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Of Pandas and Science Curriculum

Twenty years ago, a landmark court case held that intelligent design cannot be taught in science classrooms. What lessons does it offer for conflicts in education?

Two landmark court cases in American science education hit major anniversaries this year. More famous is the Scopes "monkey" trial. A hundred years ago, the legal case formally known as *The State of Tennessee v. John Thomas Scopes* made front pages of newspapers nationwide, even though it didn't actually change laws against teaching evolution. Less known is the so-called Panda Trial of 20 years ago, *Kitzmiller v. Dover Area School District*, which in some ways is *Scopes*'s inverse and has done much to keep religious views from being presented as science in the classroom. "All the Scopes trial gave was noise," said Edward Larson, a historian and legal scholar at Pepperdine University. "The Kitzmiller case gave light."

Both trials anchored the idea that the courts adjudicate the teaching of evolution in public schools. But after talking to parents, teachers, lawyers, scholars, board members, and others involved in the *Kitzmiller* case, I found what happened in community spaces—the court of public opinion—even more interesting than what happened in the courtroom.

From monkeys to pandas in court

The Scopes "monkey" trial got its start in March 1925 when Tennessee passed the Butler Act, prohibiting public schools from teaching "any theory that denies the Divine Creation of man as taught in the Bible." In response, the relatively new American Civil Liberties Union (ACLU) posted newspaper ads looking for a schoolteacher willing to challenge the law in court. Publicity-seeking business owners in Dayton, Tennessee, recruited John Scopes, a recent college graduate who'd arrived in town to teach science and coach football. He didn't remember teaching evolution at all, but he disagreed with the law prohibiting it. In the end, the judge declined to hear arguments against the law's validity; Scopes was found guilty and ordered to pay a $100 fine—a penalty later overturned on a technicality.

The subject of evolution was generally avoided in school textbooks until the Cold War, when fears that American schoolchildren were behind in science prompted federal efforts to improve curricula. In the 1960s, the Butler Act was quietly repealed, along with similar, mostly forgotten laws in a handful of other states. But an effort to void an anti-evolution statute in Arkansas led to a 1968 Supreme Court decision that struck down such laws nationwide.

Soon came mandates that teaching evolution must be accompanied by teaching creationism, which attributes living things to divine creation and seeks explanations of the natural world that align with the Bible, such as attributing fossils to Noah's flood. In 1987, the Supreme Court found that creationism is a religious belief, so teaching it as science is unconstitutional.

Next came the rise of intelligent design, the idea that life is too complex to have come about without purposeful direction of a "designer" and that scientific observations provide evidence of intentional creation. Unlike creationism,

intelligent design doesn't specify a creator or religious texts. Its precepts were laid out in what was intended as a supplemental biology textbook, *Of Pandas and People*, in 1989, with a second edition published in 1993.

In 2004, the school board in the small town of Dover, Pennsylvania, voted to require reading a four-paragraph statement in biology classrooms that downplayed evidence for evolution, offered intelligent design as "an explanation of the origin of life that differs from Darwin's view," and referred students to *Of Pandas and People* for more information. Eleven parents, including lead plaintiff Tammy Kitzmiller, sued the public school board for teaching religion as science.

Before the verdict was decided in December 2005, some expected John E. Jones III, the judge who presided over the case, to be accommodating toward the board. Jones had been endorsed for the federal bench by Senator Rick Santorum, a Catholic social conservative, and appointed by George W. Bush, who'd made headlines in the weeks before the trial for saying that intelligent design should be discussed alongside evolution. Jones's 139-page opinion thwarted those expectations.

Jones concluded that school board members had lied under oath to conceal the religious motivations behind the statement on intelligent design, set up meetings to leave townspeople and science teachers out of decisions, and violated the First Amendment's prohibition against government establishing or endorsing a religion. He wrote that the policy "undermines students' education in evolutionary theory" and promoted misconceptions—particularly that people must believe in either a divine creator or a godless universe. Finally, Jones ruled that intelligent design is not science but a form of creationism.

