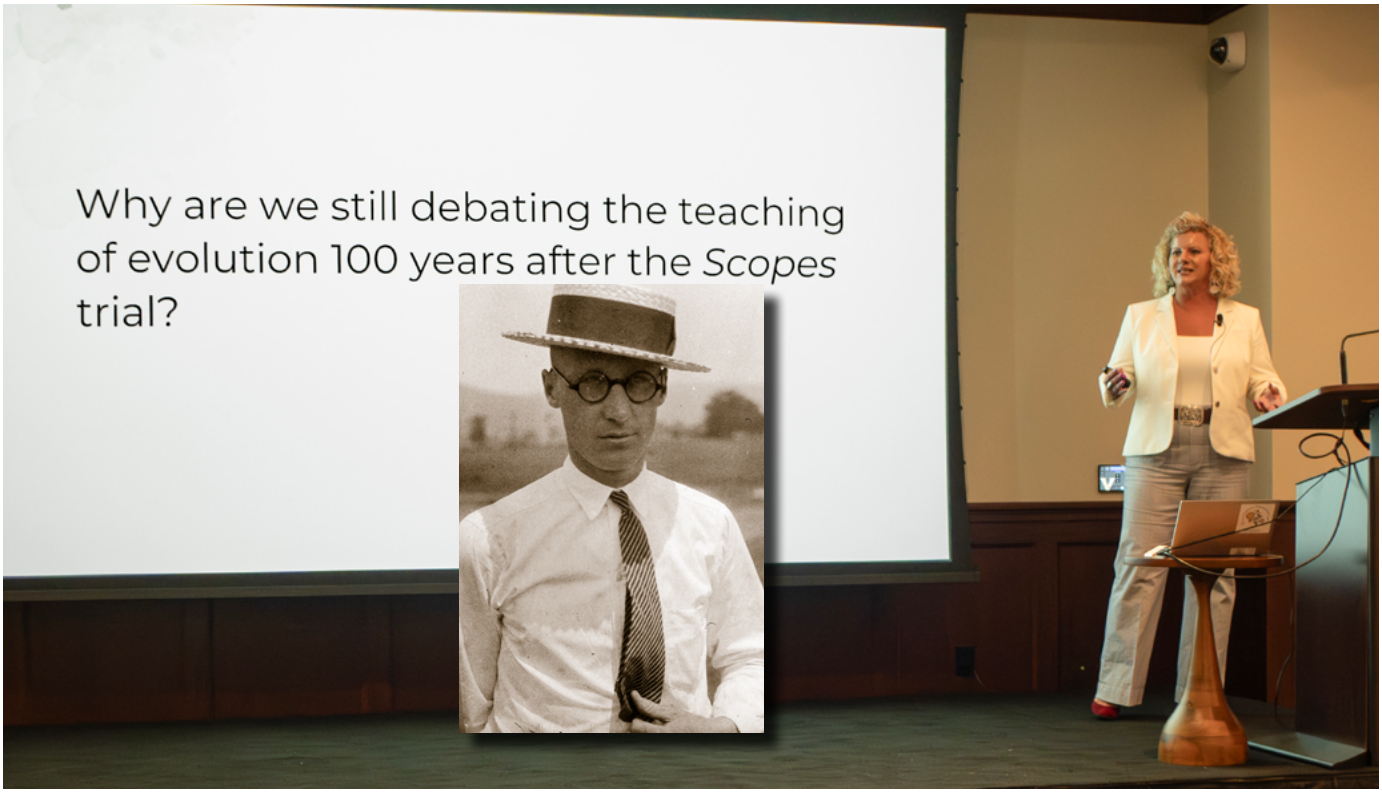
reports

OF THE NATIONAL CENTER FOR SCIENCE EDUCATION | SUMMER 2025 | VOLUME 45 | NO 3

The Ongoing Fight for Evolution Education



p. 3

EDITOR
Paul Oh
National Center for Science Education
230 Grand Avenue, Suite 101
Oakland, CA 94610
phone: (510) 601-7203
e-mail: editor@ncse.ngo

BOOK REVIEW EDITOR
Glenn Branch

PUBLISHER
Amanda L. Townley

VOL 45, NO 3 SUMMER 2025

ISSN 1064-2358 ©2025 by the National Center for Science Education, Inc, a not-for-profit 501(c)(3) organization under US law.
Reports of the National Center for Science Education (RNCSE) is a quarterly publication providing the latest on our work supporting accurate and effective climate change and evolution education.

NCSE is a nonprofit, tax-exempt corporation affiliated with the American Association for the Advancement of Science and an Associated Group of the National Science Teachers Association.

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Dear NCSE Supporters,

As someone who grew up in rural Alabama, navigating the intersections of my religious upbringing and a lifelong fascination with, and passion for, science, the stories of evolution and the surrounding public controversy have always felt personal. The *Scopes* trial, where questions of science, faith, and education collided, marked a pivotal moment in American history, and the legacy of that trial continues to shape the way we approach evolution education today..

You will see that this issue of *RNCSE* is larger than usual, and for good reason! We've expanded it to reflect the incredible reach of NCSE's work this summer: efforts in the field, updates from the evolution education landscape, and a series of tributes marking the centennial of the *Scopes* trial. You don't want to miss William and Susan Trollinger's powerful essay, my *Random Samples* interview with author and historian Brenda Wineapple, Randy Moore's insightful review of Wineapple's *Scopes* trial book, or Glenn Branch's thoughtful discussion of Edward B. Davis's *Protestant Modernist Pamphlets*.

It was both a privilege and an honor to take part in *Scopes* commemorations in Athens, Georgia, and Nashville, Tennessee. A personal highlight was standing alongside our dear friend and founding executive director, Eugenie C. Scott, in the very courtroom where Clarence Darrow and William Jennings Bryan faced off — a powerful reminder to us both of how alive this history still is. Another was the warmth and curiosity of attendees at each event, many of whom shared their own stories about teaching or learning evolution.

One hundred years after *Scopes*, we know the work is not over. The Scopes trial may be history, but the challenges to evolution education persist. Let's honor this legacy by continuing to push for accurate, evidence-based science education for all.

Amanda L. Townley
is the executive director of NCSE.
townley@ncse.ngo

The Ongoing Fight for Evolution Education

It's been 100 years since the Scopes "monkey" trial captured national attention, placing evolution education at the center of one of America's longest-running cultural debates. And yet, as we stand at this centennial moment, a question hangs in the air: Why are we still debating evolution in public schools?

The resistance to evolution isn't just about facts. It's about identity, fear, and cultural values. Many Americans don't reject evolution because they misunderstand it — they reject it because it challenges core beliefs. Here at NCSE, we've learned that fighting misinformation with more information isn't enough. We must meet communities where they are, listen deeply, and foster dialogue instead of debate. We must build trust before we can build understanding. That's why NCSE doesn't work with just policymakers and scientists — we work directly with teachers and communities. We help educators teach evolution with confidence and clarity, and we give them the tools to respond to resistance thoughtfully and respectfully.

In my role at NCSE, I see daily the renewed pressures and subtle challenges that science educators face, particularly around evolution. Today, our work is more urgent than ever. As we reflect on the *Scopes* trial in its centennial year — through commemorations like Vanderbilt University's Scopes Centennial Symposium, of which NCSE was a co-organizer — we must remember that the trial wasn't just about science. It was about the cultural fault lines of a nation grappling with change.

From the Butler Act's ban on teaching evolution to John Scopes's deliberate challenge, and with the ensuing media spectacle, *Scopes v. Tennessee* became a

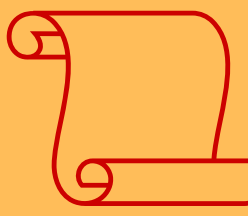
4 Bs of Resistance to Evolution Education
From Scopes to the Present Day

1 Banning *1920s*

Laws like Tennessee's Butler Act prohibited evolution outright. That era ended with *Epperson v. Arkansas* (1968), which struck down such bans.

3 Blunting *2000s*

Laws and policies encouraging the misrepresentation of evolution as scientifically controversial are enacted.



