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Understanding Creationism after *Kitzmiller*

GLENN BRANCH

If you were investigating intelligent design—the latest manifestation of antievolutionism—and you were unwise enough to regard the pronouncements of its leaders as reliable, what would you conclude? That intelligent design is, in the words of its main scientific proponent, "one of the greatest achievements in the history of science. The discovery rivals those of Newton and Einstein, Lavoisier and Schrödinger, Pasteur and Darwin" (Behe 1996, pp. 232–233). That intelligent design is not a form of creationism, since, in the words of its main theoretical architect, "Intelligent design as a scientific theory is distinct from a theological doctrine of creation.... [It] starts with the data of nature and from there argues to an intelligent cause responsible for the specified complexity in nature" (Dembski 1999, p. 248). And that intelligent design is uniquely appropriate for the promotion of the Christian gospel, for, in the words of its main public exponent, "The Intelligent Design movement starts with the recognition that 'In the beginning was the Word,' and 'In the beginning God created.' Establishing that point isn't enough, but it is absolutely essential to the rest of the gospel message" (Johnson 2000, p. 5).

Weaving all three threads of the intelligent design message within the same fabric was always awkward, and the proponents of intelligent design were unsurprisingly selective in tailoring the message to different audiences—here telling a reporter that intelligent design was a purely scientific endeavor, there telling a fundamentalist church audience that intelligent design was the key to reclaiming the culture for Christ. But over the course of 40 days in a federal courtroom in Harrisburg, Pennsylvania, the tangled web unraveled. The case, of course, was *Kitzmiller v. Dover* (400 F. Supp. 2d 707 [M.D. Pa. 2005]), in which the constitutionality of teaching intelligent design in the public schools was successfully challenged. At the trial, with the aid of a stellar team of expert witnesses aiding the plaintiffs, intelligent design was revealed to be riddled with scientific error and entangled, historically and conceptually, with creationism. The unpretentious piety of two of these expert witnesses—biologist Kenneth R. Miller and theologian John F. Haught—was, though irrelevant to the legal argument, a reminder of the absurdity of the intelligent design movement's claim to represent the only satisfactory attitude for a Christian to adopt toward evolution.

The *Kitzmiller* case was by no means the end of the intelligent design movement, still less of the antievolution movement that it aspires to pilot. Increasingly, the energies of creationists are likely to be devoted to promoting the fallback strategy of attacking evolution without mentioning any creationist alternative. To its creationist supporters, such a strategy offers the promise of accomplishing the goal of encouraging students to acquire or retain a belief in creationism while not running afoul of the Establishment Clause (Scott and Branch 2003). Still, *Kitzmiller* is clearly a landmark in the contentious history of teaching evolution in the United States, and as such it provides a convenient occasion to review the recent spate of books—from 2005 to the first quarter of 2007—that variously seek to examine the course of the trial, to explain the history of creationism, to expose its scientific failure, to explore the theological alternatives to creationism, or simply to expound the basic issues to (in the *Quarterly Review of Biology*'s charming phrase) "tyros and laics." It is particularly instructive to consider how well such books have appreciated, or anticipated, the unraveling of intelligent design in *Kitzmiller*.

The plaintiffs in *Kitzmiller* were 11 parents who challenged the constitutionality of the Dover, Pennsylvania, Area School Board's policy requiring that "students will be made aware of gaps/problems in Darwin's Theory and of other theories of evolution including, but not limited to, intelligent design." Thanks to modern technology, anyone with access to the Internet could read a blow-by-blow account of their struggle from the spirited coverage in the local newspapers—the *York Daily Record*'s Lauri Lebo and Mike Argento deserve special praise—as well as the articles in national newspapers and magazines. Moreover, the transcripts of the trial, and a host of briefs, exhibits, and submissions, were generally available online, free to the public, within a few days of the events. As copious as all these documents are, however, they are hardly a substitute for attending the trial, interviewing the principals, researching the background, and reflecting on the significance of the case. These tasks were accomplished admirably by the authors of three new books devoted to the *Kitzmiller* case. Recounting the same events and relying on the same basic sources, their books substantially overlap. Yet each is excellent in its own distinct way.

