

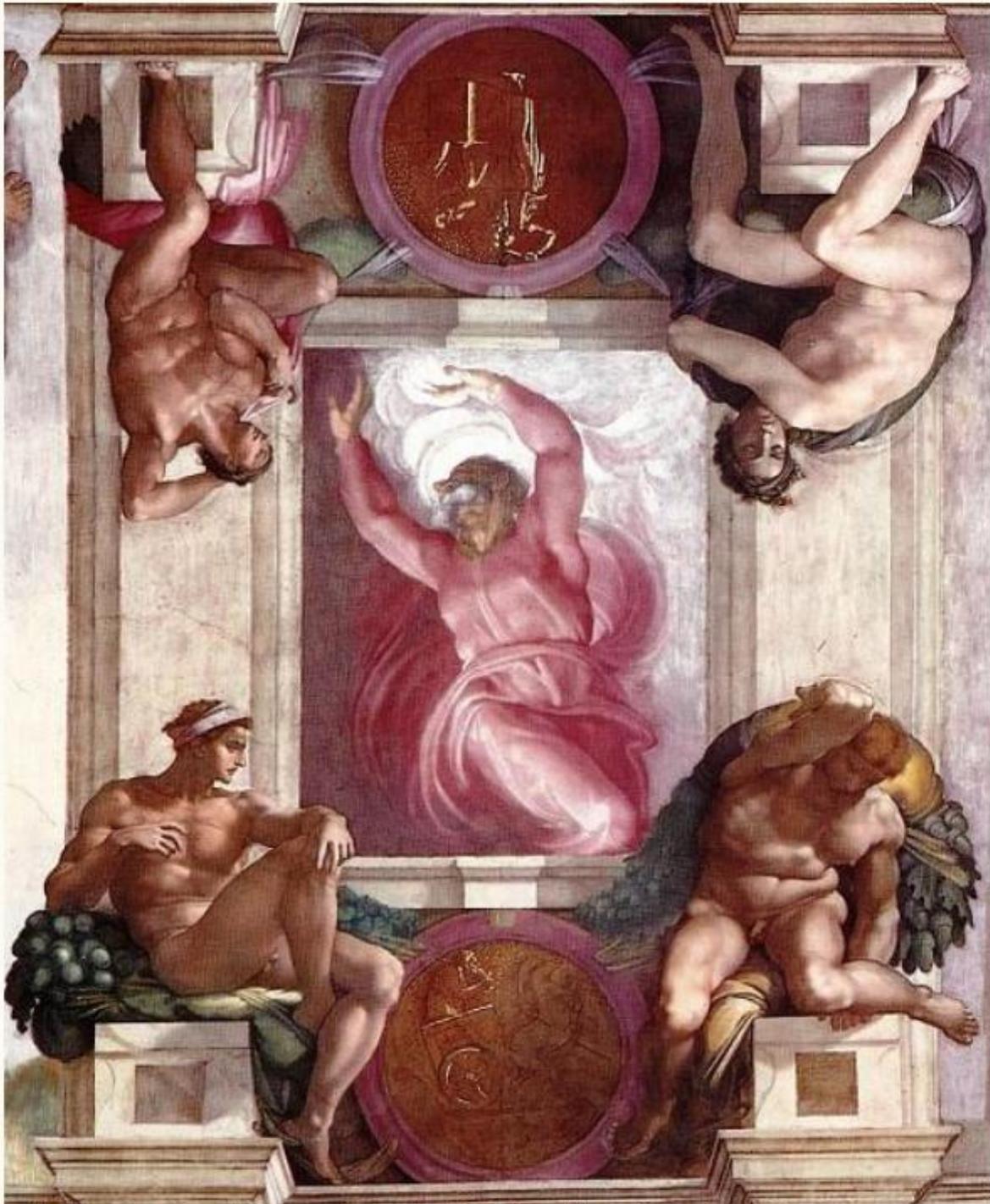
# Reports of the National Center for Science Education

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**Vol 31, No 2 (2011)**



Michelangelo's *The First Day of Creation*, from the ceiling of the Sistine Chapel

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## FEATURE

# Turtles All the Way Down: The *Atlas of Creation*

**Matt Cartmill**

A biologist reviewing a creationist attack on evolution is in much the same position as an astronomer reviewing a book that offers to prove the earth is flat. The flat-earther has a hundred bad reasons for reaching the wrong conclusions, and a hundred snappy retorts to all the painstakingly researched arguments for reaching the right ones. Taking these reasons and retorts apart is a slow, unrewarding job, like writing an introductory textbook for which you get paid no royalties. But if the flat-earther or anti-evolutionist has a large audience and a loyal following, it isn't enough to say, "This book is a monstrosity," and leave it at that. The monstrosity has to be killed.

From what I hear, Adnan Oktar (pen name: Harun Yahya) and his *Atlas of Creation* (2007a) have a big following in Turkey—so big that a Turkish court moved to block the biologist Richard Dawkins's website (<http://richarddawkins.net/>) in Turkey when Oktar complained that its contents were defamatory to him. (The offensive language was Dawkins's description of the *Atlas* as "preposterous" and "inine".) Many Christian creationists, who look on the Qur'an and the *Origin of Species* (Darwin 1859) alike as works of the Devil, will be surprised to hear that there is a growing and well-funded Islamic opposition to Darwin. But if any of them look into Oktar's massive book, they will find themselves on familiar ground. Almost everything that its author has to say against evolution has been said hundreds of times over the past century by Christian creationists. Many of them have said it better and more cleverly, though none of them has said it in such a big, expensively produced volume.

Unlike most Christian anti-Darwinists, Oktar is a so-called old-earth creationist—that is, he accepts scientific geology while rejecting biology. He admits that the universe is billions of years old, and that life on earth dates back hundreds of millions of years. He concedes that ancient faunas do not look like modern faunas, and that they look less and less modern the farther back we go in time.

This so-called succession of faunas can be explained in only two ways. Either new species are forever popping into existence out of nowhere to replace old species that have died out, or some of the old species are giving rise to new ones. The latter alternative implies evolution. Presumably Oktar prefers the first alternative. But it raises some awkward questions. What is bringing all those new species into existence? Oktar never addresses this question directly, but all the piety on display in this book suggests that he thinks there was a continual cascade of prehistoric miracles, in which God snuffed out the trilobites and replaced them with new species of crustaceans, did away with the belemnites and replaced them with squid, swept away the fish-shaped marine reptiles and after a bit put some fish-

shaped marine mammals in their place, and so on—millions and millions of acts of special divine creation over hundreds of millions of years.

Why all the false starts? Why not start with the intended end product? The picture of God that results from accepting geology while rejecting evolution is not a very attractive one. Oktar's God looks like one who keeps making poor decisions, putting out inadequate product lines, and trying to fix things up, eon after eon. This is hard to square with the orthodox image of a timeless, all-knowing, and all-powerful Creator.

### **DESPERATE ARGUMENTATION**

Oktar's arguments against the evolutionary alternative are truly dreadful. Most of them are not arguments at all; they are just proclamations of beliefs that don't follow from anything that has been presented. Some old-earth creationists of the "intelligent design" school have done their homework; they have read and understood the scientific literature and are worth arguing with. But this book is not in that class. If anything, its stupidity makes the job of a critic harder. As the American philosopher John Searle observes,

It is much easier to refute a bad argument than a truly dreadful argument. A bad argument has enough structure that you can point out its badness. But with a truly dreadful argument, you have to try to reconstruct it so that it is clear enough that you can state a refutation. (Searle 2009:89)

I'm not going to undertake this sort of reconstruction for all of Oktar's would-be arguments. One example will have to do. Oktar insists that evolution is a fraud because there are many fossils that are identical to living organisms. This is the main point of this book, and he devotes almost 700 of its 800 pages to documenting it. His documentation consists of huge, glossy photomontages showing fossils alongside similar-looking animals and plants of today, with brief captions that assert the identity of the two. Some of these supposed identities are non-starters. Several pictures of fossil crinoids (echinoderms something like brittle stars on stalks) are paired with photos of modern tube-building annelid worms, which are less closely related to crinoids than I am. The caddis-fly on p 244 appears to be a plastic fishing lure, with a big fishhook sticking out of the tip of its abdomen like an ovipositor.

On page 525, a Cretaceous turtle is paired with a Galápagos tortoise. The fossil is a water turtle some 18 cm long; the modern animal is a giant land tortoise a meter in length and weighing 250 kilograms. The text below these pictures reads

The 146- to 65-million-year-old turtle fossil pictured, which is identical with the turtles of our day, once again stresses what Darwinists are reluctant to see: Living beings have not changed for millions of years. In other words, they have not evolved. (p 525)

This is a perfect specimen of a truly dreadful argument. How can these two grossly dissimilar animals be seen as identical? And even if they were, how would that prove that they hadn't descended from a different-looking ancestor?

But perhaps this argument can be reconstructed. To begin with, we might take it as telling us what Oktar means by saying that a fossil and a living turtle are "identical". He can't mean that they belong to the same species, because even "turtles of our day" does not

refer to a species. Apparently, what “identical” means for him is that these two turtles can be classified together at some level. A zoologist would say that they belong to the same superorder of reptiles, Chelonia. All turtles are chelonians—“turtles” in the vernacular. And since the earliest chelonians are by definition already chelonians, evolution has not occurred. If Oktar’s argument means anything, it must mean something like that.

But Oktar’s conclusion does not follow. Yes, there were turtles—and birds, and mammals, and so on—in the Cretaceous. But none of them was identical with any of their modern relatives, and most of them were more primitive. The oldest fossil forms in each of these groups are strikingly primitive compared to their modern descendants and cousins. Many early birds had teeth, mobile and clawed fingers, and long bony tails like their dinosaur ancestors. The earliest mammals retained jaw joints, shoulder blades, and molar teeth like those of related reptiles. The turtle case is a particularly unhappy one for Oktar, because the oldest known chelonian, a 220-million-year-old fossil from China called *Odontochelys*, is considerably more primitive than any living turtle (Li and others 2008). It lacks a beak, its jaws still bear teeth of the standard reptilian sort, and its ribs are primitively separate and are not fused together to form a solid shell. Oktar could not have put this fossil in his book, because it was described after his *Atlas* came out. But I doubt that he will include it in future editions. After all, someone might get the idea that it was not “identical with the turtles of our day”.

Or maybe not. Maybe if Oktar put that early turtle into his book, most of his audience would still accept a claim that it was “identical” to modern turtles. After all, the creature lying there in the slab of rock has a vaguely turtlelike outline. How many readers of the *Atlas of Creation* know what a turtle skeleton looks like, or that a turtle’s carapace is made up of embryonic ribs that fuse together, or even that living turtles have no teeth? Oktar is not anxious to encourage questions of this sort, and he does not provide the sort of evidence that would allow for critical inquiry into all his supposed identities. Looking through this book, even an informed reader can’t tell in most cases how “identical” the fossil and its living counterpart really are, because Oktar shows us a fragmentary and obscured skeleton of one and the outer appearance of the other. As long as the outlines are similar, he can get away with claiming that the two are “identical”.

