

Orchid Research Newsletter No. 61

Evolution versus Creationism. Part Three: The Continuing Battle Over High School Textbooks

Continuing the series from issue 60 of the Orchid Research Newsletter, this last installment addresses the aftermath of the Scopes Trial and three other trials dealing with evolution, creationism, and intelligent design. A synopsis of this article appeared in the July-September 2012 issue of Orchid Digest. The complete and fully illustrated series of articles is available as a pdf by writing to Alec Pridgeon (a.pridgeon@kew.org).

Aftermath of the Scopes Trial

The ordeal was over. Five days after the trial, on 26 July 1925, William Jennings Bryan was still in Dayton. After attending a local Methodist church and eating an enormous lunch, he lay down at the home of Dr. F. R. Rogers to take a nap and died in his sleep. The immediate cause of death was a cerebral hemorrhage, aggravated by diabetes, heat, and stress. He was buried in Arlington National Cemetery. Mencken wryly wrote that “God aimed at Darrow, missed, and hit Bryan instead” (Larson, 1997).

In 1926, Judge John Raulston was defeated in his reelection bid. That same year the Louisiana Superintendent of Education demanded the removal of six pages about evolution from *A Civic Biology*, and so a revision appeared in 1927 without the evolutionary tree and without the e-word (Larson, 2003; Lienesch, 2007).

Two years later, the Tennessee Supreme Court reversed the decision of the Dayton court on a technicality, not the constitutional grounds as Darrow had hoped. According to the court, the fine should have been set by the jury, not Raulston. Rather than send the case back for further action, however, the Tennessee Supreme Court dismissed the case and entered a *nolle prosequi*, meaning that no one should ever prosecute violators of the law again so that the peace and dignity of the state of Tennessee could be preserved (Ginger, 1958; Larson, 1997). So the issue was never settled in court, but although the Butler Act remained on the books, it was never enforced.

Emboldened by the Scopes verdict, antievolution bills were considered in 24 states. Mississippi and Arkansas eventually joined Tennessee in banning the teaching of evolution.

In April 1926, Clarence Darrow successfully defended Dr. Ossian Sweet and three members of his family, African-Americans whose home in a white neighborhood of Detroit was attacked by a white mob. One white man was killed in the melee, and Ossian's brother Henry confessed to firing the fatal shot. After a seven-hour closing argument given without notes, Darrow was successful in bringing back a verdict of not guilty from an all-white jury, one of the first great victories for civil rights and the NAACP (Farrell, 2011). Darrow's health gradually declined from arteriosclerosis, and he died on 13 March 1938, a month short of his 81st birthday. At his request, his ashes were scattered from a stone bridge into the lagoon at Jackson Park in Chicago.

As for the former prosecutors, Tom Stewart served in the U.S. Senate from Tennessee from 1939 to 1948 and then went into private law practice in Nashville. Sue Hicks became a circuit court judge in Tennessee. In 1970, Hicks remarked, "It is an irony of fate that I have tried over 800 murder cases and thousands of others, but the most publicity has been from the name 'Sue' and from the evolution trial" (*New York Times*, 12 July 1970).

Scopes went on to study geology at the University of Chicago to become a petroleum engineer and spent time in Venezuela where he met and married his wife Mildred. He converted to Roman Catholicism, although he never practiced it. He turned down several lucrative offers for books and movies, saying that they would not give him the mental stability he needed (Scopes and Presley, 1967). In 1933 he went to work as a geologist for United Gas Corporation, first in Beeville, Texas, as an oil scout, then at the general office in Houston, and then in 1946 at its new location in Shreveport. Once in a while a fundamentalist preacher would call him out of the blue, pray with him, and try to save his soul. He handled it all graciously and with humor (Jerry Tompkins, pers. comm.).

Did he have any regrets for making the decision to be arrested for teaching evolution? According to his good friend, Jerry Tompkins, he had none (pers. comm.). More than anything, that 24-year-old was awed by the spectacle. In his autobiography, Scopes (Scopes and Presley 1967) looked back on his role as "the body that was needed to sit in the defendant's chair": "If what I did helped advance the cause of freedom half an inch, I am gratified. If it accomplished even half that much, I can have no regrets about the notoriety I experienced."