Matthew Chapman can claim to have a personal interest in antievolutionism: He is a great-great-grandson of Charles Darwin himself. In his first book, *Trials of the Monkey* (2001), Chapman juxtaposed tales of his visit to Dayton, Tennessee, where John T. Scopes was convicted in 1925 of teaching evolution, with a mordant memoir of his life as a failed scion of a great scientific family. His uproarious account of the *Kitzmiller* trial,

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40 Days and 40 Nights (2007), is presented in a series of colorful vignettes, often imbued with a caustic humor at the expense of intelligent design and its defenders. Explaining his attitude, he writes, "The worst form of elitism...was to so disdain them that you merely sniffed and turned away.... To frankly despise them, as I eventually did, was, in fact, a form of respect." Although Chapman writes that the Catholic theologian John F. Haught, who testified for the plaintiffs, has "the most beautiful mind in the whole trial," there is a certain degree of antipathy toward religion throughout the book, and Chapman concludes with a disquieting call for creationism, and indeed Christianity, to be debunked as part of the public school curriculum.

As the ungainly title of *The Battle over the Meaning of Everything* (2007) suggests, Gordy Slack is fascinated by what he sees as the clash of weltanschauungen on display in the *Kitzmiller* trial, in part owing to such a clash within his family. His clear and crisp account of the case is thus punctuated by thoughtful, if rarely conclusive, reflections on the presuppositions of creationism and the implications of evolution. Moreover, he devotes a chapter each to the expert witnesses for the plaintiffs whose testimony was most relevant to such concerns: Barbara Forrest, who exposed the creationist roots of intelligent design, and Robert T. Pennock, who discussed the nature of science. Michael J. Behe, testifying for the defense, also receives his own chapter; Slack's account of how, after a promising direct examination, the credibility of intelligent design's main scientific proponent was thoroughly destroyed in a "withering piece of lawyering" on the part of Eric Rothschild is superb. Unlike Chapman (who appears in a cameo), Slack usually portrays the creationist forces generously—for example, intelligent design's main public exponent, Phillip Johnson, to whom Slack's creationist father introduces him, is "urbane, articulate, and smart as a whip"—which makes Slack's occasional stinging remark all the more effective.

With its title taken from a taunt aimed at a Dover student interested in learning about evolution, Edward Humes's *Monkey Girl* (2007) abounds in detail, critically assessed and cogently assembled. Particularly impressive are the thorough account of the events in Dover that precipitated the case and the detailed report of the preparations and maneuvers undertaken by the competing legal teams before the trial. When Humes arrives at the trial—not until the 13th chapter of his book—he continues to provide a fluent and accurate narrative, offering insightful comments on the effectiveness of the witnesses and attorneys. Humes is generally astute about the canny tactics of the intelligent design movement, observing, for example, that owing to a simplistic conception of balance on the part of the media, the mere proclamation that there is a controversy over evolution guarantees the reporting of a controversy. His own approach, though reportorial, is not constrained by a specious insistence on balance: He is not hesitant, for example, to list the lies about evolution in a passage from Ann Coulter. Like Chapman, Humes emphasizes (particularly in his epilogue) the ambitions of the religious right to wield intelligent design, à la Coulter, as a weapon in a culture war.