For Oktar, all turtles are “identical” because they belong to the same subgroup of reptiles. But this doesn’t take into account the huge differences between those two turtles on p 525. Oktar’s claim is exactly like saying that human beings and mice are identical because they belong to the same superorder of mammals (Euarchontoglires). One might as well say that some Cretaceous mammal is identical to the mammals of our day because it’s a mammal. At bottom, the argument presented by most of the pages of this beautiful, brainless picture book reduces to something like, “There were turtles of a sort in the distant past; there are turtles of a sort today; therefore evolution is a myth.”

### LOOKING AT EVIDENCE

None of Oktar’s claims of “identity” is ever backed up with any evidence. For example, we are presented on p 18 with a fossil frog, supposedly dated to 280 million years before the present. (The oldest frog-like amphibian recognized by the frog experts, *Triadobatrachus*, is known from a single specimen about 250 million years old, and this photograph isn’t it.) The caption reads, “There exists no difference between this frog, alive 280 million years

ago, and those of today.” Well, if this fossil is an adult, there’s at least one conspicuous difference, because adult frogs today are tailless, and the fossil frog has a bony tail almost as long as the rest of its backbone sticking out from the rear end of its pelvis. In most frog species, the tail of the fish-shaped larva persists for some time after the rest of the body has taken on a frog shape. This fossil is probably just such a juvenile, but one would need some expertise to tell, and an argument would have to be developed and evidence presented. But Oktar isn’t interested in arguments or evidence; no sooner has he shown us a tailed frog skeleton and triumphantly proclaimed its identity with a photo of a tailless living frog than he is off to the next pair of pictures, without a backward look. In fact, *Triadobatrachus* retained a short tail into adult life, and was in other ways transitional between frogs and more primitive amphibians (Rage and Roček 1989; Evans and Borsuk-Białynicka 2008).

Of course, some living animals really are very much like some extinct species. This isn’t an argument against evolution. If all the strata of the geological column contained nothing but modern organisms, then we might dispense with the hypothesis of evolution; but they don’t. The succession of faunas is a reality. In general, earlier organisms are more primitive than later ones. However, there are innumerable exceptions to this generalization, because evolutionary change proceeds at different speeds in different lineages. Slow-evolving lineages produce so-called “living fossils,” which look more like their ancient ancestors than like their modern relatives. It is easy to tell an opossum from a kangaroo; but unless you’re an expert, you can’t see much difference between the bones of a living Virginia opossum and those of a typical marsupial from the Cretaceous. Living forms may also be more persistently primitive than some ancient ones were. For instance, today’s opossums are more primitive marsupials overall than any kangaroos, even including 15-million-year-old fossil kangaroos from the Miocene. Likewise, many living monkeys are more primitive primates overall than any humans, even ancient humans known only from fossils. Nevertheless, kangaroos are descended from opossum-like ancestors, and people are descended from ancient animals that we would call monkeys if they were still around.

No matter how we try to reconstruct it, Oktar’s pet argument against evolution is ultimately self-defeating. If we assume that every species is specially created, we have to ask what it means to say that two different species should be classified together—why all turtles are in some sense “identical” in being “turtles”. Biologists before Darwin never came up with a good answer to this question, and of course Oktar doesn’t offer one. But he needs to; because denying the reality of evolution leaves him with no real basis for making the claim that dominates this book—that two different species are both somehow the same kind of creature. What does “same kind” mean here? Oktar can’t equate the fossil turtle with the living tortoise on the grounds that the two belong to the same species, because they don’t. And he can’t equate them on the grounds that they are closely related to each other, because his creationist beliefs don’t allow them to be related at all.

A strict creationist like Oktar can define a grouping above the level of the species—say, “turtles”—only on the basis of some essential set of shared similarities. But similarities cross-cut each other, and people make different judgments about which similarities are essential. When Linnaeus put together the first scientific classification in the first edition of the *Systema Naturae* (Linnaeus 1735), he classified whales as fishes because they were hairless and had no legs. In later editions, he changed his mind and put whales into the Mammalia because they had milk glands. A Darwinian would say that Linnaeus was right

the second time, because whales and other mammals share a more recent common ancestor than the ancestors they share with fish. But a creationist has no grounds for preferring one choice over the other.

Some old-earth creationists get around the problem of defining “kinds” by conceding that evolution has occurred *within* kinds, but not from one kind to another. In their view, different turtle species have evolved from the ancestral turtle of long ago; but no turtle ever evolved into or out of a non-turtle. In this version of creationism, the “kinds” are defined by evolutionary continuities. But this half-Darwinian option is not open to Oktar, who rejects all evolutionary change at any level whatever.

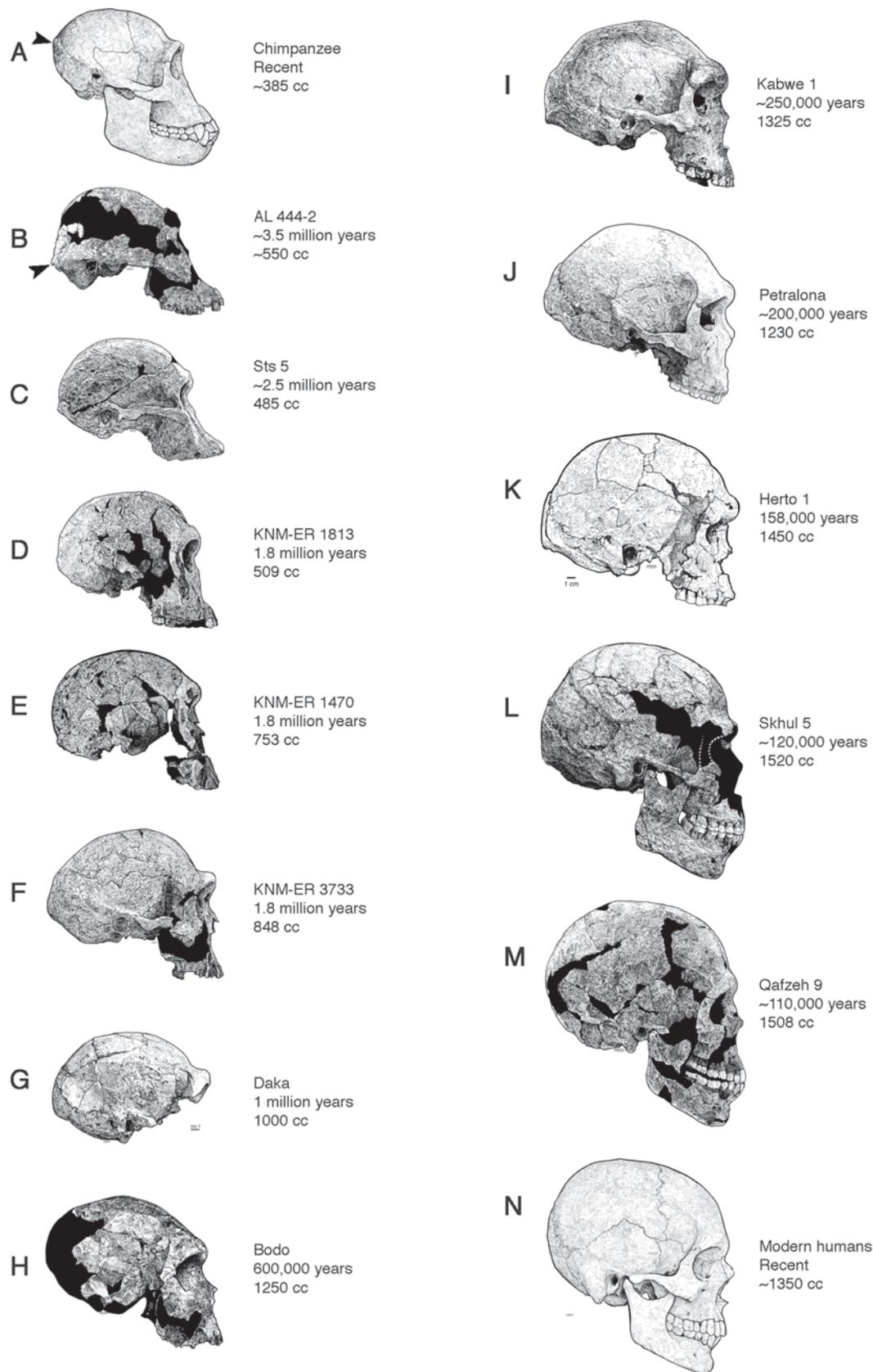
### HEADS I WIN, TAILS YOU LOSE

Because Oktar insists that all turtles past, present, and future are all the same in some sense, he denies the reality and significance of transitional fossils like *Odontochelys*. In 2008, he offered a prize of “10 trillion Turkish lira to anyone who produces a single intermediate-form fossil demonstrating evolution” (<http://www.telegraph.co.uk/news/religion/3102103/Creationist-Adnan-Oktar-offers-trillion-pound-prize-for-fossil-proof-of-evolution.html>). I suspect that he lacks the funds to cover this bet, since the amount he is wagering is almost a hundred times the annual national budget of Turkey. But it seems clear that he would be safe offering the sun, moon, and stars as a prize, because he has no intention of paying off no matter what evidence is put forward.

Let’s look at some transitional fossils. Figure 1 (page 6) is a paste-up of 14 drawings of skulls, taken from a recent book on human evolution (Cartmill and Smith 2009). The first skull in this series (A) is that of an ape, a modern chimpanzee. The last (N) is a modern human skull. The other twelve are bipedal apes—fossil humans and their ancestors and relatives, ranging in antiquity from 3.5 million years to a little over 100 000 years. The fossils are arranged in chronological order, from the oldest to the youngest, with dates and cranial capacities (braincase volumes) given for each. The oldest fossil, an early *Australopithecus* from East Africa (B), is very chimpanzee-like, with a big, protruding face and a small braincase. The most obvious difference between A and B lies in the position of the upper edge of the attachment area for the neck muscles (black arrows), which is low and human-like in *Australopithecus*. This difference reflects the fact that chimpanzees walk on all fours, whereas *Australopithecus* was bipedal and balanced its head atop a more upright neck. The youngest fossil (M), an early modern human from a site in Israel, is essentially indistinguishable from the skulls of living humans. The other fossil skulls form a graded transitional series leading from B to M, with no abrupt break or discontinuity between forms that are clearly apes and others that are clearly human.

Do I win the 10 trillion lira? No way. Oktar is aware of this series, and insists that there is no gradation in it at all. In the prose section at the end of this book, he tackles the fossil evidence for human evolution in some detail. Like the arguments of the Christian creationists from whom he seems to be borrowing, Oktar’s attack on paleoanthropology follows four main lines:

- (1) Piltdown Man was a hoax, a fraudulently concocted “fossil” that tricked many eminent scientists. Other eminent scientists have mistakenly identified fragmentary fos-



**FIGURE 1.** Fourteen skulls: chimpanzee, extinct bipedal apes, human. From Cartmill and Smith 2009.

sils of apes (*Ramapithecus*) and even peccaries (*Hesperopithecus*) as human ancestors. Therefore we needn't take anything seriously that eminent scientists say.