2 Balancing *1970s*

Advocates for creationism demanded a place in the classroom, leading to landmark cases like *Edwards v. Aguillard* (1987) and *Kitzmiller v. Dover* (2005).

4 Backsliding *2022–Present*

Judicial precedents that once protected science education are being eroded.

national moment. We often focus on the clash between Clarence Darrow and William Jennings Bryan, or the courtroom drama that ensued. We forget that Scopes himself was not just a defendant — he was a willing participant in a symbolic showdown.

In July 2025, NCSE Deputy Director Glenn Branch and I, along with current and former board members including Kenneth R. Miller, Eric Rothschild, and Barbara Forrest, had the distinct pleasure of joining a host of other leaders in evolution education, evolutionary sciences, and history to share about the impact of the trial at the Scopes centennial event hosted by the Evolutionary Studies Initiative at Vanderbilt University. We spent two days learning from scholars in science, history, science and religion, law, museum science, and more about the impact of *Scopes* as well as perspectives moving forward.

Since 1925, we've seen multiple waves of resistance to evolution in the classroom:

1 Banning (1920s): Laws like Tennessee's Butler Act prohibited evolution outright. That era ended with *Epperson v. Arkansas* (1968), which struck down such bans.

2 Balancing (1970s): Advocates for creationism demanded "ea place in the classroom," leading to landmark cases like *Edwards v. Aguillard* (1987) and *Kitzmiller v. Dover* (2005).

3 Blunting (2000s): Laws and policies encouraging the misrepresentation of evolution as scientifically controversial are enacted.

4 Backsliding 2022-Present

Judicial precedents that once protected science education are being eroded.

Today, however, we're entering a new, dangerous phase: backsliding. This fourth "b" represents a return to the bad old days. Judicial precedents that once protected science education are being eroded. The *Lemon test*, which helped courts identify violations of the Establishment Clause, has been sidelined. A recent case, *Mahmoud v. Taylor*, granted parents the right to opt out of classroom topics on religious grounds — a move that could open the door for evolution once again to be silenced.

Compared to the public battles of the past, today's conflicts are quieter but no less dangerous. They happen at school board meetings, curriculum reviews, and closed-door conversations. At local and state levels, material on evolution is again being softened or removed from standards and books, and textbook chapters are being censored; challenges are happening in ways that make it more difficult for prior legal cases to be applied. Growing pressures from communities and districts on classrooms create a perfect storm for anti-science action to move into classrooms in ways that resemble fights of the past. Teachers are the heart of science education — but they're too often underprepared and under-supported. Many lack specific training in evolution. Others fear backlash from parents or administrators. In states with teacher shortages, science classes may be led by educators from unrelated disciplines.

So where are we 100 years later?

Over the past century, significant progress has been made in the fight for evolution education. Today, evolution is included in the science standards of every state, and courts have consistently upheld the right to teach it. Technological advancements have also provided educators with powerful tools to access, share, and teach science more effectively than ever before.

Yet despite these gains, many of the core challenges remain unchanged. Cultural resistance to evolution remains deeply entrenched, especially in certain regions of the country. Religious fundamentalism continues to influence public attitudes and fuel skepticism toward evolution. And in many ways, classrooms still reflect the broader societal divides that first surfaced during the Scopes era — serving as battlegrounds for debates that extend far beyond science.

The question we must ask now is: What do we want science classrooms to look like in 10 years?

Imagine a classroom where evolution is not a battleground but a gateway — a portal to understanding genetics, climate change, biodiversity, and the very story of life on Earth. As I often say, the Scopes trial *was never really about one teacher in Dayton — it was about who gets to decide what our children learn*. That question remains unresolved.

We need more than court rulings — we need public trust. The curriculum is only as strong as the support behind it. And that support is built through relationships, empathy, and sustained community engagement.

A CENTURY AFTER SCOPES:
Much Has Not Changed, and Much Has Changed

Versions of this address were delivered to the Society of Biblical Literature's Global Virtual Meeting session on Scopes 100 Years Later and to Vassar College's Science and the Culture Wars conference, and published on the Righting America blog in April 2025.

One hundred years after the *Scopes* trial. And there is no question that there is much that remains unchanged, including the conviction of many fundamentalists and evangelicals that: mainstream science is at odds with a faithful reading of the Bible; there should be equal time for biblical creationism alongside mainstream science in public school classrooms; and this conflict between faith and science involves not only the nature of public education but, in fact, the very soul of America.

So it was in 1925, and so it is in 2025. But much has changed in the past 100 years, and it is these changes — we will focus on three — that we want to highlight here, as we think it is crucial for biblical scholars, scientists, and interested Americans to have a clear-eyed sense of how — when it comes to creationism in the US (and beyond) — 2025 is not 1925.

The first involves the very nature of biblical creationism. At the time of the *Scopes* trial, most fundamentalists were "old-earth" creationists. They adamantly and passionately rejected mainstream biology, understanding evolution to be both profoundly antibiblical and — in its emphasis on humans as highly developed animals — morally and socially corrosive. But they simultaneously accepted mainstream geology, holding either to the "gap theory" — there was an indeterminate gap of time between Genesis 1:1 and Genesis 1:2, during which time God

Photo courtesy Smithsonian Institution Archives

used six days to order his creation — or the "day–age theory," in which each "day" of Genesis 1:1 represented an indeterminate period of time.

William grew up with old-Earth creationism in a very tangible way. His father was a fundamentalist in theology if not in behavior — he made prodigious use of very colorful expletives, and won a great deal of money playing poker — and he passionately opposed evolution. But as a geologist who used aerial photographs to create maps that could predict where oil would be found, he also passionately held to the idea of an old Earth, particularly, the day–age theory.

So he was horrified by the 1961 publication of John C. Whitcomb's and Henry Morris's *The Genesis Flood: The Biblical Record and its Scientific Implications*. Borrowing heavily (without attribution) from the Seventh-day Adventist geologist George McCready Price, Whitcomb (a fundamentalist theologian) and Morris (a civil engineering professor) argued that Noah's Flood was a yearlong global

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At NCSE, we believe in a future where all students are scientifically literate, where all teachers are empowered, and where evidence-based education is not a point of controversy, but a cornerstone of democracy. So I leave you with this invitation: be a radically empathetic voice for science. Support your local educators. Speak up at school board meetings. And never underestimate the power of engagement over conflict. Because science doesn't just belong in labs or in the field — it belongs in our everyday conversations, our classrooms, and our communities.

Let's make sure it stays there.

Amanda L. Townley is the executive director of NCSE. townley@ncse.ngo

event that produced the geological strata that provided the appearance of an old Earth. More than this, they argued that not just the Earth but the entire universe was created in six 24-hour days less than 10,000 years ago.

Replete with footnotes, photographs, and the occasional mathematical equation, *The Genesis Flood* gave conservative Protestants what seemed to be a serious alternative to mainstream science. More than this, their young-earth creationism fits much better with taking the Bible literally than does old-earth creationism. As a result, young-earth creationism took conservative Protestantism (and beyond) by storm; much to William's father's dismay and anger, within a few decades it supplanted old-earth creationism as the dominant form of biblical creationism. And one very important consequence of this shift — from holding to the idea that Earth is billions of years old to the idea that Earth is but a few thousand years old — is that it dramatically widened the gap between biblical creationism and mainstream science. And this is significant.

A second and related change is that the role of the Bible in the arguments for a young-earth creationism seems, at least in some very influential quarters, to have become increasingly unserious, even irrelevant. Why do we say this? As we began research for our book *Righting America at the Creation Museum*, we assumed that we would find lots of Bible at Answers in Genesis's Creation Museum. And in one sense, there is indeed some Bible, or better, there are many little snippets of Bible. But as we looked closely at the museum's ubiquitous placards — and here we had the assistance of a very bright doctoral student — we discovered an inconsistent use of translations, extraordinarily creative editing of biblical passages, a lack of ellipses to indicate where text (sometimes whole verses) had been removed from a passage, and the failure to provide relevant context for the passages that are displayed. To give one example of the latter (and keep in mind that the threat of Hell is very important to AiG), in the Museum's "Jesus Rooms" there is a placard with Matthew 25:41: "Depart from Me, you cursed, into the everlasting fire prepared for the devil and his angels." That's it. No mention of the verses before and after, which make clear that those condemned to the everlasting fire are those who did not give the hungry food, the thirsty drink, the naked clothing, and so forth. Proof-texting on steroids.