Tammy Kitzmiller (center), the lead plaintiff in Kitzmiller et al. v. Dover Area School District et al.*, in a press scrum outside the federal courthouse in Harrisburg, Pennsylvania. Photograph: Wesley R. Elsberry.*

Reading either the transcripts of the trial or an account from Chapman, Slack, or Humes, the importance of history is manifest—the history of the Dover Area School Board's antievolutionism (including the burning in 2002 of a student's mural featuring the iconic march of the hominids), the history of the intelligent design movement since the mid-1980s, and even the history of the uneasy coexistence of science and religion from their earliest days onward. History, for the defense and its expert witnesses, became a nightmare from which they were trying to awake—but to no avail. Time after time, the attorneys for the plaintiffs elicited testimony and produced documents that contradicted the stories of the defendants and the claims of the defense's expert witnesses. One relatively neglected example occurred before the trial, when the Foundation for Thought and Ethics (FTE)—publisher of the intelligent design textbook *Of Pandas and People* that was central to the case—sought to become a codefendant. FTE's president Jon Buell told the court that FTE was "not at all" a religious organization, only to be confronted on cross-examination with a copy of its own articles of incorporation, according to which its purposes include "making known the Christian gospel and understanding of the Bible."

The key historical testimony in the *Kitzmiller* case was largely supplied by Barbara Forrest, a philosopher and a dogged critic of the intelligent design movement. In *Creationism's Trojan Horse* (2007), Forrest and the biologist Paul R. Gross scrutinize the strategy of the de facto headquarters of the intelligent design movement, the Discovery Institute, according to which intelligent design is intended to serve as a wedge "to reverse the stifling dominance of the materialist worldview, and to replace it with a science consonant with Christian and theistic convictions." While preparing to testify in the *Kitzmiller* trial, Forrest was able to probe further into the intelligent design movement's creationist roots—discovering, for example, that in drafts of the intelligent design textbook *Of Pandas and People,* the word "creation" was systematically replaced with the word "design" just after teaching creationism in the public schools was declared unconstitutional (figure 1). Now reissued with a new foreword and a new chapter discussing events since the book's original publication, *Creationism's Trojan Horse* continues to be the best exposé of the intelligent design movement available. And it is needed: As Forrest and Gross comment in their new chapter, "Though wounded, the Wedge will be with us until enough Americans abandon antievolution foolishness to make their efforts unprofitable" (p. 334).

The roots of the intelligent design movement are also explored in a reissue of Ronald L. Numbers's *The Creationists* (2006), a monumental history of creation science, the antievolutionist movement that emerged in the 1960s under the leadership of the late Henry M. Morris. New to the reissue are hefty chapters on the global expansion of creationism—impressively, Numbers traveled to Turkey to interview the chief proponent of its Islamic form—and on intelligent design, from its beginnings in the mid-1980s to the aftermath of *Kitzmiller.* Numbers synthesizes a remarkable amount of information in his chapter on intelligent design (based in part on his book *Darwinism Comes to America* [1998]), but disappointingly fails to exploit the trove of material brought to light during the *Kitzmiller* case. There are still unanswered questions about the history of the intelligent design movement. Because its proponents prefer to construct a mythic history (e.g., Woodward 2003) to serve their political ends, the true and complete history of the intelligent design movement remains to be written. Nevertheless, in its detail and scope, *The Creationists* is still essential for understanding the background of the creationist movement in the United States, of which the intelligent design movement is now clearly a branch.

Two synoptic historical overviews of the creationism–evolution controversy are Michael Ruse's *The Evolution–Creation Struggle* (2005) and Arthur McCalla's *The Creationist Debate* (2006). Ruse continues, as always, to defend the scientific status of evolution, but his concern here is primarily to understand the roots of the controversy. He concludes, "We have no simple clash between science and religion but rather between two religions" (Ruse 2005, p. 287)—where the religion opposed to creationism is not evolution, to be sure, but evolutionism, a progressivist metaphysics that resonates with the science of evolution. The book's analysis is largely predictable to anyone familiar with Ruse's previous work, but it is typically insightful, cogent, and engaging. McCalla, for his part, offers a different diagnosis, arguing that it is the status of the Bible that is at the heart of the matter. In the process, he provides a splendid tandem account of the emergence of the historical sciences and the vicissitudes of different ways of interpreting the Bible in response, culminating with a discussion of creation science and intelligent design. In whatever form, McCalla writes, creationism is "a repudiation of historical-mindedness that serves to defend biblical inerrancy" (2006, p. 199).

