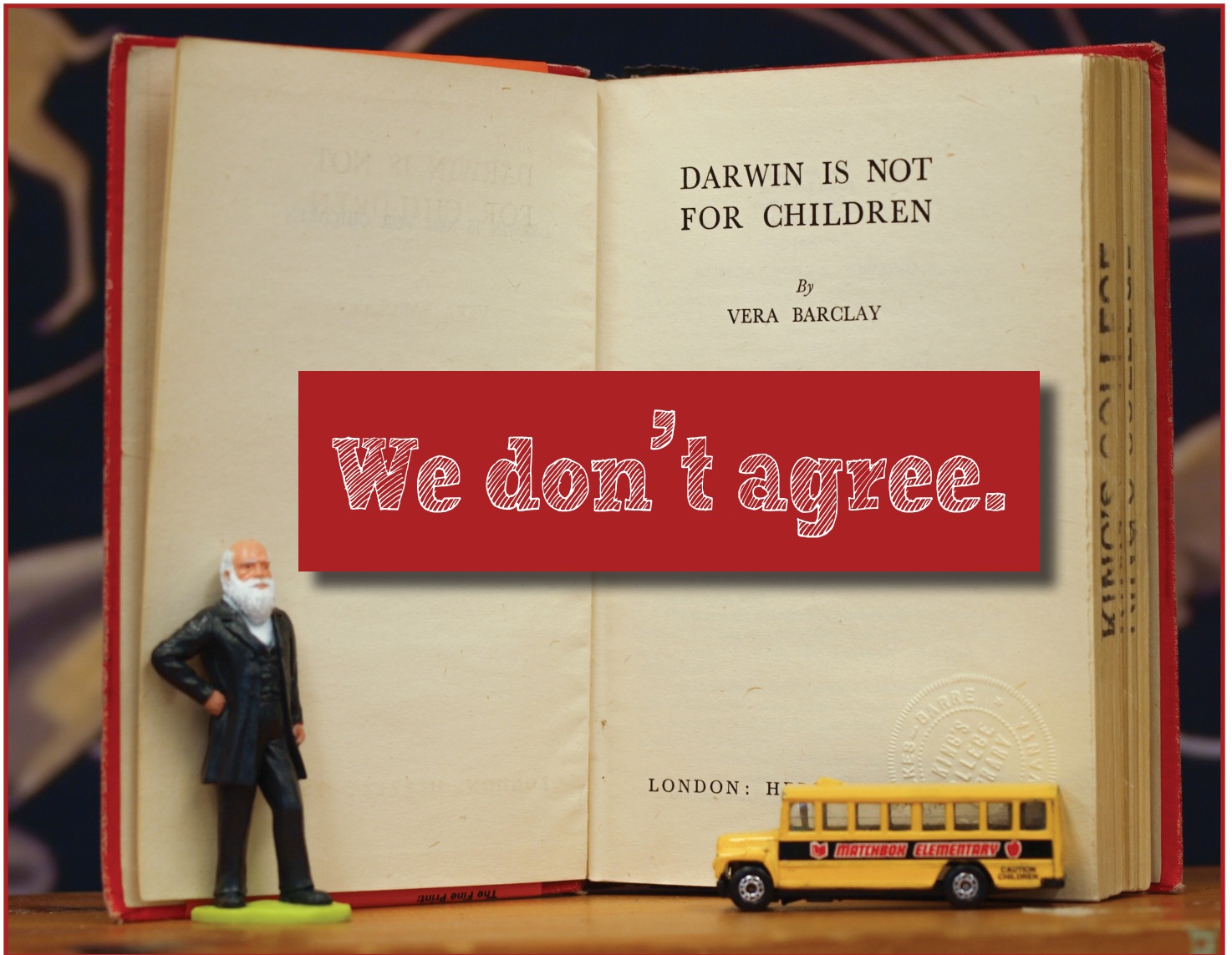


reports

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by Ashley Rodgers

Dear NCSE members,

Allow me to begin with a heartfelt thank you for your financial support of NCSE! This quarter, I'd like especially to thank our sustaining members, those who set up a recurring monthly donation. Their ongoing generosity gives a welcome degree of predictability to NCSE's budget, enabling us to fulfill our day-to-day goals and boldly start new initiatives. So thanks, sustaining donors!

As you read this, I will be rafting down Grand Canyon as one of the paying customers on an annual adventure that NCSE has led for more than a decade. This will be my first visit to Grand Canyon, and I am really looking forward to learning about its unique geology, leavened (*nota bene*: not balanced) by explanations of how young-earth creationists interpret the same geological features as consequences of Noah's flood. Guiding the trip will be NCSE's own Josh Rosenau and Steve Newton. Also on the rafts will be two teachers—Brandon Haught and Crystal Davis—who have been awarded scholarships funded through the generosity of NCSE's members.

As a reminder of why your support for our work is so important, two articles in this issue remind us that not everyone has an opportunity to learn about science in an unclouded and honest way. Creationism continues to exert a pernicious influence on science classrooms across the country. Jim Krupa describes his efforts to introduce evolution to thousands of freshman that arrive at the University of Kentucky with a host of misconceptions ("Defending Darwin," p. 3). Minda Berbeco recounts her encounter with creationists at the annual meeting of the National Science Teachers Association, and Amanda Glaze, a member of NCSE's teacher network, speaks with Minda about the reality of teaching evolution in communities where misunderstanding of the science is rife and acceptance is low ("Creationists at the NSTA Meeting?" p. 6).

Year in and year out, NCSE helps teachers cover evolution accurately and confidently. The effect of creationism on the science classroom is constant and powerful—as persistent as a river gradually wearing down solid rock. But because of NCSE, creationists will not succeed in digging a canyon through U.S. science education. We can't do it without your help and financial support, and we need that support day after day, and year after year. So if you're not already a sustaining donor, please give it some thought. New sustaining donations are eligible for some cool gifts too—just give Nina Hollenberg a call at 510-601-7203 (9 AM – 5 PM Pacific, Mon through Fri), or visit our website, ncse.com/donate, to learn more.

Gratefully,



Ann Reid is the
executive director of NCSE.
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DEFENDING DARWIN IN KENTUCKY

by James J. Krupa

Twenty years ago, I was offered a position at the University of Kentucky, and was reluctant to accept. First-year students are required to take biology, which is a good thing—unless you're the one having to teach three sections of non-majors biology classes, with 300 students per section, as many as 1,800 students each year. At the time, I wasn't particularly keen on lecturing to an auditorium of students with a questionable interest in the class.

Then I heard an interview with the renowned evolutionary biologist E. O. Wilson in which he explained why, as a senior professor—and one of the most famous biologists in the world—he continued to teach non-majors biology at Harvard University. Wilson considers intro biology the most important science class that one could teach because many of the future leaders of this nation take the class—perhaps the last chance to convey to them an appreciation for biology and science. Moved by his words, I accepted the position.