In 1960, Stanley Kramer, director of the film *Inherit the Wind* very loosely based on the trial, convinced Scopes to help promote the film and attend the premiere in Dayton. So that July, 35 years after the trial, Scopes returned to the "scene of the crime." By this time Scopes was the only surviving principal of the trial, although lesser figures were still in town. Sue Hicks was a judge, and three of the jurors were still around. A roadside marker in downtown Dayton now commemorated the trial. He visited the courtroom again with Rudd Brown, Bryan's granddaughter. Major J. J. Rogers gave Scopes the key to the city. That same morning, the Reverend Paul Levengood said on his local radio program that "The devil is here in Dayton and is having a heyday" (Scopes and Presley, 1967).

John Scopes died of cancer in Shreveport on 21 October 1970, and was buried in Paducah, Kentucky, where he grew up. His wife, Mildred, survived him by 20 years and died in Baton Rouge where their son lived (Jerry Tompkins, pers. comm.).

Today Dayton has a population about 7,000. Most of the buildings from the Scopes era are now regrettably gone, for as Edward Larson (pers. comm.) wrote, "cash-strapped rural America does not always treasure its history." However, the old Rhea County Courthouse still stands, and in its basement is a museum devoted to the Scopes trial. The boarding house where Scopes lived is now a law office.

Shortly after the end of the trial, School Superintendent Walter White proposed that Dayton should create a Christian college as a lasting memorial to Bryan; fundraising was successful, and just five years later in 1930 Bryan College opened its doors, initially in the rooms of the same Rhea County High School where Scopes was accused of teaching evolution (Scopes and Presley, 1967). Applicants were forced to sign a loyalty oath to Biblical literalism (Ginger, 1958). The college's 128-acre hilltop campus has a current enrollment of 1,250. Creationism is promoted and taught alongside evolution but as superior to it in explanatory value. The Center for Origins Research there bills itself as "the world leader in creationist biology research" (www.bryan.edu/core.html).

Up on a hill on the north side of town, Buttram Cemetery harbors the graves of many of the minor characters in this Dayton drama: druggist Frank Earle Robinson, storekeeper James Robert Darwin, prosecutors Ben McKenzie and his son James Gordon McKenzie, and physician F. R. Rogers. Like Scopes, their legacy is forever intertwined with those blazing hot July days in 1925 when religion and science, faith and reason battled in the most famous such trial since Galileo's and ignited the continuing debate about evolution and creationism in high school textbooks in America.

The Russians Are Coming, the Russians Are Coming

In the midst of the Cold War while schoolchildren were practicing duck-and-cover under their desks in the event of a nuclear war, the U.S.S.R. launched the Sputnik satellite in 1957, which mobilized Americans to enter the space race and improve science education in this country. To that end the National Science Foundation, established in 1950, was authorized to fund the Biological Sciences Curriculum Study (BSCS) in 1959. The BSCS hired professional scientists to rewrite high school textbooks embracing evolution and thereby opened some old wounds at state and local levels. The new textbooks were widely adopted and made their way into American high schools, including Central High School in Little Rock, Arkansas.

***Epperson v. Arkansas* (1968)**

Central High School had already made the news when President Eisenhower trumped Governor Faubus and federalized the Arkansas National Guard to enforce school desegregation after *Brown v. Board of Education* (1954) and allow nine African-American students to enter. The school hit the headlines again a few years later when the Arkansas version of the Butler Act was challenged. The legislation made it unlawful for a teacher in any state-supported school or university "to teach the theory or doctrine that mankind ascended or descended from a lower order of animals," or "to adopt or use in any such institution a textbook that teaches" that theory. Violation was a misdemeanor and constituted grounds for dismissal.

For the academic year 1965-1966, the school administration, on the recommendation of the biology teachers in the school system, selected a new textbook, *Modern Biology* (Otto and Towle, 1965) containing a chapter that discussed sources of variation, evolution, and natural selection and later on a chapter on the history of man, which argued that modern-day primates and humans share an ancestor.