(2) *Australopithecus* (skulls B and C) was just an ape, like the apes of today. This creature had long arms and short legs like an ape, and was apelike in many other respects. Therefore it was not related to humans.

(3) *Homo habilis* (D) and *Homo rudolfensis* (E) were also apelike in many respects. Some eminent scientists would classify them as *Australopithecus* rather than *Homo*. Therefore they were also apes, like *Australopithecus* and the apes of today.

(4) *Homo ergaster* (F), which is the same thing as *Homo erectus* (G), has no truly simian features. It was fully human. The more apelike "Homo" species *H habilis* (D) and *H rudolfensis* (E) lived at the same time as *H ergaster*. Therefore they cannot count as transitional fossils between *Australopithecus* and *Homo*. Conclusion: humans have always been humans, and apes have always been apes.

This argument is not truly dreadful, like most of the contents of Oktar's book. It is merely bad, and so it is easier to refute. Item (1) is calculated to wave away the unanimity of scientific opinion supporting human evolution. It trumpets the unsurprising discovery that scientists make mistakes, like everybody else. It ignores the fact that these particular mistakes were uncovered by other scientists, who are eager to ferret out and lay bare the errors of their predecessors and competitors.

To find any support for item (2), Oktar has to hark back forty years to the outdated papers of Solly Zuckerman (1904–1993), who was the last informed scientist to argue that *Australopithecus* was more closely related to the African apes than to humans (Ashton and Zuckerman 1950; Zuckerman 1966). Like Oktar, he held that opinion because *Australopithecus* is apelike in many ways. But this is what you would expect to find in a transitional series. Skull (B) is more apelike than skull (C), which is more apelike than (D) or (E), which are more apelike than (F), which is more apelike than (H), and so on. Scientists disagree about whether skulls (D) and (E) should be called *Australopithecus* or *Homo*, precisely because these two specimens are intermediate in so many ways. There are other skulls and bones of about this same age, from Dmanisi in Georgia, that some want to classify with (D) and others would prefer to classify with (F). The debate persists because the fossils really are intermediate in their anatomy. If there were no transitional forms, these debates would have ceased long since.

Oktar and his staff of researchers and writers have done some homework in dealing with these ancient humans. Their arguments here are correspondingly more informed and sophisticated than the flat, baseless denials of evolution that populate most of the pages of *Atlas of Creation*. But at bottom, their assertions about *Australopithecus* and *Homo* are of a piece with their insistence that all turtles are identical because they are all turtles. The distinctively humanlike features of the *Australopithecus* skeleton can be disregarded, because it is after all only an ape; and the subhuman brain size and big, protruding face of skull (F) can be disregarded, because it is after all a human skull. These assumptions are guaranteed to yield the desired conclusion, no matter what the facts are. And the argument that *Homo ergaster* (F) cannot be descended from *Homo rudolfensis* (E) because the two skulls

shown are the same age is exactly like arguing that Barack Obama cannot be descended from his grandmother in Kenya because both of them are alive today.

### **TURNING A BLIND EYE**

A lot of the pictures in this book are closeups of beautifully preserved fossils, intended to show us that they contain minutely articulated parts. We are supposed to conclude from these photos that all creatures were created in a state of perfection by Almighty God. At one point, we are asked to admire the flawless design of the human eye, a favorite of Christian creationists ever since the Reverend William Paley first expounded on it (Paley 1802). But in fact, the human eye illustrates a key point in favor of evolution by natural selection—namely, that no adaptation is perfect. Natural selection can only operate on structures inherited from ancestors, which are usually less than ideal for present needs. Nature is therefore full of examples of what appears to be bad design. However, the bad design is illusory—not because it isn't bad, but because it isn't design.

Unfortunately for us, the human eye is a case in point. Unlike the more effective focusing mechanisms seen in birds and reptiles, the focusing mechanism in the human eye is a desperate makeshift. It stops working after about 40 years of use, forcing us to either stop reading or invent spectacles. We are stuck with it because we are descended from primitive mammals, which (like most mammals today) had small eyes with no ability to focus at all. Our focusing mechanism was cobbled together later on from the bits and pieces that were available for natural selection to work on. Considered as design, it is a discreditable semi-failure; considered as a product of natural selection, it is a marvelous triumph.

In an on-line posting defending the blocking of Richard Dawkins's Web site, Oktar's lawyer contrasts Dawkins's rudeness with the respectful politeness of Oktar. "Not a single disrespectful word about anyone holding different opinions can be found in any of my client's more than 300 books," he writes, "nor in any of the dozens of web sites based on his opinions" (<http://armenhes.blogspot.com/2008/10/turkish-censor-celebrates-darwin.html>). I haven't read all of Oktar's 300 books, but I can testify that the patches of prose scattered throughout this one stink of anger and contempt—towards scientists, toward materialists, and above all toward Charles Darwin. Oktar's condescending dismissal of Darwin in the book's first pages exemplifies its tone:

Darwin's claims were of course based on no scientific evidence or findings. But since the scientific understanding and technological means available at the time were at a fairly primitive level, the full extent of the ridiculous and unrealistic nature of his assertions did not emerge fully into the light of day. (p 14)

I love the phrase "of course" in that first sentence. Anyone who has so much as leafed through a copy of the *Origin of Species* cannot help being impressed by the vastness and breadth of the evidence that Darwin weaves into his long, deep argument. This doesn't prove that Darwin was right. But it is contemptuous, foolish, and arrogant to claim that Darwin's theory was "of course based on no scientific evidence". This is not simply false; it is the exact opposite of the truth. It is like saying that Oktar's book is "of course" irreverent toward the Qur'an.

If (as Oktar says) the hypothesis of evolution is just a mistake, grounded in a primitive understanding of the world and a lack of modern scientific technology, then we would have expected Darwin's work to have wound up in the dustbin as scientists acquired more sophisticated techniques, better theories, and more data. Again, the truth is just the opposite. The more scientists learn about living things, the more certain it appears to us that the diversity of life is the product of an evolutionary process and that Darwin's account of that process was basically correct. Increasing knowledge—for example, of the mechanisms of heredity, which constituted a big hole in Darwin's original theory—has in fact shored up the foundations of the theory of natural selection.

Most of the hundreds of other books that Oktar claims to have written are attacks on Darwin in the name of Islam. The *Atlas of Creation*, which he seems to take pride in as his greatest accomplishment, has now grown to three volumes. I have not seen many of Oktar's other works, but their online titles—*The Skulls that Demolish Darwin*, *The Miracle of Electricity in the Body*, *The Miracle of Termites*, *Darwinism Refuted*, *Matter: The Other Name for Illusion*, and so on—are not promising. Most of them are available online as PDFs for the curious (see references below). I did download Oktar's book *The Miracle in the Mosquito* (Yahya 2005), to see how he explains malaria as a deliberate contrivance of a benevolent God (he doesn't). As far as I can tell, most of these gorgeously produced volumes are versions of what Richard Dawkins has dubbed the Argument from Personal Incredulity: Oktar can't think how something could have evolved, and therefore it didn't.

Oktar might want to consider putting more time into his thinking and less into his writing. Admittedly, thinking is hard. It comes slowly and painfully to most of us. Darwin spent 19 years thinking about natural selection, filling notebook after notebook with quotes, observations, and data bearing on his theory, before he published a book on the subject. The result is generally regarded as one of the most important monuments of scientific inquiry and one of the greatest triumphs of the human intellect. But then, the *Origin of Species* is only one book. And anyone who wastes so many years thinking about and seriously studying a subject is never going to manage to publish 300 books about it.

## REFERENCES

- Cartmill M, Smith FH. 2009. *The Human Lineage*. New York: Wiley Blackwell.
- Darwin CR. 1859. *On the Origin of Species by Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. London: John Murray.
- Evans SE, Borsuk-Białynicka M. 2008. The Early Triassic stem-frog *Czatkobatrachus* from Poland. *Palaeontologica Polonica* 65:79–105.
- Li C, Wu X-C, Rieppel O, Wang L-T, Zhao L-J. 2008. An ancestral turtle from the Late Triassic of southwestern China. *Nature* 456:497–501.
- Linnaeus C. 1735. *Systema Naturae, sive Regna Tria Naturae Systematice Proposita per Classes, Ordines, Genera, et Species*. 1st ed. Leiden: Theodorum Haak, ex Typographia Joannis Wilhelmi de Groot. Available from: <http://www.biodiversitylibrary.org/item/15373#>.
- Paley W. 1802. *Natural Theology; Or, Evidences of the Existence and Attributes of the Deity as Collected from the Appearances of Nature*. London: R Faulder. Available from: <http://darwin-online.org.uk/content/frameset?itemID=A142&viewtype=text&pageseq=1>
- Rage J-C, Roček Z. 1989. Redescription of *Triadobatrachus massinoti* (Piveteau 1936), an anuran amphibian from the Early Triassic. *Palaeontographica* (A) 206:1–16.
- Searle J. 2009. Why should you believe it? *New York Review of Books* 56(14):88–92.

- Yahya H. 2000. *Darwinism Refuted*. Istanbul: Global Publishing. Available from: <http://www.harunyahya.com/refuted1.php>
- Yahya H. 2002. *Matter: The Other Name for Illusion*. Istanbul: Global Publishing. Available from: <http://www.harunyahya.com/matter.php>
- Yahya H. 2005. *The Miracle in the Mosquito*. Istanbul: Global Publishing. Available from: [http://www.harunyahya.com/books/science/mosquito/miracle\\_mosquito\\_01.php](http://www.harunyahya.com/books/science/mosquito/miracle_mosquito_01.php)
- Yahya H. 2007a. *Atlas of Creation*, 1st English ed. Istanbul: Global Publishing. Available from: [http://www.harunyahya.com/books/darwinism/atlas\\_creation/atlas\\_creation\\_01.php](http://www.harunyahya.com/books/darwinism/atlas_creation/atlas_creation_01.php)
- Yahya H. 2007b. *The Miracle of Termites*. Istanbul: Global Publishing. Available from: [http://www.harunyahya.com/books/science/termites/termites\\_01.php](http://www.harunyahya.com/books/science/termites/termites_01.php)
- Yahya H. 2007c. *The Miracle of Electricity in the Body*. Istanbul: Global Publishing. Available from: [http://www.harunyahya.com/books/science/electricity/electricity\\_01.php](http://www.harunyahya.com/books/science/electricity/electricity_01.php)
- Yahya H. 2008. *The Skulls that Demolish Darwin*. Istanbul: Global Publishing. Available from: [http://www.harunyahya.com/books/darwinism/skulls\\_demolish\\_darwin/skulls\\_darwin.php](http://www.harunyahya.com/books/darwinism/skulls_demolish_darwin/skulls_darwin.php)

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## FEATURE

# The Lost Civilizations of North America Found ... Again!

Alice Beck Kehoe

Glenn Beck, the Fox Network talk-show personality, recently featured the DVD *The Lost Civilizations of North America* on his show and exclaimed, “I was blown away”—not, apparently, by the Midwest’s impressive earthen architecture of Hopewell, Cahokia, and Mississippians documented in the video, but by their apparent affirmation of a Mormon claim that the Lost Tribes of Israel inhabited North America. Beck, brought up Roman Catholic, converted to Mormonism (<http://www.religiondispatches.org/archive/politics/1885/>), which teaches that Jesus Christ as well as the biblical “lost tribes of Israel” came to America, and “that Zion (the New Jerusalem) will be built upon the American continent” as written in the Book of Mormon revealed to Joseph Smith in New York state during the 1820s. The artifacts discovered in the Midwest during the 19th century and the surviving earthworks were all the evidence Beck needed to fulfill this prophecy.