When I called Jones earlier this year, he told me he decided to write expansively because he could foresee other school boards heading down similar paths. "I thought, *Let them read what I saw and understand why this doesn't work*." Though the ruling applied only to one of the three federal court jurisdictions in Pennsylvania, it effectively "popped the bubble of intelligent design," said Larson, the Pepperdine historian, exposing it as "a purely religious Potemkin village."

Lee Meadows, who led teacher education efforts in Birmingham, Alabama, said the Dover ruling has been immensely helpful in his work over the last two decades helping science teachers cover evolution without causing their students religious turmoil. By taking the ruling as settled law, he said, teachers don't have to argue over whether intelligent design (or various sects' accounts of creation) should be included. They can focus instead on how to teach evolution without offending students' or their families' faith.

But Meadows worries that the Dover ruling and others like it may not hold much longer. Both *Kitzmiller* and the 1987 Supreme Court case applied what's known as the *Lemon* test to determine whether government action violates the First Amendment. In 2022, a Supreme Court ruling discarded the *Lemon* test when it decided a public school football coach in Bremerton, Washington, could kneel in prayer on the field after high school games. "Now there's a big question on my mind," Meadows said. "Will these legal precedents be overturned, and if they are, then what's the chaos that can happen in the science classroom?"

A focus on "best knowledge"

For most people familiar with the Panda Trial, it is the case that kept intelligent design from spreading into classrooms across the country. That is true. But in Dover, Pennsylvania, people remember how it played out across the community.

Early on in my reporting, Ave Maria School of Law professor Patrick Gillen, who argued on behalf of the school board as a lawyer with the Thomas More Law Center, warned me against reducing the Dover case to a caricature. He wrote me in an email that the dispute wasn't about intelligent design, which received only the briefest mention in classrooms, but orthodoxy in scientific thought. "The school board members were trying to address perceived scientism, i.e., a series of nonscientific beliefs, including an ideological embrace of the current iteration of evolutionary theory that was presented as absolute fact," he wrote, adding that he'd seen similar overreach during the COVID-19 pandemic. The measures the school board actually took were modest, he wrote.

Some parents in Dover felt differently. "I felt the school board was trying to take over the religious education of my daughter," said Steven Stough, who is active in his church. He called the ACLU after reading about Dover's intelligent design policy in the local paper and eventually joined the 10 other parents as plaintiffs. Stough, who proudly told me that his daughter now has a doctorate in pharmacology, was also worried the board's decision would call the quality of her education into question. "What if somebody's looking at college applications and they go, 'Oh, she's from that school that did the whole intelligent design thing'?"

Arguments over what gets taught in public schools conceal a broader, deeper agreement, said Adam Laats, a historian at Binghamton University who studies religious debates about public schooling. "As divided as we are, the United States now and always has agreed that public schools must convey the best knowledge to children."

This was the framing that the eight Dover High School science teachers used when, shortly after the case was filed, they collectively sent a memo to the superintendent refusing to read the statement. They offered to leave their classrooms so district administrators could read the statement instead. Intelligent design was not science, they wrote, and professional ethics forbade them doing something that would mislead students.

The ACLU, National Center for Science Education, and other groups devoted themselves to preparing for the trial, identifying and preparing highly credentialed professors to testify about expert consensus in science, science education, and theology. (Full disclosure: I volunteer for the National Center for Science Education and used their archives in reporting this story.) But equally important, Laats said, was the fact that local teachers would risk being punished for insubordination rather than feel they were miseducating their students. "Just as key as having celebrity scientists come to town is having teachers to say: 'These are my students. I love them. I live here. I'm from here. I'm not going to do this.'"

When people are seen as advocating for students to have the best knowledge rather than defending science or religion or advocating a particular set of values, Laats explained, it can encourage people who disagree to see each other more as community members than combatants.