Susan Epperson, who graduated from the Arkansas school system and then obtained her master's degree in zoology at the University of Illinois, is the daughter of a biology professor at the College of the Ozarks and was raised in a Presbyterian family. She was hired by the Little Rock Board of Education in the fall of 1964 to teach 10th grade biology at Central High School. At the start of the next academic year, 1965, she faced a dilemma: she was required to use the Otto and Towle textbook for biology classes, including the chapter on evolution, but she would be fired if she did. She was approached by the Arkansas Education Association (AEA), and with the guidance of its Executive Secretary Forrest Rozzell and attorney, Eugene Warren, she filed a lawsuit against the state of Arkansas.

Epperson was surprised by the amount of media attention showered upon her the day after the suit was filed. Because her picture was in the paper she received hate mail and even nasty remarks about her appearance; many compared her to a monkey (Epperson, pers. comm.).

She was called to testify in Chancery Court in Pulaski County and asserted her right to teach a widely accepted theory. Arkansas Attorney General Bruce Bennett focused on the lack of proof for evolution, but after two hours Judge M. O. Reed ruled for the plaintiff (Larson, 2003). However, it was appealed to the Arkansas Supreme Court, which on 5 June 1967, reversed the ruling of the lower court simply on the basis that states have the power to specify the curriculum in public schools. The AEA then appealed to the U.S. Supreme Court.

The Supreme Court, in a vote of 8 to 1 (Justice Hugo Black dissenting), struck down the Arkansas law. Justice Abe Fortas delivered the majority opinion of the Court on 12 November 1968, arguing that the Arkansas law violated the establishment of religion clause of the First Amendment and affirmed that “the law is contrary to the mandate of the First, and in violation of the Fourteenth, Amendment to the Constitution.” Evolution could now be taught in all public schools. Epperson and her attorneys had finished what Scopes and Darrow could not 40 years earlier.

John Scopes purposely kept a low profile during the Epperson trials. Afterwards, Jerry Tompkins, retired Presbyterian minister, arranged for Scopes and Epperson to meet over lunch in Bossier City, Louisiana, in 1969. Scopes told Epperson that he supported her effort but intentionally stayed away from the trial in Little Rock because he knew he would draw unwelcome publicity (Epperson, pers. comm.). Scopes died the next year. Susan Epperson now teaches introductory chemistry and non-majors biology in Colorado.



Susan Epperson shares lunch at the Holiday Inn with John Scopes in Bossier City, Louisiana, in January 1969.
Photo: Jerry Tompkins.

The Birth of Creation Science

Henry Morris (1918-2006) was a professor of civil engineering and born-again evangelical who developed creation science to combat the growing influence of secular science. In 1961, he published *The Genesis Flood* with Old Testament scholar J. C. Whitcomb. They tied flood geology to biblical interpretation and argued that the world was no more than 10,000 years old, that dinosaurs and humans shared space and time, and that evolutionary theory is fundamentally flawed. Whitcomb and Morris claimed that fossils only give the *appearance* of age, when in fact they are much more recent. Not surprisingly, mainstream scientists and theologians ridiculed this young-earth creationism, but lay readers ate it up -- still do -- and it is now in its 44th printing.

Creationists of all beliefs, both young-earth and old-earth, now wanted fair treatment in the schools with creation science taught alongside evolution. Local school boards pushed for equal time for the teaching of creationism but were quickly challenged by the ACLU, National Science Teachers Association, National Education Association, and science organizations such as the American Association for the Advancement of Science and National Academy of Sciences.

Edwards v. Aguillard (1987)

In the early 1980s several states introduced bills to add creationism to the school curriculum along with evolution. One of those states was Louisiana, where in 1981 the legislature passed a bill, written by State Senator Bill Keith of Shreveport and titled the Balanced Treatment for Creation-Science and Evolution-Science in Public Schools Instruction Act. Then-Governor David Treen signed the bill, which required that whenever evolutionary science was taught, creation science had to be taught as well. A similar law in Arkansas would be struck down a year later in *McLean v. Arkansas*, when Judge William Overton ruled that creation science did not meet the criteria of actual science and that the law violated the establishment clause of the First Amendment.