Beck held up a copy of one of the Smithsonian’s Bureau of American Ethnology Reports to quote a few words of its founding director, John Wesley Powell, and pointed to a blackboard inscribed “Science, Government, Commerce, Religion = Collusion of Power”. Because, he told viewers, Powell had stated that “only the savage would be considered” by the Smithsonian, Beck reasoned that that evidence of the civilized Lost Tribes of Israel would be ignored. Jumping to the supposition that such evidence had been collected, he asserted that Powell, as an employee of the federal government, must have relegated it to the obscurity of boxes in the Smithsonian’s basement. Shades of *Raiders of the Lost Ark* and Area 51!

In an approach familiar to readers of *RNCSE*, the producers of the DVD, Barry McLerran and Rick Stout, interviewed researchers with expertise on North American archeology—Terry Barnhart, Kenneth Feder, Sonya Atalay, Deborah Bolnick, Bradley Lepper, Alice Kehoe, and Roger Kennedy—at length. Then they skillfully edited the interviews to make it appear that we agreed with the film’s thesis: that various artifacts shown in the film gave evidence supporting the Mormon story. The producers sent the scholars a rough version of the film in March 2010, provoking immediate e-mail demands for rectification of this misrepresentation. Two of the younger scholars contacted legal counsel at their universities about possible lawsuits, should the film be released with distortions of their interviews.

What especially disturbed the scholars was that the connection to the Mormon legend had not been disclosed; the producers had said the film would be about appreciating First Nations’ achievements. Proof of the Mormon evangelical purpose of the DVD—and not just poor documentary making—is apparent at the Book of Mormon Evidence website (<http://www.bookofmormonevidence.org/index.php>), which describes the DVD as offering

new evidences for the Book of Mormon as a literal historical record of real people and places. ... Watch ... Glenn Beck on FOX NEWS referencing this documentary film. ... This hour long film will forever change your view about the strength of the claims of the Book of Mormon relative to where it may have taken place.

The finished DVD that Beck saw did re-edit the non-Mormon scholars' interviews to modify the apparent links between Mormon claims and their words. However, little was changed overall: Beck began his talk-show segment recommending the DVD by telling viewers that the Hopewell Octagon earthwork at Newark, Ohio, has the same esoteric dimensions as the Great Pyramid at Giza (<http://www.youtube.com/watch?v=yMyyFq1pM04>), implying a direct connection between the two. Beck was particularly enthusiastic over the Newark Holy Stones, an odd set of small stone objects with Hebrew inscriptions discovered in 1860 in Newark, Ohio, by a local surveyor. He presumed the Lost Tribes of Israel would have made inscriptions in Hebrew, and that the stones dated from Book of Mormon scriptural times corresponding to Old Testament first millennium BCE, and the lifetime of Jesus of Nazareth. Since Newark is a major Hopewell site, the objects are inferred by archeologists to have been deposited in Hopewell times (100 BCE–400 CE), although there is no direct association with other artifacts of reliable age, nor reliable dating of the objects themselves. The stone is local. Given the many Jewish peddlers in the Midwest from its earliest settlement in the 19th century, the parsimonious secular interpretation is that the set of "Holy Stones" was carved at that time by one of them, as a pastime or marker of Jewish presence on the frontier, and then later preserved in the archeological record as so many other durable artifacts are known to be. Greater antiquity can be neither demonstrated nor invalidated.

In response to Beck's program, archeologist Bradley Lepper of the Ohio Historical Society described Beck's distortions in the *Columbus Dispatch* (2010 Dec 29; [http://www.dispatch.com/live/content/local\\_news/stories/2010/12/29/dvd-stirs-up-archaeological-spat.html](http://www.dispatch.com/live/content/local_news/stories/2010/12/29/dvd-stirs-up-archaeological-spat.html)). The newspaper noted, "Beck's program did not respond to requests for comment." Within the Mormon church, fierce controversy rages over whether the Midwest or Mesoamerica is the location of the Book of Mormon history (see, for example, the FIRM Foundation newsletter, 2010 Jun–Jul, <http://archive.constantcontact.com/fs022/1102686658457/archive/1103458743076.html>). *The Lost Civilizations of North America* DVD is ammunition in that war.

*The Lost Civilizations of North America* DVD can be ignored since it misrepresents reputable interpretations of Midwest archaeological data—except, perhaps, by those interested in the persistence of pseudoarcheological claims about the cultures and peoples of North America before European colonization. It is unfortunate that Glenn Beck did not use his forum to emphasize the true charge that Manifest Destiny propaganda fed the racist denigration of America's past and its First Nations citizens, a story well told in Roger Kennedy's *Hidden Cities: The Discovery and Loss of Ancient North American Civilization* (1994). Readers interested in archaeological controversies, serious or pseudoscientific, will enjoy my *Controversies in Archaeology* (2008).

## REFERENCES

Kennedy R. 1994. *Hidden Cities: The Discovery and Loss of Ancient North American Civilization*. New York: Free Press.

Kehoe AB. 2008. *Controversies in Archaeology*. Walnut Creek (CA): Left Coast Press.

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Alice Beck Kehoe is Professor Emerita of Anthropology at Marquette University and Adjunct Professor of Anthropology at the University of Wisconsin, Milwaukee. She is the author of several books on indigenous cultures of North American and North American archeology. She is also a long-time activist in support of evolutionary science and has been active in opposing and refuting pseudoscientific claims. She recently published *Controversies in Archaeology* (Walnut Creek [CA]: Left Coast Press, 2008).

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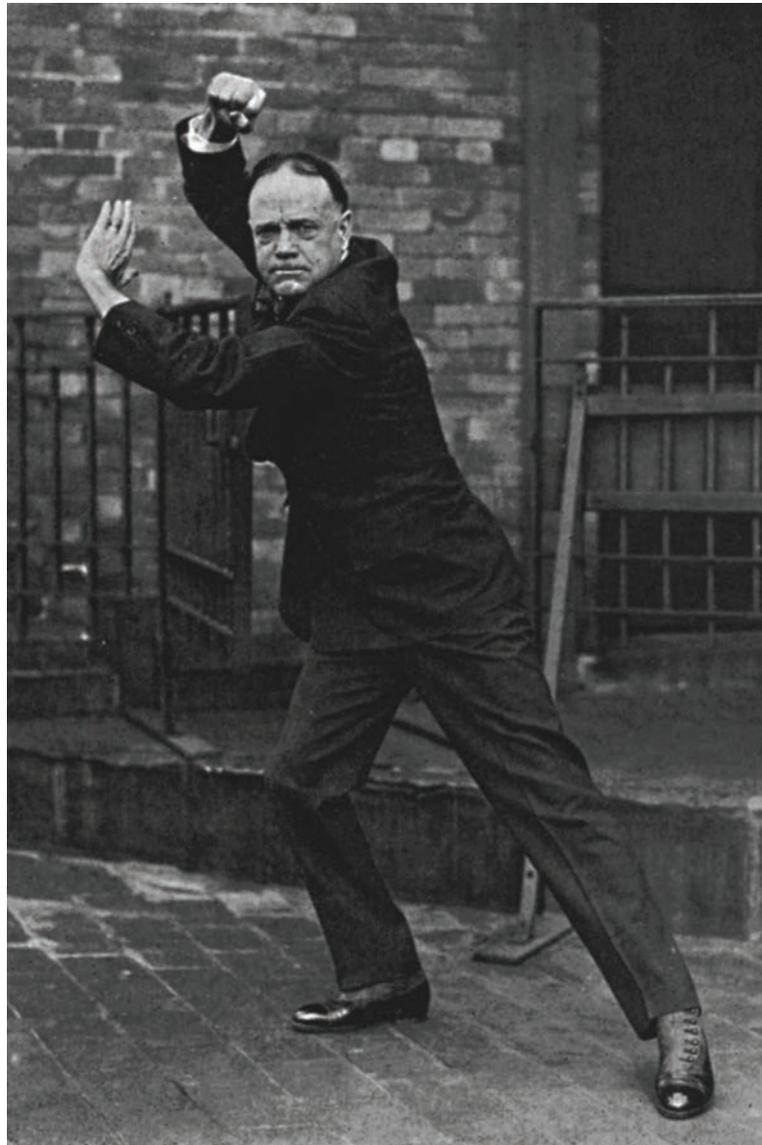


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## FEATURE

# People and Places: Billy Sunday: 1862–1935

Randy Moore



**FIGURE 1.** *Billy Sunday, the most popular evangelist of his era, used theatrical sermons to attack societal evils such as theatre, booze, and evolution.*

*I don't believe the old bastard theory of evolution ... If you believe your great, great grand-daddy was a monkey, then you can take your daddy and go to hell with him.*

William A “Billy” Sunday (Figure 1) was born on November 19, 1862, near Ames, Iowa. In 1883, after spending his formative years at the Iowa Soldiers’ Orphans’ Home, Sunday began playing professional baseball with the Chicago White Stockings (later named the Chicago Cubs). Sunday was never a good hitter (he struck out his first 13 times at bat, and his lifetime batting average was .248), but he was a good fielder and an exceptional base-runner. Sunday could circle the bases in 13 seconds, and in 1891 he set a record by stealing 90 bases in 116 games. In 1888, Sunday was traded to the Pittsburgh Alleghenies (later renamed the Pittsburgh Pirates). After quitting baseball to become “Secretary of the Religious Department” at the Chicago YMCA, Sunday became a traveling revival preacher.

Sunday’s sermons were acrobatic, theatrical, and often violent—he leaped from the piano, ran up and down the aisles, slid on the stage as if he were sliding into home, smashed chairs, and screamed from atop the pulpit. Although Sunday’s critics considered him “the worst thing that ever happened to America,” branded him a hypocrite, and labeled his services “circus salvation,” Sunday’s impassioned and unwavering world-saving message of civic cleanup, no-nonsense fire-and-brimstone, patriotism, and simplified “old-time religion” made him the most popular religious figure of his time. Sunday promised the greatest show around, and he delivered. During a 1907 revival, he even hired a former Barnum & Bailey “giant” to be an usher.