Of course, it is no accident that these verses are omitted. The emphasis on caring for "the other" as the condition for salvation does not fit with AiG's ideological agenda.

And when one looks at AiG's 46-point statement of faith, which all employees must sign, one finds this ideological agenda combined with a proof-texting that is carried even further, on occasion beyond any text at all. Each of the 46 propositions includes references to Bible verses. So here's proposition #29: "the concepts of social justice, intersectionality, and critical race theory are anti-biblical and destructive to human flourishing (Ezekiel 18:1–20; James 2:8–9)." We looked up these passages and found nothing to indicate that social justice, intersectionality, and critical race theory are anti-biblical. But as we are not biblical scholars, we turned to Abingdon's *New Interpreter's Bible Commentary*, where we discovered nothing to corroborate AiG's assertions.

All this to say that for AiG and its attractions, the Bible is often little more than a prop used on behalf of young-earth creationism and its right-wing culture war arguments. Let us be clearer. Young-earth creationism is not simply an argument that biblical creationism is true, nor is it simply an argument that biblical creationist science is the true, factual way we should understand the universe. As we discovered in our research, what matters most at the Creation Museum, Ark Encounter, and AiG's website is preparing conservative evangelicals to serve as right-wing culture warriors who attack (among others) feminists, the LGBTQ+ community, DEI initiatives, and "woke" thinking, and who argue in behalf of Christian nationalism and patriarchy.

More than this, the young-earth creationist juggernaut that is AiG is very busy attacking what they see as the scientific and academic conspiracy that works to brainwash us into believing that evolution is true, that global warming is real ("the climate cult"), and that COVID vaccines are efficacious.

Of course, to hold such conspiratorial views is made much easier when one resides within a bubble that protects adherents from what many of us would see as facts. In this regard, over the past few decades the right-wing media industry — Fox News and much, much more — has exploded, providing a wonderful landing spot for the most outrageous conspiracy theories.

But there's also education. In the *Scopes* trial, the controversy was about what would be taught in the public schools, schools that were, with few exceptions (in some places, Catholic schools) the only game in town. But this is radically changing. Today we have a plethora of Christian schools and homeschools, schools which are often equipped with fundamentalist textbooks from

MEMBER NEWS

David Amidon, a middle school science teacher at the Onondaga Nation School, part of the LaFayette School District near Syracuse, New York, and a NCSE Teacher Ambassador, received the Ecology/Environmental Science Teaching Award for 2024 from the National Association of Biology Teachers. The award is sponsored by Vernier Software and Technology.

NCSE is delighted to congratulate **Jane Maienschein** of Arizona State University on receiving the Sarton Medal, the highest honor bestowed by the History of Science Society, for 2024. According to the HSS's citation, "For over forty years, [Maienschein] has been a leading figure in the history and philosophy of science. Her prolific research includes five books, 14 edited volumes, over 95 research articles, and 41 editorials and op-eds, covering topics from embryology, genetics, and evolution to regenerative medicine and public policy. Her work exemplifies rigorous historical investigations that illuminate current science and public health issues. [Her] contributions to the history and philosophy of biology are foundational."

NCSE is pleased to congratulate **Michael E. Mann**, a former member of NCSE's board of directors, on his appointment as Vice Provost for Climate Science, Policy, and Action at the University of Pennsylvania.

The **Paleontological Research Institution**, a recipient of NCSE's Friend of the Planet award, announced the establishment of its Center for Climate Change Education in September 2024. According to a press release, "This new initiative will equip educators and the public with practical tools for addressing climate change while contributing to global mitigation efforts. The Center will produce educational resources, create museum and nature center exhibits, offer professional development for educators, and provide climate education programs designed for diverse audiences. It will also support the broader climate education community. ... The Center's creation underscores PRI's decades-long leadership in climate change education, including the award-winning 2017 *Teacher-Friendly Guide to Climate Change*. With special expertise on the geologic history of life and climates and on Earth system education, the Center will enhance PRI's role as a key resource for educators and the public, promoting urgent action on climate change."

The paleoanthropologist **Briana Pobiner** of the Smithsonian Institution received the Evolution Education Award for 2024 from the National Association of Biology Teachers. The award is now sponsored by BSCS Science Learning and NCSE; previous recipients, before NCSE became a sponsor, include NCSE Executive Director **Amanda L. Townley** (then Glaze) and NCSE Deputy Director **Glenn Branch**. Pobiner previously received NCSE's Friend of Darwin award.

publishers such as Bob Jones University Press, Abeka Books, and Accelerated Christian Education. These schools suffuse their students with a heavy dose of young-earth creationism, white Christian nationalism, and more. And then many of these students head off to "Creation Colleges" — you can see a list of them on the Answers in Genesis website — where they are inculcated with very similar messages.

Folks like AiG's Ken Ham have been quite aggressive about promoting this alternative educational system, And now there are states that are funding or seeking to fund private schools. So the fight now is not just about getting creationism, the Bible, and white Christian nationalism into the public schools. It is also about funding private schools, including fundamentalist schools. It is about expanding the right-wing subculture. It is about taking dominion over the culture.

This is where we are. One hundred years after Scopes.

Susan Trollinger is Professor of English, and **William Trollinger** is Professor of History, at the University of Dayton. They coauthored *Righting America at the Creation Museum* (2016). strollinger1@udayton.edu and wtrollinger1@udayton.edu

UPDATES

Are there threats to effective science education near you? Do you have a story of success or cause for celebration to share? E-mail any member of staff or info@ncse.ngo.

CALIFORNIA

California's Assembly Concurrent Resolution 162 died in the Senate Rules Committee when the California legislature adjourned on August 31, 2024. The resolution passed the Assembly on a 65–0 vote in May 2024. If adopted, the resolution would have established California Youth Action Climate Day, "to honor and support the efforts of young people in their pursuit of environmental sustainability, climate justice, and the preservation of biodiversity." The resolution noted that climate change "is a consequence of human activities, such as the burning of fossil fuels" and recognized "the importance of educating and engaging young people in environmental stewardship and climate action." If adopted, the resolution would have encouraged institutions, including schools, and individuals to observe California Youth Climate Action Day every September 20 with appropriate activities, including activities that promote awareness of climate change.

CALIFORNIA

California's Assembly Bill 3051 — which would, if enacted, have allowed the state's taxpayers to donate funds to the K–12 Climate Change Education Voluntary Tax Contribution Fund while filing their state taxes — died in committee on August 31, 2024, when the legislature adjourned. Donated funds would have been used to "award grants to school districts, county offices of education, resource conservation districts, district and county office of education partnerships with higher education institutions, and community-based nongovernmental organizations focused on environmental and climate change education." The bill was introduced by Al Muratsuchi (D–District 66) on February 16, 2024, and was amended twice thereafter; it was passed by the Assembly Revenue and Taxation Committee but then was referred to the Assembly Appropriations Committee, where it received no vote.