Appellants, who included Louisiana parents, teachers, religious leaders, and several scientific organizations, challenged the Act's constitutionality in Federal District Court in *Aguillard v. Treen*, seeking an injunction and declaratory relief. The District Court granted summary judgment to appellants, holding that the Act violated the Establishment Clause of the First Amendment. The State of Louisiana (then under Governor Edwin Edwards) appealed to the U.S. Supreme Court in *Edwards v. Aguillard*.

The 7-2 decision in favor of the defendants argued that creation science was a specifically religious doctrine and therefore an unconstitutional endorsement of religion with no “secular legislative purpose.” Justice Scalia and Chief Justice Rehnquist dissented. Justice Brennan wrote that “the Act is designed either to promote the theory of creation science that embodies a particular religious tenet or to prohibit the teaching of a scientific theory disfavored by certain religious sects. In either case, the Act violates the First Amendment.” However, creationists saw a loophole through which they could attempt to repeat their attempts at recasting creationism using another part of his opinion: “We do not imply that a legislature could never require that scientific critiques of prevailing scientific theories be taught.... In a similar way, *teaching a variety of scientific theories about the origins of humankind to schoolchildren might be validly done with the clear secular intent of enhancing the effectiveness of science instruction* [my emphasis].”

The Rebirth of Intelligent Design

Soon after the Court’s ruling, various alternatives to evolution began to appear, clearly deriving much of their content from creationist arguments but avoiding any mention of religion or a divine creator. By the mid-1990s another competing “theory” had come to the fore: intelligent design.

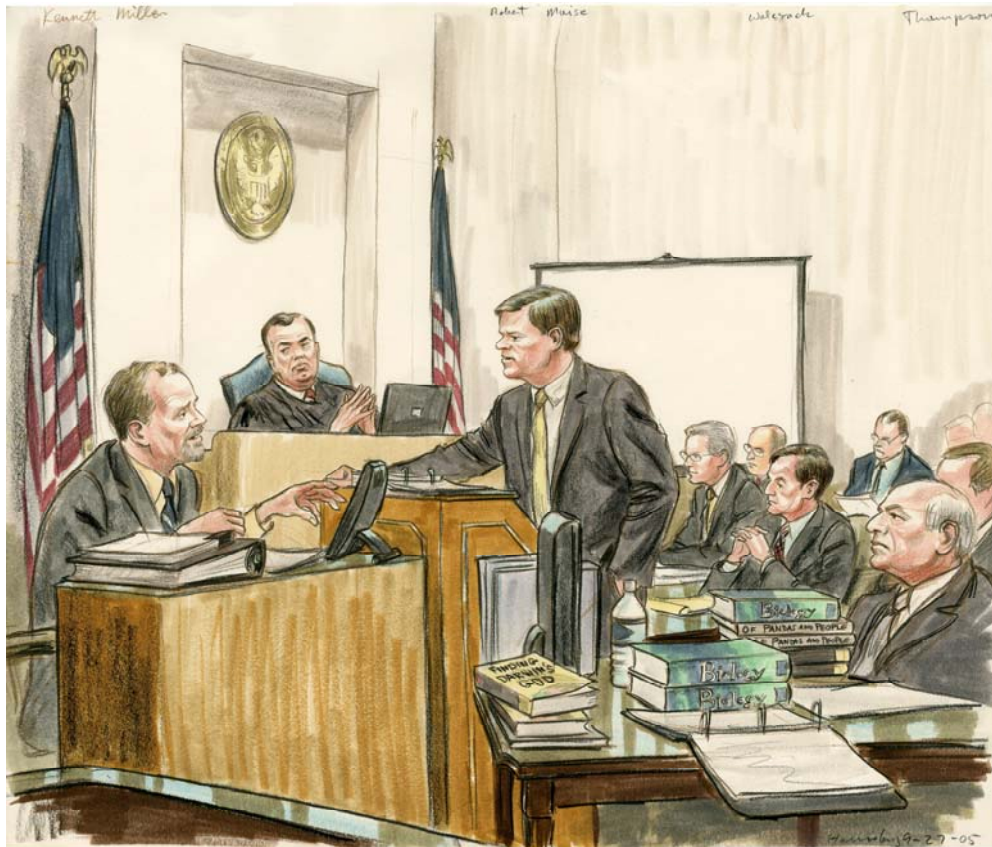
It was in fact nothing new. Christian apologist and philosopher William Paley (1743-1805) had compared the universe to a watch with parts working together for some purpose in his *Natural Theology, or Evidences of the Existence and Attributes of the Deity Collected from the Appearances of Nature* (1802). The analogy was clear to him: just as the complexity, order, and purpose of a watch implies intelligent design, so too the complexity, order, and purpose of everything in the universe implies intelligent design. But the concept actually goes back all the way to Thomas Aquinas in the 13th century and from there even back to Aristotle in the 4th century B.C.