I realized early on that many instructors teach introductory biology classes incorrectly, opting to leave discussion of evolution until the end of the semester. I quickly came to the conclusion that, since evolution is the foundation upon which all biology rests, it should be taught at the start of the course, and then as a recurring theme throughout the semester. It wasn't long before my sections of "biology for non-majors" became "evolution for non-majors."

We live in a nation where public acceptance of evolution is the second lowest of thirty-four developed countries, just ahead of Turkey. Roughly half of Americans reject some aspect of evolution—believing that Earth is less than 10,000 years old, or that humans coexisted with (non-avian) dinosaurs. Where I live, evolution is often regarded as synonymous with atheism, leading

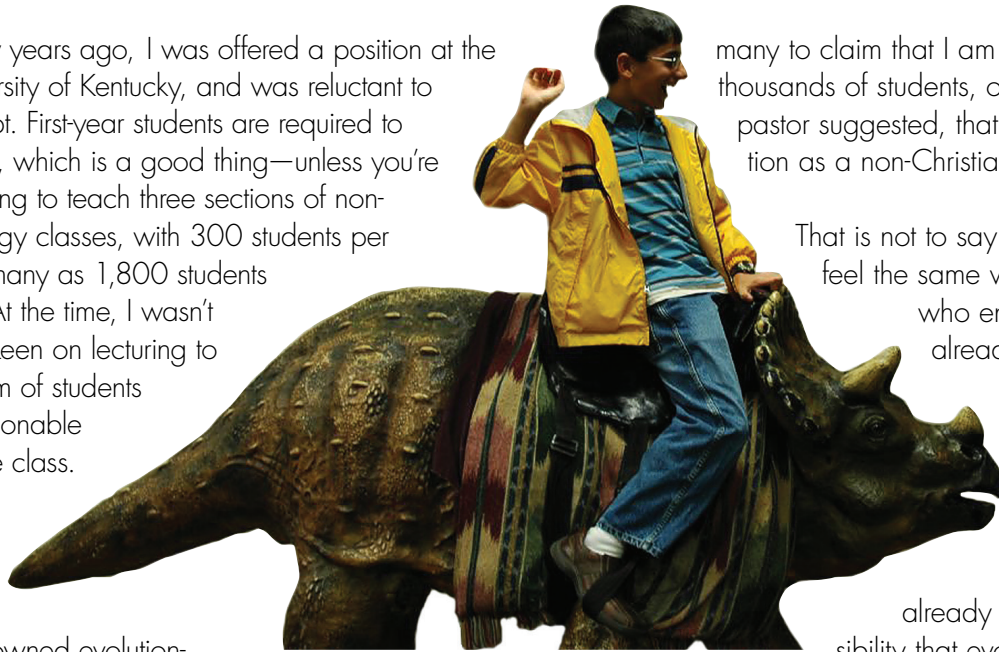
many to claim that I am teaching heresy to thousands of students, or even, as one local pastor suggested, that I was teaching evolution as a non-Christian, alternative religion.

That is not to say that all of my students feel the same way. There are plenty who enroll in my courses who already accept evolution and, although not yet particularly knowledgeable on the subject, are eager to learn more. But there are also many whose minds are already sealed shut to the possibility that evolution exists, but need to take my class to fulfill a college requirement. In the middle are the students who have no opinion one way or the other but are open-minded. These are the students I hope to reach by presenting them with convincing and overwhelming evidence without—and this is key—offending or alienating them.

It's not always easy.

During one lecture, a student asked a question I've heard many times: "If we evolved from monkeys, why are there still monkeys?" My response was and is always the same: We didn't evolve from monkeys. Humans and monkeys evolved from a common ancestor. One ancestral population evolved in one direction toward modern-day monkeys, while another evolved toward humans. The explanation clicked for most students, but not all, so I tried another. I asked the students to consider this: Catholics are the oldest Christian denomination, so if Protestants evolved from Catholics, why are there still Catholics? Some students laughed, some found it a clarifying example, and others were clearly offended.

To truly understand evolution, you must first understand science. Unfortunately, one of the most misused words today is also one of the most important to science: *theory*.



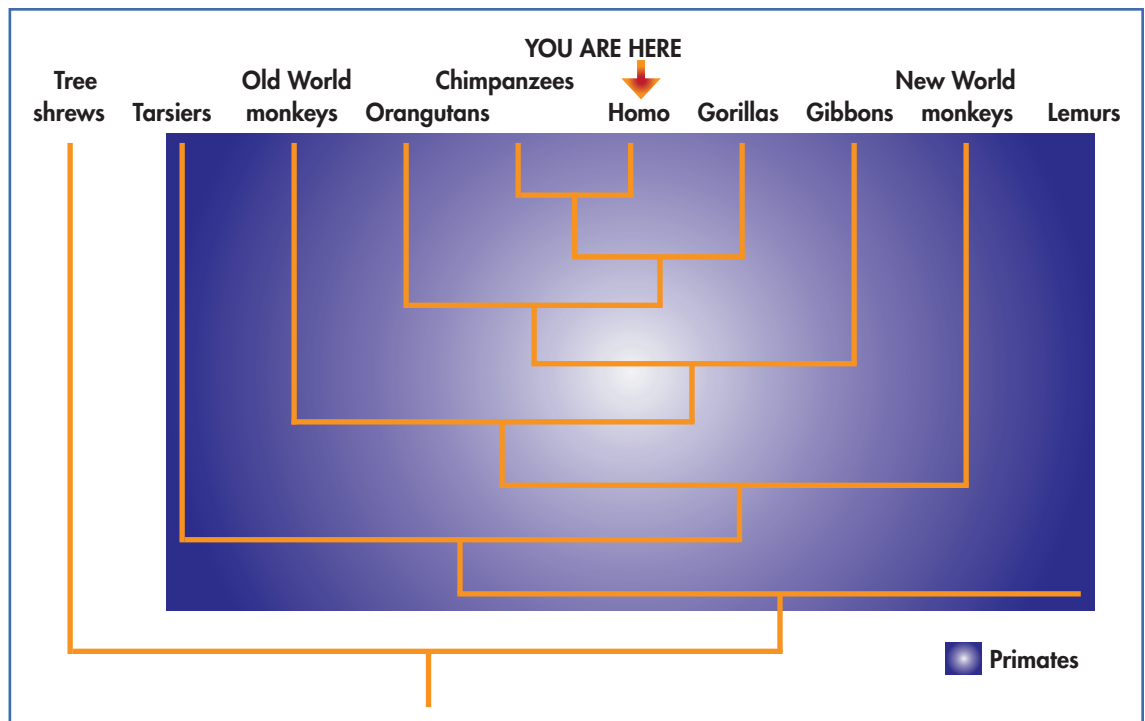
A child riding the Triceratops statue at the Creation "Museum" run by Answers in Genesis founder Ken Ham. Far too many Americans think humans did indeed live alongside non-avian dinosaurs. John Scalzi via Wikimedia Commons, CC BY2.0

The National Academy of Sciences provides a concise definition of *theory*: A comprehensive explanation of some aspect of nature that is supported by a vast body of evidence generating testable and falsifiable predictions.