During his prime, Sunday’s crusades were conducted in enormous, specially constructed tabernacles. For example, “The Glory Barn” for Sunday’s 1917 revival in New York City was 344 feet long and 247 feet wide with enough seats for almost 20 000 people; its construction required 400 000 feet of lumber and 250 barrels of nails. All of Sunday’s expenses in New York were paid by his friend John D Rockefeller Jr, and Sunday collected a “love offering” of over \$120 000 for his 10 weeks of work. Sunday donated it all to the YMCA and the Red Cross to help with the war effort.

During a typical crusade, Sunday preached two or three times per day, six days per week for three to eight weeks, and drew up to 40 000 people per day. For example, during his 1917 crusade in New York, conservative estimates projected that Sunday spoke to nearly a quarter of the city’s 5 000 000 residents. Sunday’s production costs were high, as were his needs for volunteers—for example, his Boston revival in 1916 required 35 000 local people for ushers, choir members, security staff, and outreach workers. Sinclair Lewis’s *Elmer Gantry*—in which an opportunist preacher takes money from the masses in exchange for promises of heaven—was loosely based on Sunday, and a poll conducted by *The American Magazine* in 1914 ranked Sunday the eighth-greatest man in America. Sunday was sought by celebrities such as William “Buffalo Bill” Cody, HJ Heinz, Woodrow Wilson, William Taft, Warren Harding, Herbert Hoover, and Cecil B DeMille, who described Sunday as “the only man who works harder than I do.” Although in baseball Sunday had been a minor star, in evangelism he was king.

Sunday, who idolized Dwight Moody, popularized revivalism; famous preachers such as Robert Schuller, Rex Humbard, Jim Bakker, Oral Roberts, Billy Graham, and Jimmy Swagart emerged from Sunday’s revivalist tradition. Sunday was a trustee of Bob Jones College, which gave him an honorary degree in 1935. Soon thereafter, Billy Graham—who had heard Sunday preach in North Carolina—enrolled at the conservative school.

Sunday crusaded against a variety of social ills, and especially against the evils of theater, dancing, gambling, and liquor. In 1915, Sunday teamed with William Jennings Bryan to lead a national campaign for temperance; in Philadelphia, Bryan and Sunday told a crowd of more than 25 000 that they were forming a 10 000-man “abstinence army” and declared the first Sunday in November “World Temperance Day”. Sunday’s famous “Booze Sermon” was printed in books and newspapers across the country, and resulted in Sunday’s receiving hundreds of death threats from anti-prohibition activists. Sunday saw the destructive powers of alcohol first-hand in baseball as well in his own family. His son George died in 1933 after falling from a high-rise apartment, son Billy Jr died in 1938 when he crashed his car into a telephone pole after an all-night party, and son Paul died in 1944 in a plane crash. Alcohol was involved in each accident.

Sunday was proudly anti-intellectual, often proclaiming that when research and scholarship say one thing and the Bible says another, “scholarship can go to hell.” Sunday, who never graduated from high school, flaunted his lack of theological education; “I know no more about theology than a jackrabbit does about ping pong.”

Sunday saved many of his most venomous attacks for evolution, linking it with prostitution, eugenics, and crime in the early 1900s. Sunday rejected evolution, claiming that it was for “godless bastards and godless losers”. Like most other fundamentalists, Sunday believed that the teaching of evolution poisoned minds, destroyed faith, perverted education, and destroyed society. Always a proponent of a masculine, vengeful God (“I have no interest in a God who does not smite”), Sunday’s calls for a moral purge often included prayers for the slaughter of atheist evolutionists. As he did with many of his enemies who Sunday claimed were not “pure 100% American,” Sunday promised his followers that Charles Darwin was spending eternity in hell’s flames.

In June 1925, Bryan asked Sunday to come to Dayton, Tennessee, to testify in the Scopes Trial. Sunday was also invited to Dayton by Walter White, Dayton’s superintendent of schools. Sunday declined, but urged Bryan to equate evolution with atheism, and remind people that a person can’t simultaneously be an evolutionist and a Christian. Sunday closed his response to Bryan by noting that “All the believing world is back of you in your defense of God and the Bible.”

Sunday also generated scandal. For example, he was accused of plagiarizing several writers (including agnostic Robert Ingersoll), accepting money from businesses to help subvert labor strikes, and raking in enormous amounts of money from his followers. Indeed, between 1907 and 1918, Sunday earned \$1 139 315 from his crusades’ “love offerings,” and even more from the sales of Bibles, photographs, postcards, books, sermons, and other materials he sold in his tabernacles. Sunday and his wife Helen (who was also his business manager) wore the finest clothes, sported fur coats, and traveled in private Pullman cars. Sunday may not have lived up to the demands he made of others; when he died, archivists found jazz records and brandy snifters in his home. Just as Lewis’s Elmer Gantry plagiarized Ingersoll and drank booze while preaching the virtues of abstinence, Sunday may have also enjoyed an occasional drink.

During his remarkable career, Sunday conducted more than 300 revivals and preached to more than 100 million people (without the aid of radio or microphones); no person in

history has spoken directly to so many people. However, in his later years, Sunday was increasingly viewed as a relic and his appeal began to fade. Like many other fundamentalist leaders who opposed evolution, Sunday did not distance himself from groups such as the Ku Klux Klan (Figure 2), and critics denounced his doctrine as materialistic, perverted, and plagiarized. America had changed, but Sunday had not. Sunday campaigned hard for the re-election of his friend Herbert Hoover in 1932, but Hoover lost. Sunday also became more extreme, claiming at one point that he would “stand [his enemies] up before a firing squad.” Crowds dwindled, forcing Sunday to make increasingly desperate pleas for money: “Don’t let me hear any coins fall into those buckets; I want to hear the rustle of paper.”

**KKK LUX KLAN**

ENDORSES THE WORK OF REV. WILLIAM A. SUNDAY

**Not For Self—But For Others**  
 Dear Mr. Sunday:  
 The Knights of the Ku Klux Klan, are every ready to oppose those who are against law, desires to thank you through the press for your work in showing the wrong ones the right path. The police records show a big decrease in crime of every description since you started your meetings one month ago. Our belief is that your work here will leave an imprint upon the minds of ourselves and our fellow citizens that will never be erased. You have accomplished great good for our city and we believe that sin is fast disappearing due to your preaching. This organization heartily endorses your splendid work. May God bless and keep you and yourselves in the earnest prayer of the Knights of the Ku Klux Klan of Winston-Salem.

**GOD**  
 GET WITH  
 RIGHT

**A Message From 100% Americans**  
 Rev. William A. Sunday:  
 More than one thousand per cent American citizens of Winston-Salem, members of the Knights of the Ku Klux Klan, after hearing you deliver your message of the teachings of Christ day after day and night after night, desire to take this method of sending to you a message of cheer and encouragement. You are spreading the gospel to mankind and it is only through the belief in the divine power that this great nation will be saved from sin. This organization joins you in your fight against sin of every kind. We, like you, are fighting to make our great country one that stands for Christianity.  
 "Christ is the Klansman's Criterion of Character."

**KNIGHTS OF THE KU KLUX KLAN**  
 Klan No. 56, Realm of North Carolina

**FIGURE 2.** *The Ku Klux Klan is a militant white-supremacy group that supported, and was supported by, several prominent antievolution crusaders in the 1920s. This advertisement appeared in the Winston-Salem Journal (North Carolina) during one of Billy Sunday's crusades in the early 1920s.*

Sunday preached his last sermon on October 27, 1935, at First Methodist Church in Mishawaka, Indiana. After suffering a heart attack, Sunday died in Chicago at the home of his brother-in-law on November 5, 1935, just two weeks shy of his 73rd birthday. Sunday's death was marked by memorial services across the country; his wife Helen even got a telegram of condolences from President Franklin Roosevelt, whose policies Billy had denounced. More than 3500 mourners attended Sunday's funeral at Chicago's Moody Church, and his pallbearers included former US District Judge Kenesaw Mountain Landis (1866–1944), who was professional baseball's first commissioner. The most prominent floral arrangement at Sunday's funeral was from the Chicago Cubs.

Billy Sunday is buried beside his wife along the eastern edge of Forest Home Cemetery in Forest Park, Illinois. Sunday rests beneath an inscription similar to the one that adorns the tombstone of fellow antievolution crusader William Jennings Bryan, “I have fought a good fight; I have finished my course. I have kept the faith.”

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## REVIEW

### *The Darwin Experience: The Story of the Man and His Theory of Evolution*

by John van Wyhe

Washington (DC): National Geographic Press, 2008. 64 pages

reviewed by Michael D Barton

Scores of books about Charles Darwin and evolution were published in or near 2009 in celebration of two anniversaries: the 200th of Darwin's birth and the 150th of the publication of *On the Origin of Species*. While some retold the story of the discovery of the theory of evolution by natural selection and the man behind it with a new spin, others examined the impact that Darwin's ideas had on realms of thought beyond biology, during his time and through the present. *The Darwin Experience* does both, and adds more. Most books are intended to be read, yet this one asks its readers not only to scour the detailed text throughout, but also to engage with additional material provided within its pages.

A beautifully-produced oversized book, *The Darwin Experience* is authored by historian of science and director of The Complete Work of Charles Darwin Online (<http://darwin-online.org.uk/>) John van Wyhe, a senior lecturer in the Departments of Biology and History at the National University of Singapore. Referring to van Wyhe as curator of this book would be appropriate, for the additional material is a varied assortment of facsimiles of primary documents: illustrations, photographs, letters, pages from notebooks, maps, cards, and more. Each page conjures up a topical display that is part of a large exhibit about Darwin, although you as the reader get the entire gallery to yourself. From displays that set the scientific context before Darwin enters the stage through his legacy, one can explore "Edinburgh University," "Don Carlos: 'So much of a gaucho'," "Tierra del Fuego and the shock of the savage," "The Galápagos: The true story," "At home with the Darwins," "Putting the puzzle together," "Orchids," and "The Sage of Down and the study of worms" (there are 28 "displays" in all).

The book is ordered chronologically, and van Wyhe, well-suited to bringing to life Darwin's life and work, offers *The Darwin Experience* as "an experiment in communicating the history of science, Darwin, and evolution to a wider audience" (p 4). First and foremost, this book is for the non-specialist interested in gaining a better understanding of a much-misunderstood topic. Given that, van Wyhe states, "The true story of how evolution by natural selection was uncovered is quite different from that familiar to most people" (p 4). Anyone familiar with van Wyhe's work as a historian knows that he has given much effort to dispelling myths about Charles Darwin, notably in a piece for the UK newspaper *The Guardian* (van Wyne 2008). For example, he states that it is misleading to portray Darwin and the *Beagle's* cap-

tain Robert FitzRoy as antagonists for FitzRoy only became an evangelical Christian after the voyage; that Darwin did not “discover” evolution while at the Galápagos Islands (it is a legend that arose in the twentieth century) and mockingbirds rather than finches were more important; that Darwin was indeed the naturalist for the voyage and not simply a gentleman companion for FitzRoy; that there is no evidence the death of Darwin’s daughter Annie killed off his Christianity; that Darwin did not stall in publishing his transmutation theory (referred to as “Darwin’s delay”) by working on barnacles for eight years and moving on to experiments; that the first edition of *On the Origin of Species* did not sell out to the public on its first day (it did sell out to booksellers, however); that there was great scientific as well as religious debate following the publication of the *Origin*; that the Oxford debate between Bishop Samuel Wilberforce and Thomas Huxley has been greatly exaggerated as a moment of science versus religion; and that Darwin neither renounced his theory nor converted to Christianity on his deathbed. Some of these myths or misrepresentations of history are actively being researched by van Wyhe for scholarly articles.

