NCSE

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DEFENDING THE TEACHING OF EVOLUTION AND CLIMATE SCIENCE

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"Enlightened" by Charlotte Carney. © 2013.

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UPDATES

Missouri: Missouri's House Bill 1472, introduced in the House of Representatives on January 16, 2013, was the third antiscience bill of the year, following Virginia's HB 207 and Oklahoma's SB 1765. If enacted, the bill would require "[a]ny school district or charter school which provides instruction relating to the theory of evolution by natural selection" to have "a policy on parental notification and a mechanism where a parent can choose to remove the student from any part of the district's or school's instruction on evolution." Parents and guardians would receive a notification containing "[t]he basic content of the district's or school's evolution instruction to be provided to the student" and "[t]he parent's right to remove the student from any part of the district's or school's evolution instruction."

NCSE's deputy director Glenn Branch commented, "House Bill 1472 would eviscerate the teaching of biology in Missouri." Quoting "The OOPSIE compromise—A big mistake," which Eugenie C Scott and he wrote for *Evolution: Education and Outreach* in 2008, he added,

> Evolution inextricably pervades the biological sciences; it therefore pervades, or at any rate ought to pervade, biology education at the K–12 level. There simply is no alternative to learning about it; there is no substitute activity. A teacher who tries to present biology without mentioning evolution is like a director trying to produce *Hamlet* without casting the prince.

The sponsors of HB 1472 are Rick Brattin (R–District 55) and Andrew Koenig (R–District 99), both of whom have a history of sponsoring anti-evolution bills in Missouri, none of which have passed.

Missouri: Missouri's House Bill 1587, introduced and given its first reading in the Missouri House of Representatives on January 23, 2014, was the fourth antiscience bill of the year and the second in the state. The bill specifically cites "the theory of biological and hypotheses of chemical evolution" as controversial.

HB 1587 would require state and local educational authorities to "assist teachers to find more effective ways to present the science curriculum where it addresses scientific controversies" and to permit teachers "to help students understand, analyze, critique, and review in an objective manner the scientific strengths and scientific weaknesses of the theory of biological and hypotheses of chemical evolution." It would prevent such authorities from "prohibit[ing] any teacher in a public school system of this state from helping students understand, analyze, critique, and review in an objective manner the scientific strengths and scientific weaknesses of biological or chemical evolution whenever these subjects are taught."

The sponsor of HB 1587 is Andrew Koenig (R–District 99); cosponsors are Rick Brattin (R–District 55), Donna Lichtenegger (R–District 146), Kurt Bahr (R–District 102), Galen Higdon (R–District 11), Sandy Crawford (R–District 129), and Paul Wieland (R–District 112).

Oklahoma: Senate Bill 1765, styled the Oklahoma Science Education Act, was the second antiscience bill of the year. SB 1765 would, if enacted, in effect encourage science teachers with idiosyncratic opinions to teach anything they pleased—proponents of creationism and climate change denial are usually the intended beneficiaries of such bills—and discourage responsible educational authorities from intervening. No scientific topics are specifically identified as controversial, but the fact that the sole sponsor of SB 1765 is Josh Brecheen (R–District 6), who introduced similar legislation that directly targeted evolution in two previous legislative sessions, is suggestive. SB 1765 uses the same boilerplate language as Missouri's HB 1587 (see above).

In 2011, Brecheen introduced Senate Bill 554, combining a version of the now familiar "academic freedom" language—referring to "the scientific strengths [and] scientific weaknesses of controversial topics ... [which] include but are not limited to biological origins of life and biological evolution"—with a directive for the state board of education to adopt "standards and curricula" that echo the flawed portions of the state science standards adopted in Texas in 2009 with respect to the nature of science and evolution. It failed.

In 2012, Brecheen introduced Senate Bill 1742, modeled in part on the so-called Louisiana Science Education Act. It failed. In 2013, Brecheen tried again. Senate Bill 758 followed the lead of Tennessee's "monkey law" enacted in 2012 as Tenn Code Ann 49-6-1030. However, SB 758 omitted the monkey law's statement that "biological evolution, the chemical origins of life, global warming, and human cloning ... can cause controversy" when taught in the science classroom of the public schools. SB 758 died in committee.

South Carolina: At its January 8, 2014, meeting, the South Carolina state board of education voted to adopt a new set of science standards, rejecting two different proposals that would have compromised the treatment of evolution. The standards under consideration are a revision of the standards adopted in 2005, which the Fordham Institute graded as A– in its 2012 evaluation of state science standards. According to the Fordham study, "At the high school level, evolution is treated excellently and the support documents are exemplary."

At the board's meeting in October 2013, resistance to adopting the standards included members of the board itself: Michael Brenan inquired whether the concept of "irreducible complexity" was included in the

standards, for example, and Danny Varat suggested that a standard about climate change was "leading toward a predetermined conclusion". Nevertheless, the board gave its initial approval to the standards, which then went to the state's Education Oversight Committee for its review.

On December 9, 2013, the EOC decided to return the standards to the state board of education with a list of recommended changes. Of particular interest in the EOC's list: the standard (HB 5A2) calling for students to "[c]onstruct explanations of ways scientists use data from a variety of sources to investigate and critically analyze aspects of the theory of biological evolution" would be revised—"to improve clarity"—to call for students to "[u]se data from a variety of sources to investigate and critically analyze aspects of the theory of biological evolution".

The South Carolina Department of Education responded by proposing that the standard instead be revised to call for students to "[e]xplain how scientists use data from a variety of sources to investigate and critically analyze aspects of the theory of biological evolution". Presumably reacting to the absence from the EOC's proposed revision of any reference to scientific practice, the department commented, "As evolution is a scientific theory, it is critical that students learn a scientific approach to data analysis."

The board sided with the department over the EOC, voting to adopt the standards with the department's version of HB 5A2. The board also considered a proposal by its member Neil Willis, seconded by Rhonda Edwards, to include language about "creation by design" in the standards. Explaining that he was concerned about schools teaching material that contradicted what parents taught at home, Willis said that he wanted to allow teachers to tell students that there were other theories. His proposal was rejected.

Texas: Zack Kopplin, writing in *Slate* (2014 Jan 16) reported on his investigation into Responsive Ed, which operates more than sixty-five charter schools in Texas, Arkansas, and Indiana, and receives more than $82 million in public funds to do so. Examining workbooks used in Responsive Ed's schools, Kopplin concluded, "These workbooks both overtly and underhandedly discredit evidence-based science and allow creationism into public-school classrooms."

> When public-school students enrolled in Texas'[s] largest charter program open their biology workbooks, they will read that the fossil record is "sketchy". That evolution is "dogma" and an "unproved theory" with no experimental basis. They will be told that leading scientists dispute the mechanisms of evolution and the age of the earth. These are all lies.

Among the claims that he cited as problematic: that there is no "single source for all the rock layers"; that "[s]ome scientists" question the established age of the earth; that evolution cannot be tested; that there is a "lack of transitional fossils", which is a "problem for evolutionists who hold a view of uninterrupted evolution over long periods of time". The section on the origin of life quotes Genesis 1:1.