The basic scientific claims of intelligent design were already present in creation science. During the *Kitzmiller* trial, for example, a defense expert witness conceded that Michael J. Behe's argument (1996) for the unevolvability of the bacterial flagellum—a favorite example of the intelligent design movement—was anticipated by a 1994 article in a creation science journal. And examination of the scientific literature reveals that intelligent design, like creation science, is scientifically sterile. One of the expert witnesses in *Kitzmiller* testified that no articles have been published that "provide detailed rigorous accounts of how intelligent design of any biological system occurred" or that support the claims that complex systems such as the bacterial flagellum, the vertebrate blood-clotting cascade, and the vertebrate adaptive immune system were intelligently designed. Indeed, it was sometimes difficult to remember that Behe was testifying for the defense, in favor of teaching intelligent design. After he cavalierly dismissed a stack of scientific publications on the evolution of the immune system—most of which he admitted not having read—as unsatisfactory, it became easy to remember again whose side he was on (Bottaro et al. 2006). But the proponents of intelligent design are adept obfuscators, and it takes a conscientious effort to reveal the pseudoscientific nature of their arguments.

The contributors to the collection *Why Intelligent Design Fails* (Young and Edis 2006) have taken the trouble to become thoroughly conversant with the scientific claims of intelligent design over a broad range of the sciences (and two have published their own worthwhile books on the topic; Perakh 2004, Shanks 2004). The results are devastating. Indeed, Gary S. Hurd's contribution debunking intelligent design's attempt to compare itself with forensics and archaeology was submitted as evidence in *Kitzmiller.* The quality of the essays is high; particularly useful are my former colleague Alan D. Gishlick's on the evolution of avian flight and Ian Musgrave's on the bacterial flagellum. (For a recent review of work on the evolution of the flagellum, see Pallen and Matzke 2006.) The paperback reissue of *Why Intelligent Design Fails* contains a brief review of events since its original publication; the editors observe, "ID creationists have not suggested a new argument that cannot be refuted effectively by the material in the first edition of this book" (p. vii). They might also have observed that, for all the intelligent design movement's professions to be honestly receptive to scientific

critique, the powerful criticisms of *Why Intelligent Design Fails* are as yet unanswered.

The title of the collection *Scientists Confront Intelligent Design and Creationism* (Petto and Godfrey 2007) notwithstanding, the contributors understand the historical and conceptual connections between intelligent design and previous forms of creationism. Especially illuminating are the extended comparison between creation science and intelligent design by my colleague Eugenie C. Scott and the discussion of the central assumptions of intelligent design by Robert T. Pennock (who testified on such matters for the plaintiffs in *Kitzmiller*). At the heart of the book, though, are seven valuable essays on areas of science that are favorite targets of creationists, including geochronology, research on the origin of life, and paleoanthropology. Except for Victor J. Stenger's article on cosmological versions of intelligent design and my colleague Wesley R. Elsberry's article on intelligent design's misuse of information theory, there is little direct engagement with the creationist arguments themselves, and so these essays complement, rather than compete with, the essays in *Why Intelligent Design Fails.* The collection ends with Andrew J. Petto and Laurie R. Godfrey's thoughtful and persuasive answer to the question "Why teach evolution?"—showing, in passing, the ways in which the intelligent design movement is continuing the creation science movement's attack on evolution in public education.