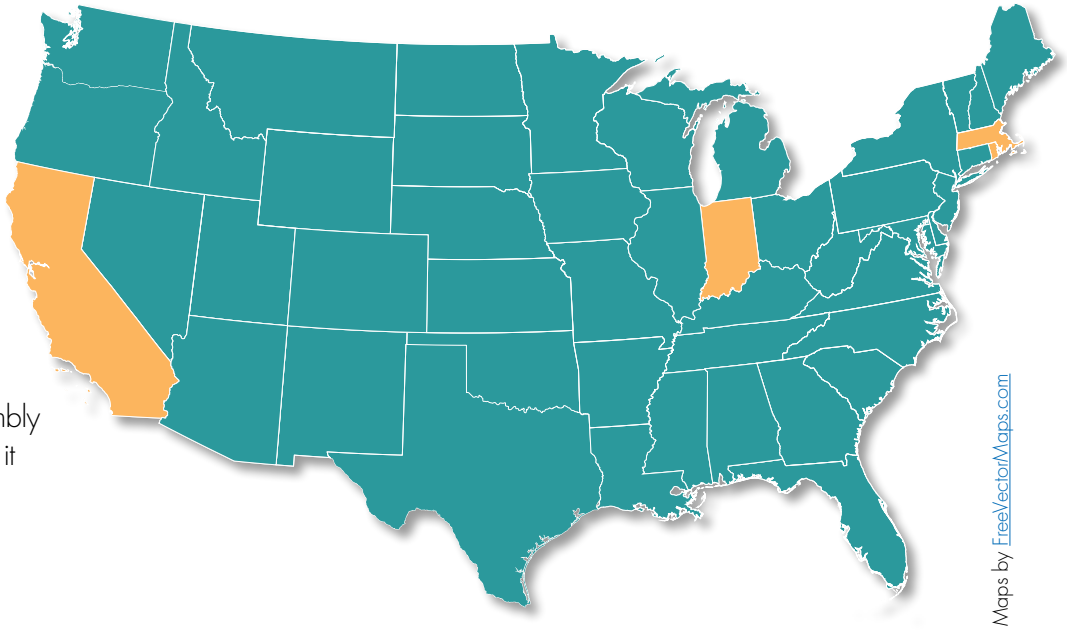
INDIANA

A lawsuit in Indiana alleging that the teaching of evolution in public schools is unconstitutional was dismissed by a U.S. District Court on August 30, 2024, according to WISHTV.

Jennifer and Jason Reinoehl, parents of five children who attended the Penn-Harris-Madison School Corporation, a school district headquartered in Mishawaka, Indiana, and one of their children initially sued the district, the Indiana state board of education, and Katie Jenner, the Indiana Secretary of Education, in May 2023.

The plaintiffs contended that the district schools teach "the state-sponsored, atheistic, religious Theory of Evolution ... under the guise that it is 'science,'" that what they regard as various components of evolutionary theory have been scientifically disproven, and that "the atheistic Theory of Evolution specially attacks the Judeo-Christian origin story."

Accordingly, they sought a declaration that the teaching of evolution in Indiana's public schools violates the federal and the Indiana constitutions, an injunction prohibiting the defendants from teaching evolution in the future and requiring them to remove all relevant instructional materials, and a monetary award of damages.



Maps by FreeVectorMaps.com

The court found that the plaintiffs failed to allege an Establishment Clause violation because, in the words of *McLean v. Arkansas* (1982), "it is clearly established in the case law, and perhaps also in common sense, that evolution is not a religion and that teaching evolution does not violate the Establishment Clause."

Noting that the plaintiffs apparently sought to invoke a federal statute as a basis for their claim that teaching evolution violates the Indiana constitution, the court dismissed the claim without prejudice, meaning that the plaintiffs could amend the complaint and try again. But the court suggested that doing so would be "futile."

The case is *Reinoehl et al. v. Penn-Harris-Madison School Corporation et al.*, No. 1:23-cv-00889-SEB-MG (2024 S.D. Ind.)

MASSACHUSETTS

House Bill 4419 and Senate Bill 2668, identical bills aimed at supporting climate education in the Bay State, died in the Massachusetts legislature when the last day of formal sessions for the 2023–2024 legislative session passed. If enacted, these bills would have established the Interdisciplinary Climate Literacy Trust Fund to support interdisciplinary climate education in the state, prioritizing underserved communities and communities that are disproportionately affected by climate change. The bills would have also authorized local school districts to implement interdisciplinary climate literacy plans. Guidelines for the development and implementation of such plans would have been provided by an Interdisciplinary Climate Literacy Advisory Council. These bills replaced a number of previously introduced climate education bills — House Bills 470, 491, 496, 504, 576, and 3387 as well as Senate Bill 260 — and were passed by the Joint Committee on Education, as NCSE previously reported.

RHODE ISLAND

A pair of identical climate change education bills were "held for further study" by their respective committees in the Rhode Island legislature and thus died when the legislature adjourned in June 2024. House Bill 7496 and Senate Bill 2356 would have appropriated funds to support "a grant program to promote and enhance climate change and ocean protection programs for youth." In fiscal year 2024, $250,000 would have been appropriated; in subsequent years, the legislature would have decided the amount. Four similar bills introduced in 2023 attempted to appropriate $500,000 yearly for such a grant program; these bills all died in committee, as NCSE previously reported.

RUSSIA

In September 2024, Muslim Khuchiev — formerly the mayor of Grozny, Chechnya, and then the prime minister of Chechnya from 2018 to 2024 — reportedly proposed the exclusion of "Darwin's theory" from textbooks in Russia, according to RBK. He was quoted as saying, "Everyone knows that this is a false theory, it goes against religion. This is the first step, I believe, in the spiritual corruption of children. We can simply remove it. This [Darwin's theory] is not true, it contradicts religious education, all religions have recognized this. Who else should recognize this, so that it can be removed from textbooks and not instilled into the consciousness of our children?" (interpolation RBK's). Kuchiev's remarks were offered at a meeting of the All-Russian Parents' Committee, at which the minister of education, Sergei Kravtsov, was present; no reaction from Kravtsov was reported. However, Anatoly Wasserman, a member of the Russian parliament and of its committee on education, was critical of Khuchiev's proposal, according to RT.

Photo credit: Elena Siebert

> "One of the chapters I had the most fun writing in this book was the chapter where I explained [the scientists'] argument in a way that I hope the general reader could understand in the same ways that I did."

Brenda Wineapple is the author, most recently, of *Keeping the Faith: God, Democracy, and the Trial That Riveted a Nation*, about the 1925 *Scopes* trial. This timely book was described by *The New York Times* as a tale framed much more interestingly than is typical "as a conflict between political visions that remain very much alive in the present" and by our own reviewer, Randy Moore, as "well-written and entertaining." NCSE Executive Director Amanda L. Townley chats with Wineapple about her research into the *Scopes* trial and its relevance today.

Watch the interview

> "I don't think there's anything in American history or culture that's binary … There was the aspect of science vs. religion or faith vs. religion. But not in a vacuum."

NCSE's Recent Contributions to Evolution Education Research

NCSE's Investigating Science Education Program, supervised by Deputy Director Glenn Branch, aims to produce high-quality research relevant to understanding, maintaining, and improving science education, especially with regard to socially but not scientifically controversial topics such as evolution and climate change. Between 2020 and 2025, the Investigating Science Education program produced five research studies, published in peer-reviewed journals.

- Jon D. Miller, Belén Laspra, Carmelo Polino, Glenn Branch, Robert T. Pennock, and Mark S. Ackerman. The acceptance of evolution: A developmental view of Generation X in the United States. *Public Understanding of Science* 2024; 33(7): 818–837.

The public acceptance of evolution remains a contentious issue in the United States. Numerous investigations have used national cross-sectional studies to examine the factors associated with the acceptance or rejection of evolution. This analysis uses a 33-year longitudinal study that followed the same 5000 public-school students from grade 7 through midlife (ages 45–48) and is the first to do so in regard to evolution. A set of structural equation models demonstrate the complexity and changing nature of influences over these three decades. Parents and local influences are strong during the high school years. The combination of post-secondary education and occupational and family choices demonstrate that the 15 years after high school are the switchyards of life.

- Glenn Branch, Eric Plutzer, and Ann Reid. What's effective and ineffective in preparing high school educators to teach evolution? Evidence from a representative national U.S. survey. *Evolution: Education and Outreach* 2023; 16(4).

What types of pre-service coursework prepare biology teachers to teach evolution effectively? The present study provides answers to that question based on evidence from a nationally representative sample of public high school biology teachers in the U.S. Evolution coursework on evolution was significantly associated with various positive classroom outcomes. But surprisingly, methods coursework on problem-based learning and on teaching controversial topics was significantly associated with negative classroom outcomes, particularly presenting creationism as scientifically credible, suggesting that pre-service methods coursework aimed at preparing educators to teach evolution effectively tends, at present, to be counterproductive, leading to the presentation of creationism as scientifically credible.

