level anthropology text, yielded a persisting fascination with evolution on her part, even though the subject was avoided in her high school biology class. "I had to wait until I got to college to study evolution," Scott concluded, "and I've been learning about it ever since." (Her reply is available on-line at <http://www.spiked-online.com/index.php?/inspired/article/1903/>.)

NCSE's executive director **Eugenie C Scott** appeared on Culture Shocks, the talk radio show hosted by **Barry Lynn**, the executive director of Americans United for Separation of Church and State, on November 13, 2006, to discuss the anti-evolutionism movement. Among the topics discussed were the decision in *Kitzmiller v Dover*, and the recent book *Not in Our Classrooms: Why Intelligent Design is Wrong for Our Schools* (Boston: Beacon Press, 2006), edited by Scott and NCSE's deputy director **Glenn Branch** (and with a foreword by Lynn himself). "'Intelligent design' really is just a subset of creation science," Scott commented, adding, "'intelligent design' is a lot sneakier than creation science. At least creation science tells you what they believe, and 'intelligent design' has a lot of handwaving and mostly just focuses on the alleged weaknesses of evolution." The show (#809) is available on-line at <http://www.cultureshocks.com/archives.html> in MP3 format.

NCSE's executive director

Eugenie C Scott received an honorary degree from the University of Wisconsin, Milwaukee, on December 17, 2006, in recognition of her dedication to promoting the sound teaching of science in schools across the country. The citation read in part:

> Dr Scott was named the first executive director of the National Center for Science Education in 1986. Since then, she has worked with educators, parents, scientists, clergy, school boards and other elected officials, and concerned citizens to keep evolution in public school science education.
>
> Under her leadership, the center has pursued this goal by providing information that it hopes will lead to community consensus rather than confrontation. Particularly important in NCSE's success has been the building of coalitions of scientists, teachers, clergy and concerned parents to support the teaching of evolution in communities and states.
>
> Her 2004 book, *Evolution vs Creationism: An Introduction*, was reviewed positively by publications as diverse as *The New York Times Book Review* and *Perspectives on Science and Christian Faith*. It was praised by creationists and evolutionists alike for its even-handedness and accuracy in presenting the controversy.
>
> Her work reflects her perspective that science teachers should teach students accurate and accepted science as it is understood by scientists, and that political pressure should not determine the science curriculum. Her work also reflects her conviction that citizens need to be scientifically literate, and that an understanding of evolution is central to this literacy. To this end she has labored for 20 years at NCSE to promote a better public understanding of science and of the science of evolution.

The honor was especially meaningful to Scott, who earned her BS and MS degrees at the university. The honorary degree was Scott's fourth; she received honorary Doctor of Science degrees from McGill University in 2003, the Ohio State University in 2005, and Mount Holyoke College in May 2006.

Robert Schneider was interviewed in *Sewanee* magazine (2006 Fall: 40–1) about the Episcopal Church's Catechism of Creation (available on-line via <http://www.episcopalchurch.org/science/>), of which he was the primary author. Asked whether it was possible to take a middle path of accepting evolution while recognizing God as creator, Schneider answered, "we can look at nature and, like the psalmist, say, 'The heavens declare the glory of God.' That's a statement of faith. Yet we also accept evolution as the best explanation for life that scientists have come up with so far. Therefore, evolution changes our understanding of the way that God relates to creation. Evolution shows that God is everywhere at work within creation, all the time. God is always creating." He added, "We would say to the creationists, 'You misunderstand the Bible, turning it into something it was never meant to be, a textbook of science.' ... To the evolutionary materialists, the people who view evolution as a philosophy, we say, 'There's no logical connection between evolution as science and evolutionism as philosophy. You say, "Because evolution is true there is no God," but that's a metaphysical conclusion on your part, and it doesn't follow necessarily from the scientific evidence.'" Schneider received his undergraduate degree from Sewanee before receiving his PhD from the University of Notre Dame; he taught at Berea College for 32 years before retiring in 2001.

Fish artist extraordinaire **Ray Troll** received the Individual Artist Award in the 40th annual Governor's Awards for the Arts and Humanities in Anchorage, Alaska, on October 27, 2006, from then-governor Frank Murkowski. The *Ketchikan Daily News* reports (2006 Nov 4), "Thank-you speeches normally acknowledge people. But when Ray Troll accepted the Governor's Award for Individual Artist, he said, 'Thanks to the fish for all the inspiration.' Along with the fish, he said, the artist's inspiration comes from his family, of course, and the people of Ketchikan. 'I had two minutes to thank everybody. That's almost impossible to do.'" He told the *Ketchikan Daily News*, "It's a real honor in a state like this, with so many talented artists. It's a really cool thing to be recognized." Troll's illustrations grace the pages of every issue of *RNCSE*; those seeking Troll art of their own are directed to the on-line store on his website: <http://store.trollart.com/home. php>.

Matt Young reviewed John Brockman's anthology *Intelligent Thought: Science versus the Intelligent Design Movement* (New York: Vintage, 2006) for *Skeptical Inquirer* (2007 Jan/Feb; 31 [1]: 59–60). "The topic is timely, and the book is well written and well edited," Young wrote. "Why, then, can I muster only two cheers? In part because the book is not well organized and not entirely about intelligent design (ID) creationism; it is a collection of mostly unrelated essays presented as unnumbered chapters whose only connection is that they are bound in the same volume." Young is Senior Lecturer in Physics at the Colorado School of Mines and the editor, with Taner Edis, of *Why Intelligent Design Fails: A Scientific Critique of the New Creationism* (New Brunswick [NJ]: Rutgers University Press, 2004). Also of interest in the same issue of *Skeptical Inquirer* are **Barbara Forrest**'s "The 'vise strategy' undone" (40–7) and a pair of letters on effective evolution education.

New Creationist Textbook On the Way (Again)

Nick Matzke

A document recently received by NCSE outlines the Discovery Institute's upcoming plans for its so-called teach the controversy strategy. In 2007, the Discovery Institute plans to release a "supplemental textbook" entitled *Explore Evolution*. According to the document, the textbook and auxiliary materials will teach the students the Discovery Institute's talking points against evolution. These talking points will evidently include the standard list of long-refuted creationist claims promoted by the Discovery Institute, including the inadequacy of the fossil record, biological complexity as a challenge to evolutionary theory, the inexplicability of the Cambrian Explosion, and other common creationist tropes. Students will be taught these talking points via the supplemental textbook and associated slide shows, study guides, and videos, and will be tested on the talking points in Discovery Institute-prepared "quiz questions".

The book is discussed in a handout received by NCSE Supporter Keith Miller at the 2006 annual meeting of the American Scientific Affiliation, which was held from July 28–31, 2006, at Calvin College in Grand Rapids, Michigan. The ASA is an association of scientists who are evangelical Christians, and although some members of the ASA are "intelligent design" or young-earth creationists, the ASA is not an anti-evolutionist organization, and many ASA members see no necessary conflict between evolution and evangelical Christianity. Miller received the handout while attending a talk by Discovery Institute Senior Fellow Michael Newton Keas. The talk was entitled, "Teach the Controversy over Darwinism: Sample Curricular Modules" (Keas 2006).

Keas runs the Master of Arts Program in Science and Religion at Biola University (the name "Biola" derives from the university's previous name, the Bible Institute of Los Angeles). The Biola program is the only one in the United States offering a graduate degree in "intelligent design". According to Keas's abstract for his ASA talk, "[s]ince 1999 I have worked with Discovery Institute to develop AP and college biological origins curriculum. Some of this curriculum will be published in 2006." The one-page handout, entitled "Teaching Evolutionary Biology in Public High Schools and Colleges", lists a number of bullet points describing Keas's proposed curriculum modules and resources, including the *Explore Evolution* book.

The History

News of the *Explore Evolution* project is particularly interesting when the general history of anti-evolution strategies is taken into consideration. Directly following the 1968 *Epperson* ruling overturning bans on evolution, Henry Morris and others at the Creation Research Society constructed the "equal time" approach for teaching "scientific creationism" in public schools as an allegedly secular scientific view (Numbers 1992). Their first major foray in this direction was the textbook *Biology: A Search for Order in Complexity* (Moore and Slusher 1974; see Thwaites 1980). This book was the subject of a number of disputes in the 1970s regarding its use in public schools. However, in 1977 the book was ruled unconstitutional for use in public schools in a strongly worded decision, *Hendern v Campbell*, from a state court in Indiana (Matzke 2006). *Hendren* was soon obscured when the issue moved to the federal courts in the 1980s.

In the 1987 *Edwards v Aguillard* case, the US Supreme Court ruled that teaching "creation science" in public schools was unconstitutional because it was a specific religious view disguised as science, rather than actually science. In the wake of the *Edwards* ruling, creationists relabeled their view "intelligent design" — a term they first systematically employed in the supplementary high school textbook *Of Pandas and People* (Davis and Kenyon 1989; see also Scott 1989).

Wielding *Pandas*, the newly named "design proponents" asserted that their view was scientific, not religious, and pushed for it to be included in biology classrooms in public schools. Again, there were fights over the use of the textbook for years before it hit the courts (see the NCSE *Pandas* resources page for a history and analysis: <http://www.ncseweb.org/article.asp?category=21>). As everyone now knows, the 2005 *Kitzmiller v Dover* case revealed that *Pandas* began as an explicitly creationist textbook and only switched to "design" terminology after the *Edwards* ruling. These facts helped produce the decisive ruling in *Kitzmiller* that "intelligent design" was not science, but instead creationism relabeled.

Following recent defeats for the "intelligent design" movement in the *Kitzmiller v Dover* case, in a February 2006 vote of the Ohio Board of Education, and in the August 2006 Republican primary election in Kansas, many observers have wondered what the next step would be for attempts to sneak creationism into the public schools. In response to questions from the media, NCSE staff have predicted that creationists would continue to move toward their so-

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called critical analysis of evolution strategy, in which long-refuted creationist arguments are claimed to be valid scientific challenges to evolution under the rhetoric of "critical thinking" and "teach the controversy". By not using the terms "creationism" or "intelligent design", creationists hope to teach their views in the public schools while avoiding constitutional challenges from the courts (Matzke and Gross 2006).

The Future

This background may explain why history appears to be repeating itself (again!) with the announcement of yet another "supplementary textbook". As before, the recently failed strategy (this time, "intelligent design" rather than "creation science") is being denied — according to Keas's handout, *Explore Evolution* will focus on "critical analysis" and allegedly "does not teach about ID".The title also mimics mainstream educational materials: there are numerous instances of legitimate museums, courses, websites, textbook chapters, and lesson plans that use some variant of the phrase "explore evolution".

Despite the "not ID" denial in Keas's conference handout, the abstract simply uncritically repeats the same old tired ID creationism talking points about the Cambrian Explosion:

> One way to motivate students to study science and to think critically is to examine case studies of scientific controversy. Through case studies, students will gain insight into the standard scientific procedure of inferring the best explanation from among multiple competing hypotheses. ...
>
> In today's climate of public educational policy, this would mean, at a minimum, teaching not just the strengths of Darwin's theory, but also the evidence that challenges it. For example, any complete theory of biological origins must examine fossil evidence. The fossils of the "Cambrian explosion" show virtually all the basic forms of animal life appearing suddenly without clear precursors.

These sorts of claims have been endlessly rebutted, most recently in Kevin Padian's dissection of *Pandas*'s Cambrian arguments during his *Kitzmiller* testimony (available on-line, complete with the slides Padian used, at <http://www.sciohost.org/ncse/kvd/Padian/Padian_transcript.html>), but the creationists seem undeterred. Keas's handout shows that *Explore Evolution* will be more of the same in other areas as well. According to point #2 of the handout:

> 2. *Explore Evolution* (supplemental textbook forthcoming in early 2007)
>
> a. Evaluates the main arguments for and against neo-Darwinism (does not teach about ID)
>
> i. Common descent (fossil succession, homologies, embryology, & biogeography)
>
> ii. Creative power of mutation and natural selection (mechanisms of evolution)
>
> iii. Recent challenges to neo-Darwinism: Molecular machines (irreducibly complex?)
>
> b. When used with a basal biology textbook, this supplemental curriculum provides an effective way to fairly teach the strengths and weaknesses of Neo-Darwinian evolution.

Longtime *Pandas* watchers may be having flashbacks at this point, but there's more!

> c. Our curriculum primarily consists of a colorful 130-page book and a series of PDF slide shows (PC or Mac) that contain the book's main talking points and illustrations (plus additional images). We also include student study guides, sample lesson plans, quiz questions, and other auxiliary materials that may be printed and photocopied.

All in all, this looks like the long-rumored Discovery Institute "intelligent design" curriculum. After the Discovery Institute began moving away from ID and toward "critical analysis", the curriculum probably moved with it. From what the above material shows, the *Explore Evolution* curriculum closely matches the 2005 Kansas Science Standards and the most recent version may have originally been aimed directly at that market.

With the recent defeats in Kansas and Ohio, no states have official policies that are highly friendly to the DI's "critical analysis" curriculum. However, creationists are continually pushing "critical analysis" language in states, and have succeeded in getting a "critical analysis" line in the South Carolina science standards. NCSE members should remain alert for bogus "critical analysis" policies as well as for creationist attempts to exploit these policies to get reworked creationist materials, such as *Explore Evolution*, into the public schools.

[*Readers can now view some of the Explore Evolution materials on-line at <http://www.explore evolution. com/index.php>.*]

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BookReviews

Books:
On Creationism and Evolution
Promoting Creationism
With Historical Perspectives on the Sciences
On the History of the Creationism Controversy

The Science of Evolution and the Myth of Creationism: Knowing What's Real and Why It Matters

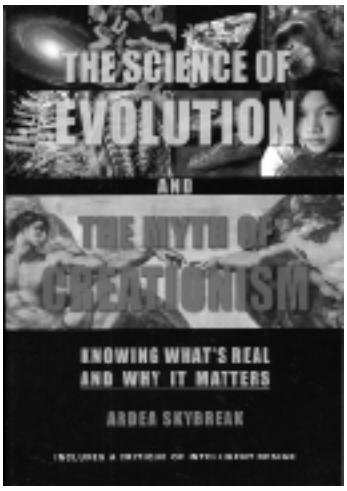
by Ardea Skybreak
Chicago: Insight Press, 2006.
352 pages

Reviewed by Jonathan Marks

This is an odd book with an unclear purpose and an even more unclear target audience. The first six chapters (p 7–116) assert the truth of, and discuss the evidence for, the scientific account of the history of life. The seventh discusses human origins in about 50 pages; and the eighth takes the direct offensive against creationism, in the length of the first six chapters combined.

Of course, creationists will not be convinced by any of this. Evolutionists will not find much they do not already know. ... And the undecideds, unfortunately, will probably be so put off by the book's rudeness and condescension toward the creationists that they may very well flock to the opposing camp. The creationists, we read, are "mad idiots" (p 36), and "nuts" (p 193) — and perhaps some are, but it is not particularly difficult to find such people in the evolution camp as well, and you do not even have to look hard.

Skybreak does a passable job recapitulating the state of knowledge of our biological history and the processes that produced it, and an even better job at rebutting creationist claims. But if the readers are not already convinced, I do not think the book will convince them of much. Yes, creationism is a religious reaction against science; yes, its advocates have tried a series of legal strategies over the last century to undermine science education; yes, "intelligent design" is just the latest such strategy; and yes, their ideals, values, and priorities are different from our own. Now, where do we go from here?



It seems to me that the conclusion to be most readily drawn is that the crux of the problem is cultural, not biological. Consequently all the talk in the world about whose biology is "right" and why, is largely irrelevant. Simply by being engaged on that issue, their side wins — for the very act of engagement shifts the focus away from the cultural issues and to issues of nature.

And calling them names will not help matters either. Skybreak appreciates the cultural aspects of the fight, but does not appreciate that it renders the biology moot, for the cultural issues are the ones that need to be confronted and debated as such. Telling readers that they are being lied to is simply less valuable (and less persuasive, since, after all, the other side says it too) than asking the question of what each side values. After all, is it not reasonable and pardonable to tell a few lies, if the eternal damnation of billions of souls is at stake?

Unfortunately, Skybreak's undisguised contempt for any such ideas and values prevents her from grappling with these issues. Ultimately, then, that leaves the battleground as we are right and they are wrong; we deal in realities, they deal in myths; we tell truths, they tell lies; and the world would clearly be a better place if everybody believed our stuff and not theirs. And since their side says the same thing, you could hardly blame any honest fence-sitters for shouting, "A plague o' both your houses!" — which would be highly self-defeating for us.

Who, then, will gain the most from this book? Argumentative high-schoolers, I suspect. And their parents, too, who may wake up one morning to find their school district is the next Dover or Cobb County, and wonder just what the heck is going on. This book will help explain that there is a cultural war over the authority of science in rendering the history of life, but it will not really provide guidance on fighting it.

