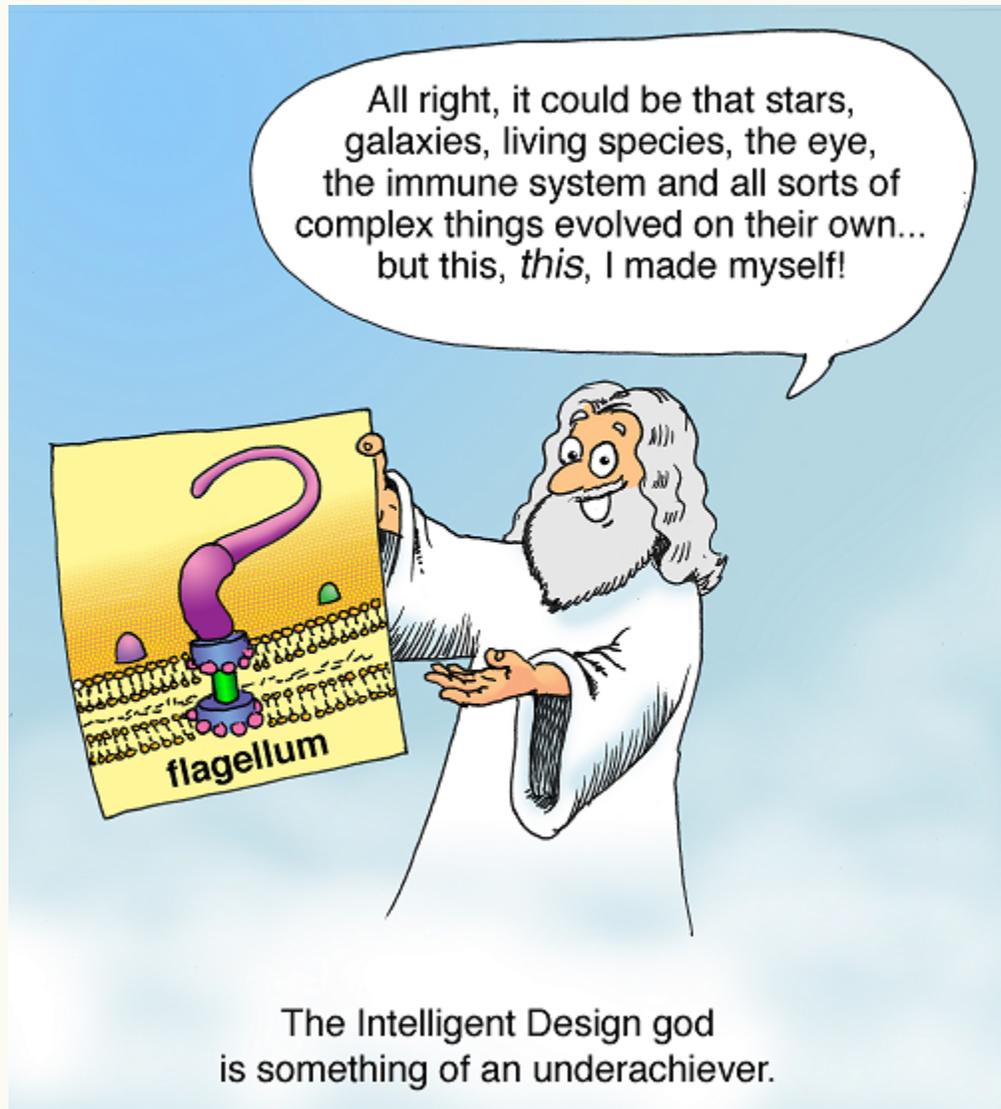


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ARTICLE

The Missionary Supposition: Evolution Education and Creationist Culture

Adam Laats

INTRODUCTION

Americans do not get it. Nearly half of US adults believe that humans were created as is, less than 10 000 years ago (Newport 2012). Those of us who care about evolution education must confront a sobering truth: evolution education does not work. Yet since long before the days of John Scopes, most of us have simply offered more of the same. Evolutionary scientists and science educators, with significant exceptions (Horgan 2012; Long 2011; Meadows 2009; Rosenau 2012), have pinned their hopes on a mistaken idea: For generations, they have assumed that Americans cling to creationist beliefs out of sheer ignorance. Scientists have insisted on the profoundly convincing nature of the scientific evidence for evolution. Mainstream scientists thought they could eliminate creationism's holdouts by simply spreading the word about evolution. But this is not the case. American creationists are often well versed in evolutionary science, sometimes more so than the general public. Yet from the 19th century to the 21st, evolutionary scientists have hoped to spread their evolutionary "gospel" to the unenlightened millions of creationist unbelievers.

Like it or not, the history of evolutionary scientists' attempts to bludgeon their creationist foes into submission bears a sad and striking resemblance to the evangelical impulse among conservative religious creationists. Instead of Scripture, leading scientists have assumed that the sheer weight of scientific evidence for evolution must convert the creationist heathen. In their zeal to heal the benighted nation, these generations of scientists have blundered into the same mistake that bedeviled earlier generations of religious missionaries. They have seen to their chagrin that evidence alone will not convert.

However, unlike most evolution educators, actual religious missionaries have accepted this uncomfortable realization. Among conservative Protestant missionaries, it has become commonplace to acknowledge the following fact: simply sharing an obvious truth with the unenlightened will not produce desired results. Unlike some evolution educators, religious missionaries have long emphasized the need to understand the home cultures of their would-be flocks. Religious missionaries have acknowledged the need to study more than just their own Scriptures. They have trained themselves to learn about those they are trying to reach. Evolution education should never become an exercise in religious conversion, but it is high time for scientists and teachers to notice that not even religious missionaries engage in the naive and blinkered missionary approach still so common among evolution educators.

EVIDENCE AND ACCEPTANCE

Mistaken assumptions about creationism began at the outset of the modern evolutionary age. As early as 1859, “Darwin’s bulldog” Thomas H Huxley assumed that awareness of the evidence for evolution would quickly and completely convince people of its veracity. Once citizens learned “the facts of the case,” Huxley argued in his 1859 essay “The Darwinian hypothesis,” thinking people would naturally “turn to those views which profess to rest on a scientific basis only” (Huxley 1859:10).

In the United States, popular controversy over evolution only began in earnest in the 1920s. One of the staunchest defenders of evolution in the era of the Scopes trial was geologist and paleontologist Henry Fairfield Osborn. Osborn had made a name for himself in the 1920s as America’s leading voice for science as head of the American Museum of Natural History. In a scathing 1925 attack on creationism, Osborn proclaimed that “The Truth Shall Set You Free” (Osborn 1925, dedication). To Osborn, Darwin was nothing less than a “prophet” of this new Truth (Osborne 1925:7). Evolution, Osborn told famous fundamentalist minister John Roach Straton, was so obviously true that it “may be actually observed in nature by an intelligent child, if the opportunity is afforded” (Osborn 1925:50). The only reason to doubt evolution, Osborn assumed, was sheer ignorance.

Yet creationism did not go away. Despite the dramatic expansion of evolutionary science in the nation’s textbooks beginning in 1960, Americans remained skeptical of scientists’ devotion to evolution ... and scientists remained determined to explain away this widespread skepticism. In 1964, for instance, eminent paleontologist George Gaylord Simpson offered blinkered explanations for the continuing popularity of creationism. Evolution, Simpson insisted, was a glorious and obvious “View of Life”. Simpson derided lingering creationism as mere “irrational prejudice” (Simpson 1964:26). As some children preferred to believe in fantasies such as Santa Claus, Simpson argued, so creationist adults preferred to live in “older worlds” (Simpson 1964:25). The root of creationism, Simpson argued, came from people who violently opposed even the clear explanation of evolution, due to “prejudice, dogma, or superstition” (Simpson 1964:26).

In our day Richard Dawkins has taken up the mantle of Huxley, Osborn, and Simpson. Perhaps most famously in 1989, Dawkins insisted that anyone who did not believe in evolution must be “ignorant, stupid or insane (or wicked, but I’d rather not consider that)” (Dawkins 1989). Throughout his career as evolution’s front man, Dawkins has explained his job as “educating the innocent” (Dawkins 1996:xii), and, in more typical language, as combating the influence of “an exceedingly retarded, primitive version of religion” (Slack 2005). In recent years, Dawkins has expressed consternation that so many teachers seem so friendly to creationist ideas. For instance, one poll of UK teachers found that most did not want to see creationism taught, but yet a strong majority (65%) favored including discussions about creationism in science classes (Ipsos MORI 2008). Why? The only explanation Dawkins could offer is that such teachers must be shockingly “ignorant of science” (Stevenson 2009).