Theories are the most powerful and important tools science has, but the common nonscientific meaning of the word *theory*—a hunch, notion, or idea—has led to confusion, causing all too many people to interpret the phrase *evolutionary theory* as *evolutionary hunch*. Not surprisingly, I spend the first week of class differentiating theory from fact, and explaining how evolution is both theory *and* fact. (Facts being scientific explanations that have been tested and confirmed so many times that there is no longer a compelling reason to keep testing them.)

Later in the semester, I teach human evolution, a topic most Kentucky students never learn about in high school biology. I do so every year, despite the fact that most semesters, a significant number of students abruptly leave as soon as I introduce the topic. Others stay but make their displeasure known. During one memorable lecture, a student stood up in the back row and shouted that Darwin denounced evolution on his deathbed—a myth spread by creationists. The student then made it known that everything I was teaching was a lie and stomped out of the auditorium, slamming the door behind him.

At the end of the semester, to address those students who remain convinced that evolution is a threat to their religious beliefs, I give my “social resistance to evolution” lecture. This lecture explains the history of the anti-science and anti-evolution movements, the arguments made by



As seen in this evolutionary tree of primates, humans did not descend from chimpanzees; rather, humans and chimpanzees share a recent common ancestor. University of California Museum of Paleontology's Understanding Evolution (<http://evolution.berkeley.edu>)

those opposing evolution, and why these arguments are wrong. I make it clear that one can accept evolution *and* maintain one's religious beliefs: they are not mutually exclusive. In fact, 77 percent of all American Christians belong to denominations that support the teaching of evolution, and several high-profile evangelical Christians are ardent defenders of it, including former President Jimmy Carter and Francis Collins, director of the National Institutes of Health. Even Pope John Paul II acknowledged the existence of evolution in an address republished in the *Quarterly Review of Biology*, in which he argued that the body evolved, but the soul was created. Pope Francis has made it clear that he accepts evolution as well.

In fact, 77 percent of all American Christians belong to denominations that support the teaching of evolution...

This lecture should put students at ease knowing that religion and science need not be at odds. Yet it often results in students expressing concern that I might not be saved. I never say anything about my personal religious beliefs, yet it is assumed I am an atheist. One student told me she hoped I could find God soon. Several simply let me know they will be praying for me and praying hard. One student explained that as a devout Catholic he had no choice but to reject evolution, and accused me of fabricating the pope's statements. Some colleagues ask why I bother teaching evolution as I

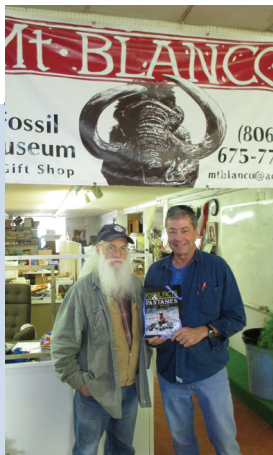
do, as if I'm the one who's the provocateur. I remind them that evolution is the foundation of our science, and we simply can't shy away from explaining it. We don't avoid using the "g-word" when talking about gravitational theory, nor do we avoid the "c-word" when talking about cell theory. To avoid emphasizing evolutionary biology is to fail as a biologist and as a biology teacher.

I know that I'd never back off teaching evolution, because biology makes sense only in the light of evolution—a message that sometimes gets through. I remember one student in particular who took my freshman seminar on evolutionary medicine. He was an ardent evangelical Christian who believed in the literal truth of biblical creation. The seminar was very hard on him, and he struggled with the information, questioning and doubting everything we read. Several years later, our paths crossed, and we stopped for what turned out to be a long, easy chat.

Now a doctor, he explained to me that, at the time, he was so upset with my seminar that he attended a number of creationists' public lectures for evidence I was wrong. He said he found himself embarrassed by how badly these individuals perverted Christian teachings, as well as known facts, to make their argument. He wanted me to know that he came to understand he could be a Christian and accept evolution. Then he did something that resonates with any teacher: He thanked me for opening his eyes, turning his world upside down, and blurring the line between black and white.

This essay is adapted from a piece originally printed in the March/April 2015 issue of Orion.

James J. Krupa is a professor of biology at the University of Kentucky. He currently teaches the required sophomore evolution course to 500 students each year. james.krupa@uky.edu



Joe Taylor (left) owns and operates the Mt. Blanco Fossil Museum in Crosbyton, Texas. Shown here with Taylor is Randy Moore, who is holding Taylor's Fossil Facts and Fallacies.

The Mt. Blanco Fossil Museum in Crosbyton, Texas, opened in 1998 with the motto "Digging up the facts of God's Creation: One fossil at a time." The warehouse-like, for-profit museum is owned by Joe Taylor, who worked for several years as a commercial artist in Hollywood, California. Taylor's art led him to paleontology.

The Mt. Blanco Fossil Museum claims that Earth is young, was covered by a worldwide flood a few thousand years ago, and has been inhabited by giant humans. Taylor's "Giants Against Evolution" exhibit features a nearly 1.2-meter-long femur of a 4.5-meter-tall human, with

PLACE & TIME

World's Largest Creation Fossil Museum

text noting that King Og and other Old Testament figures were at least 14 feet tall. (Taylor admits that this femur was sculpted after a description in a newsletter, not an actual bone.) Taylor claims that bones of giant humans are common, but that evolution-based museums refuse to display them because the extinction of giant humans disproves evolution. Taylor also claims that Noah took dinosaurs aboard the Ark and that "the Bible is more accurate than evolution."

Taylor's museum, which promotes itself as "the largest Creation Fossil Museum in the world," includes exhibits such as "Evidence Against Long Ages," "Noah's Ark is Not a Myth," and "Man and Dinosaurs Together—the Evidence Says YES." (Unlike most other creation museums, Mt. Blanco Fossil Museum does not include an exhibit about Grand Canyon.) One wall of Taylor's museum promotes the Foundation for Christian Self-Government, and a nearby sign reminds visitors that

"Satan is Alive and Well on Planet Earth." Exhibits and literature in the museum claim that "evolution is not a fact," "evolution is anti-Semitic," "evolution is anti-Christian," "death is proof against evolution," "not one single fossil of a transitional creature has ever been found," and "evolutionists are racist."

The museum's entrance advertises several relatively obscure anti-evolution organizations, including the Paleochronology Group, Genesis Science Network, and Jack Chick Publications. The gift shop sells casts of the giant human femur for \$450, crafts made by homeschoolers, numerous anti-evolution books and DVDs, and a bit less thematically, Taylor's *What I Know For Sure About Women*, and his diet book titled *You Are Too Fat*.

Randy Moore is the H. T. Morse—Alumni Professor of Biology at the University of Minnesota, Twin Cities. His most recent book (coauthored with William F. McComas) is *The Scopes Monkey Trial* (Arcadia Press, 2016).