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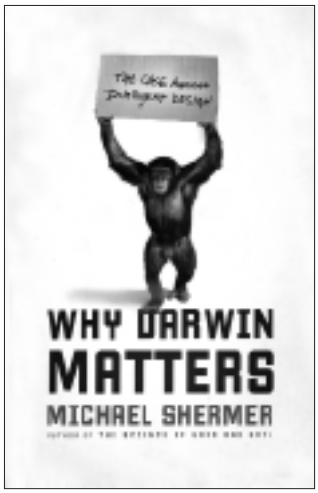
Why Darwin Matters: The Case Against Intelligent Design

by Michael Shermer
New York: Times Books, 2006.
199 pages

Reviewed by Norman Levitt



The indefatigable Michael Shermer has joined the lists of those authors bent on providing ammunition for the ongoing struggle against that old shape-shifting dragon, creationism, in its latest avatar, the "intelligent design" movement. His new book, *Why Darwin Matters*, gets high marks for its amiable style, its readability, and the unmistakable moral passion of the author. It is impressive in the wide range of issues and questions it addresses. Most important, it is likely to be a useful contribution to the unfinished task of providing the resistance to creationism, among both scientists and laypeople, with a repository of direct arguments, rhetorical devices, and philosophical themes useful in defeating or deflecting the spectrum of creationist assaults now directed against the educational system. On the other hand, if one is looking for a definitive volume of heavyweight analysis of theoretical questions about evolution and its place among the sciences, or about the history and sociology of American creationism, or about the interface between science and religion, Shermer's brisk little volume is not really in the running. It has flaws, gaps, and lapses, none fatal to its intended purpose, to be sure, but cumulatively serious enough so that it has to be said that a reader armed with this book alone will not be entirely prepared for a full-bore debate with a seasoned creationist, in or out of the context of fights over curricula and biology textbooks.

Among its virtues is the fact that *Why Darwin Matters* covers a very wide range of topics, citing a host of arguments against standard evolutionary theory from a number of strands of creationist ideology, and providing brief, accessible rejoinders — for the most part effective — to those arguments. Among its defects is the problem that this breadth, combined with the brevity of the book as a whole and its occasional digressiveness, inevitably renders some of the counterarguments sketchy and even shallow. The unpretentious informality of Shermer's style is welcome, but the downside is that some of his debating points have an improvised and off-the-cuff feel to them, and lack the depth and heft necessary to make really telling points in serious debate. They are starting points indicating the possibility of more elaborate and focused lines of argument, rather than crushing weapons in their own right.

The wide range of issues considered by the author also has the lamentable effect of diffusing the ostensible focus of the book, that is, how to counteract the ambitions of the "intelligent design" movement *per se*. The somewhat haphazard organization of chapters and topics has a similar effect. There are some matters that Shermer ought to have thought through seriously, from both a theoretical and expository point of view. Instead, he seems to have tried to work them out on the fly, at the cost of precision and even relevancy. In particular, the notion of what is supposed to be meant by "intelligent design" is somewhat wooly in this treatment, leading to the needless conflation of very different positions and attitudes.

What does "intelligent design" of the visible universe mean? Presumably, any religion or set of spiritual convictions that posits some kind of shaping intelligence in the cosmos and its history, some kind of entelechy, no matter how vague, providing purpose and direction for the universe, *ipso facto* incorporates a kind of "intelligent design theory". These belief-systems range from dogmatic, orthodox religion to non-sectarian theism, Deism, and even Spinozan pantheism. Rank atheists (like me) might not cotton to any of these ideas, but the point is that "intelligent design" in this very broad sense includes many creeds not particularly inimical to evolutionary theory or its privileged presence in biology classrooms.

But "intelligent design", as formulated and promulgated by the paladins of the Discovery Institute, is a very different matter. To keep things clear, let's refer to this as Intelligent Design™. This is a very narrow doctrine, or rather, scheme for denigrating standard evolutionary theory. The core tactic is to provide "scientific" arguments purporting to show that the quintessential Darwinian mechanism — random variation at the genetic level acted upon by various selective forces — cannot possibly account for the observed complexity and intricacy of living forms. It is conjoined with the thesis that the putative inadequacy of selection in accounting for various biological phenomena leads inexorably to the inference that a creative intelligence must be directly responsible for these phenomena. Intelligent Design™, moreover, incorporates a highly focused legal, political, and cultural strategy for making its ideals ultimately prevail in popular opinion. Its further goal, which it has been indiscreet enough to display from time to time, is to re-legitimatize the biblical creation story, rendering it immune to scientific refutation. Its ultimate goal is to remake this country and perhaps others as virtual theocracies subject to the dogmas of conservative Christianity.

Shermer finally gets around to defining and analyzing Intelligent Design™, as such, about two-thirds of the way through his book. But

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first, he spends quite a bit of time refuting some very different aspects of the broad notion of "intelligent design" — sometimes aptly, sometimes not. Finally, he appears to contradict himself, in that he adds a chapter on the desirability of irenic and mutually respectful relations between science and some kinds (necessarily liberal) of religious and spiritual belief. To the extent that these are teleological in character — and it is hard to think of any that are not — they encompass an "intelligent design" in the broad sense indicated above, albeit one that may be quite benign in the context of the current bloodletting over Intelligent Design™.

Shermer would have served his book and its readers better had he focused primarily on Intelligent Design™, its godfather Phillip E Johnson, and its hit squad, notably Michael Behe and William Dembski. Still, a parent or student menaced by an aggressively creationist school board would be well advised to get hold of a copy of *Why Darwin Matters* as a ready-to-hand source of arguments useful and pertinent enough to force the battle-lines to be accurately drawn.

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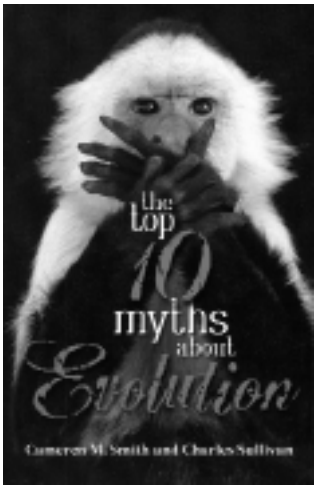
The Top 10 Myths about Evolution

by Cameron M Smith and Charles Sullivan
New York: Prometheus Books, 2006. 150 pages

Reviewed by Leslie S Jones

There is nothing that perpetuates the creationism/evolution controversy more than the basic ignorance of citizens that learn about evolution "on the street" rather than inside science classrooms. It has become painfully apparent that since generations of Americans have been exposed to little or no formal scientific instruction on the topic, they tend to believe what they hear from other sources. The failure to educate citizens about evolution has left them ready to accept common fallacies and propaganda that is deliberately circulated to convince them that evolution could not possibly be true. Assertions that evolution is an "explanation of the origin of life" and "monkeys are human ancestors" are far more common than statements indicating even a basic recognition of what biological evolution actually is. Such misconceptions are bad enough, but they also indicate why the public is so vulnerable to more elaborate misinformation such as the idea that scientists are trying to discredit the scriptural account of creation. When the same set of oppositional claims emerge over and over in creationist discourse, it is obvious that an entire body of inaccurate explanations or myths have received much wider circulation than the truth about biological evolution.

Historically, myths were legendary stories used to provide explanations for baffling natural phenomena. Ancient myths were narratives about spiritual deities, often centering on their involvement with the creation of the world and its inhabitants. Passed on through the oral tradition, myths provide historians with important clues about the thinking and values of prehistoric civilizations. Even today, contemporary cultures continue to generate myths that gather large numbers of believers before they are eventually debunked. Nothing typifies this more than some of the ridiculous "urban legends" that spread like wildfire due to the type of communication that is possible with internet technology. If there is anything that both the ancient and current stories have in common, it is the fact that myths are essentially "beliefs whose truthfulness is accepted uncritically." Authors Cameron M Smith and Charles Sullivan skillfully use this fundamental definition of myths to characterize widespread antiscientific rhetoric in their new book, *The Top 10 Myths about Evolution.*



Part of the instant appeal this book will have is the obvious reference in the title to two very popular television shows. There is the play on comedian David Letterman's propensity to assemble lists of the "Top Ten" examples of almost anything combined with the admission that the authors take on the role of "MythBusters," to unravel some of the most prevalent misconceptions surrounding the theory of evolution. (For anyone who might not be familiar with the Discovery Channel's *MythBusters*, it is an impressive display of elaborate and carefully designed experiments on a show that "uses science to tell what is fact from what is not.") There is, however, nothing comedic about the style or the substance of the book. Other than the title, the most humorous parts of the book are the silly distortions of scientific ideas that are part of the anti-evolutionary arguments that are the focus of the text.

The Top 10 Myths about Evolution uses a well-crafted rhetorical strategy to undermine the efforts to force creationism to be given inappropriate attention in science classrooms. Cameron M Smith has combined interests and training in both anthropology and archaeology to develop expertise on the ways adaptation and evolution were involved in the structure of human prehistory. Charles Sullivan comes out of a background that combines philosophy

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and English to focus on the value of reason and evidence in critical thinking and argumentative writing. Together these authors have assembled solid scientific information that provides the data necessary to dismantle stories that misrepresent evolution. Arguments typically used by creationists fall apart as this narrative effectively challenges the major claims and warrants that are built into antiscientific stories.

This book is a much-needed, direct critique of some of the most common fiction that circulates about evolution. Smith and Sullivan skillfully dissect the mythology that dangerously overshadows accurate perceptions and genuine understanding of evolutionary theory. They recognize the need to challenge the "deliberately misleading arguments of those religious ideologists who wish to replace the teaching of evolution with biblical literalism or theologically inspired 'science'" (p 168). The authors dismantle creationist sophisms and expose the lack of cogency in the pejorative stories that have been constructed to challenge evolution. Not only is the depth of the authors' knowledge of evolutionary science impressive, but they effectively weave a narrative that draws on information from other academic disciplines.

The Top Ten Myths about Evolution is going to make a significant contribution to the growing body of literature supporting evolution because of the interdisciplinary foundations of the text. The wealth of information that the authors have assembled is impressive and it is not just modern scientific data such as very recent microscopic studies that document changes in diatoms that can be traced back 3.5 million years ago (p 67). Evolution is supported by a fascinating blend of evidence that is taken from a variety of academic disciplines. Most notably, the book contains a solid body of historic information including ideas such as a notation from the Roman philosopher Lucretius in 80 BCE (p 83) that shows people were recognizing patterns of evolution more than 2000 years ago. To the authors' credit, they have done an excellent job of distilling a great deal of information into fewer than 150 pages with detailed notes at the end of each chapter to lead interested readers to sources that elaborate on various subjects.

Smith and Sullivan have created a resource that will support the teaching of evolution by addressing the ignorance that fuels the spread of these myths. When students enter science classes armed with the conviction that these stories disprove evolution, teachers need this type of information to answer predictable challenges. This effective deconstruction of some of the most prevalent myths will make a crucial contribution to the teaching of evolution because it provides a collection of information that is organized to make a case in support of science. The book is likely to be popular with discussion groups because of the accessible style, which incorporates contextual definitions with the use of specialized terminology. I plan to use it in both college classes and as part of the professional development workshops I organize for teachers who are struggling with the resistance to evolution in their classrooms. After pointedly addressing creationist resistance for nine years (writing papers, giving public talks, and most importantly trying to explain to students in my classes why biological evolution does not necessarily contradict religion), I can summarize my opinion of this book in one short sentence: "I could not have said it any better!"

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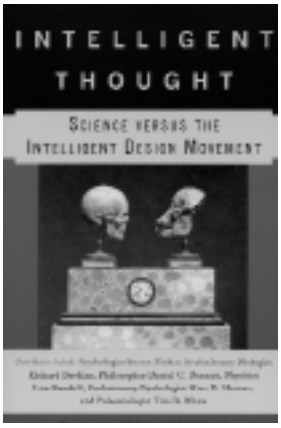


INTELLIGENT THOUGHT: SCIENCE VERSUS THE INTELLIGENT DESIGN MOVEMENT

edited by John Brockman
New York: Vintage Books, 2006.
256 pages

Reviewed by Glenn Branch

Kitzmiller et al v Dover Area School District et al was the first legal case in which the constitutionality of teaching "intelligent design" — the latest incarnation of creationism — was tested. Presiding over the forty-day trial in the autumn of 2005 was Judge John E Jones III, nominated to the federal bench by Senator Rick Santorum — then a staunch supporter of "intelligent design" — and appointed by President George W Bush, who in August 2005 endorsed teaching "intelligent design" "so people can understand what the debate is about." Yet Jones, in the best tradition of constitutional jurisprudence, ruled decisively *against* the Dover Area School District's policy of misinforming students that "Darwin's Theory ... is not a fact" and that "intelligent design is an explanation of the origin of life that differs from Darwin's view."

Jones's decision was scathing, both about the scientific credibility of "intelligent design" (which Jones wrote "is not science and cannot be adjudged a valid, accepted scientific theory as it has failed to publish in peer-reviewed journals, engage in research and testing, and gain acceptance in the scientific community" and about the behavior of the defendants (whom Jones castigated for their "breathtaking inanity" in adopting the objectionable policy). The decision was issued on December 20, 2005, and to supporters of evolution education it thus came as a welcome, if premature, holiday gift. Fans of "intelligent design" were dismayed. Phyllis Schlafly — who as a lawyer ought to have known better — actually suggested that the principled decision constitut-

Glenn Branch is deputy director of NCSE.

ed a betrayal of President Bush and his fundamentalist supporters: Jones, she complained, "stuck the knife in the backs of those who brought him to the dance."

Commenting on the case before the trial, a local pastor who supported the school district's policy explained, "We've been attacked by the intelligent, educated segment of the culture." As if to continue the attack, the victory in *Kitzmiller* is evidently provoking a spate of books, of which *Intelligent Thought* is among the first. Edited by John Brockman, the literary impresario who specializes in popular science, *Intelligent Thought* contains essays by the dazzling likes of Richard Dawkins, Daniel C Dennett, and Steven Pinker, as well as a selection from Judge Jones's decision. The book is a pleasure to read: it is lively, compelling, and eloquent. The reputations of the contributors, together with the rapidity of its production and its modest price, ensure that it will be, deservedly, widely read.

A pair of essays engages the "intelligent design" movement directly and incisively, beginning with the lead essay by biologist Jerry A Coyne, which may confuse readers because it shares its title — "Intelligent design: The faith that dare not speak its name" — with his excellent review of the "intelligent design" textbook *Of Pandas and People*, published in the August 22, 2005, issue of *The New Republic*. After carefully disentangling the ambiguities in which its proponents constantly cloud it, Coyne concludes, "intelligent design, when it has any content at all, proves to be nothing more than a mishmash of Christian dogma and discredited science." Similarly, philosopher Daniel C Dennett devotes his essay, a version of which appeared in the August 28, 2005, issue of *The New York Times*, to exposing the methods whereby the movement seeks to obscure the vacuity of "intelligent design". The value of these essays is heightened by their inclusion of bibliographic references, which are sadly absent from the bulk of the book.

After alluding to "the many dishonesties of the well-financed intelligent-design cabal," zoologist Richard Dawkins addresses a central example. Although the proponents of "intelligent design" insist that science is capable of establishing the existence of a designer (by identifying biological systems that are too complex to have evolved without a designer's assistance), they maintain that it is incapable of identifying the designer as God. The hope, of course, was to ensure that "intelligent design" would not be found to be a religious doctrine by a court. To no avail: Judge Jones noted in his decision that "no serious alternative to God as the designer has been proposed by members of the ["intelligent design" movement], including Defendants' expert witnesses." Independent of the legal point, Dawkins argues that appealing to a supernatural designer to explain biological complexity is of no avail because such a designer would necessarily be at least equally complex as the biological complexity it creates. Even if the supernatural designer's complexity is allowed without explanation, he might have added, there remains the problem of specifying how it is supposed to be conveyed to the natural world.

Biologist Stuart A Kauffman argues, perhaps not as innovatively as he thinks, that "intelligent design is, at best, hardly science, and that insofar as it can be construed as science, the evidence that has accumulated runs strongly against it." His target is Michael Behe's concept of irreducible complexity: as Behe originally defined it, a system is irreducibly complex if it is "composed of several interacting parts that contribute to the basic function ... where the removal of any one of the parts causes the system to effectively cease functioning." Behe argued that irreducible complexity entails unevolvability, but — as Kauffman suggests, if not with the utmost clarity — his argument neglected the possibility that the *function* of the system might change. Kauffman uses the outdated and misleading term *pre-adaptation* here; the modern term, due to Stephen Jay Gould and Elisabeth Vrba, is *exaptation*. Whatever the term, the concept is indeed important in rebutting Behe's argument, so much so that Judge Jones used *exaptation* five times in his decision — probably the only judicial ruling ever to use the word. Kauffman also observes that the proponents of "intelligent design" overlook self-organization, where his own scientific work focuses, as a further source of complexity.