Mainstream scientists tend to make two understandable assumptions. First, scientists assume that once people see the evidence for evolution, they will embrace it. Or, at the very least, once people understand the scientific consensus, they will defer to the authority of professional scientists. Neither of those assumptions holds water. A large number of cre-

ationists are well versed in evolutionary theory. And even when the general public is aware of scientists' preferences, they are not inclined to agree.

KNOWING ONE'S AUDIENCE

In 2009, as in 1964, 1925, and 1859, there was likely some truth to these science-activists' assumptions. At least some creationists must hold on to religious explanations of the origins of humanity out of stubborn ignorance about the overwhelming scientific evidence for evolution. But more important here is the surprising ignorance of our science "missionaries" about the true contours of creationism.

The most careful studies have demonstrated that creationists are often well informed about the scientific evidence for evolution. Such creationists—and this is the thing that the evolutionary "faith" of some scientists has rendered them incapable of understanding—such creationists simply reject the evidence for evolution. From Huxley through Dawkins, an influential majority of scientists have assumed that mere knowledge of the scientific evidence would lead to acceptance. This simply has not been the case.

Consider the best available evidence. Penn State political scientists Michael Berkman and Eric Plutzer (2010) conducted a large-scale survey of America's high-school biology teachers. With funding from the National Science Foundation, Berkman and Plutzer delved into teachers' beliefs and their educational backgrounds. Among those teachers who teach various forms of creationism—somewhere between one-seventh and one-fifth of America's public-school science teachers—nearly a third had completed a full semester-long college course in evolutionary biology. And more than half had at least a bachelor's degree in science (Berkman and Plutzer 2010:185). These teachers know the evidence for evolution. They just don't believe it.

Unfortunately for scientists and science educators, the views of these creationist teachers reflect the thinking of the general public. As Berkman and Plutzer (2010) note, a slim majority of Americans are aware of the scientific consensus in favor of evolution. Yet even among that 54% majority, a large majority want creationism taught in public schools (Berkman and Plutzer 2010:49). That's right: even those Americans who know that scientists agree on the fact of evolution don't care. They still want creationism in schools. That is a position that is difficult for scientists and their evolutionary allies to understand.

How then, shall we break out of this deadlock? Instead of thinking of creationism as a lack of something, we need to understand it as a powerful and compelling belief system in its own right. This will help us understand evolution education as a complex cultural endeavor, not merely a simple process of exposing ignorant creationist heathen to the Truth of Evolutionary Science.

Hard as it may be to accept, science educators need to take a page from their religious *bête noires*. Christian missionaries these days understand that they must do more than simply plop down in the midst of a non-Christian culture and begin passing out Bibles. Missionaries know that non-Christians are not merely theological blank slates, ignorant of the truths of Christianity and hungry for conversion. Today's missionaries know that attacking existing beliefs as devilish and ridiculous does not yield large numbers of new converts. On the contrary, thoughtful missionaries understand that conversion requires care. Conversion

requires knowledge about home cultures. Conversion requires a long-term cultural process in which both sides share their values and lessons, their hopes and dreams.

These lessons do not come only from “progressive” religious types. Indeed, some of the most fervent calls for cultural understanding come from the conservative evangelical wing of Christian mission work, exactly the same people likely to embrace creationism.

For instance, conservative Christian educator David Harley pulled no punches in his description of earnest missionaries who failed to study host cultures. Harley agreed that such folk amounted to little more than “evangelical toxic waste” (Harley 1995:9). The goal of effective Christian missionaries, Harley insisted, must include “sensitive appreciation to other cultures” (Harley 1995:9).

Similarly, conservative evangelical Protestant missionary educator J Herbert Kane has called it “consummate folly” to engage in missionary work without first engaging in a thorough study of host cultures (Kane 1978:176). Other Christian missionary writers have echoed this call for a focus on a “contextualized indigenous church” (Lingenfelter 1998:13). The only way to succeed in missions, many conservative Christian missionaries believe, is to “learn to cooperate with people who have radically different assumptions about leadership” (Plueddemann 2009:11).

In times gone by, Harley argued, missionaries believed a brief training in Bible studies must be enough to spread the Gospel. Experience had proven, Harley wrote, that without studying host cultures, missionaries floundered. “They experience the pressures of isolation and hostility,” Harley reported. “They see little response to their ministry” (Harley 1995:8).

LESSONS FROM THE FIELD

With a few words translated, that lesson certainly applies to evolution educators. With training only in evolutionary science, teachers are often utterly incapable of teaching creationist students. They feel isolated and besieged, and they certainly see little response to their educational efforts.

For conservative evangelical Protestant missionaries, the need to study and even integrate home cultures does not imply that the evangelical Truth must be watered down. It simply means that cultural sensitivity and familiarity can go a long way toward removing unnecessary roadblocks. Similarly, evolution educators would not need to compromise on the nature of science in order to speak more effectively with creationist students.

Nor does this mean that evolution education must insist on some form of religious conversion. Rather, it only suggests that when evolution educators treat creationists as cultural or intellectual blank slates, evolution education has proven singularly ineffective. In contrast to the assumptions of generations of science advocates from Huxley to Dawkins, creationism is not simply a lack of knowledge about evolution. Rather, in order to engage in more effective evolution education, evolution educators must take a page or two from missiology. We must begin with an understanding that creationism represents a vibrant and decidedly hostile belief system, internally coherent, with a durable set of alternative authorities. In order to teach evolution to resistant students, we must study not only biology and geology, but also history, sociology, and anthropology. If we spend time learning about creationist

culture in addition to mainstream science, we may hope to make a more significant and lasting change in the number of Americans who embrace evolutionary science.

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FEATURE

Bite-Sized Darwiniana: *The Origin of Darwinism: Charles Darwin and The Origin of Species*

Michael D Barton

The theory of evolution put forth by Charles Darwin in 1859 and the modifications given to it by endless contributions by biologists over the last century and a half is the best explanation for the diversity of life on earth. Darwin's "one long argument"—as he called it—also changed the way we think about aspects of our lives beyond biology: society, culture, economics, religion, politics, the list could go on. So, when someone considers Darwin, are they referring to the man (Charles Darwin, 1809–1882), his ideas (much more than just evolution), his influence (his name took on a lineage of its own), or his legacy (his life and work remain highly debated today)? It is a topic with a grand scope of material to digest. One could spend a life time reading books and articles written about Darwin and evolution, yet in the busy and quick access world of today, there is value in small, concise collections of material for the non-specialist to peruse and become acquainted with a topic.

Such is *The Origin of Darwinism: Charles Darwin and The Origin of Species* (Randerson 2012), a selection from the UK newspaper *The Guardian's* series of e-books, Guardian Shorts, which "bring you the very best of our journalism, comment and analysis, from breaking news to the season's sports and culture." They are simply a collection of *Guardian* articles from varied authors that explore a single theme, downloadable in various e-book formats. The website (<http://guardianshorts.co.uk/>) describes *The Origin of Darwinism* as a "remarkable collection of writing on Darwinism, from Richard Dawkins to Richard Harries, that examines the origins of Darwin's great idea and its impact today." The editor of this seventy-page collection is James Randerson, science and environment news editor for the *Guardian*. Randerson selected the articles, selected excerpts from Darwin's *On the Origin of Species*, and provided a main introduction and introductions to the three parts: "The origin of an idea", "The theory's reception", and "Darwin and faith".

In his introduction, Randerson begins by discussing an 1860 article in the newspaper's ancestor (the *Manchester Guardian*) that stressed the human connection to Darwin's theory despite Darwin's remaining rather silent on the topic (until, of course, he published *The Descent of Man* in 1871). "By puncturing the historical self-image that perceived humans as being closer to the angels than ocean-dwelling bottom feeders," Randerson writes, "... evolution by natural selection prompted violent reactions." This distinction, what evolution says about humanity's place in nature, is central to how Darwin was perceived in his day and through the present.