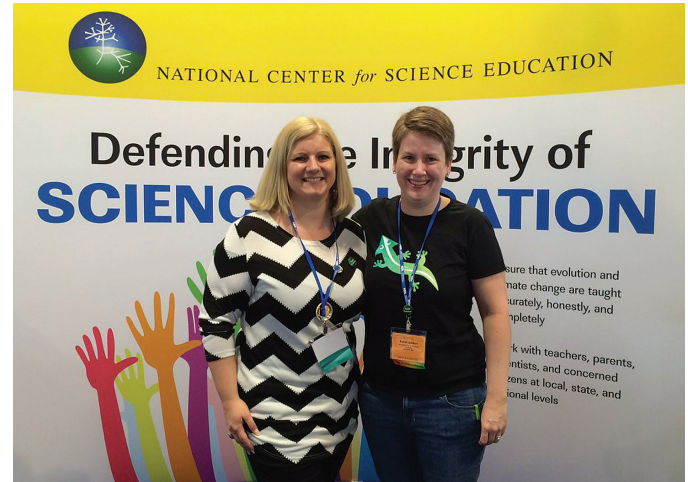
Creationists at the NSTA Meeting? Our Work is Cut Out for Us!

In late March 2016, I traveled down to Nashville, Tennessee, to attend one of my favorite conferences, NSTA—the National Science Teacher Association conference. If you haven't been, this is an absolute must go for anyone interested in science education. Everyone is there, from textbook authors to science celebrities to teachers upon teachers upon teachers. Flamingos run through the exhibit halls (really!), teachers scream with delight as they spin in huge gyroscopes, and Schmitty the Weather Dog tap-dances his way into our hearts. It's a place where you can learn about anything from astronomy to zoology, meet the likes of Bill Nye, and walk away with bags full of everything from mystery slime to animal skulls. It's basically Circus Circus for science nerds and I love it.

There is so much going on that you're lucky to make it to even half of the talks and workshops you plan, and you're thankful for even making it to that many. I made it to about a third of my planned sessions—but as it happens, I went to just the right one, because I landed smack dab in the middle of a creationist debate. You read that right. It's 2016, and teachers are still being harassed publicly for teaching evolution. Even at science teacher conferences!

It was at a talk presented by Amanda Glaze, one of my favorite science teachers, about her work and research on teaching evolution in a very evangelical community in the South. When the time came for discussion, almost immediately a creationist popped up with a question. "Can you define evolution?" What a strange question to ask! But she provided an answer and moved on. Again the gentleman raised his hand. "How do you differentiate between micro- and macroevolution with your students?"

For biologists, of course, microevolution and macroevolution describe different perspectives on the history of life—microevolution focusing on patterns of evolutionary changes that occur within species, macroevolution focusing on patterns of evolutionary changes that occur over a larger scale. But for creationists, "microevolution" denotes the evolutionary changes that even they are willing to



Amanda Glaze (left) and NCSEteach member Robin Bulleri posing in the NCSE booth at NSTA 2016. Photograph: Minda Berbero

accept—often in terms of "Biblical kinds"—while "macroevolution" denotes everything else.

Recognizing the bait-and-switch in the offing, Glaze swiftly dealt with the question and moved on. But alas, it was too late. The floodgates (as it were) had been opened.

"What do you think of intelligent design?"

When Glaze responded that she doesn't support teaching non-science in the science classroom, observing that "intelligent design" is not science, another creationist made her presence known, accusing Glaze of being rude by dismissing the creationist perspective. Then, as other teachers in the room spoke in Glaze's defense and in support of evolution, there were repeated cries from the creationists of "No! You are wrong!"

Again, yes, it happened, in 2016, at a conference of science teachers. Welcome to my world—and that of teachers across the country today. A national survey suggests that almost one in four science teachers feel pressure not to teach evolution in their communities. This is a major reason why a full 60% of high school biology teachers,

according to that same survey, somehow downplay evolution in the classroom. The consequences of an incomplete evolution education then spill over into all other topics of science and are evident in students' knowledge gaps when they reach college (see "Defending Darwin in Kentucky," page 3).

But there is room for some optimism. It was gratifying, for example, that so many of the teachers at the talk were willing to speak in defense of Glaze and in support of evolution. If we want more teachers

It's 2016, and teachers are still being harassed publicly for teaching evolution. Even at science teacher conferences!

like this, who are willing to stand up for science in the face of creationist attempts to disrupt science education, we need to let them know that scientists, parents—everybody—are behind them. That we trust them to know the science and we rely on them to teach it to our children. At NCSE, we are trying to send that message. But my trip to Nashville was a startling reminder of how far we have to go.

Minda Berbeco is a programs and policy director for NCSE. berbeco@ncse.com



Q&A with Amanda Glaze

Amanda Glaze was a middle and high school science teacher in Georgia and Alabama, and a member of the graduate faculty at Texas A&M University–Commerce. In summer 2016, she starts a new position as Assistant Professor of Middle Grades and Secondary Science Education at Georgia Southern University.

What was the goal of your NSTA workshop, which was interrupted by creationists?

I wanted to start a conversation with teachers about their experiences with teaching evolution, and to share ideas and resources to encourage and support them. I wanted to speak to any teacher who was willing to listen and engage them in a

deeper conversation about why they might choose to avoid or skip parts of evolution or why they choose to teach evolution throughout their class.

How often do you think teachers have to face challenges to teaching evolution?

Honestly, I think that for some teachers, it is a daily challenge. If you are in a school system where the administration, the other teachers, and the community embrace creationism, and you accept evolution, you will be marked as "that teacher who believes in evolution." I say this because I have lived this myself, even receiving letters from other faculty that were very critical of me for simply teaching evolution.

What do you think would help teachers?

We really need a support network for teachers—

Like NCSEteach, which reached nearly five thousand teachers in its first year, and continues to go strong!

Yes, indeed. And we all need to understand that the purpose of science education is achieving scientific literacy, not supporting or undermining religious beliefs.

It has taken me a long time to get a thick skin, and I think that teachers need to know that it is a process learning to have conversations with people about topics, such as evolution, that can elicit strong responses. But these are necessary conversations, because as science teachers, our job is science literacy for all students.

UPDATES

ncse.com/updates

Do you want to let us know about threats to effective science education near you? Or do you have any cause for celebration to share? E-mail any member of staff or info@ncse.com.

ALABAMA

At its March 10, 2016, meeting, the Alabama state board of education voted to retain a disclaimer (originally adopted in 2001) about evolution mandated for the state's textbooks. This vote came despite Alabama's new science standards that describe evolution as "substantiated with much direct and indirect evidence." NCSE's Ann Reid commented, "By voting to retain the disclaimer, the Alabama board of education is continuing to send a scientifically unwarranted and pedagogically irresponsible message to Alabama's teachers and students—who deserve better."

ARIZONA

Senate Resolution 1001, introduced in the Arizona Senate in February 2016, would have expressed the Senate's recognition of February 12, 2016, as International Darwin Day. The bill passed the Senate Committee on Natural Resources on a 5–1 vote, but subsequently died in the Senate Health and Human Services and Rules committees when the legislature adjourned in May 2016. The bill's sponsor was Andrew Sherwood (D–District 26), who cosponsored the similar House Resolution 2002 in 2015.

