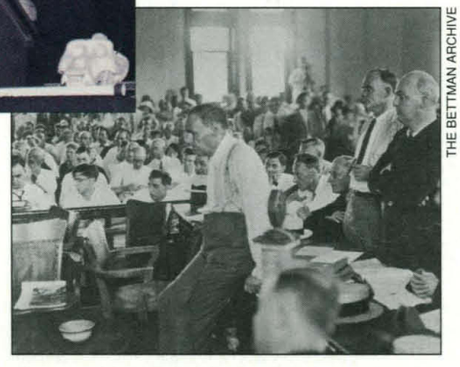
Creationists Evolve New Strategy

Creationists are taking their fight to state legislatures from Georgia to Ohio, using a new soft-core strategy that aims to get "scientific evidence" against evolution presented in public classrooms

Biologists Steve Edinger and Scott Hooper recently found themselves in a highly uncomfortable position: trying to explain the definition of a scientific theory to a hostile, standing-room-only crowd at midnight in the Ohio State House in Columbus. Over regular outbursts of "Your time is up!" the pair tried to point out that an overwhelming amount of evidence supports the "theory" of evolution. Their audience, which included the Ohio House Education Committee, wasn't impressed. "Why are you afraid to let all the facts be known?" demanded one committee member. After Edinger's testimony, several members of the audience followed him out of the hearing room, shouting epithets.

A bad dream? For the two biologists from Ohio University in Athens, this Kafkaesque experience was all too real. They were speaking out at a 14 May hearing on a proposed bill requiring teachers to present evidence challenging evolution whenever they discuss the subject. As two of only four speakers against the bill, Edinger and Hooper were badly outgunned by the 28 speakers and large crowd in favor. "It was not a collegial atmosphere of debate," says Edinger.

THE EAST TENNESSEAN



THE BETTMAN ARCHIVE

Then and now. Creationists' strategy has changed since the 1925 Scopes trial (*above*), but scientists like Niall Shanks find that evolution still needs public defenders (*top*).

Get ready for another round in a battle as old as Darwin's theory. In the past 6 months, creationists have mounted a surge of assaults on science education around the United States. In Alabama, when school opens this fall, every biology textbook will carry a paste-in warning stating that evolution is a controversial theory that shouldn't be considered fact. In Ohio, Tennessee, and Georgia, creationist bills reached state legislatures for the first time. And although these three measures were eventually shot down, the high-profile state activity has fueled anti-evolution fervor at all levels, says Eugenie Scott, director of the National Center for Science Education (NCSE) in Berkeley, California, a nonprofit organization that monitors threats to the teaching of evolution. For example, after the Georgia legislature defeated an amendment that would have given teachers the right to present "alternate" theories for the origins of life, the phones at NCSE's office began ringing with calls from Georgians concerned about similar measures now sprouting in Hall, Cobb, Clayton, Oconee, and Valdosta counties. Says Scott, "There's a direct relationship between the state-level assault and these local-level brushfires."

Other local examples abound. In Tennessee, where John Scopes was convicted for teaching evolution in 1925, teachers in some areas find the subject so controversial that they simply skip it. In Louisiana, a school board in Tangipahoa parish (a local district equivalent to a county) has adopted a resolution requiring that teachers read a disclaimer before presenting lessons on evolution. And in nearby Livingston parish, the board ignored the views of teachers and adopted a policy that allows "student-initiated discussions" of alternative origins theories. Scott and other watchdogs are also preparing for battle over textbook adoption in Texas next year (see box), and they plan to enlist the National Academy of Sciences (NAS) in their fight against current outbreaks of creationism in school districts from Kentucky to Washington state.

The recent successes of the anti-evolution movement stem in part from a shrewd new strategy that creationists are using to sneak their views into classrooms. They no longer ask that schools teach Genesis or "creation science." Instead, they insist that teachers give equal time to "scientific evidence against evolution," or ask them to present evolution as a theory, not a fact. "This is a soft-core anti-evolution strategy, which is very clever because it doesn't appear religious on the surface," explains Scott. Says Randy Moore, who edits *The American Biology Teacher* and is interim provost at the University of Akron in Ohio, "When ideas fail, people invent words; when the notion of creationism failed, they gave it a new name." By packaging the message in a more attractive form, creationists have breathed new life into their campaigns, Moore says. Indeed, the new mutations of creationist dogma are particularly worrisome because they prey on a public often unprepared to recognize pseudoscience, says Scott. "The First Amendment protects against the government establishment of religion, [but] that doesn't mean it will protect against bad science," she says.