First up, biologist Richard Dawkins shares “Why Darwin matters” (also the title of a 2007 book by skeptic Michael Shermer). Darwin matters because his theory of evolution by natural selection is simple and elegant, and comes with much explanatory power. In contrast, Dawkins argues that “intelligent design” is “the polar opposite of a powerful theory”: to claim that something has its current form because a designer created it this way is to explain nothing. Dawkins also discusses the application of Darwin’s theory to “every available field of human discourse, whether it is appropriate or not.” He is quick to note that social Darwinism (Hitler’s National Socialism, especially) falls into the “not appropriate” category: a subtle response to the anti-evolutionist claim that Darwin somehow was responsible for 20th-century Nazi atrocities. Dawkins ends by noting that “Darwin triumphantly dispelled [the] delusion” that the complexities seen in nature needed a complex explanation. Sometimes simple is best.

The first selection in Part 1, “The origin of an idea,” is from English novelist Ian McEwan. He describes how Darwin was pushed to publish his theory when he received a manuscript from the naturalist Alfred Russel Wallace, who was in the field in Southeast Asia, detailing the same theory: natural selection. McEwan recounts Darwin’s concerns over priority and the joint reading of his and Wallace’s papers before the Linnean Society in 1858, leading to the publication of *On the Origin of Species* in 1859. While nothing is new in McEwan’s “On the originality of species”, he tells a familiar story beautifully.

The next selection from Caroline Davies, a writer for the *Guardian*, is perhaps one of the treasures of this collection. She describes how Darwin spent his money as a student at the University of Cambridge, using recently uncovered university bills. These were formative years in Darwin’s life, right before he went on the *Beagle* voyage. The bills show that Darwin was not so concerned with spending money on his studies, but rather his meals and activities outside of school. They also show that Darwin was indeed a gentleman naturalist, for “the books also contain accounts for his barber, grocer, tailor, chimney-sweep, apothecary, porter, brazier, scullion (servant), glazier, hatter, smith, laundress, linen-draper and painter, among others.” And he was happy to shell out extra money to have fresh vegetables with his meals.

Biologist Armand Leroi writes about Darwin’s time in the Galápagos Islands, noting that the popular mythology of Darwin visiting the islands and—eureka!—discovering evolution there is “wrong, of course”. But even if this location is not the interpreted discovery site of scores of writers who have told a misleading story about Darwin, “the Galápagos do matter”. As a biological laboratory, biologists from Darwin’s day have descended upon the Galápagos to watch natural selection in action. Leroi goes on to describe what evolution means to him, “like a river that divides into a vastly complex delta of possible paths, and there is no saying which one will be chosen.” It is important, Leroi insists, that we understand the world of living things. While he mentions that visiting the Galápagos was like being on “hallowed ground”, his appreciation of Darwin is respectable and not hagiographic. Darwin is not a saint, but a historical figure to be remembered, appreciated, and put in context. Biology has expanded much beyond Darwin, but is still full of, Leroi quotes Darwin, “endless forms most beautiful and most wondrous” (unfortunately, the word is “wonderful,” not “wondrous”).

Part 1 ends with Randerson's first of four abridged selections from Darwin's *On the Origin of Species*. Here Darwin states that he is to address "that mystery of mysteries"—the origin of species—noting that what he is offering will go against the idea the species had been independently created (by God, one would assume). In the introduction, Darwin also explains to his readers that his book is but an abstract of a planned larger work, and mentions "Mr Wallace". He lays out his chapter topics, and ends by stating that he is "fully convinced that species are not immutable" and that "Natural Selection has been the main but not exclusive means of modification."

Part 2, "The theory's reception", begins with "The prose that launched a scientific revolution" by *Guardian* writer Justin Quirk. While noting that "the bulk of *Origin* reads, it must be confessed, like the transcript of a lecture," through his writing Darwin "conveys a boundless sense of wonder at the world around him" and "argues against himself brilliantly." A selection from Darwin's third chapter, "Struggle for existence," follows. Here Darwin describes "the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms." Just as man struggles to survive, competing for resources, so do plants and animals. This struggle for existence leads to some individuals surviving and others not.

Science writer Tim Radford, in "Developing the idea", notes that Darwin's evidence "was assembled painstakingly through decades of observation, note-taking and inquiry, quietly at home in his study and garden at Down House in Kent." And while many in Darwin's time accepted his conclusion that life had evolved, Radford reminds us that some did not accept natural selection as the mechanism, "Darwin's bulldog" Thomas Henry Huxley included.

Next is a selection from Darwin's fourth chapter, where he lays out his prime mechanism for descent with modification. "This preservation of favourable variations and the rejection of injurious variations," Darwin writes, "I call Natural Selection." These variations result from the struggle for existence, and Darwin notes the accumulative effect over time and how this affects human perception:

It may be said that natural selection is daily and hourly scrutinising, throughout the world, every variation, even the slightest; rejecting that which is bad, preserving and adding up all that is good ... We see nothing of these slow changes in progress, until the hand of time has marked the long lapse of ages, and then so imperfect is our view into long past geological ages, that we only see that the forms of life are now different from what they formerly were.

Darwin historian John van Wyhe, editor of the websites Darwin Online and more recently Wallace Online, offers a variety of Darwin myths to consider. Darwin did not sail to the Galápagos to "discover" evolution, nor did he claim that humans evolved from monkeys. Darwin was not an atheist, as many would like to think he is, but he did not renounce evolution and convert back to Christianity on his deathbed. There are a few other myths that van Wyhe discusses, as well as some that he has dispelled elsewhere but did not include in this article (such as whether or not Darwin was the appointed naturalist on HMS *Beagle*, and why Darwin delayed twenty years in publishing his theory). Part 2 ends with a selection from *On the Origin of Species* in which Darwin discussed difficulties with his theory.

Here, he shares why he thinks species now exist as “well-defined objects, and do not at any one period present an inextricable chaos of varying and intermediate links.”

Part 3 of this collection concerns “Darwin and faith”. Randerson notes standard polling that shows only 40% of Americans accept evolution by natural selection, and that the modern form of the creationist movement—“intelligent design”—was essentially already rebutted by Darwin himself. The selection from Darwin here, also from the chapter about difficulties with his theory, concerns the evolution of the eye. He anticipates criticism about how natural selection could account for such a structure, and provides an answer. This is Darwin at his best in *On the Origin of Species*, showing his ability to see what problems he may have, foresee what others might object to, and to provide a response. This selection also contains an oft-quoted phrase that has many times been used to suggest that Darwin doubted his own theory.

Young-earth creationists and “intelligent design” advocates have many times shared this quote:

To suppose that the eye, with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have formed by natural selection, seems, I freely confess, absurd in the highest possible degree.

It is shared in books, articles, blog posts, Twitter feeds, any possible avenue for someone trying to convince others that even Darwin himself was reluctant to accept his own theory. Yet, if one continues to read on, and Randerson includes the full paragraph, Darwin shows how he thinks natural selection can account for the evolution of the eye. The sentence following “absurd in the highest possible degree” even begins with “Yet reason tells me...” Following this selection, Randerson shares an article of his own, “How Darwin anticipated the ‘intelligent design’ argument,” essentially how Darwin’s argument about the eye is akin to the “intelligent design” argument about irreducible complexity in cellular structures like the bacterial flagellum.

The next two selections in Part 3 seem out of place as they do not concern religion. In “Darwin’s matrimonial dilemma”, Randerson shares how Darwin wrote up a list of pros and cons for whether or not to get married (he did, to his cousin Emma Wedgwood in 1838). Historian Alison Pearn, in “At home with the Darwins”, shows us a Darwin that balances family life and work at Down House. Despite rare travel, “It would be wrong to think of him either as a recluse or an unknown.” Darwin experimented at home, corresponded with all manner of people from across the globe, writing and receiving many letters daily (“a military style campaign to gather and marshal ‘great quantities of facts’”, as Pearn describes it), and was an active participant in the doings of his village.

Next is the final selection from *On the Origin of Species*, which comes from Darwin’s concluding chapter. Here the reader gets Darwin again discussing objections to his theory, but more likely one would appreciate also getting to read Darwin’s famous final paragraph and closing sentence:

There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on

according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

A perhaps equally profound sentence comes a paragraph before the final one. To counter the claim that to state humans evolved from other animals would lessen humanity, Darwin wrote: “When I view all beings not as special creations, but as the lineal descendents of some few beings which lived long before the first bed of the Silurian system was deposited, they seem to me to become ennobled.” Humans and “all beings” are to be together appreciated.