In Dover, the small-town conflict that carried into the courtroom ended up getting resolved in the town's voting booth. By coincidence, the trial took place in the weeks leading up to the November 2005 election for the school board, and the voters' decisions came in before the legal one. Though the election was close, all eight board members who supported the intelligent design statement and were up for election lost their seats. When Judge Jones ruled in the plaintiff's favor in December, the newly elected board had no interest in carrying on litigation (or keeping the intelligent design policy), dashing expectations that the case would reach the Supreme Court. "The quick electoral turnaround—that's the takeaway from *Kitzmiller*," said Laats.

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It's about more than a theory

When I spoke with people from Dover, I heard time and again that the case was about religion, not science. More particularly, that it was fueled by an assumption, common among both religious and nonreligious people, that people who accept evolution cannot believe in God. But plaintiffs, teachers, and others told me this view obscures the complex and profoundly personal ways people square faith with scientific knowledge.

Soon after the teachers sent their memo, the school board sent each household in the district a newsletter falsely suggesting that there were scientific controversies over the most fundamental aspects of evolution and implying that accepting evolution led to atheism. In a Frequently Asked Questions section, under the question "Are there religious implications to the theory of [intelligent design]?," the newsletter read, "Not any more so than the religious implications of Darwinism. Some have said that before Darwin, 'we thought a benevolent God created us. Biology took away our status as made in the image of God' … or 'Darwinism made it possible to be an intellectually fulfilled atheist.'"

Though it is true that scientists are less likely to believe in God than the general public, plenty do, and even more believe religion and science are compatible. There is a large body of scholarship from scientists and theologians who believe science can neither prove nor disprove the existence of God. One scientist of this opinion was the lead expert witness for the plaintiffs: Kenneth Miller, a professor of biology at Brown University and the coauthor of the biology textbook used in Dover High School, who is himself a practicing Catholic and the author of a popular book on how understanding evolution enhances his faith.

In his ruling, Jones mentioned the newsletter over a dozen times, referring to it as "an astonishing propaganda discourse" and an example of what a similar 1982 ruling termed *contrived dualism*: the stance that acceptance of God and evolution are mutually exclusive, and critique of one means support of the other.

That view was clear at an event in the Dover fire hall after the trial began, where a local pastor screened the video *Why Evolution is Stupid*. In the discussion following, Pennsylvania State University medical student Burt Humburg said it was possible to accept both Christ and evolution and tried to explain how evolutionary theory underlies medical advances from infectious disease to safety testing in animals. Forgoing an understanding of evolution means forgoing scientific progress in everything from agriculture to zoology. Humburg was shouted down and told he'd been brainwashed. Attendees couldn't hear the message he wanted to convey. Twenty years later, he said it's still the most important point: "It's not about denying God—it's about learning the science."

Such a message was received better in more intimate settings where people already knew each other. During the trial, Jeff Brown, a former school board member and Sunday-school teacher in Dover, spent a lot of time explaining to neighbors and fellow church members

why evolution didn't challenge his faith. "Science can't prove a negative. Science can't even prove Godzilla didn't exist," he told me. That sort of reasoning, from someone they knew to be religious, helped townspeople feel they could honor their faith without inserting intelligent design in the curricula. But not everyone. Brown and his wife, Casey, had resigned from the school board in October 2004, when their objections to putting intelligent design into the biology curriculum were met with hostility. "To me, this was not a case of God versus science. This was a case of people with a particular interpretation of God versus science," Brown said. "I don't believe the Bible was ever intended to be a science book."

Dover science teacher Rob Eshbach recalled that he would offer to meet students outside of class to talk about how people reconciled their faith with evolution. None of the teachers had any intention of trying to undermine anyone's faith. "I remember somebody saying that we've taken God out of our schools. That was never the case," he remembered, noting that Dover High School had an active Bible club and a comparative religion class. "The only thing we ever said was science class is not the place."

Making a case in court

As the case went to trial, the plaintiffs' team worked diligently to show what did and did not belong in science class. A *New Yorker* article described this testimony as "rather like the biology class you wish you could have taken."