Responsive Ed's vice president of academic affairs was quoted as saying that the curriculum "teaches evolution, noting, but not exploring, the existence of competing theories". Unreassured, Kopplin commented, "Bringing creationism into a classroom by undermining evolution and 'noting ... competing theories' is still unconstitutional," citing the Supreme Court's 1987 decision in *Edwards v Aguillard*.

Asked for his appraisal of the situation, NCSE's Joshua Rosenau commented,

> Some people don't realize that the First Amendment applies to charter schools just as much as to any other public school. Teaching creationism or other sectarian religious claims as if they were science is wrong anywhere, but it's especially bad to use tax dollars to force one person's religion onto school kids.

Dan Quinn of the Texas Freedom Network told Kopplin, "These materials lie to students about science, and using them puts the school—and the taxpayers who fund it—at risk of a lawsuit it would almost certainly lose." But Kopplin suggested that a lawsuit could be avoided if legislators "take the appropriate actions to regulate these schools and improve Texas charter policy," explicitly calling for the revocation of Responsive Ed's charter.

In the wake of Kopplin's article, the Texas Freedom Network called on the Texas education commissioner to investigate the allegations. In a January 16, 2013, press release, TFN's president Kathy Miller said, "It's imperative that the education commissioner investigate whether this charter school operator is undermining the education of thousands of students and putting the state and taxpayers at risk of expensive lawsuits."

The Texas Education Agency subsequently replied that Responsive Ed and the TEA were independently reviewing the materials, adding,

> It should also be noted that complaints and allegations regarding instruction at the campus level are a local matter in Texas to be addressed by

> the governing boards of local education agencies. As a result, TEA has limited jurisdiction over day-to-day operations.

Meanwhile, the CEO of Responsive Ed responded to the allegations, saying that the company

> strongly disagrees with *Slate*'s implication that the Texas state standards requiring schools to critique and examine all sides of scientific theories—including the theory of evolution—is unconstitutional. We also disagree that any reference to creationism in our science curriculum violates any state or federal law, including the United States Constitution.

A recipient of NCSE's Friend of Darwin award, Kopplin is famous for organizing the effort to repeal the so-called Louisiana Science Education Act. In 2012, he criticized Louisiana's school voucher program for funding private Christian schools that teach creationism and dismiss evolution; the voucher program was subsequently found to violate the Louisiana state constitution on unrelated grounds.

Virginia: House Bill 207, prefiled in the Virginia House of Delegates on December 27, 2013, and referred to the Committee on Education, was the first antiscience bill of 2014. The sponsor (or "chief patron") of the bill is Richard P "Dickie" Bell (R–District 20).

The bill calls upon the state board of education and local school boards to

> create an environment in public elementary and secondary schools that encourages students to explore scientific questions, learn about scientific evidence, develop critical thinking skills, and respond appropriately and respectfully to differences of opinion about scientific controversies in science classes

and to "assist teachers to find effective ways to present scientific controversies in science classes"; they are forbidden to "prohibit any public elementary or secondary school teacher from helping students understand, analyze, critique, and review in an objective manner the scientific strengths and scientific weaknesses of existing scientific theories covered in science classes." Presumably attempting to immunize the bill against the accusation that it is religiously motivated, the bill also provides,

> Nothing in this section shall be construed to promote or discriminate against any religious or nonreligious doctrine, promote or discriminate against a particular set of religious beliefs or nonbeliefs, or promote or discriminate against religion or nonreligion.

No specific supposed scientific controversies are mentioned in the text of the bill, but press reports on the bill, such as WHSV's (2014 Jan 7), suggest that Bell was thinking about evolution.

House Bill 207 subsequently received extensive coverage in a hometown newspaper—*The Recorder*, published in the district of the bill's sponsor. In reporting on various bills introduced by Bell, the newspaper commented (2014 Jan 23), "By far, Bell's proposal for science teachers has attracted the most scrutiny."

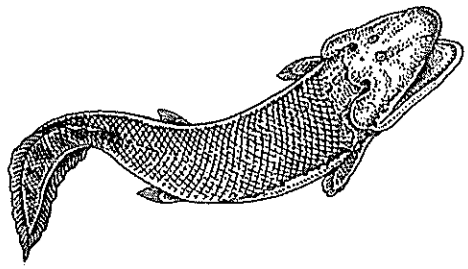
After summarizing the bill, and noting the precedents enacted in Louisiana in 2008 and Tennessee in 2012, the newspaper asked Bell about his intentions. Bell disclaimed any desire to promote doubt about evolution or encourage the teaching of religious beliefs, although he himself is a creationist and is not convinced that evolution is scientifically credible. Rather, he claimed that science educators are worried about controversies in the classroom over topics like evolution and global warming: "Some people accept global warming, some don't. You can't discount everything; it's all theory at this point." The bill, he explained, was intended not to encourage teachers to broach the discussion of such controversies but to make them comfortable when they arise.

NCSE's Glenn Branch was unimpressed, telling *The Reporter*, "These bills have been consistently and vehemently opposed by practically every national scientific and science teaching organization." He pointed out that proponents of the bills, like Bell, have never actually offered any evidence that educators are fearful about teaching scientific controversies or have been persecuted for doing so. And he added that Virginia's science standards already promote critical thinking.

The Reporter noted, "A number of religious freedom groups, civil rights and science teacher organizations are gearing up to oppose the bill," and quoted Debra Linick of the Jewish Community Relations Council as saying,

> Though creationism and evolution are not directly mentioned, this bill is similar to efforts seen no [fewer] than 50 times in 17 states in the past decade that open science classes to fringe lectures and potential costly lawsuits. Only Louisiana and Tennessee have passed such legislation—in both cases, over the protests of state and national organizations of scientists and of science teachers. A call for the repeal of Louisiana's law has been supported by over 70 Nobel laureates. ... Courts have long established that creationism is not appropriate to be considered alongside evolution.

Bell acknowledged that there is no apparent problem that his bill would solve: the absence of such a problem "will probably determine the fate of the bill ... I don't like its chances, not this year." ■



NCSENEWS News from the Membership *Glenn Branch*

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!

Two members of NCSE received awards at a recent ceremony held by the Oklahoma Science Teachers Association. **Julie Angle,** Assistant Professor of Education at Oklahoma State University, received the Outstanding College/University Science Teacher Award, conferred by the Oklahoma Science Teachers Association (OSTA). **Deborah Hill** received the Oklahoma Science Teacher of the Year Award, conferred by the National Association of Biology Teachers. Hill, who teaches biology and zoology at Norman High School in Norman, Oklahoma, is also the new High School Director for OSTA. Congratulations to both!

Photograph: Wesley R Elsberry.