Another selection from science writer Tim Radford looks at the book itself. Radford notes that Darwin received much criticism from within the scientific community as well as from the religious establishment. *On the Origin of Species* was a bestseller, and Darwin received royalties, but it “failed the Alice in Wonderland test for a useful book: it had no pictures or conversations.” The book is famous for going unread yet everyone has an opinion about it. For Radford, “Origin meets the test for a great book: it mattered then, and it matters now.” In “Darwin’s complex loss of faith”, Nick Spencer, the director of the think tank Theos, notes that Darwin’s loss of his Christian faith was “gradual and complex”. There were many factors attributable to it, yet Darwin myth-buster John van Wyhe would perhaps counter the claim that the death of Darwin’s daughter Annie “destroyed what was left of his Christian faith” (van Wyhe and Pallen 2012).

The former Bishop of Oxford Richard Harries addresses reconciling one’s religion with evolution in “Natural selection is not an obstacle to faith”. The rise of fundamentalism in America and the later rise of Richard Dawkins versus the creationists obscures the history that following the publication of *On the Origin of Species*; many Christians accepted evolution and found no conflict. In “Seals, evolution and the real ‘missing link’”, evolutionary biologist Kenneth Miller discusses evidence for evolution and how it is “an epic at the centre of life itself.” There is meaning in this, whether one is religious or not (Miller is a devout Catholic). To accept evolution (it is not a belief, for one’s inclination to acceptance should be based on evidence) is “to become a knowing participant, in the truest sense, in the living world of which we are all a part.”

The evolutionary geneticist Laurence Hirst looks at “Darwin in the genome,” asking what Darwin would have thought about the Human Genome Project (Darwin knew nothing about genes or genomes, let alone Mendelian genetics). “Contained in the patterns of similarity is the history of continuity of species,” Hirst writes. The similarity in genes between species shows evolutionary relationships. While this seems simple enough, Hirst goes on to describe more complex issues about the human genome concerning junk DNA and where the genome is active.

And finally, paleontologist Simon Conway Morris, in “Darwin was right. Up to a point”, discusses what he feels is unfinished business with Darwin’s theory: the “near-miracle of a chemical factory we call the cell” and the human mind. Here Morris, without saying the word God or Christianity, is favorable to “intelligent design” and takes a stab at atheists. Was this a conscious decision by the editor to end a series of largely favorable pieces on Darwin with one that would stir up a response? Perhaps. Both biologists PZ Myers and Jerry Coyne critiqued this piece by Morris.

In his conclusion, Randerson calls evolution by natural selection the “binding glue” of biology. Evolution has come a long way since Darwin’s book, but despite new revolutions in biology over the last 150 years, nothing “has knocked down the central idea.” This ebook would gain a little if Randerson had shared what edition of *On the Origin of Species* the selections were taken from (the first edition of 1859), as well as showing the original dates of publication for each of the Guardian articles. The placement of a few articles having nothing to do with religion in the part on “Darwin and faith” is unfortunate, but perhaps Randerson felt they did not necessitate a section of their own and need to be lumped in somewhere. As a collection of articles about Darwin and evolution, written largely during the bicentennial of Darwin’s birth and showing some differences of opinion, *The Origin of Darwinism: Charles Darwin and The Origin of Species* serves as a nice introduction for anyone wishing to get familiar with this vast and often heated topic.

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Michael D Barton graduated from Montana State University in 2010 with a master’s degree in history. His research concerned the role of John Tyndall as a supporter of Charles Darwin, and he was a participant in the John Tyndall Correspondence Project (<http://www.yorku.ca/tyndall/>). He blogs about Darwin, evolution, and the history of science at The Dispersal of Darwin (<http://thedispersalofdarwin.wordpress.com/>). He currently lives in Portland, Oregon.

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FEATURE

People and Places: Ken Hubert

Randy Moore

Ken Hubert was born on June 10, 1955, in Duluth, Minnesota. He graduated in 1978 from the University of Minnesota in Duluth, after which he worked as a high school biology teacher in Beloit, Wisconsin. In 1984, Hubert took a job as a biology teacher at Faribault High School in Faribault, Minnesota. At the time, all of the school's biology teachers devoted two or three weeks to evolution and incorporated evolution throughout their courses.

In 1997, Rod LeVake began teaching biology at Faribault, and Hubert and other science instructors soon learned that LeVake was not including evolution in his course (as prescribed in the school's curriculum), that LeVake rejected evolution, and that LeVake was awarding extra credit to students for summarizing articles from creationist magazines. Just before a meeting of the science faculty, Hubert asked LeVake how he was teaching evolution. After LeVake told Hubert that he could not teach evolution because it is not true, school administrators reassigned LeVake to teach physical science. LeVake then asked Pat Robertson's American Center for Law and Justice to file a lawsuit on his behalf. When LeVake lost the case, he appealed the verdict, eventually bringing the appeal before the U.S. Supreme Court. LeVake's case ended on January 7, 2002 when the Court refused, without comment, to hear his appeal (*LeVake v Independent School District #656*).



FIGURE 1. Ken Hubert. Photograph: Randy Moore.

Hubert was criticized for his role in LeVake's reassignment. Letters claimed that Hubert was a Nazi, that the Bible records all of the basic laws of science, that evolution is a lie, that teachers who teach evolution should be fired, and that the teaching of evolution is responsible for premarital sex, abortion, homosexuality, drugs, gangs, Satanism, and suicides. Today, Hubert is the Activities Director and an award-winning swimming coach at Faribault High School.

ABOUT THE AUTHOR

Randy Moore is the HT Morse–Alumni Distinguished Professor of Biology at the University of Minnesota. His most recent book (with coauthor Sehoya Cotner) is *Understanding Galápagos: What You'll See and What It Means* (New York: McGraw-Hill, 2013).

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RECAPITULATIONS

Reply to Mitchell B Cruzan

John Feldman

In reference to Mitchell B Cruzan's favorable review of my DVD *EVO: Ten Questions Everyone Should Ask about Evolution* (RNCSE 2013;33[5]:5.1–5.2; available from <http://reports.ncse.com/index.php/rncse/article/view/234/363>), I am writing to point out that the ten short films were specifically designed as tools to be used by biology teachers along with the *EVO: Teachers Guide*. The Teachers Guide is published by the National Science Teachers Association (NSTA) Press (which sells it on-line at http://www.nsta.org/store/product_detail.aspx?id=10.2505/PKE317X), and was written by Rodger Bybee, noted science educator and Director Emeritus of BSCS. Each ten-minute video is one part of a fifty-minute class period. The curriculum uses the BSCS 5E model (<http://www.bscs.org/bscs-5e-instructional-model>) and includes lessons to supplement each short video, lesson-by-lesson learning outcomes, thorough background, discussion topics, and material for further study. The DVD includes numerous “look again” markers that are referenced in the Guide which allow students and teachers to review certain points and use the DVD for individual projects. The DVD is being widely used in the US, and students and teachers report that *EVO* is an excellent way to learn about evolution within the classroom. In addition, many teachers who are otherwise hesitant to approach this important subject, have told us that it is particularly helpful as a tool to explain the controversy and engage students in the conversation.

ABOUT THE AUTHOR

John Feldman is a filmmaker and the owner and operator of Hummingbird Films, which made *EVO: Ten Questions Everyone Should Ask about Evolution* and is at work on a new film, *Lynn Margulis: The Revolution is in Progress*.

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REVIEW

Hindu Perspectives on Evolution: Darwin, Dharma, and Design

by C Mackenzie Brown

New York: Routledge, 2012. 276 pages

reviewed by David L Gosling

GK Chesterton's tongue-in-cheek description of the USA as "a nation with the soul of a church" may offer an important clue as to why any mention of evolution there inevitably leads to speculation about religion. In the case under review, the religion is what C Mackenzie Brown characterizes as the Hindu dharma traditions, though it is not clear why the full title of the book refers to design, unless in the eyes of the publisher to capitalize on the notoriety of "intelligent design".

Brown, professor of religion at Trinity University, San Antonio, is best known for his studies of Hindu goddesses in the medieval Sanskrit texts known as the Purāṇas. He describes his "immediate inspiration" for his more recent work as his interest in "the anti-Darwinian criticism of the Hindu creationist AC Bhaktivedanta Swami Prabhupada," founder of the International Society for Krishna Consciousness, or Hare Krishna Movement. This led to work on the Hindu tradition and science, which in turn led to speculation about the range of approaches modern Hindus have taken to evolution, and "how these Hindu perspectives might compare with the Christian spectrum of responses, from young-Earth creationism and Intelligent Design to divinely guided evolutionary theories. As this study shows, Hindus have developed their own vast and distinctive array of responses" (p xi).