In his essay, physicist Seth Lloyd poses a series of amusing questions, "Just how smart is the universe? Smart enough to evolve stars, planets, and life without any external coaching? Clearly, the universe is gifted, but what is its IQ?" He reveals that these questions are less facetious than they appear. After calculating the computational capacity of the universe and investigating the implications for the origins of life and natural selection, Lloyd concludes, "Because of the universe's information-processing power and diversity, it was virtually certain to hit upon life sooner or later." In passing, he debunks "intelligent design" guru William Dembski's misuse of the no-free-lunch theorems to argue that evolution is impossible. He then offers four free-lunch theorems, which together confirm his conclusion of the ability of the universe to produce life on its own, although it is perhaps less than helpful to be told in a footnote that the proof of those theorems is "a straightforward consequence of Kolmogorov's theory of probability based on algorithmic information."

Beneath the pseudoscientific veneer of "intelligent design" is a primal dread of the supposed consequences of evolution for morality, society, and religion. Such feelings are so common, in fact, that the "tree of evil" — with evolution at the root and various evils, real and imagined, ranging from abortion, crime, and pornography to racism, eugenics, and feminism, as its branches — is a common image in creationist literature.

Anthropologist Scott Atran places belief in "intelligent design" within his broader evolutionary theory of religion (presented in his book *In Gods We Trust*), citing the fear that evolution implies moral nihilism. It was incautious of him, however, to name the Pope as a proponent of "intelligent design"; signals from the Vatican have been mixed as of late, but it cannot be insignificant that in his Easter homily, the Pope borrowed the lan-

guage of evolution to describe the Resurrection. Linguist Steven Pinker by and large agrees with Atran's diagnosis of belief in "intelligent design", and argues that, far from undermining morality, evolution helps us to understand its source, nature, and limitations.

A due sensitivity to the reasons that "intelligent design" is appealing is important, especially to those who are likely to encounter creationists. Confronted by a pair of creationist students once, physicist Leonard Susskind angrily insisted that the supernatural was completely abolished by the results of modern science. "The result," he reports in his contribution, "was completely predictable: recriminations, and two students hostile to science." Since then, prompted not only by the desire not to offend but also by his ideals of intellectual honesty, Susskind adopted a different approach. Asked by a creationist student whether he believes in God, he answered, "No, I personally don't. But I have numerous friends — eminent scientists — who do believe that an intelligence must have been involved in creation." He added, importantly, that he and his believing friends agree on the nature of science, in particular its incapacity to consider the supernatural as potential explanations, which is precisely what the "intelligent design" movement refuses to acknowledge.

A few of the authors take "intelligent design" as a springboard for presenting their own extensions of evolutionary thought. Psychologist Nicholas Humphrey sketches his evolutionary account of consciousness, presented in its latest iteration in his new book, *Seeing Red*. As a foil, he offers and rebuts a version of the argument for a designer centered not on the traditional examples, the vertebrate eye and the bacterial flagellum, but on consciousness. He expresses surprise at the reluctance of proponents of "intelligent design" to use the argument, wondering if "they are shy of arguing ... for supernatural design?" They are not, at least to friendly audiences. Rather, they realize that consciousness is not so central a topic of elementary and secondary science education as evolution is (or ought to be), and so it is not so urgent for them to oppose naturalistic accounts of the mind as it is for them to oppose naturalistic accounts of life. Expect the proponents of "intelligent design" to become increasingly vociferous about consciousness as neuroscience begins to enter the curriculum.

With a nod to Charles Sanders Peirce's speculations about the evolution of the laws of nature themselves, physicist Lee Smolin describes his Darwinian approach to cosmology. There are about twenty free parameters in the standard model of particle physics and about fifteen in cosmology, he explains; the values of those parameters are not determined by the theory, but ascertained by experiment. It is vanishingly improbable for any randomly selected set of values for these parameters to correspond to what Smolin aptly calls a biofriendly universe. How then to explain the improbable biofriendliness of the universe? Smolin identifies three classes of explanation: appealing to a divine creator, asserting the mathematical necessity of biofriendly values, and assuming the existence of multiple universes. The mere assumption of multiple universes, however, is not testable, he argues. But adopting a Darwinian model, wherein universes reproduce themselves, their progeny vary randomly in their values for the parameters, and the fecundity of a universe depends on those values, a testable version of the multiverse hypothesis results. As interesting as it is to see evolutionary principles applied in a cosmological context, Smolin seems to take a number of questionable assumptions for granted, particularly the presupposition that any judgments about the probability of possible values for the parameters are meaningful.

A number of contributors write not primarily on "intelligent design" but on their own specialties instead. Beginning with his team's discovery at Herto in Ethopia of a human cranium from about 155 000 years ago, paleoanthropologist Tim D White offers a review of the history of and evidence for human evolution (with a passing swipe at creationists who squabbled about whether the Herto skull was human or ancient — it could not, of course, be both, according to them). Paleontologist Neil H Shubin discusses the background, discovery, and significance of the fossil *Tiktaalik roseae*, the so-called fishapod that illuminates the fish-to-tetrapod transition. Importantly, and in contrast with "intelligent design"'s scientific sterility, the discovery of *T roseae* demonstrated evolution's predictive capacity — Shubin and his colleagues knew just where to look in the Canadian North. Historian of science Frank J Sulloway provides a detailed and fascinating narrative of how Darwin came to reject the "intelligent design" analog of his day, embodied in William Paley's *Natural Theology*, on the basis of the biological and paleontological evidence.

As her essay's title "Designing words" suggests, physicist Lisa Randall is concerned with the confusions provoked by various ambiguities — "evolution" as the fact of common descent versus "evolution" as the processes by which evolution occurs;"theory" in its scientific sense of a system of explaining natural phenomena versus "theory" in its vernacular sense as a guess or a hunch; "observation" in the sense of direct sensory contact with the world versus "observation" in the sense of contact mediated by a complex web of theory. Not concerned solely with the linguistic niceties, she takes pains to emphasize the depth and breadth of the evidence for evolution, to acknowledge the fact that evolution — like any scientific theory — is incomplete, and to insist on the autonomy of science with respect to religion. In a better world, it would be unnecessary to rehearse such platitudes, but at least Randall manages to do so gracefully.

The final pair of essays, by evolutionary psychologist Marc D Hauser and paleontologist Scott D Sampson, addresses educational issues. Sampson suggests, I think implausibly, that it is a conceptual divorce between ecology and evolution that is responsible for the widespread failure to understand evolution. His call for "a seamless eco-evolutionary approach" to biol-

A New Way to Help NCSE

NCSE has one of the most complete archives of writings on all sides of the creationism/evolution controversy. Some of these are important historical documents — such as the early pre-publication drafts of the manuscript that was to become *Of Pandas and People*. The archives are important to NCSE for carrying out its mission, of course, but they also serve as a resource for scholars and professionals in a variety of disciplines who need to locate obscure or difficult-to-find materials. Learn more about the NCSE archives on the NCSE website.

One way to help NCSE to maintain its collection is to buy needed books for the archives. To help get people started, the NCSE staff has compiled a "wish list" on Amazon.com of books that we would like to add to our archives (<http://www.amazon.com/gp/registry/wishlist/39U1UMFQ22WED/>). So far, no fewer than twenty-seven books have been purchased for the archives! New books are added to the wish list on a regular basis; at press time, the following ten books were still unpurchased.

The Impact of State and National Standards on K-12 Science Technology (Research in Science Education) **edited by Dennis W Sunal and Emmett L Wright. Charlotte (NC): Information Age Publishing, 2006.**

Darwin's Gift: To Science and Religion **by Francisco J Ayala. Washington (DC): Joseph Henry Press, 2007.**

Evolution and Religious Creation Myths: How Scientists Respond **by Paul F Lurquin and Linda Stone. New York: Oxford University Press, 2007.**

Evolution and Ethics: Human Morality In Biological and Religious Perspective **edited by Philip Clayton and Jeffrey Schloss. Grand Rapids (MI): Wm B Eerdmans, 2004.**

The Scopes "Monkey Trial" (Defining Moments) **by Anne Janette Johnson. Detroit: Omnigraphics, 2006.**

Science, Religion, And Society: An Encyclopedia of History, Culture, and Controversy **(2 volume set) edited by Arri Eisen and Gary Laderman. Armonk (NY): ME Sharpe, 2006.**

Evolution for Everyone: How Darwin's Theory Can Change the Way We Think About Our Lives **by David Sloan Wilson. New York: Delacorte Press, 2007.**

Hollow Earth **by David Standish. Cambridge (MA): Perseus Books (De Capo Press edition), 2006.**

Confronting Creationism: Defending Darwin **edited by DR Selkirk and FJ Burrows. Sydney: New South Wales University Press, 1989.**

Flock of Dodos **by Barrett Brown and Jon P Alston. New York: Cambridge House Press, 2007.**

Remember, you can also help NCSE by buying books from Amazon.com via NCSE's on-line bookstore: <http://www.ncseweb.org/bookstore.asp>

From NCSE's Supporters

The three dozen or so Supporters of NCSE — listed on our letterhead and on the back of every issue of *RNCSE* — are a group of distinguished scientists, scholars, and educators whose prestige we respect, whose support we value, and whose insight we cherish. They differ among themselves on a number of issues, of course, as any such group would, but they all agree on the importance of evolution education and the need to defend it, as their official support of NCSE testifies. Featured here, therefore, are books by our Supporters on a variety of topics: evolution, science in general, and, of course, the creationism/evolution controversy. (Obviously it is only a sampling: our Supporters are prolific authors!) To see what our Supporters have to say, consult the following books, now available through the NCSE web site: <http://www.ncseweb.org/bookstore.asp> — look in the "In the latest *RNCSE*" section. And remember, every purchase benefits NCSE!

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

On Evolution

Endless Forms Most Beautiful
by Sean B Carroll
One of the principal architects of evolutionary developmental biology ("evo devo"), Sean B Carroll is the ideal guide — informed, chatty, and witty — to what is often described as "the third revolution" in evolutionary biology. The reviewer for *American Scientist* wrote, "Carroll has brilliantly achieved what he set out to do … Evo devo is fundamental to understanding the biological world we live in, including ourselves. This is a beautiful and very important book," and *Endless Forms Most Beautiful* was named a top science book of 2005 by both *USA Today* and *Discover* magazine. Carroll is also the author of *The Making of the Fittest*.

The Making of the Fittest
by Sean B Carroll
In the preface to *The Making of the Fittest*, Sean B Carroll writes, "With DNA science penetrating so many facets of everyday life, it is again time for a new departure and to seek facts of a new kind. My goal in this book is to present a body of new facts about evolution gathered from DNA evidence. ... The body of new evidence I will describe in this book clinches the case for biological evolution as the basis for life's diversity, beyond any reasonable doubt." "With fervor and clarity, Carroll amasses a glut of facts to refute the twisted logic of the anti-Darwinist camp," applauded the reviewer for *Discover*.

Darwin: Discovering the Tree of Life
by Niles Eldredge
Written by NCSE Supporter Niles Eldredge and with no fewer than one hundred illustrations, *Darwin: Discovering the Tree of Life* is the companion to the American Museum of Natural History's new exhibition celebrating the two hundredth anniversary of Darwin's birth, but it is more, too: a rich and inspiring reconstruction of Darwin's life through his writings and discoveries. The reviewer for *Science News* writes, "Using four of Darwin's notebooks as his starting point, Eldredge considers the speculation, intuitive leaps, and logical reasoning that Darwin undertook to arrive at his theory ... What results is a fascinating exposition of Darwin's skill as an experimental scientist and deductive reasoner."

Evolution
by Douglas J Futuyma
From the publisher: "*Evolution* is a readily recognized descendant of the author's previous textbook, *Evolutionary Biology*. However, it is much shorter and is exclusively directed toward an undergraduate audience. Teachers and students will find the list of important concepts and terms in each chapter a helpful guide, and will appreciate the radically different dynamic figures and lively photographs. The content of all chapters has been updated, and material has been reorganized into new chapters such as 'Conflict and Cooperation' and 'How To Be Fit.' ... A new final chapter on 'Evolutionary Science, Creationism, and Society' treats such topics as the nature of science and the practical applications of evolutionary biology."

About 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

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

of life. Employing a breadth of rhetoric[al] 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."

Voodoo Science: The Road from Foolishness to Fraud
by Robert L Park
A spirited discussion and debunking of a host of pseudoscientific claims, especially those involving denial of the laws of physics, from Robert L Park, whose "What's New" column (<http://www.www.aps.org>) for the American Physical Society is a source of constant delight. "Whatever else you may think about pseudoscience, at least it's entertaining," wrote the reviewer for *The New York Times Book Review*. "For much more of this high comedy, see the frequently droll and invariably enlightening pages of Robert Park's *Voodoo Science*." Richard Dawkins comments, "I finished this brilliant book within a day, and then felt such withdrawal symptoms I went right back to the beginning and started again."

Darwinism and Its Discontents
by Michael Ruse
The latest from NCSE Supporter Michael Ruse, *Darwinism and Its Discontents* offers a review and defense of Charles Darwin's theory of evolution. In the introduction, Ruse writes: "All the critics of Darwinism are deeply mistaken. Charles Darwin was a good scientist, the biological revolution of the nineteenth century led to genuine understanding, and today's version of the theory is good quality science. It tells you important things about the real world. ... [And] it can and should provide a positive and creative stimulus for religious people to think about their faith and move forward in a richer and deeper way."

Philosophy of Biology
(second edition)
by Elliott Sober
Commenting on the first edition of Sober's book, David L Hull wrote, "Elliott Sober has written *Philosophy of Biology* as an introductory text, and as such it succeeds admirably. But in addition to addressing more popular controversies such as sociobiology and creationism, he also motivates, elucidates, and even advances the current debates among his peers. As always, Sober's exposition is clear and penetrating." The second edition (2000) brings the text up to date. Sober is Hans Reichenbach Professor of Philosophy at the University of Wisconsin at Madison and the editor of *Conceptual Issues in Evolutionary Biology* (now in its third edition).

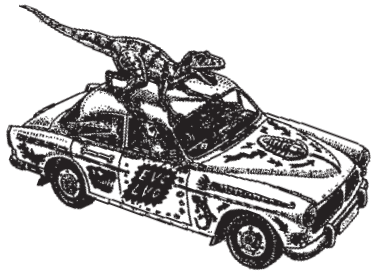
Against Creationism

Science on Trial: The Case for Evolution
by Douglas J Futuyma
Michael Ruse describes Futuyma's *Science on Trial* as "the book to show someone who is worried about the threat of creationism. ... It can be read for pleasure and profit by people at all levels of biological sophistication." Originally published in 1982, *Science on Trial* was reissued in 1995 with extensive notes bringing it up to date. Futuyma writes in the 1995 preface that "in an age in which some understanding of science is a virtual necessity for everyone, it is incredible that the single most fundamental principle of biology and one of the most fundamental in modern thought should still be an object of controversy and disbelief."

Scientists Confront Creationism and Intelligent Design
edited by Andrew J Petto and Laurie R Godfrey
A spectacular new anthology featuring essays about creationism — and its latest incarnation, "intelligent design" — by Ronald L Numbers, NCSE's Eugenie C Scott, John R Cole, Victor J Stenger, Antonio Lazcano, Kevin Padian and Kenneth D Angielczyk, Robert Dorit, NCSE's Wesley R Elsberry, C Loring Brace, Robert T Pennock, Norman A Johnson, J Michael Plavcan, Alice Beck Kehoe, and the editors, Andrew J Petto and Laurie R Godfrey; Cole, Padian, and Petto are all members of NCSE's board of directors. *Scientists Confront Creationism and Intelligent Design* is a worthy successor to Godfrey's previous collection, *Scientists Confront Creationism*, published in 1984.

Living With Darwin
by Philip Kitcher
As NCSE deputy director Glenn Branch wrote in *BioScience*, "Kitcher discusses the evidence for, and the creationist resistance to, deep time, common ancestry, and natural selection, in vivid and fluent prose, and always with accuracy and insight. Recognizing the historical respectability and the current bankruptcy of intelligent design, he describes it as 'dead science' — although, in light of its shambling tenacity, 'zombie science' is perhaps a preferable label. Kitcher concludes by offering a historically detailed and sociologically acute diagnosis of creationism as a reaction to what is understood — and not unreasonably so, he suggests — as the vanguard of the Enlightenment's critique of supernaturalist and providentialist forms of religion."