FLORIDA

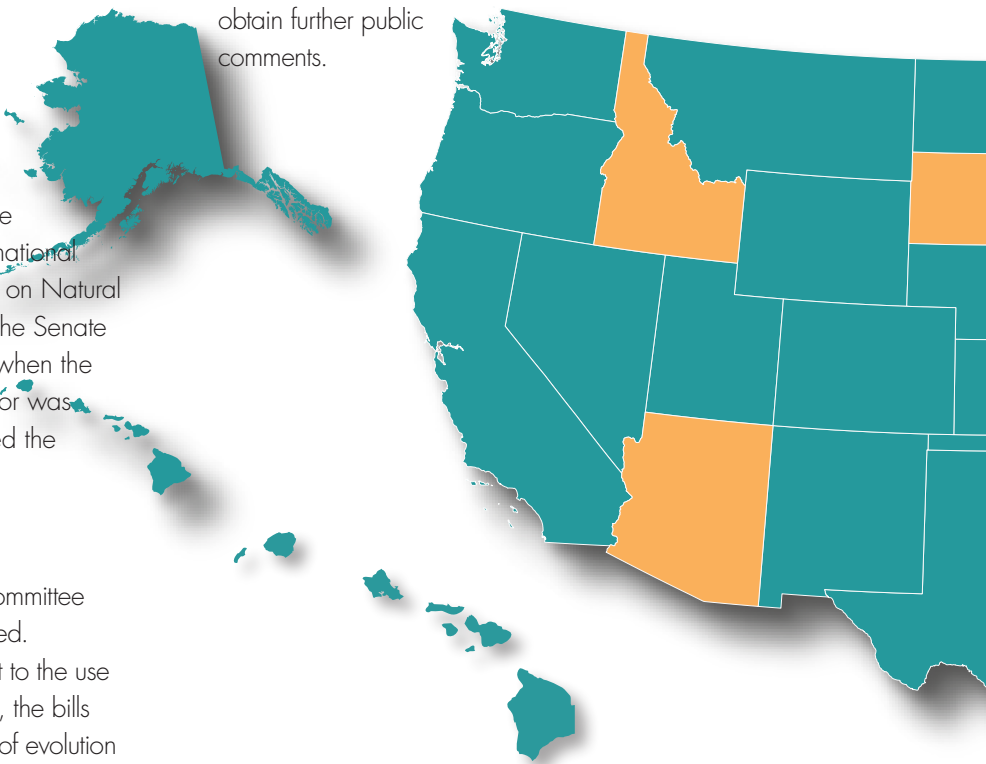
House Bill 899 and Senate Bill 1018 both died in committee in March 2016, when the Florida legislature adjourned. Ostensibly aimed at empowering taxpayers to object to the use of specific instructional materials in the public schools, the bills were promoted by groups objecting to the treatment of evolution and climate change in textbooks. "We're fortunate and happy that these bad bills didn't get out of the starting gate," Florida Citizens for Science's Brandon Haught told NCSE.

IDAHO

Senate Bill 1321, introduced in the Idaho Senate in February 2016, would have permitted the use of the Bible in the state's public schools "for reference purposes to further the study of" a variety of topics, including "astronomy, biology, [and] geology." The reference to the scientific topics was removed in committee, and the result, renumbered Senate Bill 1342, was passed by both houses. In April 2016, however, Governor C. L. "Butch" Otter (R) vetoed the bill, saying that it violated the state constitution.

IDAHO

In March 2016, with the passage of Senate Concurrent Resolution 140 by both the House of Representatives and the Senate in the Idaho legislature, the state science standards adopted in 2015 were definitively rejected. Although the stated reason for the rejection was the lack of opportunity for public comments, hostility toward the inclusion of evolution and climate change in the standards seems to have played a role. The state department of education is now circulating the standards to obtain further public comments.



IOWA

House Bill 2054, introduced in the Iowa House of Representatives in January 2016, would have reversed Iowa's adoption of the Next Generation Science Standards. The bill's chief sponsor, Sandy Salmon (R–District 63), told a newspaper in 2015 that she was concerned that the standards "present evolution as scientific fact and shine a negative light on human impacts on climate change." The bill died in committee, in February 2016, when a deadline for bills to be reported out of committee expired.

LOUISIANA

Louisiana's Senate Bill 156 would have repealed the state's Balanced Treatment for Creation-Science and Evolution-Science Act, which was enacted in 1981 and declared to be unconstitutional by the United States Supreme Court in *Edwards v. Aguillard* in 1987. Introduced in March 2016 by Dan Claitor (R–District 16), the bill was rejected on a 4–2 vote in the Senate Education Committee later in the month. It was Claitor's third attempt to repeal the act.

MISSISSIPPI

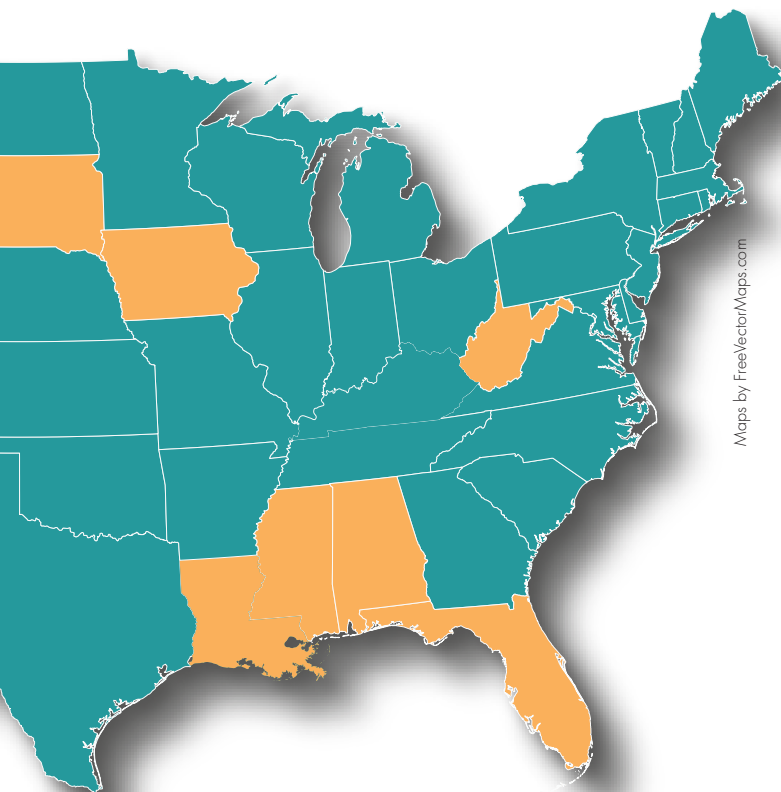
House Bill 50, introduced in the Mississippi House of Representatives in February 2016, would have allowed science teachers with idiosyncratic opinions to teach anything they pleased—and prohibited responsible educational authorities from intervening. Biological evolution and global warming were cited as topics that “may cause debate and disputation.” Its principal sponsor Mark Formby (R–District 108) acknowledged to a reporter that his intention was to enable teachers to present creationism. The bill died in the House Education Committee in February 2016.