Mutating message

Creationists were forced to adapt their message because of several crucial court decisions. In 1968, the U.S. Supreme Court ruled in *Epperson* v. *Arkansas* that states could not ban the teaching of evolution simply because it conflicted with a particular religious doctrine. In response, anti-evolutionists reframed their position as "creation science." Then in 1982 a federal district court ruled in *McLean* v. *Arkansas Board of Education* that "creation science" was in fact religion. In 1987 the Supreme Court reaffirmed that decision in *Edwards* v. *Aguillard*, ruling that "creation science" could not be taught in public schools.

But a dissent written in that case by Justice Antonin Scalia planted the seeds for creationists' next move. Scalia wrote that Christian fundamentalists in Louisiana were "entitled, as a secular matter, to have whatever scientific evidence there may be against evolution presented in their schools ..."

To many anti-evolutionists, that opened an alternate route for getting creationism into public schools: finding "evidence" against evolution, an angle that helps bury the religious aspect of the debate. For example, Representative Ron Hood, who introduced the Ohio anti-evolution bill, insists that there's nothing religious about his cause. He told *The Columbus* (Ohio) *Dispatch*: "My intent is that this [bill] stay strictly on the science, and I'd be very disappointed if it was construed any other way." John Morris, president of the Institute for Creation Research (ICR), a creation-science think tank in Santee, California, told *Science*: "We feel creation is at least as scientific as evolution."

Scott notes that as part of this strategy, creationists have adopted scientific-sound-

The Battle of the Books

Textbooks are a crucial battlefield in the fight over teaching evolution and in the past have often borne the scars of war, as publishers deleted "controversial" material. Now a renewed surge of creationist activity has educators on alert once again. They are monitoring how the power of electronic publishing to customize books may affect chapters on evolution. And they are keeping watch on preliminary skirmishes over textbooks in Texas, because the giant state's choice of biology books next year could reverberate throughout the country. "Big publishers are still finding ways to keep material on evolution in texts without making their books unsalable," says Joseph Levine, a Boston-based science writer and co-author of a widely used high school biology text published by Prentice-Hall. "But depending on what happens in Texas, that could change."

If history is any guide, publishers aren't likely to risk losing sales to defend evolution. "In the 1970s and early 1980s, nearly all commercial textbook companies caved in to fundamentalists and buried or omitted evolution from schoolbooks," says William Bennetta, editor of *The Textbook Letter*, the newsletter of a textbook watchdog group in Sausalito, California. Efforts by educators and scientists got Darwin back into the books in the late 1980s.

But the pendulum could swing back again. Already, creationists in at least one local district have gotten the textbooks they prefer, in part because publishers can now offer customized teaching materials. In May, Georgia's Cobb County school district, located in a conservative area north of Atlanta, asked Macmillan/McGraw-Hill to remove a chapter called "The Birth of Earth" from a fourth-grade book, *Changing Earth*. Parents had complained that the chapter did not include creation as a possible theory for the origin of the universe—and Macmillan agreed to delete the chapter in Cobb County's books. With electronic publishing, removing the 17 pages is easy, says Steven Weiss, director of corporate communications for McGraw-Hill, who insists that the decision was "within the bounds of integrity," because the chapter isn't required for fourth graders and will be taught later. But educators fear that the decision sets a dangerous precedent. "What will be cut out next?" wonders Levine.

Still, it is difficult to predict how many districts will make such requests and what the overall effect of custom publishing may be on evolution in schoolbooks, says Bennetta: "It may mean that publishers will do less self-censorship in designing their basic books, but will censor particular versions of the books afterward to pander to particular factions in particular places."

Because custom publishing is still in its early days, Texas is likely to continue to sway the textbook market at least for now, educators say. Next April the Texas State Board of Education will begin choosing biology books for the state's 3.7 million schoolchildren, and some observers fear that the board won't be friendly toward evolution. Five of the 15 board members describe themselves as backers of the religious right, and in past votes they have been joined by other conservative board members, says Harriet Peppel, Texas coordinator for People for the American Way and a frequent attendee at board meetings. "On creation-evolution issues, we usually prevail by just one vote," she says. And that slim margin may disappear after November's election. What's more, the Texas Christian Coalition has recently begun a well-organized "Toxic Textbooks" campaign targeting evolution and other subjects. Stay tuned: In Texas, the battle of the books has just begun. –K.S.

ing lingo, such as "abrupt appearance theory," which says that living organisms were created fully formed and did not evolve, and "intelligent design theory," which says organisms are so perfectly formed that they must be the products of a conscious designer. Creationists also push "alternative theories of origins," by which they mean the Judeo-Christian account rather than creation stories from other cultures, says Edinger.