Both *Why Intelligent Design Fails* and *Scientists Confront Intelligent Design and Creationism* are invaluable resources for anyone wishing to understand the failings of creationism in general. Not all creationists are going to be so obliging as to recite their arguments in canonical form, however; where are to be found rebuttals of such relatively unfamiliar versions of creationist arguments as—to borrow Richard Dawkins's whimsical example—the supposed unevolvability of the elbow joint of the lesser spotted weasel frog? Mark Isaak's invaluable *The Counter-Creationism Handbook* (2006) lists literally hundreds of common creationist arguments, together with brief rebuttals and references for further exploration. The scope of discussion is vast, ranging from astronomy to zoology, and including claims about philosophy, theology, and ethics along the way. Intelligent design occupies its own section of the book, but Isaak argues that it is indeed, historically and conceptually, a form of creationism. Piquantly, *The Counter-Creationism Handbook* is organized along the lines of a system used by folklorists, which is not only convenient but also fitting, since the creationist literature—the intelligent design segment of it not excluded—tends to resemble the oral tradition (see, for example, Shallit [2003] discussing the unscholarly career of a legend in the intelligent design literature).

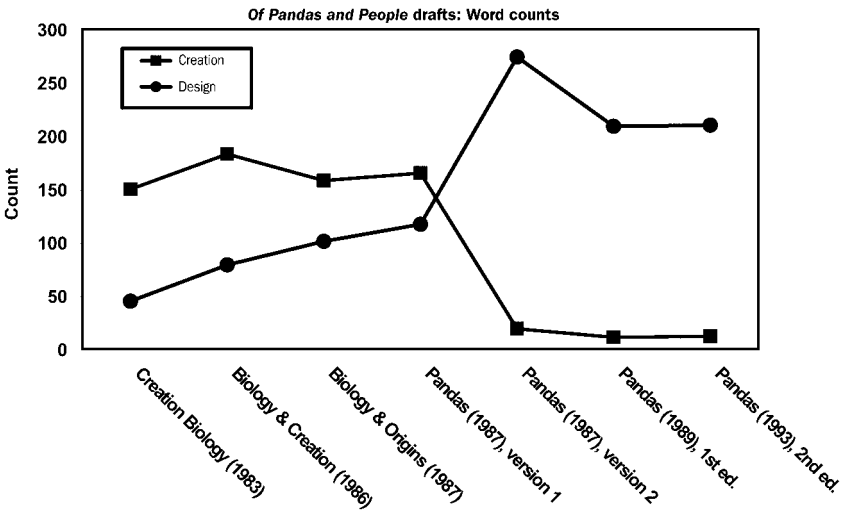

Figure 1. Uses of the word "creation" and its cognates and of the word "design" and its cognates in drafts of the intelligent design textbook published by the Foundation for Thought and Ethics (FTE) under the title Of Pandas and People. *Between the second and third 1987 drafts of the book, the Supreme Court ruled in* Edwards v. Aguillard *(482 U.S. 578 [1987]) that teaching creationism in the public schools is unconstitutional; the authors of the book responded accordingly, by substituting "design" for "creation" throughout. On 5 October 2006, Barbara Forrest presented the chart while testifying in* Kitzmiller v. Dover. *Judge John E. Jones III subsequently wrote in his decision, "This word substitution is telling, significant, and reveals that a purposeful change of* words *was effected without any corresponding change in* content*, which directly refutes FTE's argument that by merely disregarding the words 'creation' and 'creationism,' FTE expressly rejected creationism in* Pandas*" (emphasis in original). Chart provided by Nick Matzke of the National Center for Science Education.*

It is clear that the intelligent design movement aims to exploit the common idea that evolution is intrinsically at odds with Christianity. In Dover, one of the plaintiffs testified about her dismay when her daughter asked, after the school board passed its antievolution policy, "Well, Mom, evolution is a lie; what kind of Christian are you, anyway?" Although Richard Dawkins is sometimes portrayed as agreeing with the intelligent design movement's position that evolution is inconsistent with Christianity (or with theism in general), his position in his ambitious polemic *The God Delusion* (2006) is not so crude. For Dawkins, evolution is not a disproof of the existence of God, but a disproof of the only plausible argument—the argument from design—for the existence of God. Even so, efforts to argue that evolution is compatible with, or even enriches, Christianity are presumably not going to interest him. Yet, unimpressed by Dawkins's animadversions, theologians continue to explore the alternatives to creationism, in books ranging from the introductory *Can You*

Believe in God and Evolution? (Peters and Hewlett 2006) to the sophisticated *God and Evolution* (Zycinski 2006). Perhaps refreshingly, it is not only theologians who are doing so: Two distinguished biologists as well as a program of the American Association for the Advancement of Science (AAAS) have also offered their contributions.