Perspectives on an Evolving Creation
edited by Keith B Miller
From the publisher: "According to the authors of this book, who explore evolutionary theory from a clear Christian perspective, the common view of conflict between evolutionary theory and Christian faith is mistaken. Written by contributors representing the natural sciences, philosophy, theology, and the history of science, this thought-provoking work is informed by both solid scientific knowledge and keen theological insight. The three sections of the book address (1) relevant biblical, historical, and scientific background, (2) the scientific evidence for an evolving creation, and (3) theological issues commonly raised in connection with evolution, including the nature of God's creative activity, the meaning of the miraculous, and the uniqueness of humankind."



NCSE on the Road

A Calendar of Special Events, Presentations, and Lectures

Date	September 9, 2007
City	Arlington VA
Presenter	Eugenie C Scott
Title	Who Pulled the Stake Out? The Resurgence of Young-Earth Creationism
Event	Atheist Alliance Internatonal Convention
Time	2:00 PM
Location	Crowne Plaza Hotel
Contact	<http://www.atheistalliance.org/conventions/2007/>

Date	September 27, 2007
City	Amherst MA
Presenter	Eugenie C Scott
Title	Creation and Evolution: A Historical Perspective
Event	Science and Religion lecture series
Time	TBA
Location	Franklin Patterson Hall, Hampshire College
Contact	<http://scienceandreligion.hampshire.edu>

Date	October 8, 2007
City	Athens OH
Presenter	Eugenie C Scott
Title	From Scopes to the Creation Museum: The Resilience of Antievolutionism
Event	Frontiers in Science lecture series
Time	7:30 PM
Location	Templeton-Blackburn Auditorium, Ohio University
Contact	Gretchen L Stephens, stephens@ohio.edu

NCSE Speakers Available

Name	Eugenie C. Scott
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Name	Andrew J Petto
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Name	Louise S Mead
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Check the NCSE web site for updates and details — <http://www.ncseweb.org/meeting.asp>.

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ogy education, however, is worth considering. Hauser inveighs against a touchy-feely approach to education in which "a wholesale blurring of disciplinary boundaries" is allowed and "intuition, speculation, opinion, and first-person or anecdotal experience" is rampant, apparently under the misapprehension that he is thereby opposing the "intelligent design" movement. In fact, creationists tend to be conservative, even reactionary, in their pedagogy, as a perusal of *Of Pandas and People*, for example, reveals. His alternative, in which every science course would be complemented by a course on the history of that particular science and a course on its relation to the arts and humanities, is appealing but utopian.

To be sure, *Intelligent Thought* is neither a comprehensive refutation of the scientific claims of "intelligent design" (for such a volume, see Matt Young and Taner Edis's anthology *Why Intelligent Design Fails*) nor a definitive exposé of the unsavory tactics of its proponents (for that, see Barbara Forrest and Paul R Gross's *Creationism's Trojan Horse*). Still less is it a complete history of the *Kitzmiller* case, of which there are reportedly a number in the writing. Think of it instead as a chance to eavesdrop on a diverse, articulate, thoughtful group of people as they chat about a variety of subjects brought to their minds by the defeat of "intelligent design" in the *Kitzmiller* trial. (No doubt it is those notorious troublemakers again: the intelligent, educated segment of the culture.) And take it, too, as a call for action: although the *Kitzmiller* decision was a defeat for creationism, it was not a lethal blow, and the need to defend the teaching of education in the public schools persists.

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The Naked Emperor: Darwinism Exposed

by Antony Latham
London: Janus Publishing Company, 2005. 257 pages

Reviewed by Stephen B Hager and Bradley J Cosentino

Antony Latham's book, *The Naked Emperor: Darwinism Exposed,* tries to explore the possibility that evolutionary theory is supported by weak and circumstantial evidence and, despite this, is widely accepted by science and society. In an attempt to illustrate this, Latham employs a facile analogy (Young 2005) associated with the fable "The Emperor's New Clothes", written by Hans Christian Andersen in 1837. One summary interpretation of this fable is "just because everyone believes in something doesn't mean that it's true." To understand Latham's pseudoscientific reasoning, simply replace the word "something" with "evolution".

Latham — a physician and self-described old-earth creationist — hammers on this theme throughout his book, attempting to convince the reader that the evidence for evolution, especially macroevolution, is simply lacking, despite the fact the vast majority of scientists consider evolution to be sound. According to Latham, since evolution rests on such a flimsy foundation, one must conclude instead that an intelligent designer is responsible for life's diversity.

Latham's rationale for the book stems from his own personal journey, which is concerned with life and human origins (p i). His aim was to assess the evidence for evolution objectively through the lenses of a Christian (p ii). There is, however, little objectivity to be detected in the admission that "If I fully accept evolutionary theory then I cannot believe that there is any ultimate purpose to my life — nor can I believe in a creator God" (p i). Indeed, Latham attempts to reconcile his belief in God with evolution — but only part of evolution, and only as he understands, or misunderstands, it. His book suffers from a misrepresentation of macroevolution and other aspects of biology, contradictory descriptions about microevolution, and an irrational argument for "intelligent design" creationism.

In his rudimentary overview of evolutionary history, Latham suggests that macroevolution cannot explain the body plans of higher-level animals. His criticism is especially pointed when discussing the Cambrian explosion, noting that "[f]or such profoundly beautiful and intricate animals just to appear in the strata, in a geological instant, is not just a problem for evolutionary theory but is virtually a demolition of it" (p 36). In place of evolutionary theory, Latham prefers a saltationist explanation, where major body forms and phyla appear *de novo*. He even defines macroevolution in saltationist terms: "Macro-evolution … is the appearance (generally sudden) of completely new body plans or structures in an organism" (p 52). According to Latham, a lack of objective evidence for macroevolution in the Darwinian framework leads us "to contemplate the transcendent and mysterious in life" (p 44).

A recurring problem throughout *The Naked Emperor* — and the ultimate root of Latham's gross misrepresentation of macroevolution — is his antiquated view of evolutionary science. Like many creationists, Latham says that evolutionary theory predicts a "seamless transition from one type to another in the fossil record" (p 48). He thus assumes a strict view of gradualism, and virtually ignores more contemporary theories of evolutionary rates. For example, adaptive radiation predicts rapid evolution to fill new ecological niches, and punctuated equilibria models predict periods of stasis followed by rapid evolutionary change, albeit on a geological time scale (Strickberger 2000). However, Latham makes no mention of adaptive radiation, and he casually dismisses punctuated

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equilibria as just another microevolutionary process (p 59).

Oddly, Latham repeatedly claims that microevolution is well documented and produces varieties that can eventually form closely related species (p 117). However, since "there is no new information in the DNA" (p 117), he asserts microevolution cannot produce macroevolutionary patterns. In describing mutation, the ultimate source of genetic variation, Latham says, "Mutations are generally harmful and must be prevented for organisms to survive … Mutation, to a doctor, signifies damage ... Can we be sure that mutations are the source of the genetic information that leads to useful new processes and structures?" (p 120).

Indeed we can. Latham is actually referring to somatic mutations (such as cancer), which are not transmitted to offspring and are hidden from selection. Germ-line mutations, on the other hand, *can* be inherited and are subject to selection. As a physician, Latham *should* be concerned about mutations, such as those conferring resistance in pathogenic bacteria that *increase* the survival and reproduction during exposure to antibiotics.

Latham leaves readers with the idea that microevolution and macroevolution are completely different processes. Their only real difference, however, is the time scale on which they operate. The accumulation of microevolutionary changes over geologic time can produce macroevolutionary changes at higher taxonomic levels. It is thus curious that Latham apparently accepts microevolution (although chapters like "The impotence of natural selection" makes one wonder), but contends that it cannot produce macroevolution due to a lack of "new genetic information." Rather than being intellectually honest about scientists' understanding of microevolution and macroevolution, Latham alters their meaning and concludes that only an intelligent designer can explain the diversity of life.

In addition to the misrepresentation of evolution, Latham distorts other aspects of biology. One egregious example is found in the section entitled "Genetic basis of homology" (p 175). Latham begins, "It has been demonstrated that in many cases the genetic codes for specific homologies are not, in fact, homologous themselves." He fails, however, to mention the many examples of homologous genes that *have* been identified. Gilbert (2006) lists 20 genes that regulate development of anatomical structures and which are conserved (homologous) in protostomes and deuterostomes. One of these, *Pax6*, codes for development of the anterior central nervous system and eye in mice, rats, zebrafish, and *Drosophila*. Another example is the conserved molecular machinery of RNA interference, which has the promising potential for treating viral infections and cancer (Lieberman and others 2003). As a physician, Latham *should* be aware of homologous genes.

Essentially, the premise of *The Naked Emperor* fails because Latham's scientific view is clouded by an *a priori* belief in God as active designer. He rejects out of hand anything in science that conflicts with his creationist worldview. Unfortunately, after reading *The Naked Emperor,* statements in the introduction and conclusion of the book ring ironically true: "Do not expect cut-and-dried sewn-up arguments" (p v) and "Nothing I have found [and reported in this book] is radically new ..." (p 247). Latham's mistreatment of evolution and biology, and his incoherent mix of chapter content, fully support the former quote. The latter is obvious by Latham's employment of antiquated creationist arguments throughout the book.

Shame on Latham for being intellectually dishonest with his readership about the nature of life, no matter how irreconcilable it is with his faith. Latham is right that just because everyone believes in something does not make it true. But as a physician, he *should* acknowledge that evolution is a powerful theory that helps us understand our natural world. As Robert Pennock (1999: 358) observes of creationist ideologues like Latham, they "might have good intentions, but ultimately they betray the most basic value upon which good learning relies, namely, intellectual honesty."

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Intelligent Design vs Evolution

by Ray Comfort and Kirk Cameron
Living Waters Publications, 2006.
<http://www.wayofthemaster.com>
includes *The Science of Evolution* DVD

Reviewed by Carrie Sager

The latest entry in the "Intelligent Design" is Creationism file, the board game *Intelligent Design vs Evolution*, is a Ken Ham-endorsed, William Dembski-approved cornucopia of bad science and fundamentalist propaganda (see <http://www.uncommondescent.com/evolution/id-the-board-game/>). The game is the creation

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of Ray Comfort and television's Kirk Cameron (*Growing Pains*), who beam beatifically out from five of the box's six sides. It combines young-earth biblical literalism with generic anti-evolutionism with a touch of proselytizing, all wrapped up in a package that is aesthetically pleasing but scientifically bankrupt.

The gameplay is simple. Two players or two teams move their plastic brains around a timeline from "In the Beginning" to "End of Time" (alarmingly, only three spaces after the present). As they go, players collect "brain cards" and can be penalized for sins (doubt, ingratitude, compromise) or rewarded for virtues (understanding, humility, God's grace).

To advance along the board, players must answer questions, which can mostly be divided into four categories:

Biblical questions: "True or False? The Bible teaches that intelligence is the reason most people don't seek after God." "False. Pride is the reason most people don't seek after God." Besides providing an opportunity for digs at those smart-aleck scientists, these questions sometimes have penalties if players get them wrong — including double penalties for the ones deemed most important. Of course, since these questions usually have the most obvious answers, the penalties might be for stupidity.

Absurdly long quotations: (often with true/false or multiple choice answers). These tend to be creationists' usual misquotations from scientists: out of context and outdated, with generous use of ellipses. An excellent example is a 1929 quote from DMS Watson: "Evolution itself is accepted by zoologists not because it has been observed to occur or is supported by logically coherent arguments, but because … no alternative explanation is credible … the theory of evolution itself is a theory universally accepted not because it can be proved by logical coherent evidence to be true but because the only alternative is special creation, which is clearly incredible." The question, by the way, is to identify the speaker, the educational value of which eludes me.

Sneaky trick questions: "True or False? Prehistoric man may have sometimes lived in caves." "False. […] Since the first man is mentioned in the Bible's historical record, there has never been a *pre*-historic man" (emphasis in original).

Inane riddles: "There are two of us. We look the same, but we are not. […] If we faced upwards we would cause big problems in a rainstorm. Who are we?" "Your nostrils." These are frequently used to show the brilliant design of human beings; players never read: "Even though my width can cause knee problems, I am often not wide enough to fit a baby's head through without complications" for the female pelvis.

I enlisted my roommates to help me test the game. Roommate One, with a background in copy-editing, was appalled by the number of typos that can be found on the board and cards. Our favorite was a space on the board that reads, "He that belives [*sic*] not God has made Him a liar" (1 John 5:10). The generally poor grasp of punctuation was distracting but forgivable, but that no one noticed a typo in a Bible quote struck us (perhaps inappropriately) as hilarious. Roommate Two discovered that the secret trick to answering the less obvious questions is to determine which answer could best support design; the hallux probably is not the tip of the nose, because the tip of the nose has no special function, but if it is the big toe, the answer can tell players how awesomely toes help us balance, run, and walk.

It took us about an hour to get through the game. Other than admiration for the physical design of the game ("It's a lot higher quality than I was expecting," said Roommate One), the three of us were unimpressed. Questions were either blindingly obvious or nearly impossible ... and occasionally nonsensical. This made the game more a matter of luck more than of skill or knowledge. Roommate Two made a small noise of relief every time I began reading a question with "True or False?" As a result, most of our enjoyment came from reading questions like, "True or False? The people who waged war in the 'Crusades' were Christians." "False. The Crusaders were misguided Roman Catholic zealots."

The amusement value of the questions is inversely proportional to their scholarship value. Some questions cite Wikipedia as a source ("So that might not even be true!" exclaimed an exasperated Roommate One after getting such a question wrong). One source uses an article in NCSE's *Creation/Evolution* for a question about "[t]he famed 'Nebraska Man'" — an article that concludes: "The creationists who belittle mistakes by scientists cannot admit that science advances, in part, by correcting error" (Wolf and Mellett 1985: 31).

Questionable sources and questionable quoting of legitimate sources is hardly the only example of deliberate misrepresentation of science. One question refers to an "embarrassing situation" *Time* magazine ended up in when it reported that *Mononykus* was a flightless bird instead of a theropodan dinosaur. The implication, of course, is that the evidence for dinosaur-to-bird evolution is faulty and that the media cannot be trusted on the subject. There are several problems with this argument. For one, even a cursory glance at the literature on *Mononykus* shows that scientists have not reached a consensus about whether or not it is a bird. For another, even if they had, neither classification would negate the fact that it has characteristics of both birds and dinosaurs. Third, and most important, if the classification had changed, as with the "case of Nebraska Man", it would simply be an example of scientists' refining a conclusion based on new evidence. Creationists' continued confusion over this basic aspect of the nature of science is baffling — when not intentional.

Other questions are simply wrong:

> Since there are no transitional forms ("missing links"), German geneticist Richard Goldschmidt, speculated that there must have been quantum leaps from one species to another. He wrote, "The major evolutionary advances must have taken place in single large steps. … The many missing links in the Paleontological record are sought for in vain because they have never existed: 'the first bird hatched from a reptilian egg.'" His ridiculous theory is called: (A) cataclysmic escalation; (B) precipitous equanimity; (C) punctuated equilibrium.

There is no (D): None of the above — a choice necessary for an accurate answer to most of these questions. The answer they are looking for is (C): punctuated equilibrium. What's more, the same choices with the same answer are on a different question, this time for a "theory" advanced by a 1958 children's book about dinosaurs. Another pair of questions use the same Stephen Jay Gould quote with different words left out — but one cites the original *Paleobiology* article and the other from a book by creationist Jonathan Sarfati.

There are only 250 questions in this game, and some of them are repeats. *Trivial Pursuit* comes with 6000 questions and people complain that there are not enough. In our game, we went through 29 cards, which would give us eight or nine games before we knew all the answers. At $30, this makes each game worth around $3.50 — about the same as renting a movie. So if your goal is to gather a group of your scientist buddies and have a good laugh at Kirk Cameron's blinding ignorance, this is a pretty good value for your money. But that it would be used for any other purpose, particularly an educational one, is terrifying.

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Darwin's Nemesis: Phillip Johnson and the Intelligent Design Movement

edited by William A Dembski
Downers Grove (IL): InterVarsity Press, 2006. 357 pages

Reviewed by
Lawrence S Lerner

In April 2004, the leading lights of the "intelligent design" creationism (IDC) movement met at Biola University (formerly the Bible Institute of Los Angeles) to confer on their "godfather", law professor Phillip Johnson, the Phillip E Johnson Award for Liberty and Truth. Thus began a two-day conference entitled "Intelligent Design and the Future of Science." The talks presented there formed the basis for the present volume.

A perusal of the book gives a pretty good picture of what IDC really means to its advocates. The subject matter of the papers ranges widely, and I will try below to give the flavor of some of them. But first let's survey the contradictory faces the IDC movement presents to the general public (it is really science!) and to its friends (our mission is to impose our God on every aspect of society).