The new tactics also draw on the latest educational jargon. For example, Mark Wisniewski, a creationist physics teacher at Lakewood High School in Lakewood, Ohio, assigned exercises in "critical thinking," in which students researched questions of human origins. After media attention and a legal challenge, Wisniewski has agreed to stop these exercises this fall, but he has already convinced many of his students that evolution is a matter of opinion. Says Jenny Whearty, who completed his class this year, "I've come to the conclusion that evolution is not as definitive as everyone would like us to believe."

By hiding the religious intent and playing up appeals for a "broader" science education, creationists successfully used the soft-core strategy to carry their anti-evolution agenda up to the state level, says Scott. Take Tennessee, where legislators came remarkably close to tinkering with the content of the state's science curriculum. A bill that said teachers could be dismissed for presenting evolution as fact passed the state House and made it to the Senate floor in March. There it garnered 13 yea votes and 20 nays.

But the Senate debate, in which even the senators who voted no made speeches about their belief in the Bible, also made anti-evolution rhetoric seem legitimate and well-accepted, says Niall Shanks, who teaches evolutionary biology and the philosophy of science at East Tennessee State University in Johnson City. "Even when a bill like that fails to pass, it causes fear and makes teachers stop teaching evolution," he says. Shanks says many teachers in his area skip lessons on human evolution and tell students that fossils don't exist. Wesley Roberts, who teaches ecology at Hillwood High School in Nashville, Tennessee, agrees that most teachers he knows don't cover evolution because it's too controversial. The pressure comes mostly from parents and students, says Roberts—but he recalls that at a recent in-service training session, Nashville-area teachers were required to attend a seminar on intelligent design given by two local physicians, who handed out copies of a creationist book.

Monkey business

Pressure to stifle the teaching of evolution has been building since the political climate shifted in 1994, when some religious conservatives gained seats in state and local governments. Even national politicians have addressed the issue: In March, on ABC's *This Week*, presidential candidate Pat Buchanan said that he personally is not descended from monkeys, and he doesn't think children should be taught that they are.

The place where anti-evolutionists have perhaps gained the most ground is Alabama, where Governor Fob James, a self-described conservative Christian who says he does not believe in human evolution, was elected in 1994. Last November, the Alabama board of education mandated that an insert casting doubts on the validity of evolution be pasted into all biology books. At the meeting where the insert was approved, Governor James answered a reporter's question by mimicking evolution, first stooping like an ape and gradually walking upright. According to *The Birmingham News*, the governor told the laughing crowd, "That's the notion behind evolution. It's no more than a theory. If one wants to understand something about the origins of human life, you might ought to look at Genesis to get the whole story." Dick

Brewbaker, the governor's education liaison, says that this was simply a joke, and that the governor supported the textbook insert as a compromise.

Alabama's official curriculum guide for teachers of kindergarten through grade 12 science was also fitted with anti-evolution language: "Explanations for the origin of life and major groups of plants and animals, including humans, shall be treated as theory and not as fact." And in March, Governor James used taxpayers' money in a discretionary fund to send every high school biology teacher in Alabama a copy of an anti-evolution book, *Darwin on Trial*, by Phillip Johnson. The idea was to "give teachers a resource" in case students asked about the textbook insert, says Brewbaker. In response, NCSE, the National Association of Biology Teachers, and People for the American Way sent a countermailing that includes a critical review of the book.

AN EVOLVING ISSUE

Year	Decision/Action
1925	The state of Tennessee convicts John T. Scopes of the crime of teaching evolution.
1968	In *Epperson* v. *Arkansas*, Supreme Court rules that states cannot ban the teaching of evolution on religious grounds.
1982	Federal district court rules in *McLean* v. *Arkansas Board of Education* that "creation science" is in fact religion.
1987	In *Edwards* v. *Aguillard*, the Supreme Court reaffirms 1982 decision. But dissenting opinion raises idea of "evidence against evolution."
1995	Alabama Board of Education adopts anti-evolution textbook insert.
Feb. 1996	Georgia creationists add an anti-evolution paragraph to an education bill, which is later voted down.
March 1996	Tennessee Senate debates and votes down bill allowing teachers to be dismissed for teaching evolution as fact.
March 1996	Ohio House committee holds hearings, votes down bill requiring that evidence against evolution be taught.
April 1997	Texas State Board of Education will begin reviewing biology textbooks for 1998 adoption.