While we get plenty of myth-busting in *The Darwin Experience*, van Wyhe also shares a lot of interesting details about Darwin and his work that are usually not a part of shorter, introductory works on the topic. Darwin’s many years of work on barnacles stemmed from his not being able to publish a *Zoology of the Beagle* volume of invertebrates due to a lack of government funds. The astronomer John Herschel, whose 1831 work *Preliminary Discourse* was influential to Darwin in its presentation of correct methods of scientific investigation, referred to natural selection as the “law of higgledy-piggelty.” While many know about Darwin and his time at Cambridge University, less known is Darwin’s relationship with Robert Grant of Edinburgh University and a moment of scientific jealousy when Darwin presented his own research on an aspect of Grant’s area of research (marine invertebrates); Grant thought it unfair of Darwin to have published it. Perhaps such an instance pushed Darwin to be protective of his later work.

Perhaps one of the more interesting tidbits in this book concerns not Darwin but another naturalist, Alfred Russel Wallace (I do wish there was more on Wallace in this book, however). In the “display” about *On the Origin of Species*, we learn, expectedly, of Wallace’s sending Darwin his essay proposing a similar transmutation theory. The other, less expected, mention of Wallace is not from van Wyhe’s hand, but rather an anonymous one: on the facsimile document of the Order of Procession at the Funeral of Mr Darwin at Westminster Abbey in 1882, a diagram shows the ten pallbearers present. Along with Thomas Huxley, Joseph Hooker, John Lubbock, and several others, Wallace was chosen for the task. On one side of the casket, the diagram shows, Wallace was at the rear, and hand-written on the document is a clear demonstration of someone’s view that Wallace deserved more recognition for his contributions: “ARW ought to have been at other end.”

There is plenty to read in this book; beyond van Wyhe’s narrative there are quotes and excerpts from Darwin’s works, notebooks, and letters, and works of other figures related to the topic. To connect a reader to the history they are engaged with, there is nothing better than providing them with such primary documents. In order to know Darwin or how others regarded him better, one should read his own

words or what his contemporaries wrote about him, as in the passages taken from obituaries that van Whye shares at the end of the book. In the case of some of the removable documents scattered throughout the book, however, some readers may find it a difficult task to understand what they are looking at. Having worked on a project to transcribe the letters of a nineteenth-century scientist (John Tyndall), I know all too well how tough it is to decipher Victorian penmanship. *The Darwin Experience* would have benefited if along with some of the primary documents the author would have provided the reader with a transcription. Granted these works are largely all available on-line through various websites (and each document includes its individual catalog number for the Darwin Papers archive at Cambridge University Library), but if this book is a self-contained “experience,” having the transcriptions handy, in an appendix perhaps, would aid some readers.

*The Darwin Experience* is a wonderful window into the life and work of Charles Darwin, suitable for newcomers to the topic as well as those already familiar because of its display-like presentation and the illustrations and facsimile documents. Even the endpaper design for this book mimics those of late-nineteenth-century printings of books by Darwin. There is simply too much to explore and enjoy in *The Darwin Experience*.

## REFERENCES

van Whye J. 2008 Feb 9. It ain't necessarily so. [Internet.] Manchester UK: *The Guardian* [cited 2010 Jan 27]. Available from: <http://www.guardian.co.uk/science/2008/feb/09/darwin.myths>.

## ABOUT THE AUTHOR

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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## REVIEW

### *Lincoln & Darwin: Shared Visions of Race, Science, and Religion*

by James Lander

Carbondale (IL): Southern Illinois University Press, 2010. 351 pages

reviewed by Steven Conn

Around the world, 2009 was known as the Darwin Year, a grand bicentennial celebration of Charles Darwin's birth and a sesquicentennial celebration of *On the Origin of Species*, arguably the single most important book to appear in the last 150 years. Everywhere, that is, except in the United States, where the Darwin Year was marked in a somewhat more subdued fashion.

In part that was a consequence of the uneasy relationship Americans still have with Darwin. Indeed, in 2009 Americans were busier marking the 200th birthday of Abraham Lincoln, born on exactly the same day as Darwin. President Barack Obama was in Springfield, Illinois, on February 12, 2009, to celebrate Lincoln, and he made only a passing reference to Charles Darwin at the event.

Exploring this remarkable historical coincidence has been almost irresistible for historians, and James Lander, with his *Lincoln & Darwin: Shared Visions of Race, Science, and Religion*, joins a crowded field which includes most recently David Contosta's *Rebel Giants* (2008) and Adam Gopnik's *Angels and Ages* (2009).

As the subtitle suggests, Lander's approach to this well-worked material is to focus on three areas—race, science and religion—and argue that these two men shared the same outlook on all three. To make that claim, Lander proceeds carefully and thoroughly through each life, pairing the thoughts and careers of Lincoln and Darwin in virtually every one of the book's twenty-six chapters. He begins by describing their "origins and education," noting for example that each lost their mothers within a year of each other. We then march almost year by year through these two lives as Lander works hard to draw them as almost parallel.

Sometimes Lander works too hard, and the comparison feels a little strained. So, for example, Lander writes that in 1849 Darwin's chronic health problems "drove him to try out the latest medical technology" while in the same year "Lincoln made a serious effort to contribute something of his own to the history of technology" (p 67). In fact, while Darwin was unarguably a "man of science," Lincoln's interests, certainly as president, seem really to have been more about developing technology.

Happily, more often than not these comparisons and juxtapositions persuade, and they reveal two extraordinary intellects as they wrestled with some of the most important questions of their age. It should not surprise anyone that Darwin's religious faith was desultory at best, but Lander offers us a very useful tonic when he reminds us that Lincoln too cared

little about religion and that his religious expressions were probably more tactical than spiritual.

Perhaps the strongest section of the book is Lander's consideration of the relationship between science and race, and how both shaped American politics in the 1850s. Lander does not shy away from showing us that some of the finest "scientific" minds of the antebellum era dedicated themselves to justifying racism (and thus slavery too) through the use of "science". Lander takes this one step further, to demonstrate how influential "scientific racism" was on key political figures and on the debates over key issues. It is easy for us today to dismiss a book like John H Van Evrie's *Negroes and Negro "Slavery": The First an Inferior Race; the Latter Its Normal Condition* (1854) for the vile nonsense it is; Lander reminds us that when it appeared, it carried the endorsement of Secretary of War Jefferson Davis. As Americans mark the 150th anniversary of the Civil War, it is vital to remember what the Confederacy really stood for.

Resurrecting Van Evrie's book is just one example of the extensive work Lander has done with the publications of the 1840s and '50s, especially in America. Lander hews closely to the available sources, making very good use of Darwin's correspondence. From those letters we learn just how carefully Darwin followed American events leading up to and during the Civil War. Darwin was passionate in his hatred of slavery, and his letters to Asa Gray also show us just how much he was rooting for Lincoln and the Union to prevail in the war.

Lander has also done a fine job recreating Lincoln's intellectual world by reconstructing the library he had available to him in the office of his law partner. Here, though, the evidence is more slippery. Lander several times has to acknowledge that while Lincoln had access to this or that publication, we can't be sure he actually read it. This includes Darwin's book itself. As the story moves to its crescendo in 1859 and 1860, Lander acknowledges, "Gray's *Atlantic Monthly* review is very likely the source that brought Lincoln closest to *The Origin* assuming he probably never read the book himself" (p 133). Darwin cared a great deal about Lincoln; we simply don't know if that feeling was reciprocal.

In the end, both figures emerge as being largely out of step with many of their contemporaries and thoroughly ahead of their time. One hundred and fifty years later, we have inherited a political world descended from Lincoln and a scientific world that owes much to Darwin.

## REFERENCES

- Contosta DR. 2008. *Rebel Giants: The Revolutionary Lives of Abraham Lincoln & Charles Darwin*. Amherst (NY): Prometheus.
- Gopnik A. 2009. *Angels and Ages: A Short Book about Darwin, Lincoln, and Modern Life*. New York: Knopf.
- Van Evrie JH. 1854. *Negroes and Negro "Slavery": The First an Inferior Race; the Latter its Normal Condition*. Baltimore: JD Toy.

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Steven Conn is Professor of History at the Ohio State University, where he also directs the Public History Program. In 2009, he contributed "Charles Darwin's American adventure: A melodrama in three acts" to OSU's on-line history magazine *Origins* (<http://ehistory.osu.edu/osu/origins/article.cfm?articleid=37>).

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## REVIEW

### *The Origin Then and Now: An Interpretive Guide to the Origin of Species*

by David N Reznick

Princeton (NJ): Princeton University Press, 2010. 432 pages

reviewed by Piers J Hale

Darwin's *Origin of Species* is the most significant book in the history of the life sciences and arguably among the most influential in modern Western culture. The research agenda that Darwin's work set in motion has not only unified the life sciences, but also broached questions of a fundamentally philosophical character regarding what it means to be human. However, the *Origin* is not an easy read—written in nineteenth-century English and grounded in nineteenth-century science, perhaps most challenging for the modern reader, it displays a breadth of expertise that is staggering. Darwin unites geology, paleontology, biogeography, animal behavior, embryology, and comparative anatomy under the broad explanatory umbrella of his theory of “descent with modification” by means of natural selection. There is certainly reason to read the *Origin* then, but as Reznick points out, a user's guide is welcome.

Students and practitioners of science are not the only intended audience for this book. As those who care about science education will be only too aware, both Darwin and the *Origin* have come to represent much more than science in the arena of public discussion—Darwin has long been demonized by certain fundamentalist Protestant minorities for, among much else, undermining religion and morals, variously inspiring Hitler, Stalin, or both, and inciting sundry other eugenic schemes. There is clearly a need for the general public to understand what Darwin did or did not say, and Reznick's interpretive guide is a great place to begin.

*Then and Now* is more than a simple explanation of the *Origin*, though. Rather, it is a modern interpretation of Darwin's argument supplemented by “evolution today” sections that are not only informative but also demonstrate where Darwin's thinking continues to be relevant to modern evolutionary biology and where it has been superseded. Reznick does not follow the *Origin* chapter by chapter, choosing instead to organize the material into three sections: “Natural selection”, “Speciation”, and “Theory”. This device allows Reznick to speak to issues that are often unclear in the public mind today: the distinction between natural selection and speciation, in particular, and confusion over the colloquial and scientific understandings of “theory”.

