

# TEACHING THE TOUGH TOPICS

I'll never forget my personal angst when first encountering *Archaeopteryx*. How could I, as an Adventist studying science, make sense of this strange creature, the earliest fossil generally considered a bird? Indeed, *Archaeopteryx* combines reptilian and avian features, exactly what one would expect to see if birds evolved from reptiles.

At the time, I was beginning graduate study in paleontology at Loma Linda University (California) and wanted to contribute to a faith-informed interpretation of life's history. However, I found it a challenge to make sense of that history within the framework of existing denominational models. Fortunately, I had dedicated Adventist professors "by my side" during this difficult journey, teachers who shared with me the latest research on vertebrate paleontology, but who also engaged me in critical dialogue about that science as informed by a biblical worldview. For this, I am very grateful.

Now, as an Adventist paleontologist and college biology teacher, I face the other side of the question. How can I help *my* students mature spiritually and intellectu-

## How can the Adventist educator help students deal with difficult issues while preserving intellectual integrity and enhancing faith in God and His Word?

BY H. THOMAS GOODWIN

ally as they study life's history? How do I help them deal with the tensions and explore the opportunities at the interface of biblical and scientific interpretation? The challenges come from both within and without.

In the secular world, both popular and academic cultures challenge the commitment of Adventist students to bring all of life and thought under the purview of Scripture. In their homes and churches, many Adventist young people have been given simplistic answers that have ill-prepared them to deal with the realities of modern science. Despite the challenges, I believe that the rewards are commensurate. After all, we want

our young people to serve as effective witnesses for Christ in a culture infused by the claims (and often pseudo-claims) of science!

### What to Teach

There is so much to consider when studying the history of life and of the Earth—scientifically, philosophically, biblically—that it is difficult to know where to focus. When I deal with this area in my classes, I emphasize three core issues faced by most Adventist youth. These issues can be sum-

marized as three questions that form the “content core” of my teaching in this area:

1. Can I *do* good science, informed by a biblical point of view?
2. How do I deal with the concept of evolution?
3. How can I interpret the fossil record and geological time periods within a biblical framework?

**B**ut this is only a beginning. Selecting content is easy; effectively teaching it is not. How should the Adventist teacher address these questions? Or, put another way, how can the Adventist educator help students deal with difficult issues while preserving intellectual integrity and enhancing faith in God and His Word? I will offer four general suggestions, fleshed out below, as well as one or two specific, practical ideas for each. These suggestions come from my experience in general, and specifically from seven years of teaching a class at Andrews University in Berrien Springs, Michigan, that centers on these issues, “Historical and Philosophical Biology.”

### Honesty

I’m thankful that my teachers at Loma Linda University didn’t hide the tough issues from me. Having faced them in a climate supportive of Adventist faith, I could do in-depth studies at a secular institution without fearing that my faith would be threatened. Perhaps that is why I feel passionately that we as teachers must be completely honest with our students. We must offer them more than caricatures and glib condemnations. They need to learn about the realities of modern science, including those difficult to accommodate within standard Adventist models. For example, I make sure my students are aware of and have to think about strange, “intermediate” creatures such as *Archaeopteryx* (see sidebar), geological evidence for long ages, and so forth. I also readily admit when I don’t know how to accommodate such information.

Being honest about science, however, also involves exploring its humanness. Many students do not understand the relationship between various components of science (especially the differences between “data” and “interpretation”) and lack the skill to critically evaluate scientific information. They need to understand that scientific claims—even well-accepted ones—are not necessarily fact. I use specific case examples to explore this issue, showing how scientists who begin with different presuppositions and follow different lines of inquiry can arrive at remarkably divergent interpretations. (A par-

ticularly helpful example highlights the work of Leonard Brand, an Adventist scientist who has worked on the Coconino Sandstone of Arizona. See the sidebar.)

In the preceding paragraphs, I have emphasized the importance of honesty in science. I believe this philosophy also applies as we engage students in biblical study and theological reflection. Many of my students, for example, are surprised to find that conservative, Bible-believing Christians have explored a range of models in trying to harmonize the biblical account and scientific data. I provide

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a selection of such models, ranging from traditional young-Earth Flood geology to theistic evolution, to get students thinking about the options.

But this is not enough. Students also need to honestly evaluate each of these models in light of the Bible and theological concerns. Some students will latch onto a novel idea, like theistic evolution, because it solves some scientific issues, while failing to adequately reflect on the biblical support for, and theological implications of the position. Again, I want my students to seriously *think* about the implications of various positions. If Adventists are to be “people of the Book,” we must directly challenge our students, and ourselves, to truthfully engage that Book as we explore God’s creation.