They have, but what did Hindus understand by evolution prior to what is broadly known as Darwinian evolution, what motivated them to focus on Darwin's theory, and what, if anything, has any of this to do with Christian creationism and "intelligent design"? I shall briefly discuss these points.

The nearest approximation to evolution in Sanskrit, as Brown points out, is *pariṇāma*, a broad and secular term which can include such phenomena as the curdling of milk, which is far removed from Darwinian evolution. It is most strongly represented in a classical atheistic school of philosophy known as the Sāṃkhya, composed at the beginning of the common era. The Sāṃkhya Kārikā describes various categories of existence in terms of *prakṛti*—a kind of principle of energy and matter, and *puruṣa*, or spirit, the location of unfractured consciousness. It evolves from three initial aggregates into greater and greater complexity over a period of time, and recurs periodically. So the parallels with contemporary notions of evolution are very general and loose, and in any case, at the time when this literature was formulated, the important issues debated were not about evolution but whether or not God exists and rebirth occurs.

A major problem with Brown's book as a whole is that he tries too much to "cover the ground" and resorts to "cherry picking" with respect to certain modern ideas, which include both evolution and design, which he "discovers" in the past. The Hindu tradition as a whole is vast and polycentric, so much so that it is misleading even to refer to "Hinduism" on the grounds that no such monolithic entity exists (as it does in the case of Buddhism or Islam). The Hindu tradition is a unity-in-diversity, and for virtually any allegedly cardinal Hindu doctrine some acknowledged Hindu school can be found historically which did *not* subscribe to it (such as rebirth and caste—the Cārvākas rejected both).

Brown does not appear to be aware that Hindu scripture is broadly divided into primary and secondary categories—the former is *śruti* (that is, declared), the latter is *smṛti* (that is, remembered). Over periods of time, some secondary literature increased in importance—this happened with the Bhagavadgītā, which Gandhi venerated with the result that it has become more important for modern Hindus than most *śruti*.

Brown's analysis of the nineteenth-century Hindu reformers fails to recognize distinctions between them, their motivations, and the fact that what they said to English-speaking audiences often differed substantially from what they said in their mother tongues. The introduction of English as the medium of instruction for higher education in 1835 precipitated a process of secularization whereby all aspects of religious thought and practice were called in question. The consequent reform movements responded by reasserting, adapting, or rejecting tradition. Most of the nineteenth-century Hindu reformers were either reasserters, such as Dayanand Saraswati, who led the Arya Samaj, or adapters, such as Swami Vivekananda, the leader of the Ramakrishna Mission, whose dramatic presentation at the first World Parliament of Religions in Chicago in 1893 marked the beginning of a new phase of Hindu outreach.

From the outset Brown attributes too much significance to Dayanand, discovering the notion of design (*racanā*) in his writing, without appearing to recognize how utterly polemical and anti-intellectual he really was (p 2). Whatever new scientific discoveries emanated from the West (for example, guns and airplanes), Dayanand could find references to them in the Vedic literature. His personal and literary arrogance earned him an early grave at the hands of a woman who poisoned him. By contrast, very little is said about Rabindranath Tagore—admittedly somewhat later—who held erudite conversations with Albert Einstein about the nature of reality.

Not only is historical perspective lacking, but subaltern and Marxist historians would challenge Brown's reliance on English-language sources and consequent omission of the voice of ordinary people expressed in local vernaculars. Furthermore, when the Hindu reformers expressed themselves in English, they were often standing up for their faith and their country against foreigners and Christian missionaries—thus Vivekananda could charge Christians and Muslims with belief in a "hideous, cruel and ever-angry God." Such polemical utterances are not conducive to accurate scholarship.

It is hard to understand why Brown devotes four pages to a discussion of Vivekananda's rejection of theistic design (p 136–139). There are ten references in the index to either "intelligent design (general concept)" or "Intelligent Design (ID)". I am not certain how he makes this distinction, but the references seem excessive. The International Society

for Krishna Consciousness (ISKON) also receives ten mentions, two extensive. But many Hindus in India would not acknowledge ISKON members as fellow Hindus on the grounds that they have not been born into their religion.

Brown might have done better to consider how Hindu scientists in the late nineteenth and early twentieth centuries viewed and sometimes practiced science in the light of their religious beliefs. Most subscribed to Shankara's *advaita* Vedānta (partly for political reasons), which enabled them to interpret the progressive coming together of the sciences as evidence of the underlying *brahman* at the heart of all existence. Thus Jagadish Chandra Bose investigated the possibility of pain in plants, and Satyendranath Bose collaborated with Einstein in his quest for a unified field theory largely because his religious beliefs chimed in with such a unitary worldview. It is at this level that it seems to make sense to explore consonance between science and the Hindu tradition rather than by "cherry picking" at superficial similarities which—at least in the case of science—may disappear as new theories and data emerge.

ABOUT THE AUTHOR

David L Gosling was until recently Principal of Edwardes College, University of Peshawar, Pakistan, and is a Life Member and former Spalding Fellow of Clare Hall, Cambridge University. He is the author of *Science and the Indian Tradition: When Einstein met Tagore* (New York: Routledge, 2007).

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REVIEW

Mapping the Origins Debate: Six Models of the Beginning of Everything

by Gerald Rau

Downers Grove (IL): InterVarsity Press, 2012. 236 pages

reviewed by Timothy H Heaton

Most books on origins are designed to defend a particular perspective, but occasionally a book comes out that offers a semi-fair analysis of different viewpoints. This book falls into that category. The focus is a comparison between six models of origins, each representing a distinctive theological and scientific worldview. In addition to Naturalistic Evolution (#1), Old-Earth Creationism (#5), and Young-Earth Creationism (#6), Rau divides Theistic Evolution into three models: Nonteleological [Deistic] Evolution (#2), Planned Evolution (#3), and Directed Evolution (#4). As the numbers suggest, Rau considers the six models to represent a linear spectrum from the purely naturalistic to the most literal reading of the Bible. Though written from a distinctly Christian perspective, Rau does not attempt to pursue the theological or philosophical implications of any of these models beyond that necessary to distinguish them. He spends a good deal of time in the introductory chapters explaining what models are and arguing that they are based more on presuppositions than on evidence.

Rau does not defend any of the six models explicitly or even admit which one he favors, but he seems to have the least empathy for the extreme positions. Anyone familiar with the origins debate will recognize that nearly all of the detailed model building has been done by advocates of those extreme positions, while advocates of the middle positions tend to pick and choose various elements from those extremes (thus the linear spectrum). A dislike for the extremes would explain why Rau offers little insight into the inner workings of creationism or scientific research and focuses instead on the subtle differences between the six models. Ironically, Rau has trouble identifying self-professed advocates of his three subcategories of Theistic Evolution, and he has to pretend that the advocates of the various models are much more unified than they actually are. Nevertheless, this approach allows him to cover some interesting ground that is lacking in most other treatments.

Nonteleological Evolution differs from Naturalistic Evolution in a belief in God, and Planned Evolution differs from Nonteleological Evolution in that God knew and planned the ultimate outcome (especially the advent of humanity). None of these three models include supernatural intervention (after the Big Bang, at least) or any expectation that science will be able to identify a designer. The other three models require ongoing supernatural intervention (miracles). Directed Evolution includes common ancestry but with God helping evolution along, while Old-Earth and Young-Earth Creationism include separate creations of life (usually at the species to family level), and they differ mainly on the age of the earth and universe. Since the first three models are indistinguishable scientifically, there are only

four options to consider using scientific evidence and argument. These are the ones that Rau focuses the most attention on.

While the “intelligent design” (ID) movement takes a “big tent” approach and doesn’t advocate a particular model, its major tenet is that supernatural design is detectable and has been detected. Thus its proponents support the three models that include intervention (Directed Evolution and Old- and Young-Earth Creationism), while supporters of the other three models oppose ID. Rau spends a good deal of the book discussing ID and its arguments, and he seems supportive of the movement. He spends considerable time discussing various definitions of science and on what basis ID might fit under that umbrella. He denies that ID is “closet creationism” but fails to address the historic and polemic bases for that charge. At times he engages in ID rhetoric, such as promoting “information” (in DNA) as evidence for design without adequately defining what it is or the alternatives for how it might have been generated.