In his preface, William Dembski writes of a 1992 meeting, "Here, for the first time, a radical non-materialist critique of Darwinism and naturalistic evolutionary theories was put on the table for a high-level, reasoned, academic discussion *without anyone promoting a religious or sectarian agenda*" (p 14, emphasis added). And in his conference paper, he writes, "… most reporters who interview me ask how intelligent design differs from creationism. This gives me a perfect opening, and I can explain how intelligent design is not a religious doctrine about where everything came from but rather a scientific investigation into how patterns exhibited by finite arrangements of matter can signify intelligence" (p 98). But given that *Darwin's Nemesis* is an insider work, that is about all there is of the public face. Almost all of the rest of the book consists of one argument after another supporting the superiority of a theistic — and almost always a specifically "Christian" — worldview, with science reduced to the medieval role of handmaiden of theology. Here are just a few examples:

> Christianity is not burdened with the requirement that everything result from natural processes. … either natural or supernatural explanations of nature are allowed. In the study of biology, … Christians have a broader palette of explanations to draw on than do materialists. (Timothy G Standish, p 119)

> The revolution from the paradigm of Darwinism to the paradigm of intelligent design will undoubtedly be accompanied by a metaphysical shift from materialism to theistic realism. (David Keller, p 159)

> Years before, as a seminary student at Unification Theological Seminary in the late 1970s, I had become convinced that there is a fundamental conflict between theistic religions and Darwinian evolution. Among the former I include Christianity, Islam, Judaism, Unificationism and Zoroastrianism. … Now I realized I couldn't be a theist and a Darwinian. (Jonathan Wells, p 164–5)

> [I]f Darwinism is true, Christian metaphysics is a fantasy. (Nancy Pearcey, quoting a 2002 interview of Phillip Johnson, p 228)

> Complexity theory views the essence of life as independent of its particular physical medium, consistent with Christian belief. … We are thankful that the God of Christ's love is also the God of purpose and order who

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> superintends complexity and chaos. (Wesley D Allen and Henry F Schaeffer III, p 300)

Clearly, the conference participants quoted above have found it difficult or impossible to reconcile the generally accepted evolutionary theory with their personal religious views. The one speaker at the conference who accepts evolution, the philosopher and "friendly critic" Michael Ruse, summarizes the intention of his contribution in the sentence, "My aim has not been to defend Christianity, but to defend the integrity of the Darwinian who wants to be a Christian" (p 148). In the light of what the other twenty contributors have to say, he was probably wasting his time at the Biola conference.

If there were still reason to doubt that IDC is about religion, not science, a scrutiny of the speakers at this "scientific" conference yields further revelations. Using the biographical information at the back of the book itself, together with a quick internet search, I tallied the disciplines in which the twenty participants (other than Ruse) had degrees. I was able to find 39 degrees identified with a specific discipline (including two non-degree areas of intensive study on the part of contributor Nancy Pearcey and Marcus Ross's PhD candidacy in geoscience). Here is how the disciplines stack up, in order of frequency:

> 16 degrees in theology, religion, or philosophy;
>
> 9 degrees in the physical sciences or engineering;
>
> 4 degrees in the social sciences;
>
> 3 degrees in biology, microbiology, or biochemistry;
>
> 3 degrees in geology and earth sciences;
>
> 2 degrees in law;
>
> 1 degree in mathematics;
>
> 1 degree in environmental biology and public policy.

Not quite the lineup one might find at a conference on evolutionary biology, but not surprising for an evangelical revival meeting.

Let me now turn to some of the more interesting chapters.

Part I, "Portraits of the Man and his Work", centers on accounts of how the authors first met and were influenced (or inspired) by Johnson. Stephen C Meyer rehearses the standard nonsense about "gaps" and "lack of transitional forms" in the fossil record and the supposed inutility of mutations for producing useful structures. Michael Behe, the father of "irreducible complexity" and of nine children (whose names he enumerates in his essay), is more fun. He presents a folksy account of his Catholic childhood in an enormous family, his early uncritical acceptance of evolution as he had been taught it in Catholic schools, and the doubts gradually instilled, first by an evangelical lab technician he dated, and later by a series of other events. In particular, he infers on the basis of a conversation with a fellow Catholic postdoctoral scholar that deep down, biologists in general do not think that life could have originated through natural means. All this is cemented by his early contacts with Johnson, who instructs him in the underlying realities of the biological sciences. Thus enlightened, he encounters (and reflects bitterly on) the scorn with which IDCs are regarded in the scientific community. Specifically, he is taken aback when a letter he has written to *Science,* criticizing a negative review of Johnson's *Darwin on Trial,* is not published. But all is resolved when he publishes his *Darwin's Black Box.*

Thomas Woodward devotes most of his essay to a contrast between Johnson's rhetoric and that of mainline evolutionary scientists. I am not sure what essential contribution rhetoric can make in forwarding the sciences, but Woodward's most interesting point is this: "… I was amazed once to hear a brilliant rhetorician whom I respect very highly describe the issue of God's existence as a nonrhetorical issue, implying that it is a purely subjective (that is, non-rational) issue, one that cannot really be argued at all." In a long footnote, he expands on his objections to this position. They boil down to a dilemma. We can be sure that his intercourse with a very personal God is very extensive; otherwise he could hardly continue as a professor of Bible and Theology at the small Bible college where he teaches. But he wants objective, external evidence of God that will have more weight with others. This would become possible, if only science would pursue evidence of the supernatural, as Johnson insists it should. In this light, Woodward's support of IDC is entirely understandable. Receiving the Holy Spirit oneself is the *sine qua non* for evangelicals; disseminating it to others is the Great Commission. Even as a non-scientist, he could hope one day to see a newspaper headline something like, "Scientist Finds DNA Sequence That Decodes As 'I Am Who Am.'"

William Dembski leads off Part II, "The Wedge and Its Despisers". I was a bit surprised at the querulous, even angry tone of his essay, beginning with its title, "Dealing with the backlash against intelligent design". The cool, scholarly tone of his writings aimed at the "outside world" is not apparent in this us-against-them piece. The essence of the chapter is pretty well captured in the following quote:

> We have this going for us, however, which the evolutionary naturalists don't, namely, the evidence and arguments are on our side. It's therefore to our advantage to discuss intelligent design and naturalistic evolution on their merits. Conversely, the other side needs to delegitimate the debate, … casting intelligent design as a pseudoscience and characterizing its significance purely in political and religious terms. As a consequence, critics of intelligent design engage in all forms of character assassination, *ad hominem* attacks, guilt by association and demonization. (p 82)

Part III, "Two Friendly Critics," is an odd fit in the general context of the book. The ever-idiosyncratic David Berlinski contributes two short fables. He attributes them to the Argentine literary giant Jorge Luis Borges (1899–1986). Though the fables clearly attempt to mimic

Borges's dry, witty, and often hieratic style, Borges is a hard act to follow. The first fable ridicules the idea of evolution; the second does the same to the idea of IDC. Both sport a stiff manner that does Borges injustice. Nice try but no *yerba maté.*

As noted above, Michael Ruse bravely attempts the impossible reconciliation, showing that one can be a Christian evolutionist. That is true, but one cannot be a "Christian" evolutionist — that is, a Christian defined as a member of the subset of evangelicals to which the volume's contributors belong.

Part IV, "Johnson's Revolution in Biology," gets to the heart of the matter. Is IDC really science? If it were, IDC-based papers would be making floods of new, groundbreaking contributions to the sciences and would be vigorously debated in scientific journals. The one paper that actually made it into a journal is reprinted here. Stephen C Meyer's paper "The origin of biological information and the higher taxonomic categories" was published in the *Proceedings of the Biological Society of Washington* (2004; 117 [2]: 213–39). As Meyer's brief biography notes (p 352), it "created an international sensation." However, the sensation was not about the content of the paper. Rather, it turned out that the editor of the journal, who had no expertise on the subject matter, had creationist leanings of his own. He therefore published the paper, though it had nothing to do with the specialized field of the journal. The result was indeed a sensation — or rather a scandal. The upshot was that the Biological Society of Washington officially deemed the paper "inappropriate". For an analysis of the paper's content, see Alan Gishlick, Nick Matzke, and Wesley R Elsberry's "Meyer's hopeless monster" (available on-line at <http://www.pandasthumb.org/archives/2004/08/meyers_hopeless_1.html>).

Jonathan Wells has nothing new to say. His piece is a short version of his earlier writing on the evolution of his life's mission: "Just as many of my fellow Unificationists had dedicated themselves to destroying the antitheistic ideology of Marxism, I dedicated myself to destroying the antitheistic ideology of Darwinism" (p 166).

Part V, "Ever-Increasing Spheres of Influence," moves beyond scientific issues into the realm that really concerns most creationists, namely, what they see as the baleful influence of evolution in the areas of theology, philosophy, and the extrascientific world in general. Nancy Pearcey expounds on the connections between "Darwinism" and abortion, sexual promiscuity, and postmodernism. She concludes, "The Darwinian creation story leads to an upper story of postmodern relativism, and ultimately undercuts itself. But Christianity offers a rationally coherent, logically consistent worldview… It lays claim to be truth about every aspect of reality… In that sense it is *total Truth*" (p 243, emphasis in original).

J Budziszewski takes an essentially Thomist tack: "Nature, then, is a contingent being, not a necessary being like God, and contingent beings need causes" (p 246). For him, the clinching argument is that "'Darwinian' natural law" (whatever that is) is not consistent with Thomist natural law, but IDC is.

In "A Taxonomy of Teleology," young-earth creationists Marcus Ross and Paul Nelson make an elaborate analysis — a mock-cladistic one, no less — of the various types of creationists. The details are tortuous and of little interest, but the conclusion is clear: "Johnson is a creationist, all right — just not a young-earth creationist" (p 275).

The chapter "Complexity, Chaos, and God" is the most intelligent and interesting part of the whole book. In it, chemists Wesley D Allen and Henry F Schaeffer III use a clear if brief exposition of the essence of chaos theory to explicate an ancient theological dilemma: human free will versus the determinism implied by divine omnipotence/omniscience. In some completely classical physical systems, where the uncertainty principle is not relevant, the evolutionary path of the system is so exquisitely sensitive to the initial conditions that it is impossible to predict its exact course. Many real-world systems are chaotic in this sense. Hence, for humans the course of the universe is unpredictable and free will operates; for God, who can perfectly control the initial conditions, the universe is deterministic.

A pretty application of physics to theology; so far, so good. But Allen and Schaeffer lose me, I fear, when they make parallels between chaos theory and the Christian's ultimate fate as revealed in 1 and 2 Corinthians, from which they infer that "[t]he concept of a human soul can be retained in complexity theory as an emergent, nonreducible collection of properties or essences." Well, that's fine, though some theologians may get a whiff of the God of the gaps.

But next, IDC gets dragged into this discussion by the ears, as it were. Specifically, the authors conflate biological evolution with prebiotic evolution — a standard creationist ploy — and then attack prebiotic evolutionary arguments on the basis that they are as yet not heavily constrained by the available evidence. This point, well understood by the scientists in the field, they attribute to Johnson. But again, this is a God-of-the-gaps argument.

Allen and Schaeffer then make the error of taking Dembski's "fourth law of thermodynamics" seriously. As physical chemists, they should know better; the mathematics and physics of Dembski's arguments have been thoroughly and definitively demolished by numerous experts (see Mark Perakh's *Unintelligent Design* [Amherst (NY): Prometheus Books, 2004], or his "A free lunch in a mousetrap" (available on-line at <http://www.talkreason.org/articles/dem_nfl.cfm>).

Finally, a word about editor Dembski's preface. The decision of Judge Jones in *Kitzmiller v Dover* came down as Dembski was preparing the book. Needless to say, the bulk of the book was already complete. Dembski tries to make the best of Jones's devastating critique of IDC, which bears heavily on its essentially and ineluctably religious nature — a point that this book can only reinforce. But as Dembski writes, "Ultimately, the significance of a court case like *Kitzmiller v Dover*

depends not on a judge's decision but on the cultural forces that serve as the backdrop against which the decision is made." In that, Dembski is absolutely correct. It remains to be seen how American society will react in the broader sense — onward and upward with science or into a new Dark Age with concern for the soul's fate in the afterlife trumping interaction with the material world in which we pass our lives.

For those who want to take the trouble (and it is a good deal of trouble) to delve into the inner motivations of "intelligent design" creationists, *Darwin's Nemesis* is a good source. Needless to say, I do not recommend it to the casual reader!

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Darwin's Conservatives: The Misguided Quest

by John West
Seattle (WA): Discovery Institute Press, 2006. 160 pages

Reviewed by
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In his *Darwin's Conservatives: The Misguided Quest*, John West presents a well-written and well-documented case that Darwinism is incompatible with conservative political principles. I confess that I find the enterprise quixotic at the outset. Whatever dragons threaten religion, free enterprise, limited government, or the traditional family, they are not Darwinian dragons. But West, a senior fellow at the Discovery Institute and associate director of its Center for Science and Culture, has chosen a particularly odd windmill to tilt at.

Though he mentions several conservatives, including James Wilson, George Will, and Charles Krauthammer, almost all his attention is focused on Larry Arnhart. Now, Arnhart has written two excellent books on biopolitics. In one, *Darwinian Natural Right* (Albany [NY]: SUNY Press, 1998), he argues that Darwinian biology supports an Aristotelian account of natural ethics and in the other, *Darwinian Conservatism* (Exeter [UK]: Imprint Academic, 2005), that Darwinism supports conservative moral and political thought. Good as these books are, they are hardly the reason that the "intelligent design" movement has lost so many school board elections. But perhaps here, fighting among conservatives for conservative support, is a battle that West thinks he can win.

West is very careful to define the Darwinism that he opposes. He certainly does not quarrel with modern science as a whole, or with the use of biology to explain human behavior. He not only accepts that existing species are shaped by adaptation, but also takes no issue with the idea of the common descent of all species, including our own, from a universal ancestor. What he does object to is that "the primary mechanism of evolution is an unguided material process of natural selection acting on random variations" (p 13).

West is right to point out that Darwinian-minded political theorists often conflate Darwinism with biology in general. It is one thing to argue that there is a biological basis for differences between the sexes, and another to accept a purely Darwinian explanations for those differences. Unfortunately, that same confusion appears throughout West's book.

His most persistent strategy is to identify some position hostile to conservatism, say, that free will and responsibility are myths or that religion ought to be discarded, and then cite example after example of Darwinists who hold that position. This is doubly dubious. One could just as easily show that Christianity is inherently hostile to the Jews by citing a lot of Church fathers making anti-Semitic statements. Moreover, the argument proves too much. My guess is that physicists and neuroscientists are easily as prone to determinism and atheism as evolutionary biologists. Perhaps West was too quick to make peace with modern science.

Ad hominem arguments fill up a lot of the book, but he does seriously engage Arnhart's claims. Darwinism cannot support traditional morality, West argues in chapter 1, because it makes any moral standards contingent on the accidents of evolution.

> In the current set of circumstances, Darwin could believe that his view meant the extension of benevolence "to the men of all races, to the imbecile, the maimed, and other useless members of society, and finally to the lower animals." … But even Darwin would have to acknowledge, if pressed, that given a different set of circumstances, a radically different conception of morality might be dictated (p 21–2).

Of course. But any moral code would have to change if its foundations changed. Aristotle argued that slavery would be just by nature in a case where one human being was a much superior to another as the soul is to the body. Because this case never actually occurs, slavery is everywhere and always wrong by nature. If human nature were different, justice would be different. Likewise it is surely wrong according to conventional biblical morality for a father to slay one of his children. But if God unexpectedly commands otherwise, well, what is Abraham supposed to do?

It is true that Darwinism does not allow for an unchanging human nature, but neither does it allow for morally significant changes in any humanly meaningful timeframe. The possibility that evolution might render our "current" attachment to freedom and human dignity untenable two or three hundred thousand years from now, or more, does not strike me as a pressing moral problem.

West constantly confuses naturalistic explanations for human behavior with arguments about what is naturally right or good for human beings.

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> Monogamy is natural according to Darwinism, but so is adultery. Marital fidelity is natural, but so is promiscuity. Parental love is natural, but so is infanticide. Since Darwinism provides no basis for preferring one natural trait over another, we are left with a biological justification for sexual relativism rather than the traditional family (p 25).

To be sure, the mere fact that two colliding dispositions are both products of "unguided" evolution gives us no basis for preferring one over the other. But it is nonsense to say that this justifies sexual relativism. It just means that we have to look beyond the mere fact of evolutionary origin to ask which evolved dispositions promote a better life for *us*, individually and collectively.

If the traditional family is a vital institution, as conservatives tend to believe, it is mostly because it provides the best environment for nourishing children. But Darwinian psychology provides strong and largely new support for the traditional family. Human males, especially as young adults, have a lamentable tendency toward violent and self-destructive behavior. Persuading men to invest time and resources in their offspring is probably the most effective way to curb those tendencies. Darwinian theory explains the problematic behavior: across a range of species, male aggression leads to reproductive success. But it also explains why marriage is so effective. The most important step in getting dad to invest in his little ones, *in any species*, is to give him some confidence that they are indeed his.