Darwin on Trial echoes what many Americans, apparently including Justice Scalia, believe: that there is serious debate among scientists about whether evolution is a fact. "The nontechnical population believes this, and we have to get over that misunderstanding," says paleontologist David Schwimmer of Columbus State University in Georgia. The results of a recent NSF study, "Science and Engineering Indicators 1996," prove his point. Only 2% of those surveyed understood science as the development and testing of theory, and only 44% agreed with the statement, "Human beings, as we know them today, developed from earlier species of animals." Indeed, this rejection of evolution spotlights the failure of scientists to effectively communicate with the public, says evolutionary biologist Francisco Ayala of the University of California, Irvine. "We are doing a miserable job in our schools and in educating the public at large," he says.

Ayala has formed a committee to discuss how to update the NAS's 1984 booklet, "Science and Creationism," and whether the academy should provide additional support for teachers; recommendations to the NAS Council are expected in early August. Committee member Joseph McInerney, director of the nonprofit Biological Sciences Curriculum Study in Colorado Springs, Colorado, is pushing for the NAS to take an activist role by presenting new fossil and molecular evidence and promoting classroom activities teachers can use. "It's critical to have the academy involved," he says. "Scientists have to keep responding on this issue."

But just how to respond is a tricky matter. The NCSE's Scott discourages individual scientists from debating creationists, and those who have done it say she's right. East Tennessee State's Shanks, for example, took on ICR's Duane Gish in April before an audience of 1200. Shanks spent 15 to 20 hours per week for 5 months studying creationist arguments—"reading the most stupendous rubbish imaginable," he says—and examining tapes and transcripts of other debates. Although he made a good showing, Shanks says he left the 4-hour event feeling like he'd been in a boxing match. "All too often a hapless scientist goes before a crowd that has little scientific understanding, and the creationist comes out looking good," he warns.

Still, scientists can probably make a difference by being active in their school districts and states, says Scott. She says that the "evidence against evolution" strategy pushed at the state level has only just begun to metastasize to lower levels—where it has the best chance of success. Indeed, back in Ohio, biologist Edinger is keeping his ear to the ground for more anti-evolution rumblings and worries that the dead bill may soon be resurrected in a slightly different form, probably in local school-district policies. "My worry is that we're going to have to fight this school district by school district," he says—a daunting prospect, considering the effort it took to defeat the state bill. He and others vow to continue the fight by speaking out at hearings, maintaining an e-mail network, and coordinating with national groups. Creationist tactics may be shifting, but scientists' strategies are evolving too.

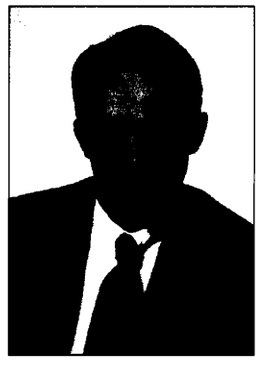
–Karen Schmidt

Karen Schmidt is a science writer in Greenville, North Carolina.

FUSION

France, Germany Drop Out of ITER Race

The list of countries willing to host a multibillion-dollar fusion facility got much shorter last week when France and Germany effectively took themselves out of the competition. The surprise announcement by the research ministers of both countries sent jitters through the international fusion community and makes Japan the odds-on favorite as the site for the International Thermonuclear Experimental Reactor (ITER)—if it is built.



AFP

No thanks. Rüttgers says Germany can't afford to host ITER.

Europe, Japan, Russia, and the United States have been working since 1992 on a design for ITER, with joint research efforts under way in Germany, Japan, and the United States. Construction is scheduled to begin in late 1998 on a tokamak-shaped containment vessel that would demonstrate the feasibility of creating large amounts of electrical power with a fusion reactor. It would be the largest and most sophisticated fusion machine ever built, drawing researchers from around the world.

Six nations were originally in the running as host for the reactor. The catch is that the host country must pick up the biggest single share of the costs, which are expected to top $8 billion during a decade of construction. Russia and the United States have already scaled back their participation in the design phase, and neither is expected to be a major player in building and operating the test reactor (*Science*, 19 January, p. 282). Sweden and Italy are the remaining European contenders for a site, although European officials say it is highly unlikely that either country could afford the honor. A private Canadian group