The father of the modern intelligent design movement is Phillip E. Johnson, a retired law professor from the University of California at Berkeley. He became a prominent critic of evolutionary theory and popularized the phrase ‘intelligent design’ in its current sense in his book, *Darwin on Trial*. He is also famous for disputing that HIV is the cause of AIDS because, he argued, they are not universally correlated.

One of the principal advocates of the movement is Michael Behe, professor of biochemistry at Lehigh University in Pennsylvania and a senior fellow of the Discovery Institute's Center for Science and Culture, a creationist organization. He has promoted the idea that life at the biochemical level is too complex to have evolved and must have been created by an intelligent designer. He termed the concept ‘irreducible complexity’ in his book titled *Darwin's Black Box* and used the construction of the mousetrap to illustrate the point. Take even one part away – the base, the hammer, the spring, the platform or the holding bar – and the trap could not perform the function for which it is intended. Among the biochemical examples of this that Behe cited is blood-clotting. Without the presence of even one of several cascade proteins in the clotting process, other proteins won't be activated, and the clot will fail. Indeed, this is the deficiency that causes hemophilia A and hemophilia B.

Kitzmiller v. Dover Area School District (2005)

The blood-clotting cascade would become a focal point in the last of our trials, which occurred in Dover, Pennsylvania, in 2005. Four high school biology teachers in Dover recommended the biology text by Miller and Levine (2004), which is used in 35% of high schools around the country (trial transcript). Their choice had to be approved by the local school board. One of the board members, Bill Buckingham, did not like the book because it was “laced with Darwinism throughout” and convinced three others that the intelligent design text, *Of Pandas and People* (Davis and Kenyon, 1993), might be used instead.



This courtroom sketch by Art Lien during the Dover trial shows Professor Kenneth Miller giving testimony with Judge John E. Jones, III, presiding. © Art Lien/courttartist.com.

On 19 November 2004, the Dover Area School District issued a press release stating that, commencing in January 2005, teachers would be required to read this statement to students in the ninth-grade biology class at Dover High School:

“The Pennsylvania Academic Standards require students to learn about Darwin’s theory of evolution and eventually to take a standardized test of which evolution is a part.

“Because Darwin’s Theory is a theory, it is still being tested as new evidence is discovered. The Theory is not a fact. Gaps in the Theory exist for which there is no evidence. A theory is defined as a well-tested explanation that unifies a broad range of observations.

“Intelligent design is an explanation of the origin of life that differs from Darwin’s view. The reference book, *Of Pandas and People*, is available for students to see if they would like to explore this view in an effort to gain an understanding of what intelligent design actually involves.

“As is true with any theory, students are encouraged to keep an open mind. The school leaves the discussion of the origins of life to individual students and their families. As a standards-driven district, class instruction focuses upon preparing students to achieve proficiency on standards-based assessments.”

Three of the school board members in the minority resigned in protest, and science teachers in the district refused to read the statement to their ninth-grade students, citing the Pennsylvania code of education, which states that teachers cannot present information that they believe to be false. So a school administrator interrupted classes to walk in and read it aloud.

The ACLU filed suit on 14 December 2004, on behalf of 11 parents from the Dover school district, including Tammy Kitzmiller, who soon began receiving hate mail just as Susan Epperson had. The trial did not begin until 26 September 2005, in the courtroom of Judge John E. Jones III, an appointee of President George W. Bush. The trial would last 40 days.