An outcome of such honesty is a real sense of humility. I’m amazed at how much I *don’t* know, both about nature and the Bible, and this tempers my confidence about any model I may construct. (By the way, I’ve found that stridently confident individuals on all sides of the creation-evolution debate often oversimplify available evidence.)

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## ARCHAEOPTERYX

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While *Archaeopteryx* appears only as a handful of specimens from the Solnhofen Limestone of Germany,<sup>1</sup> some of these are exquisitely preserved (see figure above). Generally recognized as the oldest known bird (from the late Jurassic), *Archaeopteryx* combines clear avian features, such as wings with modern-looking feathers (white arrow), with reptilian features such as clawed fingers, teeth, and a long, bony tail (black arrows). It is the kind of animal that might be expected in evolution, with early members of the bird lineage falling morphologically between reptilian ancestors and later, full-blown birds. Indeed, because it was discovered soon after Darwin published *The Origin of Species*, *Archaeopteryx* has long been used to support evolutionary theories.<sup>2</sup>

Although *Archaeopteryx* certainly seems reptilian in many respects, its feathers are fully bird-like. The wing feathers, for example, are asymmetrical—one edge is narrower than the other—an aerodynamic feature characteristic of modern flying birds.<sup>3</sup> Recent work has documented feather-like structures on what appear to be dinosaurs from China, suggesting that feathers may not be unique to birds.<sup>4</sup>

### Respect and Falseness

“I don’t know about the evolutionists, but *I* didn’t descend from a monkey!” Have you heard quips such as this? They are crowd-pleasers that show up routinely in sermons and lectures by well-meaning pastors and teachers. Such quips are often based on caricatures and simplistic assumptions that reveal a misunderstanding of evolutionary ideas and the people who hold them. They depend largely on ridicule for their persuasive power. If we really want our young people to witness for Christ in a scientifically informed society, we must avoid crowd-pleasing rhetoric and simplistic models, and learn to how to dialogue—and disagree—in a respectful way.

**B**ut respect must extend beyond our treatment of science and scientists. Most of our students come from Adventist families with strongly held corporate beliefs about life’s history. Since we’re in the business of helping our students probe, evaluate, and claim personal ownership of their beliefs, it is natural that, during this process, critical questions will arise. However, we must model respect for our church and its teachings as we lead students in this challenging but rewarding journey. Our communal understandings are certainly incomplete and may sometimes prove wrong, but they do reflect a long history of prayerful thought.

One way to show such respect is to fairly represent Adventist thought to our students. I try to do this in a number of ways. First, I organize my course to explicitly deal with content areas that Adventists find most relevant. Second, I highlight the work of Adventist scientists. Quite a number of them have made useful contributions to understanding life’s history based on and motivated by a biblically informed perspective. (One example is highlighted in the

Coconino sidebar below) It's important for our students to understand and appreciate these contributions.

A final thought on respect. Students typically enter my classes with naive and simplistic understandings of historical biology and geology. For example, a surprising number have been told by parents or teachers that dinosaurs were not real creatures but were "made up" by scientists attempting to support evolution. I think it's cru-

## COCONINO SANDSTONE

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The Coconino Sandstone, an ancient (Permian) rock unit exposed along the Grand Canyon, is well-known for its fossil footprints. Most geologists interpret these sands as evidence of a vast, ancient desert, with the sandy layers deposited by wind. Leonard Brand, an Adventist scientist, developed an interest in this sandstone because of his biblical perspective. If the Permian rocks were laid down in the biblical flood, he reasoned, one might expect them to have been laid down under water.

Typical Coconino trackways show normal animal locomotion, with toes pointing in the same direction as the animal is heading (main trackway up the center of the slab illustrated above). Several features of these trackways (for example, the distinct detail preserved in each track) are more readily explained if the animal was walking through water, rather than on dry or damp sand.<sup>5</sup> The most convincing evidence for the underwater origin of these tracks, however, may be odd trackways in which the toes of individual footprints are pointing one direction, whereas the animal was moving at nearly a right angle to this direction.<sup>6</sup> Two such trackways are marked in the pictured slab, each above a diagonal string. Note how individual toe marks point at an angle of about 90 degrees (marked by small black arrows in the topmost trackway) to the direction the animal is moving (along the string). This is difficult to explain if the track maker is walking on desert sand but makes sense if the animal was pushed sideways by currents while attempting to walk up the dunes.

Whatever the outcome of this particular debate, which is ongoing, Brand's research shows how a creationist perspective can foster original contributions to science.