It is difficult to conclude a book that takes a conciliatory approach to the creationism/evolution debate, and this was obviously a struggle for Rau. In fact, the two sections of the conclusion nearly contradict one another. First he compares the scientific data to a globe that evolutionists and creationists are viewing opposite poles of, and he suggests that working together is the key to solving the puzzle. He goes on to detail what evidence each group has to contribute to such a project and also what questions each needs to address. This is a follow-up to the assertion, stated early in the book, that each camp focuses on evidence that supports its model while ignoring or downplaying problematic data. But then he goes on to conclude:

The problem is that each of the six models of origins presented here is intimately wedded to a certain theological interpretation of scripture, so the model and the theology rise or fall together. Since we each have a faith commitment to a certain theology, we also have a faith commitment to a corresponding model. To change our model we also need to change our theology and admit that what we believed is incorrect. This is something few are willing to do, so the conflict continues. (p 189)

Whether the creationism/evolution debate is ultimately solvable is only one of the many loose ends in this book. For someone so interested in how God might have guided the earth’s history, Rau does little to address what a combination of natural and supernatural activities might look like and what the scientific and theological implications of such a mixture would be. It would seem worth addressing whether a natural/supernatural distinction even makes sense, or whether it is a convenient invention of our mixed scientific/religious culture. But Rau states in the opening pages that he had to scale this book way back because he only had space for an overview. I expect we will hear more from this author.

ABOUT THE AUTHOR

Timothy H Heaton is Professor of Earth Sciences at the University of South Dakota and teaches a course called “The Evolution/Creation Debate”. His research currently focuses on Ice Age fossils from caves in coastal Alaska.

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REVIEW

Lens to the Natural World: Reflections on Dinosaurs, Galaxies, and God

by Kenneth H Olson

Eugene (OR): Wipf & Stock, 2011. 220 pages

reviewed by Joel W Martin

The last decade or so played witness to a small explosion of books aimed at the public on the topics of evolution and on the boundaries and limits of science and faith. This sudden increase was brought on in part by the 2009 celebration of the 200th birthday of Charles Darwin and in part by the increasing volume and intensity of attacks against science coming from outspoken evangelical and fundamentalist Christians, resulting in such memorable incidents as the 2005 Dover, Pennsylvania, trial over “intelligent design.” The range of approaches in these books is quite remarkable, including large compendia of basic facts and texts in support of evolutionary theory and the fossil record written at various levels (such as those by Donald Prothero, Neil Shubin, Richard Dawkins, Jerry Coyne, and Carl Zimmer), exposés of the blatant dishonesty of the “intelligent design” movement (such as *Monkey Girl* by Edward Humes, *The Devil in Dover* by Lauri Lebo, and other books recounting the 2005 trial), and attempts by theologians (and others) to convince people of faith to be reasonable and stop denying the evidence in the world around them (such as those by John F Haught, Francisco Ayala, myself, and others).

Adding to the voices imploring people of faith to be more reasonable when confronting or speaking about the natural world is Kenneth H Olson’s very enjoyable book *Lens to the Natural World: Reflections on Dinosaurs, Galaxies, and God*. Olson, an amateur but passionate and skilled fossil hunter, is a Research Associate in Paleontology at the Museum of the Rockies. Additionally, and giving him more credibility among readers who might view evolution skeptically, he is a retired Lutheran pastor who served several congregations over a period of 37 years. Olson never really says specifically who the book is written for, but the tone and approach suggest that it is written primarily for people of faith in order to explain to them why science (especially paleontology) is a good thing. In this short book, Olson has approached the subject of compatibility of science and faith by drawing on his personal experiences as a dinosaur hunter in the Badlands of the western United States and on his experience as a pastor. In my opinion, there can never be too many books supporting evolutionary biology from an informed theological perspective, or at least from a perspective that eschews aggression and arrogance in favor of kindness, compassion, and understanding. In no other way will we succeed in slowly turning the minds of faith communities toward accepting and dealing with modern science. More hard-nosed approaches (such as the excellent but often acerbic writings of Daniel Dennett, Richard Dawkins, PZ Myers, Jerry Coyne, and others) are not only ineffective, but also tend to reinforce the stereotype of scientists as arrogant atheists and thereby inadvertently buttress the arguments

of the creationists. For that reason alone, Olson's book is a nice addition, a collection of thoughtful and personal essays drawing on his own experiences and convictions as a fossil hunter and pastor. His genuine sense of wonder and love of nature, especially of paleontology, shines through, and his writing style, although sometimes convoluted, is readily accessible.

The book is divided into two major parts, "Our context in nature" (containing seven essays) and "Issues and implications" (containing only four). I found the first part to be the more interesting and entertaining of the two, as it contains the author's personal stories and experiences, mostly related to fossil hunting. Included here are essays about the American Badlands, fossils, time, the nature of perception itself, and how our perceptions and preconceptions color what we see and what we find. These essays are entitled "Into the badlands," "Stories in stone: Fossils," "Deep time," "If these bones could speak," "To be a naturalist: On seeing," "Things change," and "The big picture." But the titles really only hint at the subject matter within, as each essay encompasses a relatively wide range of topics, and some of them tend to ramble. The second part of the book is actually the more important of the two, since it addresses areas of friction between science and faith and so it is more likely to be a "game changer" for readers who are on the fence. It also, for the same reason, draws more heavily on Olson's theological background and experience, allowing him to comment on the role that Christianity and other world religions have had on our acceptance of evolutionary biology and how to incorporate evolution into a life of faith. The second part includes essays on various worldviews and how they shape our appreciation of nature, on science and religion, and on creation and creationism, with the following titles: "Nature is ...," "The two books: Science and religion," "Creation, evolution, and creationism," and "Take care."

Olson's writing is for the most part easy to read, and he livens up the text with a liberal sprinkling of quotes from a wide variety of writers. Among the quoted are some of my (and perhaps everyone's) favorite writers, including WH Auden, EE Cummings, William Shakespeare, Carl Sandburg, Herman Melville, George Schaller, John Steinbeck, Loren Eiseley, TS Eliot, Ralph Waldo Emerson, Jonathan Swift, CS Lewis, HG Wells, and many others. Assorted anecdotes from the lives of such notables as Albert Schweitzer, Charles Lindbergh, Frederich Nietzsche, Dietrich Bonhoeffer, Adolf Hitler, GK Chesterton, Pablo Picasso, Jacques Cousteau, and others are also included. These scattered quotes and anecdotes are fun, make the book more enjoyable, and give the impression that Olson himself is a very well-read author. However, they also tend to be somewhat overwhelming, with two to three authors quoted or at least mentioned on nearly every page of the book, leaving me with the impression that at times the author is attempting to impress by name dropping, and serving to dilute his own voice, which I found unfortunate. After several essays packed with quotes from other writers, I began to feel bludgeoned by them. As might be expected from the pen of a pastor, there is also a heavy dose of scripture quoted throughout the book (the title "If these bones could speak" is derived from Ezekiel 37: 1-14, in which the prophet has a vision of dry bones rising up and assembling before him), and these verses will help convince religious readers that the author is on their side, a surprisingly important quality for a book of this nature.

Despite the obvious depth and breadth of the author's reading, the book is strangely silent as concerns other books and efforts along the same lines. Even in the Foreword, written

by Jack Horner, we read that there is "... a near vacuum in terms of books dealing with the implications of science for religion and for the rest of humanities in a manner that is both faithful to central truths and, at the same time, directed to a wide audience." This is not true, of course, and some of these books (such as Ken Miller's *Finding Darwin's God*) are even cited elsewhere in *Lens to the Natural World*. We can always use more such books, but this "near vacuum" is imaginary, and it leaves the reader wondering how a book of this nature could be written without any reference to any of the works of, for example Jack Hought, John Polkinghorne, Francisco Ayala, Michael Ruse, and others who have written much along these lines and are similarly never mentioned. I am less surprised that Olson does not mention them than I am of Horner being apparently unaware of them in his endorsement. Horner's foreword, while generally on target and correctly lamenting the anti-intellectual climate of today's society, is also a bit naive, and he comes off as being knowledgeable only about attempts by paleontologists to bridge the gap. This is more excusable in Olson, who states in the preface that the book is mostly about dinosaurs and his interest in them. Both Horner and the author come off as living in some sort of parallel universe, where dinosaur fossils exist only in the Badlands, and where no other authors have dealt with bringing modern science to the masses. Their close working relationship and admiration for one another (Olson states on p 36 that "a case could be made for saying that he [Horner] is one of the most famous or recognizable living scientists of any sort in the world today") might have played a role in causing the book to appearing to have been written with limited input from anyone else.