ACLU attorney Witold Walczak remembers flying across the country to prepare University of California, Berkeley paleontologist Kevin Padian to testify, and being so focused he had no idea that Hurricane Katrina was hammering the Gulf Coast. With the help of Padian's graduate students, they drafted and redrafted PowerPoint slides—then an avant-garde way to present evidence in court. Their presentation took apart observations that *Of Pandas and People* described as supporting the sudden appearance of species, rather than descent from a common ancestor. For instance, transitional forms were not missing from the geologic record, as the book argued, but exemplified by "walking whale" fossils. Also, the skull configuration and number of teeth show that an animal known as the Tasmanian wolf was more related to kangaroos than to wolves on other continents.

Walczak took care to monitor how testimony was landing with its audience in real time. He worked out a sort of code with Miller, the biologist and lead witness; if the judge seemed confused, Walczak would ask Miller to go over something again and explain it as if he were summing it up for his mother. You can't make an effective argument without the other person's engagement, said plaintiff lawyer Eric Rothschild. "Whether it's a judge or a jury, you want them to actually feel great about learning something."

The team was not above using theatrics. One leading proponent of intelligent design is Michael Behe, a biochemist at Lehigh University, who says many biochemical structures and pathways in cells show an "irreducible complexity" that could not have arisen part-by-part via natural selection. He has been making his case cheerfully and sincerely since the 1990s.

Anticipating Behe's argument that science had not and could not explain the evolution of the immune system, Nicholas Matzke, who directed public information projects for the National Center for Science Education, worked to gather relevant scientific literature. During his examination of Behe, Rothschild stacked ten textbooks and nearly five dozen scientific papers—all on the evolution of the immune system—until they towered on the stand beside Behe. Asked whether it was enough evidence, Behe testified, "They do not address the question that I am posing." (Behe told me that he didn't see any evidence in the judge's opinion that Jones understood his academic arguments.)

Trying to follow the thought process of intelligent design also unearthed new evidence. The creationist roots of *Of Pandas and People* itself were revealed when Barbara Forrest, then a philosophy professor at Southeastern Louisiana University, took the stand to explain how she went through hard-copy printouts of earlier drafts subpoenaed by the plaintiffs' lawyers. She found over 150 instances where "creationism" or "creation science" had been replaced by "intelligent design" in the wake of the 1987 Supreme Court decision, suggesting both that the book's treatment of intelligent design was a direct descendent from creationism, and that the exchange of terms was driven by legal rather than scientific considerations.

In court, the Dover board members argued that their intent was to improve science education by exposing students to a range of scientific views, not to promote religion. But evidence suggested otherwise. For example, one board member told a television reporter that any teaching of evolution should be balanced with creationism. Certain board members obfuscated about or denied speaking in favor of creationism at board meetings despite the reports of multiple witnesses; a couple had even denied knowing how the *Pandas* book was purchased, though funds had been solicited at one board member's church and a check for the purchase had passed between board members. Judge Jones took note of this in his ruling: "It is ironic that several of these individuals, who so staunchly and proudly touted their religious convictions in public, would time and again lie to cover their tracks and disguise the real purpose behind the [intelligent design] policy."

Miller thinks that much of the plaintiffs' success came from showing what was at stake. He had participated in friendly public debates with Behe before, but meeting with the plaintiffs underscored that this presentation was about much more than scoring academic points. "I got to see how passionate these people were," he recalled. "They were really upset. They really felt not just their kids but students in general would

be harmed." Miller testified that science requires testable explanations that can be revised, abandoned, or embraced as evidence demands. By offering an explanation beyond the natural world, intelligent design was a "science stopper" that discouraged questions about how the natural world worked or came to be. "It would tell us, 'Give up, go home, we'll never figure it out.'" Brian Alters, then a science education specialist at McGill University, testified that the overall implication of the statement—that students had to make an either-or choice of embracing their faith or learning a scientific concept—was both false and "a terrible thing to do to kids."