Farewell to Blake Touchet, Welcome to Britt Miller

NCSE bids farewell to **Blake Touchet.** Joining NCSE in 2022, although previously associated with NCSE as a Teacher Support Ambassador, he helped to expand the breadth and depth of NCSE's teacher program, especially by forming partnerships with local school districts. He worked extensively with the science teacher community, representing NCSE at conferences and workshops and contributing to journals such as *Research Issues in Contemporary Education* and *The American Biology Teacher*. He also routinely aided NCSE's Catalyzing Action program in quickly and accurately assessing proposed changes to state science standards across the country. All of us at NCSE wish him the best in his new endeavors.

NCSE is pleased to welcome **Britt Miller** as a new Science Education Specialist. Miller earned a bach-elor's degree in experimental psychology from the University of South Carolina, a master of arts in teaching degree in elementary education from Liberty University, and a doctorate in science educat-ion research and experimental psychology at George Mason University. At NCSE she will contribute to the expansion of our evidence-based curricula as an elemen-tary specialist, highlighting the critical importance of supporting all K–12 science teachers. She will also assist teachers in navigating classroom challenges to the teaching and learning of evolution and climate science through our professional learning opportunities and outreach.

- Jon D. Miller, Eugenie C. Scott, Mark S. Ackerman, Belén Laspra, Glenn Branch, Carmelo Polino, and Jordan S. Huffaker. Public acceptance of evolution in the United States, 1985–2020. *Public Understanding of Science* 2022; 31(2): 223–238.

The public acceptance of evolution in the United States is a long-standing problem. Using data from a series of national surveys collected over the last 35 years, we find that the level of public acceptance of evolution has increased in the last decade after at least two decades in which the public was nearly evenly divided on the issue. A structural equation model indicates that increasing enrollment in baccalaureate-level programs, exposure to college-level science courses, a declining level of religious fundamentalism, and a rising level of civic scientific literacy are responsible for the increased level of public acceptance.

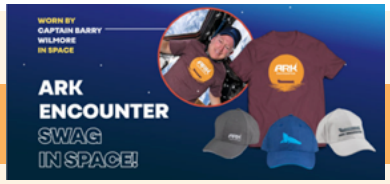
- Glenn Branch, Eric Plutzer, and Ann Reid. Teaching evolution in U.S. public middle schools: Results of the first national survey. *Evolution: Education and Outreach* 2021; 14(8).

In this paper, we rely on a 2019 nationally representative sample of 678 middle school science teachers to investigate how much time they report devoting to evolution and the key messages they report conveying about it. We find that, compared to high school biology teachers, middle school science teachers report themselves as less well-equipped to teach evolution, devoting less class time to evolution, and more likely to avoid taking a stand on the scientific standing of evolution and creationism. We show that middle school science teachers with extensive pre-service coursework in evolution and in states that have adopted the Next Generation Science Standards are more likely to report devoting more class time to evolution. Similarly, we show that middle school teachers in states that have adopted the Next Generation Science Standards and who are newer to the profession are more likely to report themselves as presenting evolution as settled science.

- Eric Plutzer, Glenn Branch, and Ann Reid. Teaching evolution in U.S. public schools: A continuing challenge. *Evolution: Education and Outreach* 2020; 13(14).

In this study, using two nationally representative surveys of public high school biology teachers, we investigate how the quality of evolution teaching, as measured by teachers' reports of their teaching practices with regard to evolution and creationism shifted between 2007 and 2019. We find substantial reductions in overtly creationist instruction and in the number of teachers who send mixed messages that legitimate creationism as a valid scientific alternative to evolutionary biology. We also report a substantial increase in the time that high school teachers devote to human evolution and general evolutionary processes. We show that these shifts reflect both generational replacement and changes in teaching practices among veteran teachers, due to widespread adoption of the Next Generation Science Standards, along with improvements in pre-service teacher education and in-service teacher professional development.

These studies have received substantial attention in the press — thanks in part to NCSE staff both communicating with journalists and writing popular expositions themselves — and the scholarly literature. NCSE is of course grateful to its academic collaborators, especially Eric Plutzer of Pennsylvania State University and Jon D. Miller of the University of Michigan, and to its members for their invaluable support of NCSE.



WHAT WE'RE UP AGAINST

The Wrong Stuff

Evidently a fan of Answers in Genesis's Ark Encounter, Captain Barry "Butch" Wilmore was seen wearing t-shirts and hats advertising the young-earth creationist attraction in images from the International Space Station. Ken Ham, the entrepreneurial founder of the Answers in Genesis ministry, promptly hawked the merchandise on his blog, writing, "These 'as seen in space' items are available on our online store or at the attractions." But in a September 8, 2024, post on The Panda's Thumb blog, Dan Phelps, a frequent critic of Answers in Genesis (and a recipient of NCSE's Friend of Darwin award), observed that federal law provides that "ISS crewmembers shall refrain from any use of the position of ISS crewmember that is motivated, or has the appearance of being motivated, by private gain, including financial gain, for himself or herself or other persons or entities." Perhaps as a result, the post promoting the merchandise was then removed from Ham's blog.

— *GLENN BRANCH*

Peace for Now in the Peace Garden State

North Dakota's Senate Bill 2355, introduced on January 24, 2025, sought to require the state superintendent of public instruction to "include intelligent design in the state science content standards for elementary, middle, and high school students." The superintendent would also have been required to "provide teachers with instructional materials demonstrating intelligent design is a viable scientific theory for the creation of all life forms and provide in-service training to include intelligent design as part of the science content standards."

Antievolution legislation is rare in the Peace Garden State. In 1927, a bill seeking to ban the teaching of human evolution similar to Tennessee's Butler Act of 1925, was introduced but failed. Then there was apparently nothing until 2019, when a bill that would have ostensibly promoted "the freedom to teach students the strengths and weaknesses of scientific theories and controversies" while prohibiting state and local administrators from exercising supervisory responsibility over teachers was introduced and then withdrawn by its sponsor eight days later.

In seeking to include "intelligent design" in the state science standards, Senate Bill 2355 was a radical novelty. Creationists have notoriously attacked the treatment of evolution in state science standards ever since standards were introduced as part of the push for outcome-based education in the 1990s, enjoying occasional limited successes in states from Alabama to Utah. But it appears that no form of creationism, including "creation science" and "intelligent design," has ever been explicitly ensconced in any state's science standards.

NCSE sprang into action as soon as Senate Bill 2355 was introduced, alerting its local members, state and national organizations concerned about the integrity of science education, and journalists in North Dakota. Although no NCSE staff was mentioned in the first substantive news article about the bill — published in the *Grand Forks Herald* on February 10, 2025 — NCSE provided background information to the reporter and also connected her with Steve Travers, a professor of biology at North Dakota State University, who was equipped with NCSE's talking points.

It was initially unclear what the sponsors of Senate Bill 2355 were thinking. Were they simply unaware of the 2005 decision in *Kitzmiller v. Dover*, which would strongly suggest that a federal court would find a law such as they were proposing to constitute a breach of the Establishment Clause of the First Amendment? Or were they hoping to relitigate the issue, perhaps on the theory that today's revanchist Supreme Court — which in its 2021 decision in *Kennedy v. Bremerton* overturned the legal tests underlying half a century's worth of Establishment Clause case law — might be sympathetic?

On February 12, 2025 — coincidentally, Darwin Day — the lead sponsor of the bill, Michael Dwyer (R–District 47), testified before the Senate Education Committee on behalf of his bill. With regard to *Kitzmiller*, he claimed:

> The Litigation mentioned by many of the testimonies in opposition to this bill had a different set of facts. In that case, Intelligent Design was directed to replace the teaching of evolutuion [*sic*]. In this case, it is simply requested to include this information as part of the science content standards, along with evolution.

In fact, the policy challenged in *Kitzmiller* required the teaching of "intelligent design" while not banning the teaching of evolution. It is surprising that Dwyer, a lawyer by trade (although no longer in practice) so badly misrepresented a case so relevant to his bill.

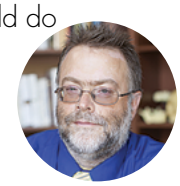
Dwyer was at least correct in observing that a lot of the testimony against Senate Bill 2355 argued that its provisions would

run afoul of the *Kitzmiller* decision. Organizations that cited *Kitzmiller* in their testimony against the bill included the Biology Program at the University of Jamestown (organized by Bruce Jensen, a member of NCSE), the Department of Biological Sciences at North Dakota State University, the North Dakota School Boards Association, the North Dakota Council of Education Leaders, and — unsurprisingly — the ACLU of North Dakota.