This is particularly true in the essay on "Creation, evolution, and creationism" (chapter 10). Although Olson is correct in his arguments against fundamentalism and literalism, and convincing in his reasoning that Biblical accounts of creation should not be seen as competing with modern science, most of his arguments, at this point, sound dated. There is no mention of, for example, the Discovery Institute, the think tank behind the "intelligent design" movement. No mention is made of the Clergy Letter Project (a project devoted specifically to the reconciliation of people of faith with modern science). Nor is there any mention of Ken Ham's Answers in Genesis organization (though Ham is mentioned with regard to the Institute for Creation Research). Most of the topics, and even the examples and case studies that Olson chooses to illustrate the problems associated with creationism, have been dealt with elsewhere, with the result that this important section will be somewhat repetitive to readers with a general interest and background in this field. On the other hand, if someone is completely new to this discussion, as could easily be the case, Olson provides a good starting point.

The writing, although for the most part enjoyable, is not particularly strong. This matters mostly because so much of the creationist literature is poorly written; in defending science, I think it is important for us to set ourselves apart not only in the evidence we are presenting but in the quality of our writing. To some extent this is an editorial, rather than the author's, responsibility. But either way, a grammatical mistake is a grammatical mistake, and it detracts from how seriously the volume is viewed. Those mistakes, coupled with attempts to make the writing sound somewhat grandiose or overly flowery, make parts of the book sound a bit pretentious. A more careful approach to editing could have improved the book here.

In summary, it's worth reading, particularly so for people who might be looking for a more inviting introduction into the arguments about the compatibility of science and faith compared to some of the more polemic writing currently available. The personal stories and anecdotes, the abundance of (largely) appropriate and interesting quotes, and the insight that a combined knowledge of theology and paleontology offer when thoughtfully applied all combine to make the book more interesting than most, and occasionally even delightful. Although some chapters can be glossed over (the same material having been covered previously by other writers), there are enough unusual examples, metaphors, anecdotes, and quotes offered here to help anyone attempting to convince the faith community of the validity of, and the sheer beauty of, the natural world, especially as viewed through a paleontological lens.

ABOUT THE AUTHOR

Joel W Martin is Chief of the Division of Invertebrate Studies and Curator of Crustacea at the Natural History Museum of Los Angeles County, and the author of *The Prism and the Rainbow: A Christian Explains Why Evolution is Not a Threat* (Baltimore (MD): The Johns Hopkins University Press, 2010).

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REVIEW

The Evolution of Adam: What the Bible Does and Doesn't Say about Human Origins

by Peter Enns

Grand Rapids (MI): Brazos, 2012. 192 pages

reviewed by James F McGrath

The Evolution of Adam explores the way the understanding and depiction of the figure of Adam develops over the history of Jewish and Christian interpretation. Using texts which mention Adam as an example, Peter Enns provides an introduction to the history and methods of the scholarly study of the Bible. Enns sees four options available for those seeking to relate science and Scripture: (1) accept evolution and reject Christianity, (2) accept Paul's view of Adam as binding and reject evolution, (3) reconcile the two by positing a first human pair in the evolutionary process, or (4) rethink Genesis and Paul (p xvii–xviii). Enns considers the fourth option preferable, and the book is written not only to make the case for that option, but also to explore how to go about it in detail.

The book is divided into two main parts, the first focusing on the creation stories in Genesis, the second focusing on Adam in Paul's theology. Part one begins with the evidence and approaches that emerged in the nineteenth century, which forced Christians to reconsider their assumptions about Genesis. On the one hand, new textual discoveries revealed accounts of creation from Israel's neighbors, stories which were older than the Bible and which clearly had some relationship to the Bible's contents. On the other hand, careful analysis of the contents of Genesis resulted in the realization that it was not the product of a single author (Moses), but incorporated multiple sources, and could not have been put in its final form until much later, since it makes reference to kings in Israel, to the Canaanites as no longer being in the land, and so on. Challenges to traditional ideas about the nature and character of Genesis thus result from study of the Bible and from discovery of ancient texts, quite apart from any considerations raised by the natural sciences.

In surveying the history of Pentateuchal criticism, Enns notes a similarity between how ideas and theories develop in Biblical studies and in the natural sciences. In the cases of both Julius Wellhausen and Charles Darwin, many of the details of their proposals have been challenged or overturned, and yet both are regarded as having set the course for the future of their fields in important ways, having a lasting impact down to the present.

Enns stresses the need to practice "genre discernment," since many assume from the outset that they know what sort of literature Genesis is and what it is appropriate to expect from it. This first part of the book also discusses the Eden story as modeled on the story of Israel, and the cosmological significance of the Tabernacle, among other details.

In part two, Enns turns his attention to Adam as Paul understood him, emphasizing that this is not simply Adam as depicted in Genesis. Paul was willing not merely to reinterpret passages, but even to reword them in order to make his point. Paul was clearly not a Bibli-cist. The implication, of course, is that those who set themselves up to be the defenders of Paul's view of Adam are, in the very process, approaching Scripture in a radically different way than Paul himself did.

One reason why Paul's view of Adam is distinctive is that he views Adam in relation to Jesus. Indeed, it is Paul's view of Adam that is shaped by Jesus, rather than vice versa. Enns acknowledges that Paul presumed Adam to be a historical individual. But he considers it important to separate the observable situation in which humankind finds itself (namely one of domination by sin, alienation from God, and subjection to death), and Paul's presumed cause of that state of affairs (p 123–125). One can view Jesus as God's solution to humanity's plight much as Paul did, even while taking a different view of the cause of that plight. That does require rethinking of Christian theology, but not necessarily the jettisoning of its core tenets, much less of the whole package in its entirety.

Enns makes many other important points in this part of the book. Among them is his emphasis that “failure to provide at once an adequate counterproposal to a historical Adam for ‘why’ does not mean that the scientific and archaeological data that raised the problem in the first place can be set aside” (p 126). The question of whether the sun orbits the earth or vice versa was settled by the scientific data and the simplicity of the latter explanation in accounting for the relevant evidence, and fortunately did not have to await a point at which all Christians felt that they had adequately adapted to the new cosmological view. The question of whether evolution occurred is to be settled scientifically, and accepting the conclusion of science must not be made dependent on whether Christians have yet come up with a satisfactory way of adapting their theologies to this new understanding.

In the conclusion to the book, Enns offers nine theses. One is that literalism is not an option—and indeed, is dangerous. Another is that an incarnational view of Scripture is appropriate. For Christians to claim that one has to deny the humanity and cultural trappings of the Bible in order to encounter God is to deny the very nature of the incarnation, which claims that God is made known in and through a human life. Enns also emphasizes the need for serious theological reflection on the subject of evolution. Evolution requires a very different view of a number of matters, from aggression and sexuality to death. Nevertheless, Enns views it as a genuine and viable option to rethink Christian theology in a way that keeps core elements intact.

These, perhaps, are the key points to take away from this important book, which packs an impressive amount of persuasive detail into a relatively small space. On the one hand, mainstream science including evolution is not going away, and so one can only ignore or deny evolution by isolating oneself and engaging in deception of oneself and others. On the other hand, there are viable and attractive options in between preserving faith by rejecting science or rejecting faith because of science. It is possible (and for those committed to both the Christian faith and honest engagement with other spheres of human knowledge, necessary) to rethink elements of Christian theology in relation to the current state of scientific knowledge. In doing so, Christians are not being unfaithful to God and the Gospel, but are doing precisely what has always been done, even within the pages of the

Bible itself, namely allowing their faith to find expression in a way that is relevant to and incarnate within their particular historical context.

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REVIEW

From the Dust: Conversations in Creation

directed by Ryan Pettey

Mountain View (CA): Highway Media, 2012. 66 minutes

reviewed by **Keith B Miller**

This 2012 documentary film by Highway Media and the BioLogos Foundation was produced by filmmaker Ryan Pettey of Satellite Pictures. Highway Media is a non-profit founded for the purpose of creating visual media to promote conversations about the “big questions” that face the Christian community. BioLogos was established in 2007 by Francis Collins (past director of the Human Genome Project), who served as its president until 2009 when he became the director of the National Institutes of Health. Collins was disturbed by the prevalence of the warfare view of science and religious faith held by many both inside and outside of the Christian community. The mission of BioLogos is to foster a dialogue among evangelical Christians on the harmony of science and faith. The BioLogos website (<http://biologos.org>) has rapidly become a major web presence, and is now one of the most viewed websites dedicated to science/faith issues.