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### Personal Engagement

After honesty and respect, my third suggestion is to actively foster students' personal engagement with the issues. This approach has risks because one can't simultaneously tell students what to think and promote their personal involvement in the process! As they struggle with the evidence, students come to varying conclusions. But I think it's worth the risks. Furthermore, this approach seems to reflect the philosophy set forth by Ellen White: "It is the work of true education, to train the youth to be thinkers, and not mere reflectors of other men's thought" (*Education*, p. 17). But how does the teacher accomplish this?

Here are several suggestions that have worked well for me. First, I assign students to read materials that take contrasting approaches

or offer divergent interpretations about a particular topic, then lead them in a critical discussion (*not* lecture) about these readings. Students thus have to think about and interact with the contrasting claims, and do the difficult work of *thinking for themselves*.

**S**econd, I seek to strike a balance between overselling my own views and offering too little guidance and insight. Many students are convinced that the way to get a good grade is to figure out what the teacher thinks. Once they do that, they stop thinking. So I often wait to explain my personal views until late in the school term, by which time students have already wrestled with most of the major issues. This must be done with caution, however, as it's beneficial for students to see how others have nego-

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iated the way before them. I typically introduce in general terms my approach early in the term, model that approach as best as I can during subsequent class periods, and then lay out my thoughts in considerable detail late in the semester. (By the way, students are usually eager to hear this lecture!)

**F**inally, I've come to appreciate open-ended, reflective journaling as a way to stimulate personal engagement. Scientists like to emphasize the "hard facts" in learning, but such "facts" can be meaningless if students fail to connect learning with life. Reflective journaling around a set of well-chosen questions provides a remarkable opportunity for students to "pull together" classroom learning and life.

## Storytelling


If you teach about the interface of science and faith, you likely have experienced some struggles in working through the issues. (That certainly characterizes my experience.) I've searched long and hard to achieve harmony between a faith informed by honest biblical scholarship and theological reflection on the one hand, and the best of scientific work on the other. I've found peace in my search, although not complete answers. I've also experienced a number of interactions with secular colleagues that have helped me think about this enterprise more carefully.

Every year that I teach, I'm amazed at what happens when I share

these experiences. Students who are half asleep suddenly pay attention. The story does more than just hold their interest. Students find that they are not alone as they wrestle with science and faith. They discover that others have experienced the same internal tensions and struggles while remaining faithful to God and His Word.

Another approach, one that works well here at Andrews University, is to assign interviews with thoughtful scientists, teachers, and clergy. I ask students to do four such interviews during my course, two with biology teachers, one with a scientist in an area other than biology, and one with a theologian or pastor. Students must choose from a list of potential interviewees whom I know have thought carefully about the issues at hand. Students routinely tell me how much they appreciated this assignment and the chance to hear how various Adventist professionals have dealt with the tensions they faced.

## Finding Faith

As Adventist science teachers, we have a remarkable opportunity to influence young people. We can help our students grow in academic understanding, and this is rewarding. We can also model and encourage the kind of respectfully critical thought that needs to characterize the Adventist's engagement with a highly secularized world, and this is even more rewarding. But most rewarding of all is to watch our students develop a deeper, more mature faith in God and His Word, one that holds firm *when the tough issues have been engaged.* 

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**H. Thomas Goodwin** teaches biology and paleontology at Andrews University in Berrien Springs, Michigan. He is a vertebrate paleontologist with published work on the systematics, biogeography, microevolution, and ancient biology of fossil squirrels. He also has worked in a collaborative team seeking to understand how fossils come to be concentrated in certain fossil beds.

*Dr. Goodwin has an active interest in the interface of Adventist faith and the historical sciences and particularly enjoys teaching a course in this area, "Historical and Philosophical Biology."*

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1. Peter Wellnhofer, "Archaeopteryx," *Scientific American* 262 (May 1990), p. 70.
2. Ibid.
3. Ibid., p. 73.
4. See, for example, J. Qiang, Phillip J. Currie, Mark A. Norell, and J. Shu-An, "Two Feathered Dinosaurs From Northeastern China," *Nature* 393 (June 1998), pp. 753-761.
5. Leonard R. Brand, "Field and Laboratory Studies of the Coconino Sandstone (Permian) Vertebrate Footprints and Their Paleocological Implications," *Palaeogeography, Palaeoclimatology, Palaeoecology* 28 (1979), p. 37.
6. Leonard R. Brand and Thu Tang, "Fossil Vertebrate Footprints in the Coconino Sandstone (Permian) of Northern Arizona: Evidence for Underwater Origin," *Geology* 19 (December 1991), pp. 1,201-1,204.