SOUTH DAKOTA

Senate Bill 83, introduced in the South Dakota Senate in January 2016, would have allowed teachers to discuss “the strengths and weaknesses of scientific information” presented in courses aligned with the state education standards. The lead sponsor, Jeff Monroe (R–District 24), previously sponsored bills that would have allowed teachers to present “intelligent design” and that identified biological evolution and global warming as scientifically controversial. After a hearing in February 2016, the Senate Education Committee voted to defer further consideration of the bill indefinitely.

WEST VIRGINIA

West Virginia's House Bill 4014 would have prevented the state board of education from implementing the state science standards adopted in 2015—and there were indications that the treatment of climate science in the standards was part of the motivation. The bill passed the House of Delegates in February 2016, but the Senate amended the bill to require only a review, not a repeal, of the standards, to be conducted by a panel of academics, and its version of the bill became law.



Preserving NCSE's History

NCSE's founder, Stanley L. Weinberg, started the Committees for Correspondence from his home in Ottumwa, Iowa, in the early 1980s; the National Center for Science Education eventually emerged in order to coordinate the activities of those organizations. Weinberg's work leading and coordinating these state-level citizens for science

groups, which spread to nearly every state in the union, was instrumental in the fight to keep evolution in America's science classrooms that continues to this day.

A tremendous volume of Weinberg's documents related to these groups and their activities is yet to be archived. Thanks to a joint effort involving the Weinberg family, NCSE, the American Philosophical Society, and the Iowa State Univer-

sity Library, these documents will be preserved and made accessible to all. The hope is that by 2017 these historical records will be cataloged and ready for use in the special collections of the Iowa State University Library, providing researchers an important resource regarding NCSE's early history as well as the history of the evolution/creationism conflict in the United States.

—EMILY SCHOERNING



Andrew J. Petto



Donald R. Prothero



Paula Spence



Katharine Hayhoe



Dana Nuccitelli

2016 Friend of Darwin and Friend of the Planet Awards

NCSE is pleased to announce the winners of the Friend of Darwin award for 2016: **Andrew J. Petto**, a physical anthropologist, who formerly served on NCSE's board of directors and as the editor of *Reports of the National Center for Science Education*; **Donald R. Prothero**, a paleontologist and prolific author whose latest book is *The Story of Life in 25 Fossils*; and **Paula Spence**, a cartoonist and artist who has been contributing graphics of all sorts to NCSE for almost a decade. "Anj Petto served NCSE, as well as the cause of science education,

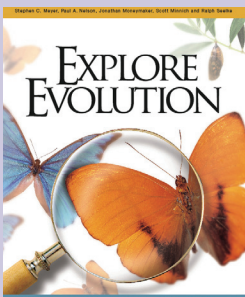
so long and so well that he was a natural choice," commented NCSE's executive director Ann Reid, "while it would be hard to think of anyone who has contributed as much to the public understanding of the paleontological evidence for evolution and against creationism as Don Prothero." She added, "And Paula Spence's art for NCSE [including her owl, p. 11] has entertained, enlightened, and educated thousands of people."

NCSE is also pleased to announce the winners of the Friend of the Planet award for 2016: **Katharine Hayhoe**

of Texas Tech University; **Dana Nuccitelli** and **John P. Abraham**, who contribute the "Climate Consensus—the 97%" column to the *Guardian*; and **Skeptical Science**, a website devoted to explaining climate change science and rebutting global warming misinformation created and maintained by John Cook of the University of Queensland.

"All of the Friends of the Planet for 2016 shine as climate communicators, in different but complementary ways," Reid explained. "Katharine Hayhoe excels at building connections

WHAT WE'RE UP AGAINST Creationist Textbooks in Minnesota



We recently heard of a charter school in Minnesota using the cryptocreationist textbook *Explore Evolution: The Arguments for and against Neo-Darwinism*. Noticing that one of the school's science teachers regularly contributes

to a local creationist group, we assumed that he must have requested the book. On further investigation, it turned out that the book was adopted in 2008, at the request of a different teacher as she pursued a master's degree at a local religious college (her thesis related to "critical thinking" about evolution). Minutes from the 2008 meeting at which the book was approved reveal that

Explore Evolution was adopted to replace *Of Pandas And People*, the book at the center of the 2005 *Kitzmiller v. Dover* trial, in which "intelligent design" was found to be unconstitutional to teach in public schools (including charter schools).

While it never advocates for creationism explicitly, *Explore Evolution* takes a series of topics close to creationists' hearts, presents a flawed version of the standard account of that topic, then uses quote-mines and phrases such as "some critics say" to attack that strawman. Our analysis of the book found it laced with gross errors, plagiarized material from creationist websites, and meritless creationist talking points. Students deserve better than a book like this. —**JOSH ROSENAU**



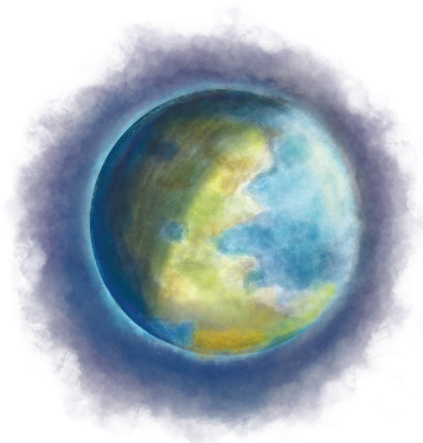
John P. Abraham



between science and society and Dana Nuccitelli and John Abraham have consistently provided timely commentary on the latest developments. And Skeptical Science is simply unrivaled as a vast, up-to-date, and in-depth source of accurate and accessible information on climate change science."

The Friend of Darwin and Friend of the Planet awards are presented annually to a select few whose efforts to support NCSE and advance its goal of defending the teaching of evolution and climate science have been truly outstanding. Previous recipients of the Friend of Darwin award include Niles Eldredge, Susan Epperson, John F. Haught, and the plaintiffs in *Kitzmiller v. Dover*. Previous recipients of the Friend of the Planet Award include Michael Mann, Naomi Oreskes, and the Alliance for Climate Education.

—GLENN BRANCH



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DINNER PARTY 101:

When a Climate Denier Comes to Dinner



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Picture this. You're at a dinner party.

You've never met the person seated next to you, but let's imagine it's the spouse of a colleague or a relative—someone who'll be in your life for the foreseeable future. So you need to be pleasant.

But that's a challenge, because when someone at the table brings up climate change, your neighbor confidently offers a misrepresentation or a misinterpretation. Perhaps, for example, "I don't believe it. I heard that there hasn't been any warming in the last 18 years." What do you do when you know that these assertions are in direct conflict with the scientific evidence? You might react angrily or didactically, of course, which might feel good at the time, but how pleasant would that be for everyone else?