Francisco J. Ayala's *Darwin and Intelligent Design* (2006) and Joan Roughgarden's *Evolution and Christian Faith* (2006) are comparable: Both are by biologists with a keen interest in religion, both are slim volumes addressed to a readership relatively uninformed about science and religion, and both aim to persuade the reader to reject intelligent design not only as scientifically useless but also as theologically harmful. The difference is in the details. Roughgarden's discussion of evolution begins with a howler—"Just what is evolution? The main finding, originally suggested by Darwin in *The Voyage of the Beagle* in 1860, is that all life is related" (Roughgarden 2006, p. 13)—and there are minor irritants throughout, such as her insistence on using "natural breeding" for "natural selection" and a chapter unconvincingly rehearsing her case against sexual selection (Roughgarden 2004). Except for a hyperbolic claim about the power of molecular phylogeny, Ayala's discussion of evolution is unproblematic and polished. Roughgarden's discussion of intelligent design's scientific claims is cursory but reasonable, stressing its scientific uselessness—"a way to avoid doing the hard work," as she writes. Ayala delves a bit deeper, with a knowledgeable section (relying in part on *Why Intelligent Design Fails*) on the bacterial flagellum.

Ayala and Roughgarden diverge in their approaches to the religious issues, although apparently not on account of their different faiths (Roughgarden is a member of the Episcopal Church; Ayala is a former Dominican priest, although he is silent about his current religious views in *Darwin and Intelligent Design*). Ayala takes a historical approach, considering the argument from design throughout the history of theology, describing intelligent design as a mere revival of William Paley's arguments in the early 19th century, and citing a theological tradition, from Augustine to Pope John Paul II, of respecting the autonomy of science. In contrast, Roughgarden takes a biblical approach, affirming the compatibility of a literal reading of the Bible with common ancestry and the mutability of species. She is not herself a literalist, however, and so it remains obscure why such compatibility—which is affirmed but not argued—is supposed to matter. Both Ayala and Roughgarden are critical of intelligent design's theology, although for different reasons: Ayala objects that intelligent design encourages the inference that God is either not almighty or not benevolent, while Roughgarden worries that intelligent design distracts believers from the Bible and from the majesty of God's creation as a whole.

The Evolution Dialogues (Baker 2006) was produced under the auspices of the AAAS, and in particular its Dialogue on Science, Ethics, and Religion program, which seeks to facilitate communication between scientific and religious communities. Intended for use primarily in adult religious education programs, the book consists of four pairs of chapters, with the odd-numbered chapters discussing the nature of science and the content of evolutionary theory and the even-numbered chapters discussing the history and variety of Christian responses to evolution. Interspersed throughout is a narrative about a college student struggling—with the aid of a perhaps implausibly sympathetic set of advisors—to reconcile evolution with her religious faith. A whiff of committee can occasionally be detected in the prose, but overall *The Evolution Dialogues* communicates the basic scientific and theological issues in a particularly comprehensible way. Adding to the book's usefulness are a glossary, suggestions for further reading for each chapter, and a separate online study guide (AAAS 2006). As its title suggests, *The Evolution Dialogues* is intended to invite and inspire discussion; it is to be hoped that it succeeds in doing so, both within and beyond its intended audience.