Yet the organization that may have tilted the balance against Senate Bill 2355 was the de facto institutional headquarters of the "intelligent design" movement. A representative of the Discovery Institute sent a letter — arriving too late to be official testimony — to the Senate Education Committee, urging rejection of the bill. Why? Because it would provoke a lawsuit, and "such a lawsuit would most certainly entangle the intelligent design academic community, harm academic freedom for pro-ID scientists in the academy, and greatly hinder our efforts to develop ID as a scientific theory."

It is tempting to infer that the Discovery Institute's prediction was based on the consequences of the *Kitzmiller* case. The detailed proceedings in the courtroom effectively exposed the intellectual bankruptcy of the "intelligent design" movement to a broad public. The decision from Judge John E. Jones III was scathing about the scientific status of "intelligent design," concluding that it is not only not science but also inextricable from its creationist antecedents. And the Discovery Institute comprehensively failed to cover itself with glory throughout the process.

In the end, the Senate Education Committee voted 4 to 1 to give a Do Not Pass recommendation to the bill. In North Dakota's legislature, all bills receive a hearing on the floor, and on February 24, 2025, after a few minutes of discussion during which the prospect of a lawsuit loomed large, the Senate voted against the bill. But it was a close vote: 22 to 25. And since in a future legislative session, a North Dakota legislator may act on the Discovery Institute's advice, offered in the same letter, to introduce a bill like 2019's bill, Peace Gardeners concerned about evolution education would do well to prepare for war.



Glenn Branch is NCSE Deputy Director.
branch@ncse.ngo

Friend of Darwin and Friend of the Planet Awards for 2025

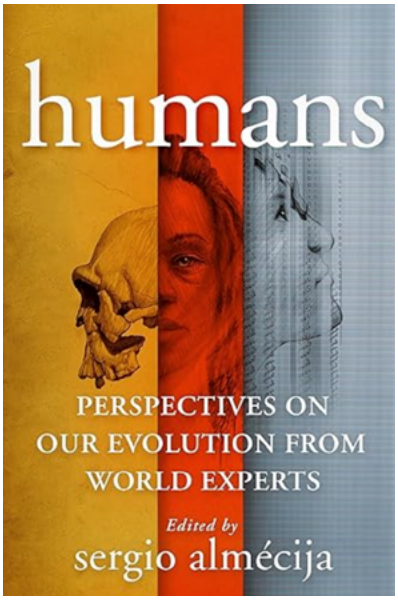
NCSE is pleased to announce the winners of the Friend of Darwin award for 2025: Vanderbilt University's Evolutionary Studies Initiative, directed by evolutionary biologist Antonis Rokas; Katie Hinde, a biological anthropologist at Arizona State University and the founding director of March Mammal Madness; and Randolph M. Nesse of the University of Michigan and Arizona State University, a physician who is among the founders of the disciplines of evolutionary medicine and evolutionary psychiatry.

"The contributions to the public understanding of evolution from the new Friends of Darwin are spectacular," commented NCSE Executive Director Amanda L. Townley. "Randy Nesse's work confirms that understanding evolution is practically important, while March Mammal Madness inspires hundreds of thousands of people to explore the diversity of life through competitive brackets. And Vanderbilt University's Evolutionary Studies Initiative is a model of interdisciplinary focus on the importance of evolution in higher education."

NCSE is also pleased to announce the winners of the Friend of the Planet award for 2025: The CLEO Institute, a non-profit organization seeking to build climate literacy and mobilize climate action, directed by Yoca Arditi-Rocha; Kim Cobb, a climate scientist and gifted climate communicator at Brown University (formerly at Georgia Institute of Technology); and John Toohey-Morales, a Florida-based atmospheric and environmental scientist who was among the first broadcast meteorologists to emphasize climate change on the air.

"The new Friends of the Planet have tirelessly promoted the cause of climate change education, particularly in the southeast United States, where it is sorely needed," Townley explained. "John Morales especially through the medium of broadcast meteorology, in both English and Spanish; Kim Cobb especially through her research and engagement and outreach on climate change; and The CLEO Institute especially through its commitment to mobilize community members and educate teachers and students about the urgency of climate change."

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 Fred Edwords, Niles Eldredge, Tammy Kitzmiller, Mohammed Noor, and Carl Zimmer. Previous recipients of the Friend of the Planet Award include Kerry Emanuel, Ayana Elizabeth Johnson, and Dawn J. Wright.



Humans: Perspectives on Our Evolution from World Experts

editor: Sergio Almécija *publisher:* Columbia University Press

reviewed by: Nathan H. Lents

Humans is not your typical popular science book about human evolution. For one thing, you will not find the grand narratives and romantic speculations that so often imbue books on this subject (admittedly including my own). You will not find bold hypotheses, scant of evidence, for the origins of human nature, the emergence of our unique intellect, or the development of social stratification. And you will certainly not be subjected to the haughty pontifications of the author, brazenly interpreting all evidence in accordance with his particular anthropological perspective. In fact, you won't hear much from the author at all!

Instead, *Humans* is a book of thoughtful contemplation. Sergio Almécija, a biological anthropologist currently at the American Museum of Natural History, has assembled more than one hundred of the top scientists who spend their days and nights actively working on the countless unanswered questions about the origin of our species, and asked them to step outside their narrow research questions and consider what we know, or think we know, about human evolution.

The book contains interviews of a sort, in which Almécija presents a variety of questions that challenge these scientists to explain their unique research perspective and to wax philosophical about the larger questions in the field, to which their own contributions may be only tangentially related. Among the questions are items like, *What fact about humans amazes you the most?* and *What factors set our ancestors on the path to becoming human?* as well as more personal items such as *When and why did you decide to do what you do?* and *What discovery do you most consider a "game changer"?* And there are some more speculative ones as well, such as *Where would you go if you had a time machine?* and *How will humans evolve in the future?*

The researchers chose which questions to answer. To my surprise, they often elected to address issues quite removed from their typical sphere. I think this speaks to how we scientists often relish opportunities to wrestle with puzzling issues apart from those that usually consume us. In a field not known for its humility, I was delighted to see giants of paleoanthropology step back and say, "Gee, I really don't have any idea how this might have happened." I was also stunned to read some of these scientists expressing open skepticism of received wisdom, vaunted ideas, and prevailing theories.

Because it pulls back the curtain on how leading scientists really think about each other's ideas, *Humans* is ideal for students and teachers of human evolution, and anyone interested in coming to grips with the field. It illuminates the reality that knowledge is tentative and dogma is fragile. No one gets the last word.

It took me a minute to realize how best to engage with this book (odd, since I was one of the anonymous peer reviewers of the book proposal), so let me save you some time. Most importantly, this book is not meant to be consumed in a linear fashion. You needn't simply sit down and start reading, beginning to end. Instead, feel free to leaf through the various entries in whatever order you want.

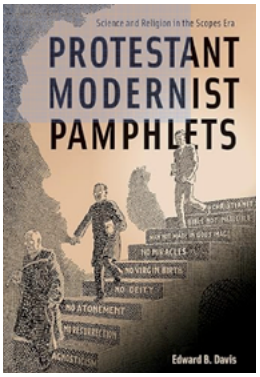
Yes, the book is loosely organized into sections covering specific geological eras when major evolutionary transitions occurred, for example, the origin and diversification of apes, the roots of the *Homo* genus, and so forth. But within each entry, the contributors offer their unrestricted ruminations on anything and everything in the field, from the mismatch of our modern and our ancestral diets to what a future extraterrestrial human population might look like. I recommend consuming this book in bite-size bouts of time, skipping around randomly or seeking out a specific researcher whose thoughts interest you on a given day.