Instead, you might try to open a dialogue by asking questions. You might say, for example, "Well, 18 years is not a very long time, so even if that were true, I'm not sure that would settle whether the climate is really changing. Let me ask you something different: if it were up to you to figure out whether the climate is changing or not, what kind of evidence do you think we'd see locally?" You can then model scientific thinking, encouraging your dinner companion to share any relevant observations such as changes to when the first frost has come or when certain flowers have bloomed.

Of course, you are not going to change the mind of a hardcore climate change denier with exchanges like these. But you don't need to prove anyone wrong, or change anybody's mind, right away. Just by providing a chance to think scientifically, and respecting your climate-change-denying dinner companion as a person worth engaging in a constructive dialogue, you are playing a small but critical role in shifting the national conversation from one where people take sides to one where people take ownership of evaluating the evidence for themselves.

Cheers to that.

—STEPHANIE KEEP



news from the booster clubs

Hikes, Fossils, and Science Camp: Summer Fun the SBC Way

We're looking forward to a great summer with the Iowa Science Booster Clubs. As kids get out of school and life becomes a little more relaxed, we're providing tons of great opportunities to explore evolution and climate change in a fun community context. From fair exhibitions to fundraisers to our first-ever summer camp, we're going to make the most of this season.

State and County Fair Exhibitions

The Science Booster Club Project will have the opportunity to reach tens of thousands of people throughout Iowa by exhibiting at county fairs, as well as a special chance to exhibit at the Iowa State Fair with our partners at the University of Iowa Museum of Natural History. The Iowa State Fair draws an enormous audience; around 100,000 people attended the fair every day in 2015. What a chance to help a really diverse group of people learn about important scientific issues in a hands-on way! People travel from far-flung communities to visit the state fair as well as their county fairs every summer. By providing great content at these events, we will have an unparalleled opportunity to help people realize what benefits a Science Booster Club could bring to their community. As we prepare for another round of expansion in the fall of 2016, we look forward to developing relationships with new community partners.

Nature Hikes and Barbeques

Large-scale fair exhibitions are a great, high-volume way to reach people, but they don't give individuals a lot of time to engage with our programming. To that end, we'll be hosting many smaller, community-focused events throughout the summer months. Our guided nature hikes have proven very popular, with our last community hike attracting nearly fifty families. This summer, we'll host hikes at sites throughout our region to provide accessible, fun, and

educational ways to explore a variety of ecosystems, from forests to wetlands to prairies. Our guided hikes give participants opportunities to learn about the natural world in the context of evolution. Native species are presented not just by name, but also with attention to their particular adaptations, evidence of genetic variation in the local population, and ways the species may be impacted by the changing climate.

We hosted a much-anticipated barbecue fundraiser in Coralville, Iowa, on June 5, 2016: the "Gorge at the Gorge." At the event, held at an important local fossil site, attendees explored beautiful, clearly exposed Devonian specimens with the guidance of trained paleontologists while enjoying great food and company. The money raised was put toward "Back to School" microgrants, which will be distributed to five local teachers in September.

Generous Funding Enables NCSE's First Summer Camp

Thanks to generous support from local STEM-invested businesses such as Integrated DNA Technologies and Rockwell Collins, and education leaders such as the European Society for Evolutionary Biology and the ACT Corporation, we will be able to host our very first summer camp. This week-long day camp will provide a STEM-enrichment opportunity for forty-five kids from rural areas completely free of charge. Every day we'll visit a different area partner, from museums to nature parks, to learn about evolution and climate change in different contexts. Kids will keep journals to record and reflect on their understanding of these foundational concepts over the course of the camp. This type of enrichment activity is not always available to kids in rural areas, and rarely available to any population



"Mr. Purple," one of the sea creatures people get to meet and touch when we teach about ocean acidification, posing with SBC-Iowa City buttons. Mr. Purple will be making many appearances at SBC events this summer. Photograph: Robert Todd

Spotlight on Interns

The Science Booster Club Project continues to be supported by interns from graduate programs at the University of Iowa. These young scientists are able to gain experience engaging with the public, developing curricula, and connecting with different types of audiences through their work with NCSE. Here are two members of our hardworking team.



Claire Tucci

Photograph: Emily Schoerning

Claire Tucci, a second-year master's student in evolutionary biology, is an exemplary event planner whose eye for detail and contagious enthusiasm have contributed enormously to the success of our organization. Her successful grant writing and organizing of

fundraising events have benefited hundreds of students. She writes:

Working with NCSE has been a wonderful opportunity for me to participate in scientific outreach events. I have been able to engage with children and adults in a many different activities related to evolution and climate change. I hope to continue to be involved in scientific outreach after I graduate from the University of Iowa.

Robert Todd's warmth and humor allow him to connect with audiences on multiple levels. His ability to explain complex scientific concepts in a manner that is both clever and accessible really contributes to the educational quality of our events. He writes:



Robert Todd

Photograph: Robert Todd

I am interested in facts as well as context. Facts are easy and logical. $A + B = C$. But I have learned that in a different context, sometimes $A + B = D$. And when the facts in question are about evolution, or climate change, D is often for denial. The reason I wanted to work with the Iowa City Science Booster Club was because I wanted to explore what drives people to challenge science, and more importantly; how to bridge that divide.

Our internships at the University of Iowa create major impacts for both NCSE and our students. Supporting a single graduate student for a semester costs \$5,000. Please consider contributing. Your gift will improve NCSE outreach and will provide unique opportunities to graduate students that will be important for their career. Each intern will directly and indirectly improve classroom conditions for hundreds of local students and will help educate thousands of local citizens about evolution and climate change.

—EMILY SCHOERNING

at no cost. We are enormously excited about this teaching and learning opportunity!

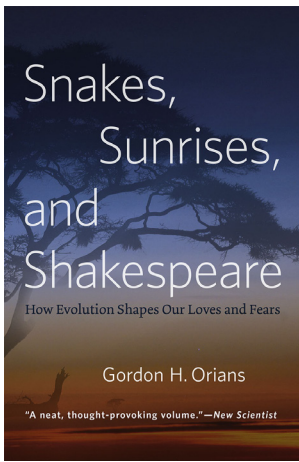
Next Steps: Major Fall Expansion

Our Science Booster Clubs are doing great. On the basis of what we've learned, we have compiled a handbook with community organizing material, fundraising strategies, and fun, hands-on, and field-tested activities. The handbook, we hope, will help more communities start their own Science Booster Clubs with less direct

NCSE support. In the fall of 2016, we plan to expand the project to communities across the state of Iowa. Participating communities will receive regular updates with new suggestions for event plans, and can write or call us for support as needed. Are you interested in starting a club in your community in Iowa? Now's the time to get in touch!