In a February 2006 speech to the Anti-Defamation League, John E. Jones III, the judge selected by lot to preside over the *Kitzmiller* trial, remarked that when the suit was filed, he was completely ignorant about it—adding, "Boy, do I know what intelligent design is now!" Jones gained his knowledge in enviable circumstances, during the trial, which a reporter for the *New Yorker* said "turned out to be rather like the biology class you wish you could have taken" (Talbot 2005), with six expert witnesses testifying for the plaintiffs on paleontology and biochemistry, on philosophy and pedagogy, and (of course) on the history of the intelligent design movement, and three, including intelligent design's main scientific proponent, Michael J. Behe, for the defense. (Three of the defense's expert witnesses—including William Dembski, intelligent design's main theoretical architect, and Stephen C. Meyer, who directs the intelligent design movement's institutional headquarters—withdrew, or were withdrawn, from the case under circumstances that are still in dispute.) In lieu of arranging such a comprehensive tutorial for everyone interested in intelligent design, a trio of new books attempts to introduce the controversy surrounding intelligent design to the tyro and laic—with decidedly different degrees of success.

The Complete Idiot's Guide to Understanding Intelligent Design, written by the Episcopalian chaplain to the University of Massachusetts with the aid of a freelance journalist, is simply dreadful, teeming with errors small and large. For example, the authors assert, "The first 30 years of the Cambrian period...saw a veritable explosion of plants and animals as has never been seen again" (Carlisle and Smith 2006, p. 152). Worse, the authors report but never critically assess a host of false, dubious, and unsupported creationist claims; they repeatedly cite creationists (not always identified as such) as authorities on history and science. The same misguided concern with balance produces such absurdities as "It is an assumption [!] of mainstream biology that the empirical evidence for common descent is simply overwhelming" (2006, p. 113). The result is a bias, not by intention

but by effect, in favor of intelligent design. The bias is reinforced by exaggerating the prevalence of atheism among scientists and by emphasizing (and distorting) the views of E. O. Wilson, Richard Dawkins, and Daniel C. Dennett. Additionally, it is astonishing to find no systematic discussion of the intelligent design movement's ambition for science education in the public schools, which, after all, is the reason for the hullabaloo.

Although Michael Shermer's *Why Darwin Matters* (2006) is not free from error—carbon-14 dating is not relevant to ascertaining the age of the Earth, for example, and the Cobb County, Georgia, evolution warning sticker was not required throughout the state—it is head and shoulders above *The Complete Idiot's Guide,* in terms of both accuracy and cogency. With a career in explaining science and debunking pseudoscience for the public (in *Skeptic* magazine, of which he is the founding publisher; his column for *Scientific American;* and a series of popular books), Shermer excels at informal, unpretentious, energetic exposition, often enlivened by personal reports of scientists and historians engaged in their research. A creationist himself in his college days, Shermer offers a sympathetic, unrelenting, but not always carefully articulated critique of intelligent design. It is no substitute for *Why Intelligent Design Fails* or *Creationism's Trojan Horse,* on which it relies in part, but it provides a serviceable introduction to the scientific failures and creationist antecedents of intelligent design. *Why Darwin Matters* also discusses a wide range of related scientific, historical, and philosophical issues, in what is sometimes a haphazard or cursory manner, but Shermer never fails to provoke, inform, and entertain along the way.

Philip Kitcher's first book, *Abusing Science* (1982), was a powerful critique of creation science, and Kitcher occasionally interrupted his subsequent distinguished career as a philosopher of science in order to lambaste creationism. In *Living with Darwin* (2007), he returns to the fray, aiming not only to debunk intelligent design and expound the case for evolution but also "to respond to the concerns of the thoughtful people who are beguiled by the advertisements for intelligent design, to expose just what it is that is threatening about Darwinism, and to point to the deeper issues that underlie this recurrent conflict" (2007, p. xiii). He succeeds brilliantly. Kitcher discusses the evidence for, and the creationist resistance to, deep time, common ancestry, and natural selection, in vivid and fluent prose, and always with accuracy and insight. Recognizing the historical respectability and the current bankruptcy of intelligent design, he describes it as "dead science"—although, in light of its shambling tenacity, "zombie science" is perhaps a preferable label. Kitcher concludes by offering a historically detailed and sociologically acute diagnosis of creationism as a reaction to what is understood—and not unreasonably so, he suggests—as the vanguard of the Enlightenment's critique of supernaturalist and providentialist forms of religion.