Professor Kenneth Miller, Professor of Biology at Brown University and co-author of the biology text (Miller and Levine, 2004) under consideration, was summoned as a witness for the plaintiffs. He testified that the proposed positive argument for intelligent design does not satisfy the ground rules of science, which require testable hypotheses based on natural explanations, and that he had not found a single peer-reviewed paper anywhere in the scientific literature that supports the idea of intelligent design. In relation to Behe's example of the blood-clotting cascade, he cited published papers that showed that removal of a certain factor in the series does not prevent clotting in whales and dolphins and removal of yet another two factors does not prevent the blood in puffer fish from clotting. More complete discussions of this and other arguments can be found in Miller (1999, 2008).

Lead defense expert Professor Michael Behe admitted under cross-examination that his broad definition of science, which encompasses intelligent design, would also embrace astrology. Added to the defense's miseries was the testimony by Dr. Barbara Forrest, Professor of Philosophy at Southeastern Louisiana University. She examined documents related to *Of Pandas and People* subpoenaed from its publisher, Foundation for Thought and Ethics. Dr. Forrest noted that the definition of creationism in version 1 (1987) – written before the decision in *Edwards v. Aguillard* – was "Creation means that the various forms of life began abruptly through the agency of an intelligent creator with their distinctive features already intact -- fish with fins and scales, birds with feathers, beaks, and wings, etc." Shortly after the decision in *Edwards v. Aguillard*, version 2 appeared with this definition: "Intelligent design means that various forms of life began abruptly through an intelligent agency, with their distinctive features already intact -- fish with fins and scales, birds with feathers, beaks, wings, etc." Wherever the word 'creation' had appeared in the first version, 'design' had been substituted for it by simple find-and-replace word processing throughout the second version. Similarly, 'intelligent design' had been substituted for 'creationism' throughout. The intent of the publishers was clearly to comply with the letter of the law in *Edwards v. Aguillard* but defined intelligent design no differently than creationism.

On 20 December 2005, Judge Jones ruled that the Dover mandate was unconstitutional and barred intelligent design from being taught in public school science classrooms. He also chastised members of the Dover School Board, who he said lied to cover up their religious motives, made a decision of "breathtaking inanity" and "dragged" their community into "this legal maelstrom with its resulting utter

waste of monetary and personal resources." Judge Jones concluded from the expert testimony that intelligent design was not science, and that in order to claim that it is, its proponents admit they must change the very definition of science to include supernatural explanations.

The Dover Board of Education members who voted for the curriculum change were voted out of office in the next election.

Attitudes on both sides of the evolution issue have not changed since 2005 as advocates of creationism and intelligent design look to alternative approaches that would seem *prima facie* to lie within the letter of the law. Passed by the Louisiana state legislature in 2008, the Louisiana Science Education Act stipulated that "The State Board of Elementary and Secondary Education, upon request of a city, parish, or other local public school board, shall allow and assist teachers, principals, and other school administrators to create and foster an environment within public elementary and secondary schools that promotes critical thinking skills, logical analysis, and open and objective discussion of scientific theories being studied including, but not limited to, evolution, the origins of life, global warming, and human cloning." Branch and Scott (2009) called the act "pernicious" because "it tacitly encourages teachers and local school districts to miseducate students about evolution, whether by teaching creationism as a scientifically credible alternative or merely by misrepresenting evolution as scientifically controversial.... Telling students that evolution is a theory in crisis is—to be blunt—a lie."

Coming full circle to the Scopes Trial, a bill (HB 368/SB 893) with wording suspiciously like that of the Louisiana Science Education Act passed with wide margins in Tennessee's House and Senate and was enacted without Governor Bill Haslam's signature on 10 April 2012. The new law, which took effect ten days later, allows teachers to question "the scientific strengths and weaknesses of...biological evolution, the chemical origins of life, global warming, and human cloning." Just as in 1925, the ACLU is prepared to pursue litigation in Tennessee and this time is joined by the American Association for the Advancement of Science, Tennessee Education Association, and members of the Tennessee Academy of Science.

All of the legal battles I've discussed, from Scopes in 1925 to Kitzmiller 80 years later, have dealt with high school textbooks. In the issue of *Science* magazine dated 28 January 2011, the results of the National Survey of High School Biology Teachers were published, based on a sample of 926 public school biology instructors (Berkman and Plutzer, 2011). Twenty-eight percent of all teachers consistently implement the recommendations of the National Research Council and prepare lesson plans with evolution as the theme that unifies different aspects of biology. Thirteen percent explicitly advocate creationism or intelligent design by spending at least one hour presenting it in a positive way. The remaining 60% want to avoid controversy or don't feel knowledgeable about evolution, and only 37% of them have completed a course on evolution.