Emily Schoerning is the NCSE Director of Community Organizing and Research. schoerning@ncse.com





THE RNCSE REVIEW

Snakes, Sunrises, and Shakespeare: How Evolution Shapes Our Loves and Fears

author: **Gordon H. Orians**

publisher: **University of Chicago Press, 2014**

reviewed by **Nancy Easterlin**

With so many general overviews of evolutionary psychology available already, readers might well ask what a new contribution to the market has to offer. In *Snakes, Sunrises, and Shakespeare*, Gordon H. Orians provides a valuable new perspective as a biologist and researcher in environmental aesthetics, suggesting how dynamic interactions with the environment might have influenced human psychology.

Orians unfolds his argument in eleven short, highly readable chapters. In chapter one, he identifies the book's central topic: human emotional responses to nature and their scientific explanations. Thus, he differentiates his argument from many within evolutionary psychology who foreground mating strategies and sex differences. He also likewise distinguishes his argument from those of first-generation cognitive psychologists, who sever cognitive processing from emotion. Chapter two identifies five categories central to hunter-gatherer life: shelter, safety, nourishment, friends, and contentment. Emotion, the main gear of motivation and the core of preferences and aversions, not only figures into each of these categories but also extends under the sense of beauty.

Chapters three and four, which

focus on habitat selection and environmental aesthetics, particularly show the value of Orians's specific thesis that the "ghosts" of past environments

[W]e can all live better if we have an ecological understanding of our human past and its "ghosts," which continue to haunt us and our lives.

inhabit us and orient our thinking. Evolutionary psychology and Darwinian literary studies typically focus on sexual selection and mating strategies, but Orians emphasizes that any organism capable of mating strategies must ascertain the safety and viability of its local surroundings before seeking mating opportunities. In his words,

Survival depended on knowing those locations:

Where were prey animals yesterday? Where did I cache the food I could not carry back to camp? Where are the trees with ripe fruit? Where are safe hiding places that I may need to use in an emergency? (page 28).

Habitat selection involves much more than a cursory inspection for available resources; it requires the observation of members of one's own and of other species, as well as recognition of "affordances," or opportunities for action.

Thus, Orians offers a dynamic model of thinking and emotion guided by evolved human objectives. Moreover, his ecological sketch of the human species includes geographer Jay Appleton's prospect-refuge theory, which postulates that preferences in landscape aesthetics are predicated on assessments of affordances. Later chapters extend this understanding to sensory modalities other than sight. For instance, noting that sound is a central feature of a habitat, Orians points out that even silent animal species (of which there are many) can detect sound. Nevertheless, though the conscious production of music probably derives from a basic aural sensitivity to the ambient environment, a theory of the origins of music must explain not only how it "benefited performers and listeners ... [but also] how music became so remarkably elaborated" (page 127). Orians then presents an overview of recent theories of music's origins.

At times, Orians presents evocative evidence but does not sufficiently connect it to the overarching scientific theory. His discussion of landscape manipulation is somewhat unclear in the context of prospect-refuge theory, which itself suggests that humans favor, for example, trees of certain height and shape to provide protective cover from both elements and predators as well as cliffs and hills that afford a superior view of the surroundings. Whereas prospect-refuge theory explains the wavelike raked patterns of Japanese gardens, it cannot satisfactorily explain the rationally patterned gardens of eighteenth-century Europe. Only late in the book does Orians note that such stylized gardens likely function as dominance displays. The likelihood that some aspects

of garden design derive from sexual selection might have been woven into chapter four for a more unified treatment of landscape aesthetics and ornamental practices.

Despite the lovely alliterative title, Shakespeare—a metonymy for all literature here—gets short shrift, compared to the well-covered snakes and sunrises. This is not surprising: literary art is of extremely recent origin, dating back only a few thousand years, and it is also quite abstract. Because evolutionary social scientists spend little time pondering the special biocultural dynamics of this art form, those who choose to comment often produce ideas that are uninformative, given the complexity of literary

production and consumption. Orians selects a better topic for his conclusion, exploring there how the “videophilia” of today’s children results in what Richard Louv calls “nature deficit disorder.” Orians argues that this loss of sensitivity to our environment is dangerous and unhealthy. I am grateful for Orians’s insistence that we can all live better if we have an ecological understanding of our human past and its “ghosts,” which continue to haunt us and our lives.



Nancy Easterlin is Research Professor of English and Professor of Women’s and Gender Studies at the University of New Orleans. She is the author of *A Biocultural Approach to Literary Theory and Interpretation* (Baltimore [MD]: The Johns Hopkins University Press, 2012). neasterl@uno.edu

BEST OF THE BLOG

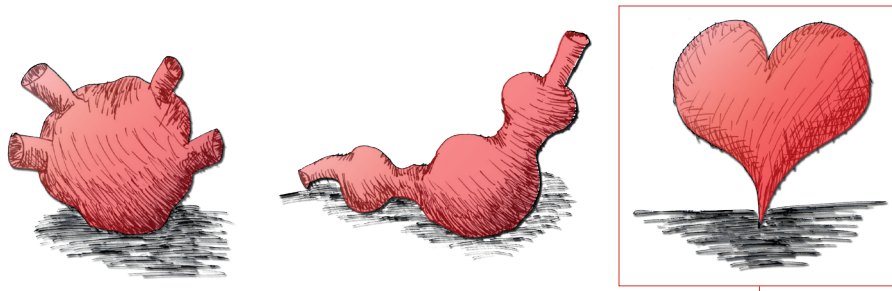
ncse.com/blog



The NCSE blog covers everything from history to politics, popular science to common misconceptions about evolution and climate change. Here are a few highlights from the last quarter.

- **911 for Planet Earth:** Guest blogger Brendan Casey explains the benefits of showing kids how to diagnose and cure what ails our Big Blue Marble. [<http://bit.ly/1Tb6YAA>]
- What made Stephanie Keep exclaim **Say What?** this time? The **Infuriating False Dichotomy** in science communication that you can be accurate or engaging, but not both. [Part 1 of 3: <http://bit.ly/1qj0mTp>]
- **Disrupting the Classroom:** Steve Newton on how self-styled “education reformers” always get it wrong. [Part 1 of 3: <http://bit.ly/1Tb78bf>]
- “As Bill Nye would say...” Glenn Branch on the *other* Bill Nye’s puckish role in evolutionary thought. [<http://bit.ly/1X8hckT>]
- **Access to Scientific Papers is Priceless...and yet pricey.** Josh Rosenau advises teachers on how to avoid sticker shock. [<http://bit.ly/1UZGMlv>]
- Ann Reid applauds James Hansen for **Talking Climate Risks Without the Mute Button.** [<http://bit.ly/1TbvUGn>]
- **Glyptodonts Were Armadillos!** cries Stephanie Keep. Here’s why to care. [<http://bit.ly/27kQOZA>]
- **Confusion, Indifference, and Compromise:** Josh Rosenau asks “How do we answer surveys when we don’t know the answer?” [<http://bit.ly/1TTafBt>]
- Guest blogger Eileen Hynes tells us what it’s like having a scientist visit her classroom in **A Fishy and Fun Tale.** [<http://bit.ly/1rKNqXB>]
- **A Crack in the Denial Machine?** Emily Schoerning makes ocean acidification real for kids. [<http://bit.ly/1TCrLHV>]

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