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The creationism–evolution controversy is even returning to the movies—not, thankfully, in the form of *Inherit the Wind,* already filmed once for the cinema and three times for television. A screenplay about the *Kitzmiller* trial was reportedly commissioned by Paramount, although it remains to be seen whether a movie will eventuate. In the meantime, Randy Olson's hilarious documentary *Flock of Dodos* (2006), centering on the Kansas State Board of Education's decision in November 2005 to adopt a set of state science standards in which evolution was systematically disparaged, is making the rounds of film festivals and Darwin Day celebrations. A wide cast of colorful characters is featured, including the ringleaders of the intelligent design movement in Kansas; a group of scientists in Cambridge, Massachusetts, excoriating intelligent design over poker and beer; and Olson's lively octogenarian mother. Even though the decision about the Kansas science standards is expected to be reversed, thanks to the results of a school board election, *Flock of Dodos* is eminently worthwhile, not least for the lessons it attempts to impart to scientists defending the teaching of evolution. Olson, himself a former biologist, suggests that intelligent design is successful in part because scientists are ineffective communicators, appearing arrogant, condescending, and awkward to the public.

Concerned scientists and nonscientists alike are taking their case for evolution and against creationism directly to a wide public in a new venue for science journalism: the blog. Of the five most popular science blogs—"those written by working scientists covering scientific issues"—identified by *Nature* (Butler 2006), two specialize in debunking creationism: P. Z. Myers's "Pharyngula" (named for a particular stage of embryonic development; *www.scienceblogs.com/pharyngula*) and the collectively authored "The Panda's Thumb" (named for Stephen Jay Gould's essay; *www.pandasthumb.org*). As Jack Krebs, president of Kansas Citizens for Science and a contributor to "The Panda's Thumb," told *Nature,* "There is an interest, a hunger even, for thoughtful analysis of the issues related to evolution and creationism" (Butler 2006). It is a hunger that "Pharyngula," "The Panda's Thumb," and a number of additional science blogs—including quite a few of the 57 now operating under the ScienceBlogs umbrella (*www.scienceblogs.com*) sponsored by *Seed* magazine—are helping to satisfy. Individual essays vary in quality and relevance, and comments from the readership—a typical feature of blogs—are sometimes pointless, raucous, or crude, but at their best, the evolution bloggers are offering essays that rival anything appearing in traditional media, and often with greater accuracy, detail, and insight.

Of making books there is, famously, no end, and the next noteworthy offerings are forthcoming from a familiar pair of adversaries: Michael J. Behe's *The Edge of Evolution* (2007) and Kenneth R. Miller's *Devil in the Details: Evolution and the Battle for America's Soul* (2007). But antievolutionism is not a problem that books alone are able to dispel. Despite the profusion of information confirming that intelligent design is scientifically bankrupt, conceptually and historically entangled with creationism, and theologically contestable, the teaching of evolution in the public schools of the United States remains under siege. A climate of ignorance of, skepticism about, and hostility toward evolution is common in the United States, where almost a third of science teachers report experiencing pressure to downplay or omit evolution in their curricula and a similar fraction report experiencing pressure to include creationism (NSTA 2005). It is a daunting challenge to take action to promote the teaching of evolution under such difficult conditions (see Branch [2006] for suggestions on how to do so). But if you find yourself in need of inspiration, you only have to look to the shining example of 11 brave parents in Dover, Pennsylvania, who took a stand in defense of the integrity of science education by serving as plaintiffs in the *Kitzmiller* case.

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