The institution of marriage is not the result of deliberate planning. Some kind of marriage exists in all or almost all cultures, and it is highly unlikely that its first cultivators had any clear idea what they were doing. Likewise healthy economies are self-organizing systems, producing what human beings need most effectively when there is least planning from above. West is right to point out that, even in decentralized systems, human actors have some idea what they are aiming at. But microevolution, which West seems to accept, shows that "intelligent design" is not always necessary. The beaks of Darwin's finches change over decades in response to the climate, producing at any moment flocks of birds admirably fit for their environment, and all this without intelligence at any level.

Conservatives believe that human economies and societies are better designed from below than from above. Darwinism shows that decentralized, self-organizing systems are sufficiently powerful to generate all the plants and trees, birds and bees. This puts conservatism not only on the side of history, but on the side of natural history.

In his chapter on religion, West shows why some conservatives refuse to take advantage of Darwinian support. Explaining the history of life by unguided natural selection seems to exclude a designer God as a cause. But again this is true of physics or neuroscience. A scientist in any field looks for causes that can explain some phenomena but not others. Because a biblical God can do anything, His influence can never be eliminated as a cause; and for that reason it can never be confirmed. In this respect, Darwinian biology is no more inconsistent with biblical faith than molecular biology.

Darwin wrote his magnum opus at the very moment that Christianity was losing its tight grip on Western civilization. West shows us how much that accident of history colors our view of Darwin's achievement. Whether Darwin's natural selection can be reconciled with biblical religion remains an open question. That it can be reconciled with conservative principles has been adequately demonstrated by Larry Arnhart.

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Present at the Flood: How Structural Molecular Biology Came About

by Richard E Dickerson
Sunderland (MA): Sinauer Associates, 2005. 307 pages

Reviewed by
Michael Buratovich

Originally trained as an inorganic chemist, Richard Dickerson (a Supporter of NCSE) eventually became interested in the structure of biological molecules. His productive career at the California Institute of Technology included X-ray diffraction studies of several interesting molecules. Dickerson not only rubbed shoulders with most of the greats of structural molecular biology at meetings and conferences but also spent evenings in some of their homes. Therefore, he is able to put a human face on the achievements of these brilliant researchers. Dickerson is also an excellent writer who describes the work of each individual simply and accurately, but with wit, a wry sense of humor, and an involved passion that comes from working in structural biology for many years. The result is *Present at the Flood: How Structural Molecular Biology Came About*.

Dickerson's book is an anthology of reprints of several key papers in structural molecular biology. The papers are grouped into six chapters and introduced with beautifully written explanations and personal anecdotes about each of the reprinted works. In prefaces to each chapter, Dickerson explains the scientific importance of each work and provides an historical perspective that only someone who lived through the era could supply. His work is, at places, rather technical, and this is a book for those who have an interest in and at least some prior knowledge of protein chemistry.

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Present at the Flood begins with William T Astbury's classic 1934 paper on X-ray diffraction studies of hair, wool, and related fibers. From these studies, Astbury was able to discern the structure of β sheets, a common secondary structural motif found in many proteins. The next chapter discusses a mistake that people inferred from Astbury's paper, when he called hydrogen bonds "pseudo-diketopiperazine rings" (p 8). This unfortunate use of terms led to expectations that the hydrogen bonds were actually covalent bonds, and produced the "cyclol theory", which plagued protein chemistry for almost a decade. The cyclol controversy is the subject of the entire next chapter, and it includes Linus Pauling and Carl Niemann's paper rebutting the existence of cyclols.

The next chapter is all about the pioneers of X-ray diffraction techniques that allowed researchers actually to solve the structure of proteins. The trio of William Lawrence Bragg, Max Perutz, and John Kendrew were the main originators of this technique, and their papers loom large in this section. Even though the structural studies of these men provided the first helical structures of proteins, they were unable to choose among several rival structures. "None of these structures was felt to be satisfactory," notes Dickerson (p 59). Then Linus Pauling, who was in bed with a cold, concocted the structure of an α helix by drawing out the structure of a polypeptide on a flat piece of paper and rolling it up so that the peptide chain wound about the paper in a coil. Max Perutz confirmed Pauling's hypothesis by tilting his protein crystals so that the X-ray beam struck them at an angle, instead of perpendicularly to the protein crystals. The result revealed structural features that were not seen in previous studies. This additional information confirmed Pauling's theoretical model.

Chapter 5 is about the race to discern the structure of DNA. Dickerson manages to infuse this familiar story with life and flair. Chapter 6 recalls the following discovery by Max Perutz in 1953: "If one binds a single atom of a metal such as silver, gold or mercury to each protein molecule in the crystal, this is enough to produce measurable changes in the intensities of the spots in its diffraction patterns" (p 200). This finding led to MIR or Multiple Isomorphous Replacement phase analysis, and it allowed researchers to formulate three-dimensional structures for globular proteins like the globins. Chapter 7 illustrates how Perutz and Kendrew solved the structures of hemoglobin and myoglobin. Once again, Dickerson brings substantial personal insight into these revolutionary findings, and his insights are a joy to read. The penultimate chapter is a summary of the explosion of protein structural knowledge. The final epilogue includes a tribute to Irving Geis, the artist who painstakingly illustrated Perutz and Kendrew's *Scientific American* articles (Dickerson calls him the "molecular Vesalius"), and other fellow scientists who inspired him.

A perusal of Dickerson's many published works shows that he has a keen interest in protein evolution. Proteins from all living organism are composed of the same set of amino acids (with a few rare exceptions) linked together in the same manner (peptide bonds). They also utilize a very limited number of structural motifs and mix and match them to assemble molecules with a dizzying amount of diversity. In the case of Dickerson's beloved cytochrome c, some types of cytochrome c proteins sported a protein fold he called the "cytochrome fold", which appeared in photosynthetic cytochrome c proteins from green and purple sulfur bacteria, and algal cytochrome f proteins. This suggests that they all evolved from a common evolutionary protein that was involved in electron transport. Repeated use of the same structural motifs over and over again is a powerful testimony to common ancestry. Dickerson's volume is a fine account of how such evidence was uncovered.

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Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution

By Martin JS Rudwick
Chicago: University of Chicago Press, 2005. 732 pages

Reviewed by David Sepkoski

For readers unfamiliar with the work of Martin Rudwick, this volume — part one of what will certainly be his *magnum opus* — offers a perfect introduction. Over more than thirty years, Rudwick has pioneered the study of the beginnings of the modern scientific fields of paleontology and geology in such books as *The Meaning of Fossils* (1972) and *The Great Devonian Controversy* (1985). His detailed, sensitive accounts of scientists such as Georges Cuvier and Charles Lyell have enriched historians' understanding of the foundations of current views about the history of the earth and its inhabitants, and have provided an antidote to a historical approach that tends to view all 19th-century natural history as beginning and ending with Charles Darwin. We are, therefore, immensely fortunate that Rudwick has chosen to synthesize his life's work in a study of vast and comprehensive scope — no less than a history of the discovery of "deep history" by Darwin's forerunners in 18th- and 19th-century France, England, Germany, and elsewhere. We are even more fortunate that he has presented this synthesis in engaging, readable prose: while this volume is "weighty" in the literal sense (clocking in at more

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than 650 ample pages) it is directed towards the specialist and the general reader alike. In short, this is a masterful study by the world's foremost expert in the history of natural history (himself a former paleontologist) which deserves to be read by anyone interested in understanding the foundations of the modern historical sciences (including evolutionary biology).

The subject of the book is "the reconstruction of geohistory", a process that, between the 18th and 19th centuries, "historicized" nature and the earth. By this Rudwick means that over this period of time scientists developed the view that the earth's history is the product of a series of contingent, unrepeatable events not connected in any necessary way with theology or the story of human civilization. Nonetheless, Rudwick argues, this historicization was prompted by the transposition of new ideas concerning the nature of human history — the metaphors and cultural conceits European intellectuals used to explain the development of civilizations — onto natural history during a time when much of Europe was caught up in a series of revolutionary political and cultural events (such as the French Revolution of 1789). In other words, the modern historical sciences of geology and paleontology owe their origins to a specific moment in Western history when history itself was being invented and against a backdrop of rupture and transformation.

The first half of the book is devoted to setting the scene and establishing a basis for connecting the general intellectual milieu of the late Enlightenment to a burgeoning interest in the geosciences in France and Britain. Rudwick describes his approach in Part I as "a synchronic *survey* of the sciences of the earth" that "reviews the kinds of work and the kinds of ideas that were, or could have been, familiar" to the "savants" who practiced geohistory towards the end of the 18th century (p 22). Indeed, the reader is treated to lessons in subjects ranging from the culture of literary science (or "natural philosophy", as such pursuit was still normally called), to contemporary theories and beliefs about the formation of minerals, fossils, and rock strata, to theological and post-theological accounts of the earth's history popular in the late 18th and 19th centuries, to the debates that grew out of the discovery that fossils can be considered "documents" in the often violent narrative of natural history. Along the way, we encounter many figures and topics that will be familiar to students of the history of geology — the French savant Georges Leclerc (better known as the Comte de Buffon), the Scot James Hutton (who pioneered "uniformitarian" geology), and Baron Georges Cuvier (whose "revolutionary" theory of earth's history became the foil for Lyell and Darwin's gradualism) — but also a host of lesser-known people and events in the history of geology which Rudwick weaves together seamlessly. Rudwick is both a master teacher and a natural storyteller, and this first part of the book entertains with evocative anecdotes as much as it educates through lessons about the science of geology.

Three hundred pages of set-up, however, are just preparation for the book's real payoff, which comes in Part II, "Reconstructing Geohistory". Here Rudwick moves from his "synchronic survey" to a more focused argument about the transformation of geohistory into the modern science of geology. Here the book takes on its major interpretive task: to place the heterogeneous amalgam of scientific pursuits that constituted late 18th century geohistory within the frame of the broadest intellectual currents of the day — namely, the political, cultural, and theological meanings of "revolution" as they were understood in Europe during the first half of the 19th century. It is only by understanding the growth of geology in this context, Rudwick argues, that the magnitude and importance of the intellectual shift from a static, theologically-centered natural history to a de-anthropocentrized, contingent, and almost unimaginably vast geohistory can be properly appreciated. Its product, modern geology, negotiated competing cultural influences from traditional religious belief and revolutionary secular ideology, and its main navigator was Cuvier, who established the chief agenda for "modern" geology: to relate the fossil and stratigraphical record of the distant past to the state of the present world. As many questions were posed as answered during this period of investigation — is geohistory characterized by steady and uniform progression or by violent, revolutionary upheaval? — but Rudwick is less interested in tying his story together with a neat bow than with setting the scene further for volume two of this work, which will pick up the story in the middle of the 19th century.

A short review cannot possibly do justice to the intricate, erudite, meticulously researched and immensely enjoyable history Rudwick weaves in *Bursting the Limits of Time*. An added pleasure are the lavish, abundant illustrations throughout the volume, which were made possible in part through a grant from the Getty Foundation to the book's publisher. All in all, it is difficult to imagine a more impressive survey of genuinely "big questions" in the origin of a modern scientific field, or a more appropriate statement of a life's work spent promoting a vital but often-overlooked topic within the history of science. In every way, this is a truly magnificent book.

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After the Dinosaurs: The Age of Mammals

by Donald R Prothero
Bloomington (IN): Indiana University Press, 2006. 362 pages

Reviewed by Kevin Padian

There are hundreds of books about dinosaurs, popular and technical, but very few about the mammals that followed them. Some are geared for a general audience; some for specialists. Prothero's new book has the advantage of something for everyone, almost. A specialist can read it for a fine overview of many aspects of life throughout the age of mammals; a general reader will get the same overview, plus an introduction to a great many new topics to research further.

Don's strengths have always been in the climatic and faunal evolution of mammals, and the stratigraphic relationships of the deposits in which their fossils are found. This book plays to his strengths, which many of us lack. The result is a comprehensive look at the geology and climate of the Cenozoic Era, including the climatic indicators afforded by isotope studies, invertebrates, and fossil plants. The Age of Mammals is presented here as a series of subdivided slices of time, each with its own distinctive climates, geological circumstances, and faunas.

This is about the most readable volume imaginable in what is one of two classic approaches to the history of life: either one goes group by group or one goes through the time column successively. Because Don takes the second approach, there are hardly any cladograms in the book, and not much discussion of phylogenetic relationships or evolutionary adaptations. There are many reproductions of artists' reconstructions of fossil mammals, but very few skeletons and almost no drawings of teeth, which are the stock in trade of mammalian paleontologists. On the other hand, this is a great source for understanding geological and climatic change, and its effects on the faunas and floras of the Cenozoic Era — a comprehensive coverage found in almost no other book.

This is perhaps not the source to take anti-evolutionists to if you want to explain to them the fine points of how whales evolved from terrestrial animals. On the other hand, this book is unusually good in showing how a great many lines of evidence — from chemistry, physics, astronomy, geology, botany, and climatology — contribute to a unified picture of the history of life that accompanies the fossils in the rock record.

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Galápagos: A Natural History

by John Kricher
Princeton (NJ): Princeton University Press, 2006. 221 pages

Reviewed by Kenneth S Saladin

How important are the Galápagos Islands? Few books so profoundly influenced Western science and philosophy as Darwin's *On the Origin of Species,* and no stop on his epic voyage so deeply influenced Darwin's thinking as the Galápagos. Located on the equator about 600 miles from the coast of Ecuador, the Galápagos subsequently became the birthplace of ecotourism, pioneered in the 1960s by Julian Huxley, noted humanist and director general of UNESCO. Today, over 100 000 tourists visit the Galápagos annually. It is a priceless opportunity to walk in Darwin's footsteps and observe at first hand the starkly awesome volcanic geology and the profusion of wildlife featured in innumerable textbooks and television documentaries.

Visitors to the Galápagos must be accompanied by a naturalist guide, most of whom are Ecuadorians trained at the Charles Darwin Research Station on Santa Cruz Island. The guides I have toured with have been impressively knowledgeable, helpful, and friendly. Nevertheless, an intelligent traveler who desires an intellectually substantive visit to the islands will want more information, and something less ephemeral than lectures along the trails. Here is where Kricher's *Galápagos: A Natural History* will help immensely.

Kricher, a biology professor at Wheaton College, deftly provides intellectual substance and scientific insight without being pedantic or so technical and arcane that only a fellow scientist could appreciate it. Indeed, he has a delightful, good-natured writing style that brings a chuckle page after page — for example, as he writes of the "decidedly unpleasant" personality of Floreana Island's first inhabitant, Patrick Watkins. Watkins, we learn, "had an annoying habit of periodically capturing visiting sailors at gunpoint and making slaves out of them" until 1809, when he made his escape to the mainland in a stolen boat. He sustained himself on the 600-mile voyage, some say, by cannibalizing his captives.

Beyond the wry anecdotes of human involvement in the Galápagos, there is a wealth of lucid natural history in this fine book. Kricher covers all the essentials: the birth, volcanic geology, and plate tectonics of the islands; their geography, oceanography, and climatology; biotic colonization, adaptive radiation, biodiversity, and ecological zonation; the history of human discovery, exploration, settlement, and exploitation; the archipelago's impact on Darwin's

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thought; the pressures of population growth and dilemmas of ecotourism; and of course the natural history of their present flora and fauna. Kricher provides the clearest explanation I have ever seen of how the ocean currents affect the Galápagos climate, nutrient availability, and biogeography.

For photographers, cinematographers, and other visitors, most of the mystique of the islands comes from famous species of animals found nowhere else in the world, and so nonchalant toward humans that they go about their normal courtship, parenting, and predatory behaviors virtually within arm's reach, indifferent to a semicircle of a dozen nature lovers staring down at them, camera shutters clicking madly. The islands are a photographer's paradise. All of the exotic species one is likely to see appear in this book. Kricher offers especially substantive discussions of the giant tortoises, marine iguanas, and Darwin's finches, from which even I as a biologist drew new insights that I am eager to teach to my next class.

This is such a well developed book that it is difficult to suggest improvements without nitpicking. *Galápagos* is not without errors and a few regrettable omissions — what book is not? — but they do not significantly detract from its value. Ideally they can be corrected in a future edition.

There is a sprinkling of misspellings. Some may be mere typographical errors, but some words are misspelled repeatedly, suggesting a need for conceptual correction. Most are taxonomic names: the herons are Ardeidae (not Ardidae), the Sally lightfoot crab is *Grapsus* (not *Graspus*); the tube-nosed seabirds such as albatrosses are Procellariiformes (not Procellariformes), and the cormorants are Phalacrocoracidae (not Phalacrocoracideae). *Punta Cornoran* should be *Punta Cormoran* (named for the cormorant). The Spanish names for the volcanoes are correctly spelled *Volcán* (as in *Volcán Alcedo,* p 57) at first, but are all misspelled by the end of the book (*Vulcán Alcedo,* p 181). The frozen lava flows should be called *tracts* rather than *tracks*. The namesake of Marchena Island is Antonio Marchene (not Antionio). Floreana Island is named not for flowers, but for Juan José Flores, the first president of Ecuador, under whom the country took possession of the Galápagos in 1832.