Barbara Forrest

Writing in the Erie, Pennsylvania, *Times-News* (2013 Sep 18), **Barbara Forrest** warned Pennsylvanians about the threatened antiscience bill in their state. As NCSE previously reported, in August 2013, Stephen Bloom (R–District 199) was circulating a memo seeking cosponsors for a proposed bill resembling the antiscience bill enacted in Tennessee in 2012.

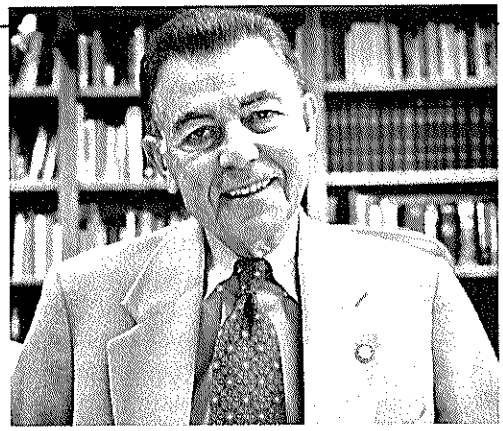
Reminding her readers about the 2005 trial in *Kitzmiller v Dover*, establishing that the teaching of "intelligent design" in the public schools is unconstitutional, Forrest observed that the Discovery Institute's reaction was to announce its "new front in the debate over intelligent design—the need to protect academic freedom."

She continued, "With intelligent design exposed as creationism in court, the Discovery Institute now conceals its true aims behind the sanitized code language of 'academic freedom' legislation, seeking to undermine the teaching of evolution under the guise of 'critical thinking.' But the Discovery Institute's 'new front' is a shopworn creationist tactic."

Forrest argued that Bloom's bill pursues the goal of promoting "intelligent design" creationism: "Pennsylvanians shouldn't be fooled: Bloom is pushing a stealth intelligent design creationism bill, pure and simple, and the Discovery Institute plans to exploit Pennsylvania's legislative process the same way it exploited Louisiana's and Tennessee's."

Glenn Branch is NCSE's deputy director.

AYALA JOINS NCSE BOARD OF DIRECTORS



Photograph: Xiao Dai, via Wikimedia Commons.

NCSE is pleased to announce the addition of Francisco J Ayala, a distinguished evolutionary geneticist at the University of California, Irvine, to its board of directors. "I have long been impressed with NCSE's effective advocacy in the cause of the integrity of science education," Ayala explained. "At a time when its efforts are as needed as ever, I am pleased to become a member of NCSE's board of directors and to help it with its diverse efforts to defend the teaching of evolution and climate science."

NCSE's executive director Ann Reid commented, "Ayala's contributions to NCSE and its goal of defending the teaching of evolution in the public schools have always been substantial," citing in particular his testimony for the plaintiffs in *McLean v Arkansas* and his coordination of support for evolution education at the National Academy of Sciences, including his lead authorship of *Science, Evolution, and Creationism* (National Academies Press, 2008; previous editions were published as *Science and Creationism* in 1984 and 1999).

Brian Alters, the president of NCSE's board of directors, was also enthusiastic:

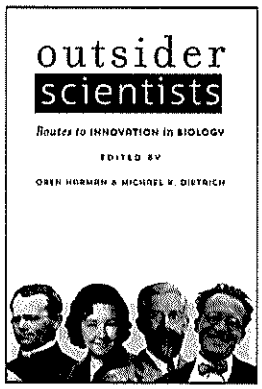
> I can't think of anyone who understands the importance of NCSE's work better or anyone who is more committed to the cause of defending science education than Francisco Ayala, and I am delighted to welcome him aboard.

A supporter of NCSE since its founding, Ayala is University Professor, the Donald Bren Professor of Biological Sciences, and Professor of Philosophy at the University of California, Irvine. He received the National Medal for Science, the nation's highest award for lifetime achievement in scientific research, in 2001, and the Templeton Prize in 2010, as well as honorary degrees from twenty-one universities worldwide. A prolific author, his latest book is *The Big Questions: Evolution* (London: Quercus, 2012). ■

When Forrest wrote, there was no sign of Bloom's bill, but the legislature was not in session at the time. The bill is still not apparent. Bloom told Fox 43 television (2013 Sep 4) that he recruited seven cosponsors for the bill and hoped to add further cosponsors when the legislature reconvenes.

Forrest is Professor of Philosophy at Southeastern Louisiana University, coauthor (with **Paul R Gross**) of *Creationism's Trojan Horse: The Wedge of Intelligent Design* (revised edition, New York: Oxford University Press, 2007), and a member of NCSE's board of directors and a recipient of NCSE's Friend of Darwin award; she testified for the plaintiffs in *Kitzmiller v Dover*.

Among the contributors to *Outsider Scientists: Routes to Innovation in Biology* (Chicago: University of Chicago Press, 2014), edited by Oren Harman and Michael R Dietrich, were a few members of NCSE. **Sander Gliboff** of Indiana University wrote on "The many sides of Gregor Mendel"; **Michael Ruse** of Florida State University (and a member of NCSE's Advisory Council) wrote on "The paradox of Samuel Butler: Insider or outsider?"; and **Richard C Lewontin** of Harvard University (and a member of NCSE's Advisory Council) offered the epilogue, "The problem with boxes." In the preface, the editors explain that the volume aspires to present "a thought-provoking sample of some of the remarkable boundary crosses of the modern era who have come into biology": in addition to Mendel and Butler, the book contains essays on Louis Pasteur, Félix d'Herelle, Erwin Schrödinger, Linus Pauling, Walter Goad, RA Fisher, Nicolas Rashevsky, Robert MacArthur, Noam Chomsky, Elaine Morgan, David Hull, Ilya Metchnikoff, François Jacob, John von Neumann and Norbert Weiner, George Price, and Drew Endy.



NCSE congratulates **Leonard Krishtalka** for becoming the namesake of *Nyctitherium krishtalkai*, "a fossilized 50-million-year-old insect-eating mammal, about the size of a shrew or small hedgehog," according to a press release issued on October 28, 2013, by the University of Kansas. **Richard Stucky**, curator of Paleoecology and Evolution at the Denver Museum of Nature & Science (and member of NCSE's Advisory Council), was quoted as saying, "I named it after Krishtalka because of his mentoring in the early stages of my career and for his research on the group of fossil mammals to which it belongs."

Krishtalka himself commented in the press release, "I'm very honored to have a new species discovered by science named for me." A member of NCSE, Krishtalka is Professor of Ecology and Evolutionary Biology and director of the Biodiversity Institute at the University of Kansas. He was active in resisting the attempts of creationists to compromise the integrity of Kansas's state science standards in 1998 and again in 2005. Krishtalka is generally credited with the memorable description of "intelligent design" as "creationism in a cheap tuxedo."