This 66-minute film is directed at a specifically Christian audience, and seeks to address the major concerns voiced by those Christians who reject evolution. It emphasizes theological issues, rather than questions of scientific evidence or interpretation. This is entirely appropriate for the target audience, whose rejection of evolution is not based on scientific argument but on deeply held religious views. There is a strong focus on questions of biblical interpretation. This is critical for reaching out to a part of the Christian community that has come to see evolution as in conflict with the Bible, largely because of a literalistic reading of these ancient records. Other important theological and philosophical issues addressed by the film include: the role of randomness in natural processes, the false perception of conflict between natural processes and divine action, the role of death, and the meaning of human uniqueness in an evolutionary context. In addition, the film touches on some common misconceptions of the nature of science. It is made clear that science, by itself, is incapable of assigning meaning or purpose to the natural processes it describes. The important role of uncertainty in science is also discussed, as a source of tension for those who demand certainty. The desire for unquestioning certainty is shown to be an obstacle to the pursuit of truth.

From the Dust is presented as a conversation over the meaning of creation in light of the conclusions of science about the history and processes of the natural world. It opens with interviews of individuals representing the Creation Museum in Kentucky, Answers in Genesis, and Canopy Ministries. The claims of these young-earth creationists serve to set up the questions to be discussed in the film. The voices of a large group of British and American scholars are used to develop the theological and philosophical responses to the young Earth advocates. The names of many of these theologians and scientists will be fa-

miliar to those who have followed the scholarly discussion of evolution and the Christian faith. These include John Polkinghorne, Nancey Murphy, NT Wright, Alister McGrath, David Wenham, Peter Enns, and John Walton, among others. Having such a large number of voices (over fifteen) from a wide range of institutions and Christian denominations serves the purpose of showing that evolutionary science is accepted and embraced by theologians and scientists from a large segment of the evangelical Christian community. However, drawing on so many individuals doesn't allow enough time for developing a coherent explanation or perspective. The film jumps rapidly from one individual to another, never resting long on a single point or topic. In my view, the benefit of showing many individuals is outweighed by the loss of coherence.

Although the film has a very worthy objective and includes some very excellent content, it suffers from trying to do too much. It not only includes too many voices, but also revisits arguments from the young-earth creationists at intervals throughout the film. This becomes a distraction to the central points that are being made. Furthermore, there are several story lines that are interlaced throughout the film. These include stories of Christian college students working through the theological issues and of science faculty struggling to find a voice in the polarized public atmosphere. Stories of how to communicate evolutionary science to a skeptical Christian public are important, but would be better dealt with on their own. Last, the quality of the videography of the film is very uneven. Some of it is very good, but at other points it more resembles a family video. This unevenness adds to the distraction.

In summary, despite some weaknesses, this film is a valuable resource for initiating discussion of the place of evolutionary theory within an entirely orthodox Christian theology. It would serve well for church discussion groups and parachurch groups, as well as for individuals who are struggling with reconciling their faith and the claims of science. This film represents one more tool in a growing list of books, on-line videos, websites, and blogs that seek to break down the false dichotomy of science and religious faith. This can only be good news for increasing the public acceptance of science at a time when our society is facing increasingly pressing scientific and technological challenges.

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Keith B Miller is Research Assistant Professor in the Department of Geology at Kansas State University and a member of NCSE's Advisory Council. He edited *Perspectives on an Evolving Creation* (Grand Rapids [MI]: Eerdmans, 2003).

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REVIEW

Science, Creation and the Bible: Reconciling Rival Theories of Origins

by Richard F Carlson and Tremper Longman III

Downers Grove (IL): InterVarsity Press Academic, 2010. 144 pages

reviewed by **Justin D Topp**

The highly publicized misconception that science and faith are incompatible has been addressed in many books over the last few decades. In the highly religious culture of the US, results have been mixed and correlated with the stream of Christianity within which one navigates. For moderate Christians, the compatibility of science and faith either is a non-issue or has become one with time. Yet for the more conservative and highly abundant Evangelicals, reconciliation has been turbulent, if not virtually non-existent, due to the existence of additional roadblocks specific to this branch of Christianity (the most important being the interpretation of the early chapters of Genesis in the Bible). To remedy this, several books have been written by and for Evangelicals to help to alleviate the special concerns this group has about science and faith.

Science, Creation and the Bible is a short introduction aimed at reconciling Christian and scientific theories of origins that deals specifically with the Bible and its interpretation. Authors Richard F Carlson and Tremper Longman III are professors of physics and biblical studies at the University of Redlands and Westmont College, respectively. The pairing of a scientist and biblical scholar is relatively distinctive for a work such as this, as similar books are usually solely authored by religious scientists or theologians who have respect for science. The more collaborative and interdisciplinary efforts like this by practicing scholars, the better.

The authors' thesis is that the first two chapters of Genesis are not to be understood in a literal sense and, as such, there is no need for conflict between the biblical and scientific creation accounts. In their words:

The first two chapters of Genesis, which accurately present two accounts of creation in terms of ancient Hebrew scientific observations and their historical understanding, are neither historical nor scientific in the twenty-first century literal sense. Instead, the underlying message of these chapters applies for all time and constitutes a complete statement of the worldview of the Hebrew people in the ancient Near East. They accurately understood the universe in terms of why God created it but not how in the modern scientific and historical sense ... If the first two chapters of Genesis present the fundamental character of the ancient Hebrew people rather than a factual scientific account of beginnings that meets contemporary standards, then it is not appropriate to try to reconcile contemporary science with the Genesis accounts. (p 14)

The book introduces creation and briefly discusses the natures of science and theology, but it is primarily focused on methods of Biblical interpretation and the specific passages of the Bible that are relevant to origins. In writing such a short introductory volume, the authors sacrificed depth for brevity, and this isn't without its problems. In multiple areas, the book would have been improved by greater exposition. For example, discussion of the characteristics of science and theology, their "data", and the relationship between the two disciplines is oversimplified and focuses on similarities at the expense of differences. Cosmological beginnings are addressed, but there is very little treatment given to the evidence for evolution, possibly because of the other books on evolution and faith that are available. Also, those with experience in the area of science and religion will note several times where issues were introduced that could shock the intended audience and open up a can of theological worms, so to speak. The declaration of the Council of Chalcedon on the essential character of Jesus is said to "defy common sense" (p 41-2). Metaphorical truth is said to be "more true" than "merely factual accounts" (p 58). In light of this last argument, it is unclear why Adam is assumed to be an historical individual: why read Genesis 3 in a historical and scientific manner but not Genesis 1 and 2? Even in a short introduction such as this, it should have been acknowledged that the reconciliation of science and theology is complex, and the reader would have benefitted greatly from more depth and/or references to the wealth of resources available in this area.

That said, the book is uniquely strong in the areas of Biblical interpretation and teaching on Biblical passages about origins, especially those *outside* of Genesis 1 and 2. Furthermore, the authors hold to a very high view of the Bible, affirming the 1978 Chicago Statement on Biblical Inerrancy. The combination of Biblical breadth and acceptance of inerrancy (that the Bible is accurate and totally without error) is music to the ears of conservative Evangelicals and makes the book more likely than others to be welcomed by this community. This alone makes *Science, Creation and the Bible* an essential addition to the discussion of science and faith. Yet the authors don't shy away from engaging areas of research that could be considered controversial by conservative Christians, such as comparative ancient Near Eastern mythology, the Incarnational model for the Bible, and of course, the scientific truth of origins. In total, this makes for a challenging, but compassionate, considerate, and conservative introduction to scientific and Biblical accounts of origins.

This book is recommended for conservative Evangelicals who have no academic background in science and religion or for high school students and young college students from a similar Evangelical background. The authors write that they hope their work will reach both Christians at broad and non-Christians who see science as a barrier to the Gospel, but it isn't clear to me that those hopes will be founded by this introductory volume alone. Also, the goals or "gains" as they call them (p 137-140) that would accompany acceptance of their thesis seem unrealistic, because of the book's lack in the areas mentioned above. However, this book in combination with several other good ones in the area (Miller 2000; Towne 2003; Falk 2004; Collins 2006; Alexander 2008; Walton 2009; Evans 2010; Giberson and Collins 2011) that appeal to a broader Christian audience and are collectively more thorough could achieve the gains the authors seek. In any regard, the coupling of a high view of the Bible and high respect for science and its results makes the book in itself a worthy contribution to the discussion of science and faith.

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