“Natural selection” begins in the Galápagos Islands with an introduction to Rosemary Grant and Peter Grant's work on what have become known as “Darwin's finches”. These charismatic species remain iconic of natural selection in action. After giving a detailed and accessible recapitulation of what Darwin had to say on the subject, Reznick finishes with

a brief account of his own work on evolution in guppies. Throughout Reznick is clear to indicate when and where he moves between the mid-nineteenth century and the present.

Following this, Reznick starts “Speciation” with Ernst Mayr. Mayr, one of the twentieth century’s most prominent evolutionary biologists, proposed the first modern definition of species and so this is a fitting place to start—especially considering that the answer to the question “what is a species?” remains both controversial and contested. As Mayr pointed out, despite the title of Darwin’s book, his main concern was not to define what a species was—indeed the kinds of definition we use today rely on concepts and methods that have been developed since Darwin’s death—but was rather to show that species had not been “specially created” and that—contrary to contemporary belief—the barrier between one species and another was not immutable. Reznick again supplements his account of Darwin’s work with comment and present-day examples before ending the section with a provocative account of the 1990s work of the British geneticists Byrne and Nichols on the evolution of what some would classify as a unique species of mosquitoes in the London Underground—an environment, and thus a development, that we know dates from only 1863!

The final third of *Then and Now* turns to “Theory.” The concern here is not only with public confusion over the issue, for given his dissenting statement in the 1987 case *Edwards v Aguillard*, even the likes of Justice Antonin Scalia are perplexed on this matter. The fact that we use “theory” colloquially to mean something like “a vague hunch” can easily undermine the fact that the term implies something different in science. For the record, Reznick quotes the *American Heritage Dictionary*, which defines a theory as “Systematically organized knowledge applicable in a relatively wide variety of circumstances; especially a system of assumptions, accepted principles, and rules of procedure devised to analyze, predict or otherwise explain the nature or behavior of a specified set of phenomena” (p 220).

*Then and Now* is prefaced by a short biographical sketch written by the historian and philosopher of science Michael Ruse, which provides valuable context on this issue. Ruse notes that Darwin was keen to ensure that his argument matched up to the very best standards of the science of the day: major players in this debate included the geologist Charles Lyell, but even more significant were the astronomer John Herschel and the Cambridge philosopher William Whewell. Herschel and Whewell were concerned with causation, and in particular with how one might recognize a true cause—or, as Newton had termed it, a “*vera causa*.” In his own work, Whewell thought the distinction between fact and theory important. Facts in themselves—without some overarching explanation of how they related to each other—Whewell thought relatively uninteresting things. Theories were much more so—theories were the ideas that strung facts together in such a way as to make sense. How would we know a theory to be a good one? To have identified a *vera causa*? Well, Whewell argued that the best test would be what he called the “consilience of inductions,” by which he meant that we could have greater confidence in the truth of an explanation not only on account of the number of phenomena it could explain, but also on account of its ability to explain and predict phenomena from other fields—and notably, phenomena that it had not been constructed to explain. As Reznick goes on to demonstrate, Darwin’s theory of evolution by natural selection did this—and continues to do this.

In sum, *Then and Now* is an excellent book. Reznick offers insightful analysis and compelling present-day examples, and is wonderfully readable in the process.

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Piers J Hale is Assistant Professor in the History of Modern Science at the University of Oklahoma. He is currently working on two books: the first, on politics and evolution in the nineteenth century; the second, with John Beatty, on Charles Kingsley and his Darwinian book for children, *The Water Babies*.

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## REVIEW

### *The Annotated Origin: A Facsimile of the First Edition of On the Origin of Species*

by Charles Darwin, annotated by James T Costa

Cambridge (MA): Belknap Press of Harvard University Press, 2009. 576 pages

reviewed by **Allen D MacNeill**

In November 1859, the London publishing house of John Murray brought out the first edition of what would become the most famous and important work of science of the 19th century: Charles Darwin's *On the Origin of Species*. The first edition of 1250 copies sold out in one afternoon (first edition copies today fetch over a hundred thousand dollars on the rare book market) and was eventually reprinted over the next fifteen years in five increasingly popular editions. The success of the *Origin* catapulted Darwin from a relatively unknown specialist in the taxonomy of barnacles to the most famous naturalist of the 19th century and became the most widely read (and most controversial) science text of all time.

Many historians of biology credit the *Origin* with founding the modern science of biology. Hence, it is very curious that the first edition of the *Origin* lacks what most scholars expect to find in such influential and widely respected works. Unlike most other books of its kind—including Darwin's other famous books, *The Voyage of the Beagle* (first published in 1839) and *The Descent of Man* (first published in 1871)—the *Origin* has virtually none of the usual “machinery” of a scholarly work. Although Darwin cites the findings and opinions of hundreds of naturalists worldwide in the *Origin*, he does not provide any footnotes or written citations to their published works. The first edition of the *Origin* also does not include a bibliography or any listing of published references. And despite focusing on the most visual of the natural sciences, the *Origin* contains only one illustration, a hand-drawn diagram of the branching pattern of descent that Darwin proposed for his theory of descent with modification (his term for what we now refer to as “evolution”).

The reason for this surprising lack of documentation is well known: Darwin had been scooped on his theory of natural selection by a fellow English naturalist, Alfred Russel Wallace. In April 1858, Wallace sent Darwin a letter that included a brief essay “On the tendency for varieties to depart indefinitely from the original type,” in which Wallace anticipated virtually all of the major concepts of Darwin's theory of evolution by natural selection. Darwin had been working on his theory for over two decades, and had been writing the book that would eventually be published as the *Origin* for at least five years when he received Wallace's letter. Anxious to preserve his priority as the discoverer of natural selection and urged on to do so by his friends and fellow naturalists, Darwin rushed what he considered to be an “abstract” of his ideas into print in November 1859. This “brief abstract,” published without footnotes, illustrations, or bibliography, was the first edition of the *Origin of Species by Means of Natural Selection*.

The first edition of the *Origin* was a masterwork and is still published in its original form, sans footnotes, illustrations, and bibliography. Reading it, one can still get a taste of the overwhelming scholarship with which Darwin supported what he called his “long argument” for descent with modification. However, to really appreciate how much of the science of natural history Darwin wove into his argument, one really needs to know what Darwin’s sources were and how they were related to each other.

Presenting these sources and showing how Darwin marshaled them in his defense of his theory is the heart of James Costa’s brilliant annotation of Darwin’s classic, *The Annotated Origin*, published by Belknap Press of Harvard University Press. Brought out in celebration of the 150th anniversary of the publication of the first edition of the *Origin*, Costa’s annotated version more than compensates for the “missing” material in Darwin’s original. The introduction to *The Annotated Origin* alone is worth the price of the book. In it, Costa presents a lightning biography of Darwin and a nuanced exploration of the reasons for his rush to publish in 1859. It also contains a reader’s guide to the *Origin*, a book that is often difficult for modern readers who are unaccustomed to the density of Victorian prose. Costa then analyzes and annotates virtually every page of the *Origin*, including the title page, for which he provides a brief history of Darwin’s illustrious publisher, John Murray, and his decision to print only 1250 copies of what would eventually become his best-selling and most famous publication.

Costa’s annotations run the gamut from personal anecdotes to hard-science references. He weaves together Darwin’s own telegraphic notes in his unpublished notebooks, his correspondence, his other published works, and his autobiography, providing the reader with a wealth of information and insight. Tracking down each line of evidence becomes a kind of “exploration” in itself. One can follow threads of evidence that elucidate Darwin’s views about nature, science, his fellow naturalists, and even such “taboo” subjects (at least in the Victorian era) as sex and the intimate details of family life.

Costa’s annotations also provide a detailed framework for Darwin’s argument, showing how the various explanations and examples are marshaled in such a way as to support Darwin’s underlying argument for “descent with modification by means of natural selection.” As just one example, consider Costa’s annotations to the section of pigeon breeding in the first chapter of the *Origin* (“Variation under domestication”). Naïve readers of this chapter are sometimes puzzled by Darwin’s emphasis on pigeon breeding and its relationship to his theory. But, as Costa points out, “[p]igeons provided a microcosm of Darwin’s model of selection, as well as valuable data on development, correlation of traits, and reversion” (p 20). Like so many of his Victorian contemporaries, Darwin raised pigeons; he conducted dozens of breeding experiments at his country estate at Down House in Kent to test his theories. Darwin pointed out that all of the various breeds of pigeons could be shown to have descended from the wild rock pigeon (*Columba livia*) by a process that we now refer to as artificial selection. Darwin constructed an argument by analogy that natural selection followed the same rules as artificial selection. And since so many of his contemporaries (and potential readers) were also pigeon fanciers, he could be reasonably confident that they would be able to follow his argument without extensive explanation or citations of obscure references to the scientific literature.

Reading the first edition of Darwin's *Origin of Species* is a revelation. One catches the threads of Darwin's argument and follows his reasoning through to his startling (and sometimes troubling) conclusions. James Costa's masterful annotation of the *Origin* does much more. It supplies the scholarly apparatus that the first edition lacked and provides a coherent and comprehensive background for Darwin's arguments, as well as many fascinating insights into Darwin's personality, thought processes, and research methods. No other scientist has been as exhaustively analyzed as Darwin, and no other published work of science has been as widely criticized or praised as the *Origin of Species*. Reading James Costa's *Annotated Origin* provides an even deeper appreciation for Darwin's achievement and its impact on science and society. I recommend it with the highest possible praise.

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## REVIEW

### *Darwin's Camera: Art and Photography in the Theory of Evolution*

by Phillip Prodger

Oxford: Oxford University Press, 2009. 284 pages

### *The Art of Evolution: Darwin, Darwinisms, and Visual Culture*

edited by Barbara Larson and Fae Brauer

Hanover (NH): Dartmouth College Press, 2009. 332 pages

reviewed by Michael Ruse

Thanks to Plato, generations of philosophers have been rather toffee-nosed about pictures. In the *Republic*, the great Greek philosopher spoke rather contemptuously of the fine arts, thinking them misleading and dangerous to the kind of society he was building. He also argued that when it came to mathematics, although exalted, it could take only second place to the Forms or Ideas because it uses pictures to make its main points. True knowledge of the highest kind has no need of such aids. I would not say that no great philosopher has ever used an illustration—René Descartes in his role as a physicist gave a delightful picture of the vortices and of a comet passing through the earth's area of influence—but when it came to the *Meditations* you look in vain for a picture of the *cogito*.

Closer to our time, the perfect proof of what I am saying is given by the late Thomas Kuhn. In his truly great book, *The Copernican Revolution*, there is diagram after diagram—planets looping the loop (retrogressing, in the language of the experts), spheres spinning within spheres, and buckets of water with magnets pulling and pushing for all that they are worth. But this is Kuhn as a historian. When, a year or two later, we turn to Kuhn as a philosopher, in his celebrated *The Structure of Scientific Revolutions*, we find nothing at all to lighten the way. Not even a duck-rabbit, showing how perception is in the eye of the beholder.