The latest discoveries of hominid remains at Dmanisi in the Republic of Georgia prompted **Al Kuelling** to write to the Fort Wayne, Indiana, *Journal-Sentinel* to explain, "science welcomes testable evidence either to support or contradict existing understandings. The skulls, in this case, strongly support the universally accepted concept (in scientific circles) of biological evolution—that all species, large or small, that have ever existed evolved from some other specie[s], rather than being created instantly by a supernatural power." But that, he added, should not be taken as conflicting with religion: "My God leaves filling in the gaps of human knowledge about the natural world up to science. My religious denomination accepts the findings of science, including evolution and human-induced global warming." Kuelling was instrumental in convincing the United Methodist Church to adopt a statement opposing the teaching of creationism (including "intelligent design") in the public schools. His letter appeared on November 3, 2013.

On August 29, 2013, **David Morrison** was awarded the NASA Exceptional Achievement Medal "for ... exposing the 2012 doomsday hoax and using science to reassure the public and overcome widespread fear of the end of the world." The citation for the medal cited his work answering questions for NASA's "Ask an Astrobiologist" website for a decade, which included sustained efforts to debunk the belief that the world would end on December 21, 2012. A member of NCSE's Advisory Council, Morrison is Director of the Carl Sagan Center for the Study of Life in the Universe, at the SETI Institute in Mountain View, California. He is Past Director of the NASA Lunar Science Institute and a senior scientist in astrobiology at NASA's Ames Research Center.

Howard Winet's article "Understanding creationist physicians and engineers as students and collaborators in biomedical engineering" was published in *Ethics in Biology, Engineering & Medicine* (2013;4[1]:15–23). The abstract of his article:

> Creationism is not uncommon among members of the medical and engineering professions. While this circumstance may seem counterintuitive, it is consistent with the history of both professions. Both medicine and engineering avoided science until the 19th century, and education in both professions did not incorporate science into their curricula into the 20th century. Until fairly recently, these professions were primarily empirical. Their primary goal has been and still is problem solving, and if one sees problem solutions as truths, they can be termed "truth professions". Science is an "understanding" profession, and the most fundamental understanding in biological science is the natural selection model of Neo-Darwinism. It can be reasoned that truth professions attract individuals who find fulfillment

in developing truths, and science attracts individuals who can endure uncertainty. Because religious individuals are psychologically more accustomed to thinking in terms of truths, they tend to gravitate toward truth professions. Their training does not, generally, include rigorous science, so they can satisfy any licensing requirements without exposure to biology in depth.

Winet is Adjunct Professor of Orthopedic Surgery and of Bioengineering at the University of California, Los Angeles. ■

AYKUT KENCE DIES

Turkish biologist Aykut Kence died on February 1, 2014, at the age of 67, according to soL Portal (2014 Feb 1). A pioneer in evolutionary biology and population genetics in Turkey, he was also a tireless advocate for teaching evolution and an opponent to government attempts to include creationism in the Turkish biology curriculum and to the efforts of fundamentalist groups to undermine the teaching of evolution.

Writing in *Reports of the NCSE* in 1999, Kence and a colleague reviewed the history of evolution education in the Turkish Republic. There was a secular curriculum in place from 1923, but a rise of fundamentalism after World War II eventually ushered creationism into biology classroom in the 1980s. A change in government in 1998 led to temporary improvements in evolution education. But these "infuriated and mobilized those who wanted evolution to be taken out of the curriculum." Now, by the efforts of powerful Turkish politicians and the Islamic creationist organization headed by Harun Yahya, Turkey has the lowest rate of acceptance of evolution in the developed world. As Kence and two colleagues wrote in *Science and Education* in 2010, "[c]urrently most students at K–12 and beyond in Turkey are not provided with a scientific understanding of the origin and history of life." For nearly 35 years, Kence consistently was at the forefront of scientists working to counter and reverse anti-evolution activity in Turkey—even despite receiving anonymous death threats. Kence told the journal *Science* in 2001, "If knowledgeable people keep quiet, it only helps those who spread nonsense."

Aykut Kence was born in Istanbul, Turkey in 1946. He received his diploma in zoology and botany from Istanbul University in 1968 and his PhD in biology from the State University of New York, Stony Brook, in 1973. After postdoctoral studies at the University of Houston, he returned to Turkey to work at the biology department of the Middle East Technical University of Ankara. He served as the president of the Biological Association of Turkey from 1988 to 1992.

BERNARD WINOGRAD DIES

Bernard Winograd, a member of NCSE's board of directors, died on March 1, 2014, at the age of 63. A successful business executive, Winograd was fervently interested in evolution and concerned with the integrity of science education. He joined NCSE's board of directors in 2010, serving as vice president and treasurer during his tenure on the board. "It wasn't just his financial acumen that was invaluable to NCSE," commented Eugenie C Scott, then NCSE's executive director, "but his intelligence, his curiosity, his broad knowledge of so many subjects, and his passion."

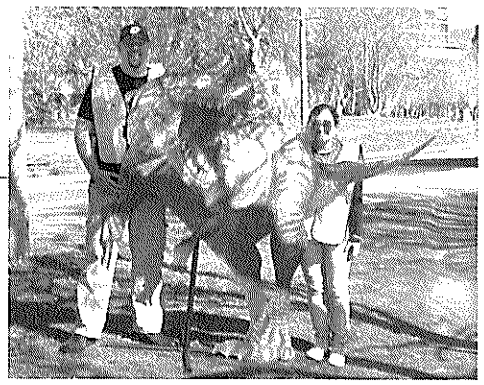
In *The Neighborhood Project: Using Evolution to Improve My City, One Block at a Time* (New York: Little, Brown 2011), David Sloan Wilson recounted his encounter with Winograd, to whom he was introduced by NCSE's Scott:

> His evolution began when he was forced to take a biology course and he became fascinated with the part that dealt with evolution and biological anthropology. Ever since, he maintained an amateur's interest in evolution and saw parallels with the ways that companies compete and financial markets evolve over time.

Wilson added, "He was attracted to my work after reading *Evolution for Everyone*. The NCSE was defending the teaching of biological evolution in public-school education. I was gazing at humanity through the crystal ball of evolution. Bernard was interested in helping out with both endeavors." Winograd subsequently joined the executive advisory board of the Evolution Institute, cofounded by Wilson.

Winograd was born on December 31, 1950, in Detroit, Michigan. He attended the University of Chicago, graduating in 1970 with a BA in social sciences. During his career, he worked for the Bendix Corporation, the United States Treasury Department (where he was executive assistant to the Secretary of the Treasury, W Michael Blumenthal), and Taubman Centers. In 1996, he joined Prudential to lead its real estate investment operations. In 2002, he started at Prudential Financial, where he was senior vice president and then executive vice president and chief operating officer, and also at Prudential Investment Management, where he was president and chief executive officer. He retired in 2011.

from THE STAFF



Two volunteers, Ben Matzen and Elizabeth Ferrer, with Fluffy the Giganotosaurus

Photograph: David Clark.