There is some residual confusion over the name of the Nazca booby. This bird was formerly considered a subspecies of the masked booby, *Sula dactylatra,* until a 1998 study led the American Ornithologists' Union to rename it the Nazca booby *(Sula granti)*. Kricher calls it the masked booby in some places and the Nazca booby in others — as close together as pages 101 and 109, respectively — creating potential confusion that ought to be rectified at the next opportunity, lest visitors think the islands have four species of boobies (these and the blue- and red-footed boobies). This confusion reaches a nadir at page 109, where Kricher states that "The Nazca booby is named for the dark black surrounding its face and eyes...." That would have been correct as an explanation for the name *masked booby,* but the change to *Nazca booby* requires a new explanation: it is named for the Nazca tectonic plate whose movement underlies the vulcanism and ultimately the biology of these islands.

A few other factual corrections are in order, some concerning the bizarre saga of the feuding German inhabitants of Floreana Island. Contrary to Kricher and some sensationalist journalism of the 1930s, Friedrich Ritter pulled his rotting teeth while on the island, not as a preventive measure before leaving Germany. The Wittmers' first child was not born in the Galápagos. He was Harry Wittmer, whose ill health was their primary reason for emigrating from Germany. Frau Wittmer subsequently bore a son in a pirate cave on Floreana. The sultry and coldly manipulative "Baroness" almost certainly was murdered on Floreana and never sailed to Tahiti; there is nothing to corroborate her claim that a yacht had come to take her away from the island. Her beleaguered lover Lorenz, apparently a literal whipping boy for the dominatrix, died of exposure on Marchena Island while trying to escape the Galápagos, not while "exploring" as Kricher has it.

Most biophiliacs who visit the islands go for the animals, but plant enthusiasts may find Kricher's book disappointingly light. So too will scuba divers, for other than a short section on fish, there is little about the subsurface marine life of the archipelago. There is a center section of 50 color photographs, as well as black and white photographs throughout the book, but there are no underwater scenes. There are other books to fill those niches, however, and Kricher provides references to them.

It would be nice to see expanded discussion of a few other points if they would not make the book significantly longer. Some of these could be dispensed with in only a few sentences. Since most visitors to the Santa Cruz highlands will see not only the giant tortoises, but will also visit the Los Gemelos pit craters and probably hike in one of the cavernous lava tunnels, it would be helpful if *Galápagos* included a little explanation of how these craters and tunnels form. This would help to compensate for the limited English of some of the naturalist guides, who I find cannot always explain these very clearly for the English-speaking tourist.

To the traveler who reads in this book that graffiti is prohibited in the islands, it may come as a shock to see so much of it painted on the cliffs of Tagus Cove on Isabela Island and at Darwin Bay on Genovesa Island. It would be helpful to note when the prohibition took effect, and interesting to remark on the historicity of some of the old graffiti. At Darwin Bay, for example, we see the boldly painted signature of the *Velero III,* a research yacht from Los Angeles that visited there in 1938 and rescued Dore Strauch, of the Floreana incident, from the islands. Another bit of history: Kricher remarks that when Louis Agassiz visited the Galápagos in 1872, he published little of his impression of the islands. It should be noted that his wife Elizabeth accompanied him on that trip and she wrote liberally of their impressions in the *Atlantic Monthly*.

On a biological note, it would perhaps be interesting to add something on the unusual polyandry of the Galápagos hawk and mockingbirds; to note that the Galápagos mockingbirds do not mimic other species as the northern mockingbird of the US does; and to note the threat that the fire ants pose to nestling finches and other birds. The book gives a misleading impression that fur sea lions are found on Espumilla Beach, rather than around the bend at the seal grotto. Visitors may be disappointed not to see them at Espumilla, but usually have the option to walk the trail to the seal grotto, one of the islands' most picturesque spots. Kricher's description of Kicker Rock misses the point that it is the eroded remains of a submerged volcanic caldera. I saw the formation in an entirely new and more meaningful light once this fact was revealed on my second or third trip.

Although each chapter provides a moderate list of references for further reading, it is regrettable to find no mention of *Evolution's Workshop: God and Science on the Galápagos Islands,* Edward Larson's masterful 2001 work on the history of human engagement in the Galápagos.

Galápagos is probably best read before departure or aboard ship while cruising the islands. It begins with a chapter told from the viewpoint of a first-time visitor's impressions — a good read for the flight down. The last chapter provides a profile of every island an ecotourist is likely to visit. Reading these just before a shore trip can be helpful in knowing what geological and biological features to expect, and thus contribute to a more meaningful time ashore. Between these first and last chapters are the stories of the iguanas and volcanoes, the tortoises and crabs, the cormorants and boobies. I do wish the chapter titles were more helpful. They are phrases from Darwin's *Voyage of the Beagle*, but are rather cryptic and sometimes misleading. The chapter "Several Huge Whales," for example, has less than two pages on whales and is more about crabs, sea lions, fish, and shorebirds. However, the very good index compensates for this shortcoming.

Galápagos is not a pocket field guide for plant and animal identification while ashore; it is more a story than a guidebook. For a field guide, I recommend the Princeton Pocket Guide, *Wildlife of the Galápagos,* by Julian Fitter, Daniel Fitter, and David Hosking.

I was torn between recommending this book to my 2007 Galápagos touring companions and keeping it a secret so I could draw on it to seem smarter and wittier than I am. In the end, I enthusiastically recommended it, and I look forward also to using it as my text the next time I teach my Galápagos course at Georgia College. Kricher has provided the best available introduction to Galápagos natural history.

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The Tree of Life: A Phylogenetic Classification

by Guillaume Lecointre and Hervé Le Guyader
Cambridge (MA): Harvard University Press, 2006. 560 pages

Reviewed by Kevin Padian

In the past 30 years, the approach of phylogenetic systematics (cladistics, or Hennigian phylogenetics) has revolutionized how we classify organisms. Hennig was a German entomologist who believed, among other things, that organisms should be classified only by descent, not by degree of similarity or other factors, and he set out a method by which to practice this conviction. (Darwin had felt the same way, as he constantly insisted in letters and publications, even while acknowledging that it was not always practical to do so [Padian 1999]).

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Gradually, cladistics swept the world of systematics, first in the ichthyology and vertebrate paleontology departments of some major museums, and then through the other vertebrate biologists to the botanists and invertebrate specialists, fossil and recent. Methods for adapting cladistics to molecular genetic analyses soon followed and continue to be developed. So essentially the whole world is on the same page with this approach (except the inevitable holdouts), and although it has been difficult and confusing to change the meanings and compasses of some classical terms (Reptilia, Mammalia, Tetrapoda), and some have to be discarded as formal terms (Invertebrata), apart from this bookkeeping there is general agreement that cladistics is more explicit, consistent, and ultimately satisfying than the classical approach to classifying life.

The Tree of Life is a terrific compendium of the conclusions of thirty years of research and standardization by thousands of scientists around the globe. It is clearly written, logically organized, and beautifully illustrated. In short, it is one-stop shopping for anyone with questions about where a given group of organisms fits on the tree of life, what characteristics put it there, and how we know all this.

There are fifteen principal chapters: four on basal life forms, two on green plants, five on what are generally called invertebrates, and four on vertebrates, plus a few appendices and indices, and a summary insert of the whole classification of life stapled into the back. Each taxonomic chapter is organized in the same way around a series of internested cladograms. If they look up any group, from streptophytes to turtles, readers will find illustrations of a few representatives of the group and some important anatomical features, a list of its unique derived features (cladospeak for the diagnostic characteristics that set it apart from all other organisms), some information on ecological habits, and a summary of its diversity, fossil record, and current distribution. This is about as compact a road map as anyone could design for a quick overview of biological diversity; and

although for obvious reasons of space not all taxa in the world are explicitly mentioned (and fossil groups are not treated), it is difficult to find fault with the authors' choices of groups to discuss.

Most welcome is the introductory chapter, which encapsulates in about 35 pages a digested history of biological classification, its rationale, and an explanation of current methods and approaches. In future, when I need to give students a quick introduction and update to understanding how we classify organisms, I'll send them here. This chapter and the compact, explicit treatment of all living groups of animals makes this book more than a reference work: it is a handy guide to theory and practice in systematics. Karen McCoy's translation of the original French edition is competent and fluid, a pleasure to read. This book deserves wide distribution and use in libraries and classrooms, as well as among professionals and students of biology.

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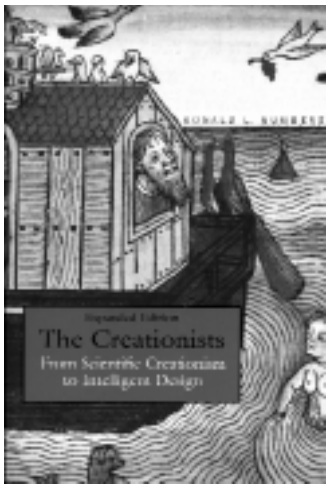
The Creationists: From Scientific Creationism to Intelligent Design (Expanded Edition)

By Ronald L Numbers
Cambridge (MA): Harvard
University Press, 2006. 606 pages

Reviewed by Francis B Harrold

In 1992, Ronald Numbers published *The Creationists* to wide acclaim (Numbers 1992). Numbers has now produced an expanded edition, which adds a new introduction and two new chapters to an otherwise unchanged text. Since some readers have become interested in the creationism/evolution issue in the years since Numbers's book appeared, I will review the book as a whole, while stressing the new chapters that update his coverage of the controversy.



This book is an intellectual history of religiously inspired anti-evolutionism, primarily in the US, since the latter 19th century. It is a meticulous work by a distinguished historian — with 431 pages of text, followed by 133 pages of detailed notes on sources. Some readers might find it heavy going, but Numbers writes in an engaging style and keeps the narrative moving briskly, writing about the human qualities as well as the theology of leading creationists.

The book is based on prodigious research (done mainly in the 1980s) on interviews with creationists, books, pamphlets, journals, newsletters, and correspondence. Many of the figures Numbers interviewed are no longer alive, and his book gives us an invaluable look at their work and thought. Who were the writers and speakers who have driven the creationist movement? How did their thinking and writing "evolve" over time? Numbers answers these questions in detail, recounting creationists' disputes with evolutionists, and with each other, over religious doctrine and its proper relation to science, and the tactics and strategy to be employed against evolution. While making it clear that he disagrees with creationists, he treats them fairly and indeed sympathetically.

Numbers shows that, from the beginning, creationists' objections to evolution have been based, not on scientific grounds, but on prior theological commitments. They have typically accepted scientific findings that they believed could be squared with their religious beliefs, rejected those that could not, and sometimes, advanced arguments against evolution on putatively scientific grounds. At a time when many believe the creationism/evolution dispute to have been always the same argument between science and religion, Numbers demonstrates that the grounds of the argument have shifted over the past century and more.

Anti-evolutionist intellectuals well into the 20th century accepted far more of the scientific consensus on the history of the earth and of life than do most creationists today. They typically conceded that the earth and life are ancient, and that the fossil record demonstrates gradual, often progressive, change through time in life forms. They usually insisted on the special creation of humanity, and denied that evolution, driven by natural selection, had produced the great variety of life on earth. Their reconciliation between the Bible and science generally was either through the "day-age" theory (linking the days of creation in Genesis with geological ages) or "gap" theory. The latter allowed an indefinite period between verses 1 and 2 of the first chapter of Genesis, a period which could contain the long history of earth and life depicted by geologists, before the recent creation of Adam and Eve. Famous anti-evolutionists, from William Jennings Bryan to Jimmy Swaggart, have embraced this "old-earth" creationism.

The main story of Numbers's book, however, is the obscure origin and eventual triumph of "young-earth" creationism — the claim that, as implied by a literal reading of Genesis, the earth and all life were directly created within the past few thousand years. So complete has been this triumph

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that in most people's minds today, "creationism" and "young earth" are synonymous. Numbers recounts the stories of the seminal figures in this transformation of Christian anti-evolutionism. There was George McCready Price (1870–1963), the Seventh-Day Adventist who, inspired by the writings of Adventist prophet Ellen G White, wrote numerous books arguing that the standard system of geological ages was completely wrong, offering in its place "flood geology" — the claim that essentially the entire geological and fossil record was the product of the biblical Deluge. Not a trained geologist, Price was widely dismissed as a crank in both scientific and many Christian circles.

However, Price laid the basis for modern creationism, which was launched by theologian John Whitcomb and hydraulic engineer Henry Morris in *The Genesis Flood* (1961). Whitcomb and Morris began the age of "scientific creationism," claiming that scientific evidence, properly interpreted, supports a biblical-literalist explanation of the geological and fossil records at least as well as conventional scientific theory. Numbers chronicles in detail the growth of scientific creationism in the 1970s and afterwards, powered especially by Morris's Institute for Creation Research (ICR), and the challenges to evolution in legislative and court battles aimed at "equal time" for creationism in public schools. He details how, as conservative Christianity became a potent sociopolitical force, it increasingly emphasized young-earth creationism. Numbers's book is not a social or cultural history — for instance, it sheds little light on why conservative Christianity has gained such influence in American society since the 1960s, or of how the resources to spread the creationist message were mobilized — but it peerlessly traces the intellectual history of modern Christian anti-evolutionism.

The new chapters in the expanded edition discuss two signal developments in creationism since 1992. The first is the rise of the "intelligent design" (ID) movement. Led by figures who are both less religiously conservative than traditional scientific creationists, and less marginal in academic and intellectual circles, the ID movement is well financed and sophisticated. It has both an intellectual project — redefining science to include supernatural forces — and a political one. ID has supplanted "scientific creationism" as the rallying cry for those opposing evolution in public schools. Numbers ably traces the rise of this movement and profiles its leading figures. He notes its success in constructing a "big tent" under which many different Christian denominations and sects (though they may not agree on much else) can use the same language (for example, "Teach the controversy!") in opposing evolution in the schools and society.

The final chapter discusses the recent international spread of young-earth creationism. This spread is linked to the success of fundamentalist and evangelical Protestant missionaries in the Third World. Young-earth creationism has become a standard part of the theology of such missionaries, who have diffused it widely, aided by such organizations as the ICR and Answers in Genesis. But young-earth creationism has also had success in non-Christian parts of the world. The ICR, for instance, has been active in Turkey and other Muslim locales, and inroads have been made among Eastern Orthodox Christians, Catholics, and conservative Jews who were previously indifferent or accommodating to evolution. These other groups do not adopt the ICR's theology, but, in what may be a worldwide religious reaction against modernism, they find the message of young-earth anti-evolutionism appealing. Numbers does not really seek to explain these large-scale movements, consistent with his tendency to eschew social analysis for detailed intellectual and theological history.

One regret on the part of this reviewer is that, except for the two added chapters, the book has not been updated. As the author himself notes, "Had I chosen to rewrite the book, I could have benefited from a considerable amount of fresh scholarship" on creationism (p 5). In particular, insights from the social sciences into the recent successes of conservative Protestantism in general, and creationism in particular, would have enriched the book (for example, Toumey 1994; Harrold and Eve 1995; Coleman and Carlin 2004). Nonetheless, this is an essential book for anyone seeking to understand modern creationism.

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The Scopes Trial: A Brief History with Documents

by Jeffrey P Moran
Boston: Bedford/St. Martin's, 2002.
230 pages

Reviewed by George E Webb

This volume offers much to students of one of the most famous court trials in American history. Moran seeks to accomplish the laudable goal of integrating the Scopes Trial not only into the continuing evolution controversy in America, but also into broader cultural developments in the 1920s. His target audience is clearly

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American historians, rather than historians of science, so details of the development of evolutionary theory are, at times, lacking. This oversight, however, does not detract from the value of the book as a convenient summary of the trial and the culture that surrounded it.

Moran points out in his preface that the Scopes Trial involved important themes such as constitutional issues, religious views, and educational philosophy. For these and other reasons, he describes the trial as a "useful lens" for focusing attention on the cultural conflicts of the 1920s. Following an introductory section that provides an overview of the Jazz Age and various aspects of the trial, Moran provides a carefully edited trial transcript (eliminating the legalistic details that make reading such documents a chore) interspersed with newspaper accounts of the day's proceedings. These reporters' comments add greatly to the reader's better understanding of the trial. The third section of the book includes various supporting documents (including a small collection of cartoons), most of which are organized around various themes such as regionalism, race, gender, and academic freedom. The book is completed by a useful chronology and bibliography, as well as an excellent index.