In fact, perhaps the best way to utilize this book is as a resource to

hear more from an author whose book or article you are currently reading. Whenever Nina Jablonski is in the news, or Frans de Waal publishes a new book, or Yohannes Haile-Selassie presents a new fossil, you can grab this book, flip to their entry, and gain insightful context about them. I did this twice in the month I was working on this review, once when reading an article by Susana Carvalho and her colleagues about chimpanzee social networks, and once as I read *Determined* by Robert Sapolsky. In both cases, the work instantly became more personal, more intimate even, and I got a glimpse of how these two scientists think about their work, even though I have never met them. As such, this book serves more like a reference text than a popular science book, but the reference material isn't established knowledge, but rather the unprocessed thoughts and ideas of the scientists in this field.

In sum, *Humans* is an engaging book filled with the thoughtful musings of many of the top minds in anthropology, packed with endless insights and ideas. Whether you are a layperson, a scientist in another area, or even a veteran paleoanthropologist yourself, you will learn a great deal from this book, and broaden your perspective. You will even encounter opinions and conclusions that you disagree with — indeed there are direct disagreements among the contributors! — and you may find your own preconceived notions unsettled. In my opinion, that is a defining feature of a good book.

Nathan H. Lents Professor of Biology at John Jay College of Criminal Justice. His most recent book is *Human Errors: A Panorama of Our Defects, from Broken Genes to Pointless Bones* (2018). nlents@jjay.cuny.edu



Protestant Modernist Pamphlets: Science and Religion in the Scopes Era

author: Edward B. Davis

publisher: Johns Hopkins University Press

reviewed by: Glenn Branch

Protestant Modernist Pamphlets reprints 10 pamphlets published between 1922 and 1931 by the American Institute of Sacred Literature in its "Science and Religion" series, with annotations and a lengthy introductory essay by the historian of science Edward B. Davis. Thirty years ago, Davis edited a collection of the antievolution pamphlets of the creationist Harry Rimmer for Ronald L. Numbers's *Creationism in Twentieth-Century America* series. Here, however, he presents what began as a reaction to the antievolutionist crusade of the 1920s, and in particular to William Jennings Bryan, whose invited column on "God and Evolution" appeared in *The New York Times* on February 26, 1922.

Was this the column that launched a million rebuttals?

Was this the column that launched a million rebuttals? Scientists like Edwin Grant Conklin, a Princeton University zoologist, and modernist clergy like Harry Emerson Fosdick, a Baptist minister in New York City, were quick to respond in the pages of the *Times*, but the apparent growth of the antievolution crusade seemed to require a continuing response. The AISL — "a correspondence school for Protestant pastors administered by the University of Chicago Divinity School," as Davis explains — stepped up to the plate, issuing a revised version of Conklin's response and the original version of Fosdick's response as the first two installments in the "Science and Religion" series.

In a document entitled "Implication of the *Scope* [sic] Trial," apparently written during the Scopes trial itself, the AISL complained that the trial showed "that religious prejudice is intolerant and incapable of fair play," which Davis suggests alluded to the fact that the jury was not permitted to hear testimony from religious scientists and liberal theologians — the AISL's crowd, essentially. (Reproducing the document in its entirety would have been nice.) "In any case," Davis writes, "Bryan's confrontational attitude toward evolution profoundly discouraged the kind of conversation that the AISL tried to facilitate" (page 78). And yet evolution was not front and center in the following installments.

Throughout the series, the authors were concerned to argue for the compatibility of science with faith, if not necessarily with the complete set of traditional religious beliefs that fundamentalists — but not only fundamentalists — were unwilling to revise or abandon in response to the challenges apparently posed by the deliverances of contemporary science. Notable contributors included the Nobel-Prize-winning physicist Robert A. Millikan and the Pulitzer-Prize winning physicist Michael Pupin (who, as Davis acknowledges, was neither a Protestant nor a modernist), as well as the Harvard University geologist Kirtley F. Mather, who was prepared to testify at the *Scopes* trial.

The Catalyst: RNA and the Quest to Unlock Life's Deepest Secrets

author: Thomas Cech

publisher: W. W. Norton

reviewed by: David Ratner

RNA has been playing second fiddle to DNA's lead in the popular imagination ever since Watson and Crick deduced the double helical nature of our genes three quarters of a century ago. That view is changing, with RNA now understood to possess diverse catalytic abilities that DNA lacks, and thus to play a range of previously unsuspected roles in all living things. This shift reflects the work of Thomas Cech (who shared the Nobel Prize in Chemistry for 1989) as much as of any other single researcher. Cech was there at the beginning and remains active to this day. *The Catalyst* elucidates RNA science for non-scientists while illuminating both the process of discovery and the personalities of many of the researchers involved.

The book comprises two parts. The first ("The Search") provides some needed background on molecular biology. It was once thought that RNA served primarily as intermediary between gene (i.e., DNA) and protein end product. Simple base pairing, either with DNA or other RNA molecules, was RNA's specialty. Cech then presents his growing suspicion, radical at the time, that RNA had other tricks up its sleeve. The surprising discovery that the enormously long nuclear RNA transcripts found in higher organisms (eukaryotes) are extensively processed, or spliced, into much smaller messenger molecules before they can direct cytoplasmic protein synthesis is followed by the even greater shock that one of the molecules doing that splicing, in the case of Cech's favorite critter at the time, *Tetrahymena*, is the RNA itself! For the preceding 60 years of research, every biochemical change — the making or breaking of molecular bonds—accomplished by a cell's enzymatic machinery was, when studied in detail, shown to be performed by some protein. Many

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A recurrent theme in Davis's discussion is the influence of the conflict thesis — the idea that science and religion are intractably opposed and therefore have been in irreconcilable conflict through their history — on the AISL authors. Of Andrew Dickson White's *A History of the Warfare of Science with Theology in Christendom* (1892), which was particularly influential, Davis writes, "[T]he modernists and many others accepted its contents unquestioningly, embraced its attitude uncritically, and often mimicked his over-the-top rhetoric" (pages 96–97). As its title suggests, White's book opposed "theology," i.e., dogmatic religion, rather than religion per se; the AISL authors tended to agree.

So it is ironic that a handful of these modernist authors invoked what is in fact premodern philosophy. For a central example, Shailer Mathews, the dean of the University of Chicago's Divinity School, argued in "How Science Helps Our Faith" (1922), "But if there is that within this rational and purposeful activity which in the course of evolution results in personal life, then *there must be that within the activity itself which is at least as personal as we*" (page 141, emphasis in original; Millikan and Mather offered similar claims in their pamphlets). But Mathews's inference is intelligible only in light of ancient (and then medieval) views about the nature of causation.

Relying on his archival research, Davis describes the history of the AISL's series in detail. Understandably, the AISL was sometimes lucky and sometimes unlucky in obtaining permission to reprint existing articles and recruiting contributors to prepare new pamphlets. Substantial funding was provided not only by eminent scientists but also by John D. Rockefeller Jr., the wealthiest man in the United States at the time, thanks to the cultivation of his minister by Shailer Mathews. Between 1922 and 1931, Rockefeller donated more than $24,200 to the AISL (about $440,000 in today's money). Reactions to the pamphlets was mixed, as Davis shows through a series of entertaining quotations from the AISL's archives.

By the time the series ended, owing partly to the waning of the antievolution crusades of the 1920s, about a million pamphlets had been distributed, in the primary hope of reaching "young people in churches, colleges, and universities." For Davis, however, their enduring value is in illuminating "what leading scientists and modernist religious thinkers thought of the relationship between science and religion." With the caveat that their presentations may have been simplified and perhaps even subdued by the need to address a general readership, *Protestant Modernist Pamphlets* makes a convincing case that he is correct.

Glenn Branch is NCSE Deputy Director.
branch@ncse.ngo

thousand such protein enzymes had been purified and characterized. Now, somehow, RNA could act similarly! (I can still recall my own surprise when reading Cech's astonishing report 40-plus years ago.)

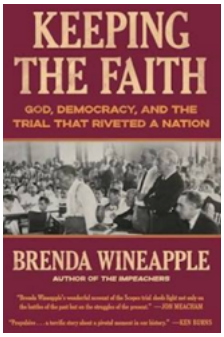
There follow informative chapters on the structure and workings of ribosomes, the enormous cellular complexes that make all new proteins. Once again, despite the presence of dozens of ribosomal proteins, it is a central RNA we now know that serves as catalyst. "The Search" concludes with fascinating speculation, backed up by current research, as to how RNA might explain the origin of life itself. If proteins need DNA to encode them, but DNA needs protein enzymes to replicate, how could life ever have begun? RNA on its own, it is now clear, is capable both of encoding information and of replication. Perhaps RNA is the key to this long-standing chicken-and-egg riddle, substituting for both DNA and protein in Earth's first living things.