DAVID ALMANDSMITH writes: On February 16, 2014, NCSE sponsored a Billion-Year Walk in partnership with Oakland's Rotary Nature Center and the University of California's Museum of Paleontology. Over two hundred participants registered to walk five kilometers around Lake Merritt, Oakland's downtown lake and wildlife refuge, while encountering forty-two signs describing the geology, climate, cosmology, and biology of the previous billion years on the planet. Docents signed up the participants, explained exhibits, answered questions, and took people's pictures with Fluffy, a cardboard *Giganotosaurus,* and with Lucy, an *Australopithecus afarensis* skull replica.

In April 2013, Glenn Branch brought my attention to a story on AAAS's blog by Margo Pierce about "The Ancestor's Trail Hike" near Toronto. It is an annual 12.5–kilometer hike with signposts along the way that describe evolutionary events from a billion years ago to the present. Each step on the trail takes the participant another 60 000 years closer to the present day. I contacted the Hike's organizer, Kevin Saldanha, and learned he had patterned the event after a 20–kilometer "Ancestor's Trail Hike" in the United Kingdom that began in the present and ended 3.2 billion years in the past at the dawn of life. Both events were based on the book *The Ancestor's Tale: A Pilgrimage to the Dawn of Evolution*, by Richard Dawkins. Saldanha encouraged me and NCSE to prepare our own version.

NCSE's mission to defend the teaching of good science in public schools nationally is well served by such an event aimed at helping the public grapple with the fundamental concept of Deep Time. Without some appreciation for the immensity of time over which evolution has operated, the fine-tuning of living organisms to their niches seems thoroughly magical. Putting together this pilot event in the Bay Area gave NCSE a chance to document the preparations and materials needed to stage similar events in other communities.

I chose Saldanha's version, where the walk starts a billion years in the past and ends in the present. This resulted in more frequent signposts as the participants progressed through the walk but still offered a significant Deep Time experience. For example, in the five-kilometer walk around Oakland's Lake Merritt, the distance between "1492—Columbus sets foot on North America" and "1969—Astronauts set foot on the Moon" was 2.6 mm. Images and text on a mere half-meter wide sign at the end depicted the entire final 200 000 years up to the present.

Keeping costs low was a major project goal. We used one-inch PVC pipe for the forty-one signposts. The resulting signposts were very sturdy and stable. They are reusable year after year, slip apart for easy storage, and cost only about $6 each. The signs were printed on 11"×14" paper using NCSE's inkjet printer and then laminated in plastic to protect them in case it rained on the day of the event.

I sent an e-mail to all of NCSE's members in the Bay Area asking for volunteers. On the day before the walk, I met with the seventeen volunteers to answer questions and let them each select the assignments and time shifts they wanted.

Starting an hour before the walk, volunteers set the signposts along the trail and prepared displays and food inside the Rotary Nature Center. A generous donor gave us a hot water urn, beverages, and snacks. The Rotary Nature Center contributed energy bars, as well as their facilities and staff. NCSE set up its banners and our table included materials from the Lawrence Hall of Science.

After a slow start, the docents could barely keep up with registering participants and equipping them for their billion-year walk. Each child picked out a toy dinosaur and a compass before the trek. Also, the docents gave each family or group of participants a billion-year trivia quiz, a pencil, and a guide to local birds.

The responses of the walkers were overwhelmingly positive. Teachers wanted us to schedule future walks during school days so that their students could complete walk. Parents had great suggestions for making the walk more kid-friendly such as attaching a sign for kids below the current adult sign and giving out passports to stamp at stations around the lake. Everybody praised the volunteer docents for their knowledge, helpfulness, and friendliness. I agree. More than anything else, it was the volunteers that made the event successful.

We have posted detailed documents on NCSE's website (http://ncse.com/taking-action/billion-year-walk) describing every facet of preparing and running a billion-year walk. Try it out yourself, and let us know about your successes!

Although I doubt that anyone can fully comprehend Deep Time, it is possible—and essential—to make it easier for people to accept and appreciate that 10 000 years is but a moment in the history of the earth. NCSE is doing its part toward that end.

A Reflection on the Bill Nye–Ken Ham Debate

John W Patterson

On February 4, 2014, two well-known figures debated the question "Is creation a viable model of origins in today's modern scientific world?" Ken Ham, the founder and leader of the Answers in Genesis ministry, repeatedly insisted that it is, that the universe as we know it was created by God in six 24-hour days some 6000 or so years ago. Bill Nye—widely known as television's "Science Guy"—argued that Ham's biblical creationism is not scientifically viable at all.

To the scientifically literate, Nye clearly won the debate by patiently outlining many reasons why the overwhelming majority of competent scientists today regard Ham's faith-based creationism as scientific nonsense. So successful was Nye, in fact, that Pat Robertson, the famous television evangelist—whose presidential campaign back in the 1980s was heavily supported by young-earth creationists—said, "to say that it all came about in 6000 years is just nonsense. ... I think it's time we'd come off of that stuff and say, this isn't possible" (http://www.mediaite.com/tv/pat-robertson-on-creation-debate-nonsense-to-think-earth-is-only-6000-years-old/).

Having followed creationist debates since the late 1970s—and participated in six or more myself—my assessment of the debate will differ from that of those who, to my astonishment, seem completely unaware that creationism is still being taught as science in many of America's public schools.

First and foremost, Ham's honesty and candor sets him markedly apart from any of the creationist debaters I have listened to or debated in the past. Previously, creationist debaters would insist that neither debater should make any reference whatever to religion or the Bible. With this precondition in place, they then proceeded to deliver unsettling barrages of thinly veiled apologetics, polemics, and code phrases. These, to the delight of creationists in the audience, provided indisputable "scientific" support for ideas that even Pat Robertson calls nonsense, such as that the Genesis Flood produced the geologic column and that the age of the universe is on the order of 6000 to 10 000 years.

This debate was completely different, and I for one applaud Ham for being the first creation science debater in my experience to be honest about the biblical basis for all young earth creationism. I commend him also because he did not rely on the misquoting of renowned scientists, preferring instead to quote credentialed creation scientists. Truthfulness has its price. Ham's candor spared Nye the burden of having to refute the kinds of obfuscations and distortions that creationist debaters typically have used in the effort to direct attention away from the biblical basis for creationism.

Because of this, some will say that Nye should have done much better than he actually did. But I think Nye chose to be much more gentlemanly than a lesser man might have been under the circumstances. However, I think the Nye–Ham debate will unleash unprecedented divisiveness within the creationist movement. I expect that the "traditional" creation-science ministries may condemn Ham's candor as a harmful blunder. Ham's candor could harm their previously successful debate strategy which hid the biblical roots of their assertions and pretended to have a scientific basis.

Now there will be far less public confusion about the distinctions between legitimate evidence-based science and the faith-based biblical varieties so successfully propounded by creationist debaters. In contrast, Ham's approach lays bare what's really behind all creationism, from the young-earth biblical literalism to the more inchoate "intelligent design" models.