The 72-page introduction offers a succinct background of the Scopes Trial. An excellent sketch of William Jennings Bryan and a good account of the passage of the Butler Act provide the political foundation for the trial, but the author is primarily concerned with establishing the cultural context of the anti-evolution phenomenon. To this end, he examines such topics as the rise of the "new woman" and its challenge to Victorian ideals, the emergence of "modernity" and the reaction against it, and the status of evolutionary concepts within the society of the early 20th century. Keeping in mind that the author is targeting students in American history, his decision to exclude the debates over evolution within the scientific community is understandable, if somewhat disappointing.

The last 16 pages of the introduction focus on brief discussions of various topics that add to the broader understanding of the Scopes Trial. In addition to surveying the divisions in the United States at this time (rural vs urban, south vs north), the author also examines the controversy surrounding academic freedom in the public schools. He then addresses topics that, as he stresses, have not been sufficiently examined. Although not addressed during the trial, race relations receive significant attention. A survey of these relations in the 1920s is followed by a brief analysis that reveals the same divisions among black churches as characterized white churches during the anti-evolution crusade. He also discusses the role of women and gender issues, pointing out that women were active in the controversy over evolution, but almost exclusively on the anti-evolution side. Moran argues that these were part of the reaction against the "flappers" of the 1920s. "As with prohibition," he concludes, "anti-evolutionism was a female-dominated reform movement that invoked a mother's duty to protect her children and make the state an extension of maternal moral influence" (p 71).

Moran provides a valuable perspective on the trial itself by including a day-by-day transcript of the high points of the court proceedings, followed by a reporter's comments from that particular day of the trial. The well-known exchanges between Darrow and Bryan are included, as well as numerous comments by other trial participants. The final section of the book includes several essays and comments about various topics related to the trial. Here the author attempts to cast the trial in terms of currently fashionable themes in American history such as race, class, and gender, with intermittent success. Admittedly, the author's goal is to provide a book for use in a general history course, but at times the inclusion of social history topics is something of a stretch. He includes comments by noted Indian activist Vine Deloria Jr, for example, who wrote in his volume *Red Earth, White Lies* (New York: Scribner, 1995; reviewed in *RNCSE* 1998 Nov/Dec; 18 [6]: 10–4) that European science has given us an incorrect view of the earth and that, in fact, the earth is quite young, as many Native American belief systems hold. Moran asks readers to evaluate the degree to which Deloria's perspective is different from that of the 1920s fundamentalists, an intriguing pedagogical suggestion but not one that will please readers seeking a more detailed account of the Scopes Trial.

In short, Moran has provided a very good supplemental volume for a course in American history, one that alerts students to the multifaceted aspects of the Scopes Trial. All readers will benefit from the broader perspective on this important event. Readers familiar with the scientific aspects of the evolution controversy will gain much from his discussion of the cultural factors involved, while those whose knowledge of the trial comes from *Inherit the Wind* will learn that the Scopes Trial was truly much more complex than is generally known.

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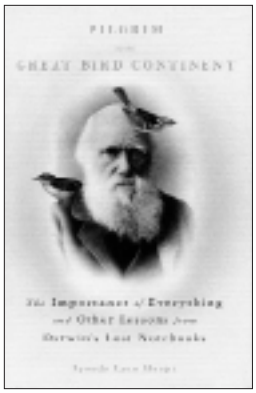
Pilgrim on the Great Bird Continent: The Importance of Everything and Other Lessons from Darwin's Lost Notebooks

by Lyanda Lynn Haupt
Boston: Little, Brown and Company, 2006. 277 pages

Reviewed by
Paul Lawrence Farber

Lyanda Haupt has produced an accessible and entertaining biographical sketch of Darwin in her book *Pilgrim on the Great Bird Continent*. Her stated goal was to show how Charles Darwin, who set out on HMS *Beagle* at the tender age of 22 with a smattering of knowledge in natural history, became a serious naturalist. In



reading Darwin's carefully written books, it is easy to forget that he had little formal training to become a naturalist, much less one who would revolutionize the life sciences. He had studied medicine in Edinburgh, but left without a medical degree, and then had trained for the clergy in Cambridge. In both places, he had the good luck to fall under the tutelage of competent naturalists, but it was during the five years he spent in his circumnavigation that he went from a having a curiosity about nature to becoming a committed naturalist.

Haupt sets out in her charmingly written book to tell how Darwin matured during those years associated with the *Beagle*'s voyage. She focuses considerably on the *Ornithological Notes* that Darwin made during his five years' traveling. The notebooks, like most of Darwin's manuscripts, have been published and make for interesting reading for scholars. To the general reader, however, they are obscure. Haupt has taken them, and combined them with information that she has mined from the most up-to-date and reliable sources on Darwin's life, his ideas, the state of natural history at the time, and the state of ornithology in his day. The result is an easily readable book that follows Darwin's maturation as a scientist and places that story in a wider context.

Indeed, the context is very broad. Haupt follows Darwin's early observations in South America, his awe at first seeing the Brazilian jungle, his slowness to catch on to what ornithological wonders existed in South America (he was more interested in geology and beetles, at first), and his increasing feeling for nature. She captures through a few well-chosen examples Darwin's prodigious powers of observation and his ability to design simple experiments to discover more about how animals behave. The book repeats some of the best Darwin stories, such as his realization while eating a meal in the field that the bird that was being served was exactly the kind for which he had been searching. By recovering what the cook had not served (head, neck, legs, some feathers, and a wing) he was able to salvage enough to permit a good reconstruction by John Gould, the famous ornithologist who studied Darwin's bird collection after the voyage. Haupt also debunks some of the Darwin myths, like the importance at the time of some small finches he collected in the Galápagos Islands, or the preposterous story about Darwin's alleged deathbed conversion.

Pilgrim on the Great Bird Continent also explores some of the issues concerning Darwin's theory of evolution and religion. Haupt recounts Darwin's agony over the loss of his favorite daughter and how that ended whatever sympathy he had with the vision of a universe designed by a benevolent creator. At the same time, she is careful to capture Darwin's sense of humility and his tolerance and respect for others (including his wife) who held religious convictions.

Haupt tells her story well. We see Darwin maturing before our eyes, and she has drawn a sympathetic portrait of him. She has also interspersed her account with extensive discussions of her own experiences in the field, with birds, and with the conservation movement. She moves smoothly from telling us about her experiences stuffing birds, to 15th-century Buddhist poets, to Darwin's attempts to discover whether condors have a sense of smell or not. Darwin's humanity, humility, and observational acuity emerge in her telling of his life seen through the lens of his interest in birds. This is an ideal book to give to a bird-watcher acquaintance who thinks Darwin was some sort of modern devil, out to destroy religion and to dehumanize our picture of nature.

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Dawkins' God: Genes, Memes, And The Meaning Of Life

by Alister McGrath
Malden (MA): Blackwell Publishing, 2005. 202 pages

Reviewed by Evan B Hazard

Setting: Richard Dawkins is a noted evolutionary biologist, a skilled popularizer of evolutionary biology, and a militant atheist who believes science precludes a reasonable person's accepting any sort of religious faith; Alister McGrath has a PhD in biophysics from Oxford. An atheist in his student days, McGrath became interested in the relationship of science and Christianity while continuing his education in the sciences. He eventually became an Anglican priest, as have some other British scientists. McGrath first served an English parish and later returned to Oxford as Professor of Historical Theology.

When McGrath was renewing his interest in Christianity as an Oxford undergraduate, he began wondering whether "the working methods and assumptions of the natural sciences" could "be used to develop an intellectually robust Christian theology." After some decades, he published *A Scientific Theology* and *The Science of God: An Introduction to Scientific Theology*. McGrath has written

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many and diverse books at various levels, several of them about theology and its relation to science. Unfortunately, of these I have read only *Dawkins' God*. However, I have read some of Dawkins's books, and find McGrath's treatment of them accurate and fair.

Dawkins' God is accessible, clearly written, and scholarly. Extensive endnotes refer to Dawkins's writings plus other relevant works, and a bibliography lists other works consulted. McGrath puts his cards on the table in an introduction, including relevant autobiography and an account of his encounter with Dawkins's books, from *The Selfish Gene* (1976) through *A Devil's Chaplain* (2003). He emphasizes that *Dawkins' God* is not a critique of Dawkins's evolutionary biology, and I find no evidence that McGrath has reservations about evolution, as evolutionary biologists generally understand it today. His issue, rather, is with the conclusions Dawkins draws about intellectual history and theology.

Five chapters follow the introduction. Chapter 1 introduces Dawkins, his thinking on why evolution invalidates religion, the history of Darwin's theory, Mendelian genetics, the Modern Synthesis, molecular genetics, and current developments. In this chapter, McGrath says that "most evolutionary biologists" consider Darwinism a description, not an explanation, of reality. Following Bronowski (1965), I demur. Scientists may spend most of their time gathering and analyzing data, but our distinctive calling is to devise testable explanations, that is, to create theories that generate hypotheses with predictions we can measure. It is true that in our role as scientists, we cannot provide metaphysical explanations ("Why is there a universe?"), and many of us suspect that nobody can with any assurance. Dawkins has no patience for those who hold that, if science cannot answer "why" questions, some other discipline must be able to. McGrath seems to think that theology might be at least qualified to *ask* them.

Chapter 2 shows (to my satisfaction, at least) that Dawkins demonstrates not that Darwinism disproves God, but only that it disproves William Paley's 1802 "argument from design", which had been rejected by many Christian theologians even before Darwin published (including John Henry Newman in an 1852 lecture). In short, McGrath claims that Dawkins knocks down a straw man.

Chapter 3 examines the nature of evidence as used in science and theology. Dawkins treats religion of any sort as "blind faith" that disregards evidence. McGrath does not claim faith to be capable of the sort of verification characteristic of science, but shows that theology is (or at least can be) characterized by intellectual rigor that takes into account the realities of the natural world. To Dawkins, faith is like belief in the Tooth Fairy — something to grow out of. McGrath notes that many come to faith in God as grownups, but nobody does so with the Tooth Fairy. McGrath fairly contrasts Dawkins's elegant presentation of evolutionary biology with his superficial, oversimplified, and often historically inaccurate caricature of religion, Christianity in particular.

Chapter 4 examines Dawkins's notion of "memes" and their supposed spread by natural selection. McGrath and other authors have shown memes to be at best Lamarckian, not Darwinian phenomena, and that the notion violates Occam's Razor: memes are redundant. They are already better explained within accepted social science categories.

Finally, McGrath argues that historians now believe that Christianity has as often supported the sciences as opposed them. He says the "warfare of science and theology" of AD White (1896) and others is basically an outdated, "historically located" model, "developed by religiously alienated individuals in the 19th century to help ... natural scientists to break free from ecclesiastical control — a major issue in the intellectual life of Victorian England." Like Father Ernan McMullin (1992 and elsewhere), McGrath gives numerous examples of church support of science over the centuries. On the other hand, McGrath cites similar tensions between science and religion in 11th-century Persia and 19th-century Japan. In light of those observations, of his acknowledgment of Galileo's difficulties, and of a careful reading of the works and lives of Linnaeus, Copernicus, and others, it seems — in contrast to McGrath's summary argument — that the "warfare" model, of one cultural institution claiming jurisdiction over another, was and is widely valid.

McGrath says "a Christian reading of the world denies nothing of what the natural sciences tell us," thus not limiting us to Dawkins's "pokey little Medieval universe of religion." That's his (and my) reading, but it hardly reflects consensus, either among Christian (or other religious) laity, or among professional theologians. This may be less of a problem in Britain than here, where major religious groups have official hostile positions on science's picture of reality, and where most people surveyed hold anti-scientific views of the operation and history of the universe.

Dawkins' God elegantly shows Dawkins's views of religion to be shallow and historically flawed, and shows science does not necessarily conflict with faith. The book's only failing is that Dawkins's bad job of confronting religion allows McGrath to ignore the reality that many present-day believers have the sort of superstitious worldview that Dawkins abhors, and that this poses a real danger for humanity's future.

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Darwin Loves You: Natural Selection and the Re-enchantment of the World

by George Levine
Princeton (NJ): Princeton University Press, 2006. 304 pages

Reviewed by Chet Raymo

Let's get the title out of the way first. It was suggested by a bumper sticker given to the author by his son — a takeoff on the ubiquitous "Jesus Loves You." Levine seems anxious that the catchy title will trivialize what is a serious work of scholarly argumentation. He repeatedly asserts the title's relevance.

If "Darwin Loves You" was chosen to appeal to a broad popular audience, it is false advertising; the book is not an easy read, especially the early chapters. Levine is a professor of English at Rutgers University, and his prose is more typical of the *Modern Language Quarterly* than the front tables of the bookstores. On the other hand, scholarly readers who will appreciate Levine's broad familiarity with literary and scientific sources are unlikely to feel the need for Darwin's affection.

Having said that, I hasten to add that the subject of the book is of considerable interest to cultural warriors both scholarly and pop, and any reader who does the work necessary to attain the latter chapters will be amply rewarded.

For a substantial number of contemporary Americans, perhaps the majority, "Darwinism" has come to stand for an amoral world of blind chance, without human meaning — in short, a disenchanted world in which humankind's highest aspirations are reduced to mere illusions. Without a supernatural agency to lend purpose to our lives, we might as well be quarreling rats in a cage, say the anti-evolutionists, with no reward for goodness and no compensation for pain endured.

The complaint that natural selection disenchants the world is not new. It was prominent in Darwin's time, and troubled Darwin himself. He may have delayed publication of his great book for fear of the uproar it would cause. Perhaps it was necessary for Darwin to consolidate his own sources of enchantment — which Levine takes care to elucidate — before he was confident enough to release his secularizing blockbuster onto pious Victorians. Not least of the pious Victorians, Darwin worried about his beloved wife Emma, a devout Christian made anxious by her husband's apostasy.

Darwin's robust agnosticism was based on more than an absence of evidence for divine interventions in the world. As the saying goes, "absence of evidence is not evidence of absence." Like others before him, Levine ascribes particular gravity to a singular event in Darwin's life — the death of his daughter Annie at age ten, probably of tuberculosis. It was inconceivable to Darwin that Annie's suffering was willed by a just and loving God. To believe such a thing was "not only intellectually impossible but morally repulsive," writes Levine. Of course, theist Victorians, like believers today, had rationalizations of the so-called "problem of evil", but Darwin would have none of it. Nature was neither good nor evil, it just *was*. To lean on the crutch of faith to evade or deny the pains of life was not a path Darwin's fierce intellectual honesty would allow him to take.

But if there is no God to give meaning, and no promise of an afterlife to rectify the apparent injustices of the earthly realm, why get out of bed in the morning? Why be good? Why work? Why love?

The late-19th-century British statesman Arthur Balfour questioned those scientists, like Darwin, who restrict themselves to naturalistic explanations of the world. Without divinity, wrote Balfour, "the starry heavens" become comparable to "the protective blotches on the beetle's back." In other words, buy into Darwinism, and the grandeur of God's creation, including the moral law, becomes as mundane as a beetle's spots. But, says Levine, the power of the Darwinian synthesis is that it endows the beetle's spots with the sublimity of the starry sky. It is precisely by integrating even the lowly beetle into a sublime fabric of nature that natural selection re-enchants the world.

By writing the divine out of the world, Darwin wrenched intellect away from feeling, say the anti-Darwinists, and this more than anything is the reason for the modern feeling of disenchantment. Give the evangelical Christian opponents of evolution this: their heads and their hearts are in the same place.

Levine's book shows that for Darwin too, intellect and feeling were one: "His work and his life were infused with a sense of the value of things, with a deep emotional engagement in the material world." Darwin was not a mechanical materialist, insists Levine; he was a romantic materialist, with a sense of the "miraculousness of the natural order in every one of its manifestations," the beetle's spots, for instance, and even manifestations that most of us would be happy to do without, such as the tuberculosis pathogen.

Darwin's works, like the Scriptures, have lent themselves to a multitude of readings. Levine brings to his agenda the close reading skills of an accomplished literary scholar. A clearer notion of his audience might have yielded a book that would have more successfully engaged those who could most profit from Darwin's love.

Canada's Creation Museum

Shortly after Answers in Genesis opened its creation "museum" on Memorial Day, the Big Valley Creation Museum — reportedly the first permanent creationist museum in Canada (*Globe and Mail* 2007 Jun 6) — was also opening its doors. The new museum is located in Alberta, about halfway between Calgary and Edmonton, and about an hour's drive from the Royal Tyrell Museum of Paleontology. In addition to the usual biblical fare, it features something described as an "interactive bacterial flagellum".

Chet Raymo is the author of more than a dozen books on science and nature, including Skeptics and True Believers *(New York: Walker and Company, 1998). His essays on science appear on-line at <http://www.sciencemusings.com>.*

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