This austere attitude does little service to the understanding of science. Open up any magazine or journal of science, even the most august and pompous, and you are greeted by a cornucopia of diagrams and graphs and photos and pictures and more—often in dazzling color. And if anything, thanks particularly to the power of the computer, this riot of visual information is getting greater by the year. So what is any self-respecting philosopher of science to do? Most take a leaf from the Calvinist's playbook. Just as no good Reformed theologian let a little matter of innate sexual orientation deter from the conclusion that homosexuals are damned to eternal torment because of their desires, so no good philosopher lets a little matter of evidence and practice deter from the conclusion that pictures play no significant role in the making and product of science. Graphs and everything else

are inessential aids for the weak. There are some indeed, the New York philosopher Jerry Fodor being a case in point, who will not even allow the importance of literary pictures. Real science begins when the metaphors get dropped.

I am glad to say that there are those who rebel against this Platonic impoverishment. The historian Martin Rudwick has for many years written brilliantly on the importance of illustration in geology. He should know. For many years before he was an accomplished historian of science, he was a no less accomplished invertebrate paleontologist. The philosopher William Wimsatt has likewise long championed the importance of illustration in biology, undoubtedly a personal crusade because he is himself an accomplished draftsman, and more recently one adept with the world of computers and the power they give to the pictorially minded.

It is as well that there are these distinguished scholars and a few others who stand against the horde, for to do otherwise is to miss so much. And nowhere more so than for those of us who are interested in Charles Darwin and his thinking. It is true that in his masterwork, *On the Origin of Species*, Darwin gives us but one rather Spartan illustration—an idealized tree of life—but this is exceptional, brought on by the need to get the *Origin* written quickly and then published. (There are no footnotes or references either, likewise exceptionally in Darwin's work.) In other works, there are illustrations galore, and only a fool (or a philosopher) could deny their importance. How, for instance, would one assess Darwin's coral reef theory (that the reefs are caused by sinking brought on by the ever-added weight of new coral), without those famous cross-sectional pictures of an island at different times in its history—from poking out happily into the ocean to lying submerged beneath the waves, acting now only as a support for the coral above?

The early Darwin did not use photographs. Why? Simply because photography had not then been invented. (It comes into being around 1840, and obviously took some time to take off technologically.) But by the time of the later works, for example *The Expression of the Emotions in Man and Animals* (1872), it was a tool waiting to be used and use it Darwin did to the full. The work is cram full of photographs of people caught in different moods and emotions—happiness, sadness, hate, fury, love, and more. Phillip Prodger, the curator of photography at the Peabody Essex Museum in Salem, Massachusetts, in his *Darwin's Camera: Art and Photography in the Theory of Evolution*, does a magnificent job of tracing and explaining Darwin's illustrations, giving great detail about the sources of the pictures and their background, indeed the general background of the whole business of picture taking when Darwin was putting together his work.

Like many Darwin scholars, I suspect, I have never been quite sure about the *Expression of the Emotions*. Is it anything more than the clippings from the floor after Darwin had finished his very important *The Descent of Man and Selection in Relation to Sex*? The *Descent* clearly is a book with a major thesis, namely about the truth of human evolution, and with a mission, namely to refute the claim of natural selection's co-discoverer Alfred Russel Wallace that no naturalistic process could explain the coming of humankind. To counter Wallace's claim that spirit forces must be at work, Darwin made much of his secondary mechanism of sexual selection, showing that Wallace's arguments crumble when once we see the full range of selection's powers.

But the *Expression of the Emotions* does not strike me that way, being more a potpourri of thoughts about emotions and so forth. The recent Penguin reprint, with an introduction by Anglo-American historian of evolutionary biology Joseph Cain, suggests that the *Expression* cannot be read apart from the *Descent*, and should be seen as part of Darwin's overall drive to show that human features, like facial expressions and the emotions they convey, are simply part of the natural world, making us kin to the animals. No more, but certainly no less. Perhaps we should leave things at that. Deeper judgments are unneeded and almost certainly false.

To be candid, I do not see that Phillip Prodger gives us much more than the Cain thesis suggests. He does not show for instance that Darwin's theorizing was throughout an epiphenomenon of camera techniques of the day. I hasten to add that I have no reason to think that it was, although Prodger surely shows that the sorts of things that Darwin talks about were going to be constrained and funneled by the pictures that he could get. No high-speed flashes, for instance, showing split second reactions. I think the contributors to *The Art of Evolution: Darwin, Darwinisms, and Visual Culture*, edited by Barbara Larson and Fae Brauer, would want to push things a bit further down that line. Certainly, going the converse way, they want to argue that Darwin fed back into the culture of his day and of generations succeeding. The very titles of the contributions tell you that. Thus, for instance, we have: "Darwin in caricature: A study in the popularization and dissemination of evolutionary theory," by Janet Browne; "From *monera* to man: Ernst Haeckel, *Darwinismus*, and Nineteenth-century German art," by Marsha Morton; and "Wild beasts and tame primates: 'Le Douanier' Rousseau's dream of Darwin's evolution," by Fae Brauer. (Phillip Prodger also has a piece, "Ugly disagreements: Darwin and Ruskin discuss sex and beauty.")

To take an example of how Darwin connects to culture, Robert Michael Brain in "Proto-plasmania: Huxley, Haeckel, and the vibratory organism in late nineteenth-century science and art"—an article that is not quite as erotically exciting as the subtitle might lead one to expect—argues that there is a line from Darwin to some of the weirdest excesses of modern art at the beginning of the twentieth century. As a result, for instance, "Picabia made ribbon-like forms coil over one another while refusing any focus or point of rest, and effacing any distinction between form and space" (p 117). The trouble with this sort of stuff is that it is very hard to know what would count as confirming—or falsifying—evidence. I don't mean to say that evolutionary ideas never find their way into art, writing, drama, or painting, or that we cannot prove this. Take an example unmentioned in this book, Jack London's *The Call of the Wild*. Obviously here we have a portrayal of Social Darwinism working flat out. But effacing distinctions between form and space? I dunno!

Searching through the volume for claims I could get my teeth into, I plunged into James Krasner's "'One of a long row only': Sexual selection and the male gaze in Thomas Hardy's *Tess of the D'Urbervilles*." The claim here is straightforward. Hardy, who read Darwin even in his teens, is trying to show sexual selection in action—Tess and the other girls are passive, the men are aggressive and the choosers. Much is made of the way that Angel Clare picks out Tess from the others on display. Fair enough, but if Darwin has any bite surely we need to follow things through a little. The whole point about sexual selection in humans is that it leads to distinctive types—men are men and women are, well, children. Darwin argues that because of sexual selection, men are brighter, tougher and all of the rest. The

creatures of brawn and brain. Women on the other hand are child-like, less intelligent, but really good with the emotions and the heart. I don't see Krasner arguing for any of this, nor frankly do I think Hardy's novel bears such an interpretation. Of the two leading men, Alec D'Urberville is a cad and a sexual predator, and Angel Clare is a double-standard hypocrite and a bit of a wimp. Tess is more sinned against than sinner, but when push comes to shove, shove is precisely what she does. She finishes off Alec with a knife, for which act she ends the novel by being hanged. Not much support from or for the *Descent of Man* in any of this.

Good, bad, or indifferent, these two books underline a very important point, making clear the need for the kind of organization that produces the magazine in which this review is appearing. Charles Darwin's ideas are a lot more than mere science. They grow out of culture and they extend back into culture. Some find this exciting and exhilarating. Others, too often especially in America, find this upsetting and threatening. Problems and disputes are not going to be settled overnight. But as a start, we need to understand Darwin himself and the work that he did, why and how he did it, and what the consequences were. This is the aim of the two books under review, with greater or lesser success. It is an ongoing process, one stone—or one book—at a time. That alone makes the work worthwhile.

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## REVIEW

### *Darwin's Pictures: Views of Evolutionary Theory, 1837–1874*

by Julia Voss

New Haven (CT): Yale University Press, 2010. 340 pages

reviewed by Keith Thomson

Not only is a picture worth a thousand words, some concepts can scarcely be expressed or explained without them. Watson and Crick needed to visualize possibilities for the structure of the double helix DNA molecule in sketches and then physical models. And they needed Rosalind Franklin's x-ray crystallographic images in order to start. It is not surprising, therefore, that when Charles Darwin first began to think through the consequences of transmutation of species (as he called it), he made an attempt to draw a model of the relationships that would result from a process of descent from common ancestry.

A central component of Charles Darwin's evolutionary theory is that patterns of similarity and dissimilarity among organisms are based in genealogy. Two kinds of hummingbirds look alike, not because they represent some version of an "ideal hummingbird" but because they share a common ancestor. As do humans and apes. In one of those aha moments, he sketched into his notebook B (page 36, around July 1837) one of the iconic images of all biology—an evolutionary tree. His simple scheme took into account both the origin of new species and extinctions of older ones; the result was patterned but patchy, just like nature. His tree represented an historical process; vastly refined it became the sole illustration in his *On the Origin of Species* (1859).

We can only guess at how differently the history of Darwin's theory might have progressed if he had had the fluent draftsmanship of Thomas Henry Huxley (his great supporter) or Richard Owen (their rival). Both of them were gifted artists. Darwin, frankly speaking, simply could not draw. And this came to pain him as much as his failure to learn refined dissecting skills when a student. He could remedy the latter omission by hard work, and did so during his massive project on barnacles, but it was too late for him to express himself as well with a drawing pencil as he could using a writing implement.

As Julia Voss explains in *Darwin's Pictures*, during Darwin's lifetime, science changed dramatically in all subjects, not just his own. The drive for clear exposition of the new sciences, both for the public and for specialized readers, was facilitated enormously by the more or less simultaneous development of the "illustrated book." Lithography, engraving, and photography created a revolution in the art of exposition. Darwin took advantage of these developments. He was one of the first to realize also that photography could be a powerful tool in the scientist's laboratory. His study *The Expression of the Emotions in Man and Animals* (1872) would not have been possible without comparative, analytical, illustrations, which started with crude sketches that he made of his own children.

As Darwin was a poor draftsman, Julia Voss's *Darwin's Pictures* is not a critical retrospective of the man as an artist. Instead she uses a small number of images—like the figure of Galápagos ground finch beaks in *The Voyage of the Beagle* (editions after 1845), the tree in the *Origin*, and the use of photographic series in *Expression of the Emotions*—to explain the development of his ideas and the history of his career as a scientist of the mid-to-late nineteenth century. In the process she is able to retell a familiar story from a novel and newly illuminating point of view. Given everything that has already been written on Darwin, this is no mean accomplishment, and she has written a most readable book that should attract a wide audience.

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Keith Thomson is Professor Emeritus of Natural History at Oxford University and Senior Research Fellow at the American Philosophical Society. His most recent book is *The Young Charles Darwin* (New Haven [CT]: Yale University Press, 2009).

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