The one thing I wish Nye had not left out has to do with why modern science so completely ignores God and supernaturalism in general when striving to explain natural phenomena. In science, interpretations and explanations are deemed credible according to their predictive capacity and how much mystery and fearful bewilderment they eliminate. Nye spoke to the predictive poverty of creationism, but failed to point out that explanations involving supernaturalism (and God especially) necessarily increase the amount of unfathomable mystery and bewilderment beyond anything that ordinary nature can entail.

In science, supernatural explanations are considered worse than none at all for two reasons. First, they tend to stifle meaningful inquiry by any who accept such fruitless explanations. Second and more important, religious explanations do the opposite of what genuine scientific explanations are intended to do. For creationists, an escape from fearsome mysteries of this world is a good thing. Modern science, by contrast, seeks to enhance the human understanding and control of nature, not only by eliminating as much mystery and fear as possible, but also by opening new vistas to explore and devising new methods for exploring them. Frequently scientific endeavors lead to unexpected new understandings of fascinating new phenomena and in many cases to a certain betterment of the human condition.

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Creation–Evolution at the Podium: That's Debatable!

Andrew J Petto

I have never witnessed a creation–evolution debate. In nearly 35 years of following arguments and counterarguments from creationists of various sorts and the scientists who oppose them, I have never witnessed what one could accurately call a debate in the strict sense of the word: an interactive argument or disputation with a specific rhetorical structure. This description may fit the great formal debates of our cultural history, but they hardly apply to what most of us experience as "debate" in modern society, as exemplified by political campaigns or the legislative process (even less on cable television) ... and, of course, creation–evolution debates.

These events often do *mimic* true debates: they start with a premise or a resolution. The most recent example featuring Bill Nye and Ken Ham proposed this one: "Is creation a viable model of origins in today's modern scientific era?" Since we know the short answer from both of them ("Yes" for Ham and "No" for Nye), what we should expect is for each debater to provide evidence about why his answer is true. Then, in rebuttal, each debater should be able to magnify the obvious weaknesses in his opponent's position while strengthening his own arguments.

For the most part, this event followed the pattern of public "debate" in the early 21st century: little more than an exchange of carefully drafted sound bites and "gotcha" moments. These make it easy to tally up points to name a "winner" but we all lose in the process for the failure of the "debaters" to engage critically and formally the arguments of their opponents and expose their weaknesses.

In creation–evolution encounters, what happens on the podium is rarely what one can reasonably consider a debate. Perhaps the sun has set on the great age of debates. But only a naturalistic model can tell us how the sun sets ... and why we can expect to see it in the morning. And that is not debatable.

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Summary of *RNCSE* 2014;34(2):3.1-3.3; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/297/443

AN INVITATION TO RNCSE READERS

Are we living at the end of a geologic epoch, about to pass into the next? If extinction events mark major boundaries in geologic time, our times surely qualify. Some kind of cascading environmental crisis, beginning with the melting of the polar ice caps, may change earth's climate and affect living species as much any of the major extinction events in the past.

I believe that these challenges are serious enough that we need a new way of looking at both the problems and possible solutions. I have served as the lead writer of an integrated intellectual approach to these issues, and I invite the readership of *RNCSE* to read, respond, and critique the ideas posted on this website: www.leavingearth-creationstory.com. I would greatly appreciate the critical engagement of a readership as diverse and dedicated as those who read this publication.

The main thesis is that, for humanity to survive, we cannot afford to ignore any of our human intellectual endowments, because the margin between survival and apocalypse may be quite narrow. The future belongs to those who can access the entire human intellect, which includes our scientific knowledge, but also our rich legacy in the humanities—history, literature, the arts, philosophy, and theology, for example—and the valuable traditions that they provide in recognizing and promoting value, morality, and aesthetics to our common pursuits.

Perhaps, to be fully human we must learn the truths that these disciplines offer. Not only will they help us survive the grim realities we face, but they will also give us the vision and the determination to build a sustainable civilization for the future of our species. In particular, I believe that there is an essential role for religious faith in these efforts at creating a viable future for our species.

If you are curious about how science and faith work together, visit the web site for *Leaving Earth? A Creation Story for Off-World Emigrants* (www.leavingearth-creationstory.com) and tell us what you think. We are eagerly searching for frankly critical, science-educated readers to review a creation story for global civilization, one that combines science (in all its glory) with our highest spiritual aspirations.

George Elias, Lead Writer
The Global Creation Story Project
www.leavingearth-creationstory.com

Eyewitness to the Debate

Steve Watkins

On February 4, 2014, a rare event took place at the Creation Museum in Petersburg, Kentucky. Bill Nye ("The Science Guy") and Ken Ham (Answers in Genesis's chief executive officer and co-founder of the Creation Museum) met to debate the topic "Is creation a viable model of origins in today's modern scientific era?"

Accompanying me to the debate was James Bielo, an anthropologist from Miami University (Ohio). Bielo is a colleague also working on a project related to Answers in Genesis. We had planned to walk around the Creation Museum and to observe the overall environment informally. However, a staff member suggested that we should promptly proceed to Legacy Hall: a large room with a multi-purpose stage that is regularly used as a lecture hall for the Creation Museum and the site for this event.

The crowd was almost exclusively white and fairly young—I estimated an average age under 35 years. Based on the automobiles in the parking lot and attire of those in the audience, I concluded that the crowd was also predominantly middle- to upper-middle class. There was also a quite visible group of Nye supporters in the audience.

Readers interested in a detailed summary of the event can find the entire debate (as well as highlights) at National Public Radio (http://www.npr.org/blogs/thetwo-way/2014/02/04/271648691/watch-the-creationism-vs-evolution-debatebill-nye-and-ken-ham). The arguments of the principals did not really interact with their opponent's positions. Ham repeatedly asked Nye how life could come from non-life. Nye repeatedly asked Ham to make predictable statements that could be tested by scientists. Ham repeatedly appealed to the Bible as the ultimate source of authority for science and any other matter it spoke to.

It was really little more than a set of talking points that were prepared and polished by both men in advance. It was more like a presidential debate where questions can be easily avoided in favor of returning to a given agenda. They did not react to one another's ideas in a more discursive, emergent way.

One of the most telling questions for me was the last one asked by the moderator to both Ham and Nye. He asked the following: "What is the one thing more than anything else upon which you base your belief?" Ham's reply was essentially that the Bible was the perfect record of all history and that what it said was undeniable. Nye responded that he based his beliefs on the process of science.

These two competing sources of authority—the academic scientific community and personal interpretations of the Bible—are dealing with entirely different epistemologic bases. In this respect, I think the Creation Museum scored the most points because it made it appear that there was an actual debate within academic science, even though Nye pointed out that the terms Ham used to define science were simply nonexistent in the scientific community.

So the question about whether to hold "debates" like this one remains: If we do not expect (or generally observe) that anyone's mind has been changed, then what is the purpose? If there is no serious engagement of one's opponent's ideas and just a repetition of "talking points", then is it even a "debate"? Perhaps we are too conditioned by what we see in legislative sessions or political campaigns under the guise of "debating", but even if we accept the value of confronting creationism's masquerade as science in public events, these events seem to do little more than "show the flag". And that is not nearly enough.