The second half of the book ("The Cure") presents recent advances in medicine in which RNA plays a starring role. RNA turns out to encode the puzzling strings of repeated DNA ("telomeres") found at the ends of all eukaryotic chromosomes; Cech, along with former students and collaborators, made key contributions to our understanding. Might longer telomeres be a secret to longevity, a ticket to unlicensed (i.e., cancerous) growth, or both? Stay tuned. RNA serves as the highly mutable genome of some nasty human viruses, in particular SARS-CoV-2, responsible for the Covid 19 pandemic. But RNA-based technology also underlies our most effective vaccines against that same virus, vaccines created many times faster than had ever been done before. Finally, RNA sequences aim the enzymatic machinery termed CRISPR at specific genes (of crop plants, mosquitoes, or humans) with unprecedented efficiency and precision, enabling genetic modifications that researchers hope will increase food production, ward off illness, and eventually cure serious congenital diseases.

The Catalyst is written in clear and compelling fashion, free of jargon and unnecessary details. It explains complicated science in appropriately simple terms aided by clever analogies: if the cumulative effect of diverse regulatory RNAs on gene expression is confusing, imagine instead what a snowstorm, a stalled truck, and the closing of the Brooklyn Bridge would do, individually and collectively, to Manhattan traffic. Cech offers an intriguing tale, enhanced by vignettes of his personal interactions with many of the major players. Outstanding women and international scientists, it's worth noting, are prominently featured. In short, *The Catalyst* is a good read.

I would offer one quibble, and it is, ironically, with the use of the terms "catalyst" and "enzyme." As Cech makes eminently clear in his scientific writings, and even in the glossary of this book, a true enzyme (like other, non-biological catalysts) accelerates a chemical reaction, RNA splicing for example, without itself being changed by that reaction. That wasn't true in the case of the *self*-splicing of *Tetrahymena* RNA Cech reported in 1982; rather, a different RNA molecule, reported a year later by Cech's Nobel co-laureate, Sidney Altman, first satisfied that criterion. Of course, as this book relates, many other bona fide RNA enzymes, "ribozymes," have followed (including a processed form of the original *Tetrahymena* RNA, as Cech discovered a few years on). And while in the many medically significant examples presented later in the book, RNA plays key roles — as viral genome, as messenger RNA template for vaccines, or as a base-pairing guide for telomerase or for gene targeting — in none of these cases is the RNA itself catalytic. But then perhaps we should lighten up, and revert to more common parlance. As Cech writes, "RNA is already catalyzing a revolution in medicine" (page 125). With that, there can be no quibble.

David Ratner is Professor Emeritus at Amherst College, having retired from the Department of Biology and Program in Biochemistry and Biophysics. diratner@amherst.



Keeping the Faith: God, Democracy, and the Trial that Riveted a Nation

author: Brenda Wineapple

publisher: Random House

reviewed by: Randy Moore

Brenda Wineapple's *Keeping the Faith* is a good book about the *Scopes* trial, an often-discussed trial in 1925 in which high school teacher and coach John Scopes was prosecuted for violating Tennessee's newly-passed law banning the teaching of human evolution in its public schools. Scopes's trial became a sensational "media event" (before the term was coined) because it featured a face-off between two celebrities — Scopes's defender Clarence Darrow and famed politician and religious leader William Jennings Bryan. Scopes's conviction in Dayton was later overturned, but his trial left unanswered many questions that continue to spark debate, including

who determines the school curriculum and how to resolve the tensions between science and faith in public schools.

Wineapple's book is well-written and entertaining. *Keeping the Faith* sets up the *Scopes* trial well, covers most of the trial's important events, and mentions all of the important participants. However, the reader has to wait for it. Indeed, the trial does not start until about halfway through the book. Moreover, although Wineapple's extensive discussion of pre-trial events is accurate, it often focuses on portraying William Jennings Bryan as a racist. Certainly by today's standards, Bryan was a racist, and racism was a popular part of the fundamentalist campaign. However, Bryan's views about race — and racism in general — were not part of the trial. Wineapple's discussion of the Ku Klux Klan might have been relevant to the passage of anti-evolution laws in other states (e.g., Oklahoma), but the KKK was not visible at Scopes's trial.

Attentive to Bryan's racism, Wineapple overlooks similar faults of the scientists who supported Scopes and ridiculed Bryan. For example, she describes Scopes's supporters as "liberal-minded men and women… who believed in the scientific method and progress," but fails to note that many of the scientists who publicly condemned Bryan were fervent advocates of eugenics. These scientists twisted scientific findings to fit their social biases, promoting racial hierarchies and social inequalities as though they were simply biological facts. Many of these eugenicists were involved in the *Scopes* trial. For example:

- The American Association for the Advancement of Science's "Committee on Evolution," which met with Scopes and his attorneys before and during the trial, included Charles Benedict Davenport, whose Eugenics Record Office promoted eugenics as an applied form of heredity, and Edwin Grant Conklin, who wanted to forcibly sterilize people to preserve the purity and superiority of the white race.
- Famed paleontologist Henry Fairfield Osborn, who hosted the Second and Third International Congresses of Eugenics, met with, advised, and gave money to Scopes before the trial. David Starr Jordan, Scopes's leading fundraiser after the trial, believed that racial decay had resulted from "the survival of the unfit." To Jordan, the racial superiority of whites was simply "the common observation of every intelligent citizen."
- Several of the scientists who, unlike the members of the Committee on Evolution, came to Dayton to testify on Scopes's behalf similarly strongly advocated eugenics and white supremacy. For example, zoologist Horatio Hackett Newman — the author of *Evolution, Genetics, and Eugenics* (1925) — promoted eugenics to "save [humanity] from racial degeneration."

The textbook that Scopes used in his biology class (*A Civic Biology,* by George Hunter) included a much-discussed section promoting white supremacy titled "The Races of Man," but there is no evidence that Scopes taught his biology students anything from this section of the book. However, Scopes quizzed his students about Hunter's discussion of eugenics, and the quiz presumably reflected what he taught.

Wineapple's discussion of the trial's day-to-day events is accurate and flows quickly, but I was struck by what is missing from the narrative. In particular, Wineapple pays little attention to the testimonies of what she calls "students from Scopes's class." In fact, the two students who testified at Scopes's trial were from different classes taught by Scopes. Harry Shelton testified that Scopes taught human evolution in biology, where the textbook included five pages about evolution. However, Howard Morgan — the only other student to testify — was in general science, where the textbook (*General Science,* by Lewis Elhuff) did not mention biological evolution. Nevertheless, Morgan testified that Scopes taught evolution — in a non-biology class that used a textbook that did not include evolution. This is why prosecutor Sue Hicks had announced on May 23, 1925, to the Knoxville News that "The state has an airtight case … In his class in general science, in which the textbook involved in the case [i.e., Hunter's *A Civic Biology*] was not used, Scopes made statements to his students which are not in the text of the general science textbook. He went beyond the text and out of his way to teach the theory of evolution." Other students (e.g., Jack Hudson) were ready to testify that Scopes had even taught evolution in his physics class.

After discussing the trial, Wineapple then excellently describes Scopes's appeal of his conviction; this is a strength of the book. *Keeping the Faith* concludes with a short review of post-trial events (e.g., the production of *Inherit the Wind*) and a brief presentation of the post-trial lives of many of the trial's participants. I wish this section had been longer.

Those interested in the *Scopes* trial will enjoy this well-written account, as will readers wanting to know more about Bryan's racism. I would have liked to see more new facts or insights about the trial, but it's a good read anyway.

Randy Moore is Professor of Biology and H. T. Morse-Alumni Distinguished Teaching Professor at the University of Minnesota. His books include *John Thomas Scopes: A Biography* (2023).
RMoore@umn.edu.edu

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