Walczak thinks the plaintiffs managed to get a fair hearing in a setting where people could make their best case and rebut challenges. In an ideal situation, courts provide a kind of intellectual rigor that other forums and branches of government cannot, he said. Any whitewashing, falsity, or logical gaps can be exposed in discovery, cross-examination, and the rules of the court. "The rules of evidence and the rules of civil procedure give you the tools to expose bullshit." But Walczak now worries that this ability is waning, with jurists increasingly prioritizing ideology over empiricism. Civil society depends on having a mechanism to lay out ideas and evidence, people to respect and care about them, and a means for their will to be carried out.

Elections—and connections—matter

Courts are sometimes necessary to protect science education, but communities are an even better defense, said Eugenie Scott, who was executive director of the National Center for Science Education from 1986 to 2014. As a biological anthropology professor in the 1980s, she became involved in organizing for Kentucky's public schools, where she saw how different groups each brought their own reasons for keeping creationism out of classrooms. Parents didn't want their children miseducated or undereducated; teachers didn't want to teach something incorrect; civil libertarians wanted to keep government from pushing religion; and various pastors, rabbis, and ministers wanted to teach creation from their own traditions. The key to success was yoking those diverse motivations together.

Something similar happened in Dover. In early 2005, a group of townspeople, including plaintiffs and Dover High staff, met in the basement of a neighborhood church seeking volunteers to run for school board. The group grew into a tight-knit campaign called Dover Citizens Actively Reviewing Educational Strategies, or Dover CARES. The science teacher Rob Eshbach's father, Warren Eshbach, a retired local minister who helped organize the campaign, remembers that it was only in response to a question at a press conference that the Dover CARES candidates learned that half of the group were Democrats and half Republicans. Party affiliation simply hadn't been relevant. They convinced neighbors and shop owners to put up signs and had countless conversations on fellow citizens' front porches, many of whom were closely following the trial, in effect bringing the chance for a fair hearing into the voting booth.

In her book about the Panda Trial, journalist Laurie Lebo reports that Stough, the plaintiff who originally organized the parents, printed out transcripts of the trial to make his case for the Dover CARES candidates at the polls—and then realized voters were already well aware of what happened. She also describes friction between opposing teams and accusations that Dover CARES candidates were anti-religious; at least one chance encounter between a plaintiff and a board member devolved into a shouting match on the street.

Warren Eshbach said his work today remains the same as two decades ago: finding ways for people to reconcile their differences. "There's still an underlying meanness in the political process," he said. And things are harder now with online algorithms that herd people toward narrow, polarizing information and social media where people don't speak face-to-face. The solution is elusive, he admitted, but it will likely involve ways for people to meet and hear each other, something he thinks didn't happen in Dover 2005, where board meetings sometimes devolved into screaming matches. In the aftermath of Martin Luther King Jr.'s assassination and civil rights riots in 1968, Eshbach was part of a group of Black and white clergy members who got together for the chief purpose of hearing each other's stories, he recalled, adding wistfully that he didn't make the time for that in 2005.

Plaintiff and Dover CARES member Cyndi Sneath said that the experience taught her the importance of vigilance, particularly when people are ready to make arguments that hide their true intentions. "If one side is lying and the other isn't, how do you present both sides?" she asked. Even—perhaps especially—"down to the tiny, micro-level" elections, it's important to understand people's agendas and whether they are truly interested in the nuts and bolts of governing. That's a sort of civic duty, she said. "People need to pay attention, and they need to be engaged." Burt Humburg, now a hospitalist in Michigan, took away a similar lesson: It's important to speak up, even if the people arguing will never convince each other; other people are listening and trying to make up their minds.

The voters who narrowly turned out the incumbent board members in 2005 had a variety of reasons: government overreach, quality education, and particularly the legal fees the school district was facing. Some felt the board members had acted in bad faith in how they chose to promote their faith. And enough were willing to listen when a canvasser knocked on their door.

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