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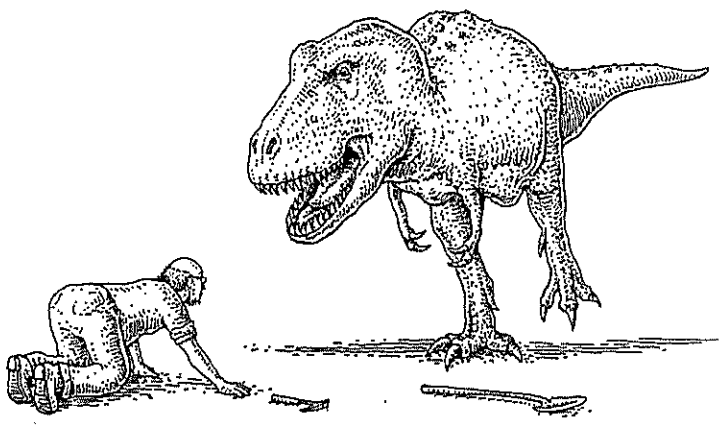
Summary of *RNCSE* 2014;34(2):4.1-4.5; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/299/447



Science and Public Policy

Bernard Winograd

Is science policy doomed to be another political football, kicked back and forth between the right and the left? No less a right-wing political luminary than Yuval Levin, former Bush Administration policy staffer and the founding editor of *National Affairs,* wrote: "The dispute ... is ... between two elements of the larger society (which we would not be remiss to call the left and the right), with science merely one subject of the argument" (Levin 2008:2).

That science policy can be used by left and right for political purposes does not necessarily mean that it must be nothing more than another in the depressingly long list of disputes between those two political tendencies. It turns out that there is a public policy agenda that is pro-science, yet it is orthogonal to the right–left divide. But even once we understand what that agenda would be, it becomes obvious how hard it is to escape the gravitational-like pull of the right–left dichotomy.

To begin with, it seems obvious that the primary objective of science policy would be defense of the scientific method and scientific inquiry from pre-emptive attempts to limit it. The teaching of evolution in science classrooms is a wonderful illustration of this policy issue. NCSE has spent more than a quarter of a century wrestling with efforts to limit this kind of attack on science teaching.

Readers of *RNCSE* do not need a recapitulation of the history of these battles. Since the defendants of teaching evolution are more frequently (although not exclusively!) from the left side of the political spectrum and the opponents are (virtually all) from the right, this example seems to support the thesis that science has an agenda that is reducible to the right–left continuum. In this view, the right seems willing to limit the scientific agenda to avoid challenging other perspectives, and the left seems to favor the right of scientists to set their own agendas and police their debates by using the rules of scientific inquiry.

But the issue is clearly not that simple. There is a second imperative which logically belongs in a science policy agenda: that facts unearthed by the scientific process should be used to inform public policy decisions. Using the example of the controversy over Golden Rice—a cultivar genetically modified to provide vitamin A to malnourished populations—Levin explores the incongruities in the arguments among both left- and right-leaning organizations in their support of allowing science's efforts to examine issues without regard to potential political controversies.

Much of the rest of Levin's book is devoted to advocating for an exception to this approach in the case of biotechnology, which he sees as posing huge moral issues that ought to warrant pre-emptive restraint, for example, the scientific investigation of human cloning. Here we have in a nutshell how confusing science can be to the traditional right–left categories. Both the left and the right are prepared to limit the freedom of science when it touches certain of their sacred cows. Just which cows are sacred depends on one's prior political disposition, not on the science. One of the more important insights of recent research is that people will react to questions of right and wrong more strongly than to rational arguments employed by advocates on both sides (most notably, Haidt 2012).

There actually is a scientific agenda. Its key elements surely include having political and social rules that make possible the pursuit of scientific inquiry and leave the resolution of scientific disputes to the scientific community. It also includes allowing scientists to prescribe the substance of science education. And it would arguably include strong advocacy for deference to science in settling questions of fact, expecting everyone to share the chore of dealing with those facts in setting public policy.

Science has made powerful contributions to human well-being reducing poverty, malnutrition, childhood mortality, and widespread adult disease. The gap in well being between the societies that embraced free scientific inquiry and those that shunned it is conspicuous in just a few generations. Advocacy for science in the name of these benefits is worthwhile and is not an issue that should belong to either the left or the right.

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Summary of *RNCSE* 2014;34(2):5.1-5.5; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/300/448

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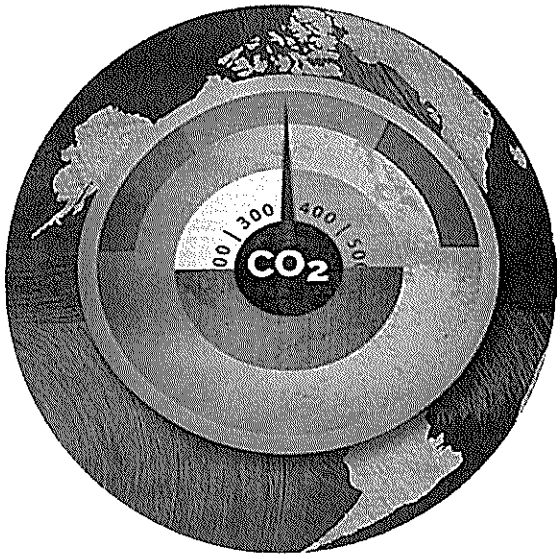

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The "Man Tracks" in Glen Rose

Randy Moore

Among the most enduring legends used by young-earth creationists to impugn evolution are the alleged "man tracks" beside dinosaur tracks in the Paluxy River near Glen Rose, Texas. Although dinosaur tracks in the area's Cretaceous limestone became famous when they were excavated from the Paluxy River by Roland Bird in the late 1930s (Bird 1939), the "man tracks" were not well-known until the 1960s and 1970s, when they were promoted by the Bible-Science Association and young-earth creationists such as the Reverend Stanley Taylor and Henry Morris.

Today, the Glen Rose "man tracks" continue to appeal to young-earth creationists (YECs) because the tracks are an easily understood piece of evidence allegedly showing that humans lived with dinosaurs. They are also a rare example of actual field research by YECs that does not involve scanning the Internet or citing other creationism-based publications. Despite extensive debunking by the scientific community that the Paluxy "man tracks" are anything *but* human footprints, they continue to be promoted in numerous books (for example, Baugh and Wilson 1994, Judkins 2009) and are a standard exhibit in several "creation museums" (as discussed, for example, in Moore 2010).

Why do claims about the Glen Rose tracks persist?

Since the early 1980s, the primary advocate of the Paluxy "man tracks" has been Carl Baugh, a former Baptist preacher who advertises and displays several "man tracks" in his successful and expanding Creation Evidence Museum (CEM) outside of Glen Rose (Moore 2009a, 2009b). Baugh claims to have excavated "more than 80 human footprints in Cretaceous limestone" around Glen Rose (Creation Evidence Museum 2013).