This study supports the observation that there is less teaching of evolution in American high schools today than in the early 1920s, putting the United States farther and farther behind other developed nations in that respect. Orchid scientists and other

educators hope that we are not, as Darrow put it in 1925, “marching backward to the glorious ages of the sixteenth century when bigots ... burned the men who dared to bring any intelligence and enlightenment and culture to the human mind.”

Acknowledgments

I thank Susan Epperson, Art Lien, Wesley Elsberry, Randy Moore, and the Associated Press for use of their images. It was my honor to discuss John Scopes and the trial with Jerry Tompkins, a retired Presbyterian minister who knew Scopes and his wife Mildred well and edited a superb retrospective of the trial from several contributors, including Scopes himself. Susan Epperson, Wesley Elsberry, Barbara Forrest, and Ken Miller have been most helpful with respect to the court trials.

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News from Correspondents

Please submit any news about newly completed research, future research plans and needs, change of address, upcoming or recent fieldwork, etc. to Alec Pridgeon (a.pridgeon@kew.org). Graduate students are especially encouraged to share the subjects of their thesis or dissertation with the international community. We will print submissions in the format below. Many thanks to those who have contributed.

Antonio Toscano de Brito has been named Curator of the Orchid Research Center at Marie Selby Botanical Gardens. His duties will include researching selected orchid species, publishing scientific and popular articles, identifying plants, building Selby's living and preserved collections and giving lectures on plant research. Toscano began work at Selby Gardens on the Global Plants Initiative project, funded by the Mellon Foundation in April 2011. He is currently working under two grants studying orchids of Brazil. His research involves molecular work which is funded by the Institute for Museum and Library Services, and fieldwork partially supported by an individual grant from the National Geographic Society.

Upcoming Conferences

We welcome any news about future orchid conferences for promotion here. Please send details to Alec Pridgeon (a.pridgeon@kew.org) as far in advance of the event as possible, remembering that the *Orchid Research Newsletter* is published only in January and July of each year.

Fourth Andean Conference a Success

The Fourth Scientific Conference on Andean Orchids, held in Guayaquil, Ecuador, in early November 2012, was a success by any measure. There were three days of bilingual talks on orchid systematics, ecology, and conservation science by 30 speakers from the Americas and Europe. In addition, 50 poster abstracts were submitted by participants as far away as India, showing that these conferences have become truly international events. The *Proceedings* will be published in *Lankesteriana* later this year (2013).

The Fifth Scientific Conference on Andean Orchids will be held in Cali, Colombia, in approximately two years. More information will be posted here as soon as it becomes available.

21st World Orchid Conference

The 21st World Orchid Conference (WOC21) will take place from 10-14 September 2014 in Johannesburg, South Africa, at the Sandton Convention Centre. The official accommodation provider for WOC21 is Southern Sun Hotels and the official tour operator is Grosvenor Tours. For further information, visit www.woc21.org.

Recent Orchid Nomenclature

New orchid names may now be accessed on the IPNI website:

(www.ipni.org/ipni/plantsearch?request_type=search&output_format=query&ret_defaults=on)

Click on "Show additional search terms" on the right-hand side of the screen. After the search page appears, type in **Orchidaceae** under family name and (for example) **2010-11-30** under "Record date" and "Added since." This will pull up a list of all names added to the IPNI database since 30 November 2010.

Recent Literature

We consult a variety of other sources for recent literature, and you will find a more extensive range of journals from more disciplines than ever before. We sincerely thank Paolo Grünanger for supplying references from European orchid journals. If you are aware of any recent citations not listed here and henceforth, please send them – in the exact style below – to Alec Pridgeon (a.pridgeon@kew.org) for publication in the following issue (January or July). Write "ORN references" in the subject line of the e-mail. Book citations should include author(s), date of publication, title, publisher, and place of publication (in that order).

Anatomy and morphology

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