Baugh describes the concerns of his critics as "nonsense" (Baugh and Wilson 1991:156), claiming that "the only reason for rejecting [the 'man tracks'] as a human print is 'the Establishment' argument that dinosaurs had died out long before man was around" (Baugh and Wilson 1994:73). Baugh claims that critics cannot find the human prints because (a) the prints dry out or erode quickly to be documented photographically; or (b) they simply do not know where to look.

In July 2013, I participated in an excavation of the Paluxy River organized and directed by Carl Baugh and the CEM. We found and cleaned several dinosaur tracks, as well as several features that were certified as "man tracks" by Baugh and his assistants (Moore 2014).

In my assessment, the alleged "tracks" were indistinguishable from countless other random marks, erosional depressions, and in-filled marks from heel impressions of dinosaurs. However, Baugh, his assistants, and others participating in the excavation quickly agreed that the tracks were made by humans; one visitor placed her foot in a track, after which the leaders of the expedition proclaimed that the track was "women's size 9."

If you'd like to learn about some of the Glen Rose "man tracks," see the excellent and extensive work by Glen Kuban (1995–2010, 1996–2013), who has studied the Glen Rose tracks for decades.

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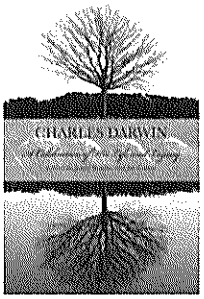
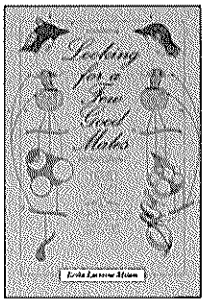
Summary of *RNCSE* 2014;34(2):1.1-1.6; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/282/452

SUMMARIES OF BOOK REVIEWS



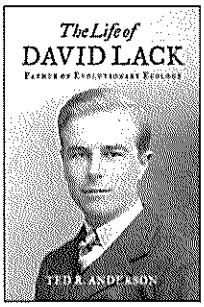
Charles Darwin: A Celebration of His Life and Legacy edited by James T Bradley with Jay Lamar (Montgomery [AL]: NewSouth Books, 2013; 253 pages). The product of Auburn University's celebration of the Darwin anniversaries in 2009, "this anthology would be of interest to anyone wishing to gain a grasp of the impact of Darwin on the disciplines discussed in these essays, and anyone seeking lucidity regarding the theory of organic evolution," writes reviewer **Carol Anelli,** who particularly liked the contributions by Richard Dawkins; Kelly A Schmidtke, John F Magnotti, Anthony A Wright, and Jeff Katz; Anthony Moss; and James T Bradley.

Summary of *RNCSE* 2014;34(2):5.1–5.3; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/244/423



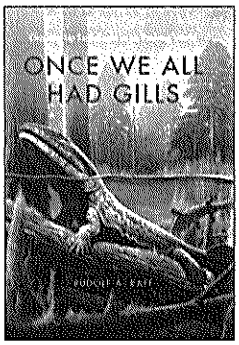
Looking for a Few Good Males: Female Choice in Evolutionary Biology by Erika Lorraine Milam (Baltimore [MD]: The John Hopkins University Press, 2010; 236 pages). "*Looking for a Few Good Males* provides a historical survey, essentially limited to the twentieth century, of concepts and research concerning biological issues of female reproductive choices," reviewer **Lee Ehrman** explains. Especially valuable in her view are "a chronological record of experiments into sexual selection—described, documented, and interpreted as nowhere else." Praising the international coverage of Milam's treatment, she adds, "These unique chapters, utilizing interviews, are valuable, and soon to be irreplaceable."

Summary of *RNCSE* 2014;34(2):6.1–6.3; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/159/458



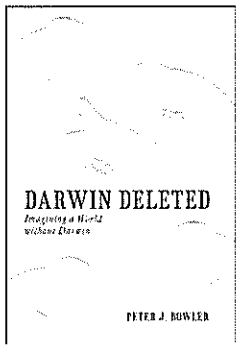
The Life of David Lack: Father of Evolutionary Ecology by Ted R Anderson (Oxford: Oxford University Press, 2013; 256 pages). Although Ted R Anderson's "short book is packed with interesting detail," reviewer **Paul Lawrence Farber** concludes, "the biography suffers from its close focus on Lack's writings and personal life at the expense of looking at the broader intellectual and institutional context of his work. Nonetheless, *The Life of David Lack* is a welcome addition to the literature on the history of evolution, and it will be of interest to all of those who teach about evolution in their classes."

Summary of *RNCSE* 2014;34(2):7.1–7.2; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/256/457



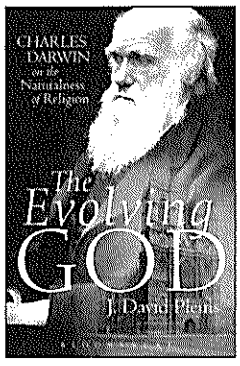
Once We All Had Gills: Growing Up Evolutionist in an Evolving World by Rudolf A Raff (Bloomington [IN]: Indiana University Press, 2012; 354 pages). According to reviewer **Scott F Gilbert**, "it is well worth while to read this book for many reasons. One is to read of a life, a life in science, well lived. But this is not only an autobiography of Rudolf Raff; it is a biography of contemporary embryology and how it, too, has changed during the past half-century. Moreover, this is a book about natural history as path to science."

Summary of *RNCSE* 2014;34(2):8.1–8.3; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/173/454



Darwin Deleted: Imagining a World without Darwin by Peter J Bowler (Chicago: University of Chicago Press, 2013; 318 pages). *Darwin Deleted,* writes reviewer **William Kimler**, "is a fully fleshed imagining of the type of evolutionary theory that might have developed had Darwin not lived," which "gives us a brilliant scholar, fully in command of his material, enjoying himself in thinking through what might otherwise have been by constructing a counterfactual history." "[A]nyone who has read a biography of Darwin or followed the controversies over evolution will find a graceful, cogent discussion full of small gems and larger lessons."

Summary of *RNCSE* 2014;34(2):9.1–9.3; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/231/414



The Evolving God: Charles Darwin on the Naturalness of Religion by J David Pleins (New York: Bloomsbury, 2013; 171 pages). "This is a marvelous book on Darwin and religion," writes reviewer **Keith Stewart Thomson.** "It repeats much that is already familiar, including the progressive loss of faith that is laid out in [Darwin's] Autobiography and letters. And it contains much that readers will find new because, if it is true that few people read *On the Origin of Species* seriously for content, even fewer delve deeply into *The Descent of Man*." Thomson praises the "wonderful details" of Pleins's account.

Summary of *RNCSE* 2014;34(2):10.1–10.3; the full text is available from http://reports.ncse.com/index.php/rncse/article/view/263/455

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