The Grand Canyon and the Age of the Earth – A Christian Scientist's View

As a Christian scientist, Dr. Bohlin is open to examining the theories of both young-earth and old-earth scientists to explain what we can observe today. The Grand Canyon provides an excellent venue to consider the theories of both groups on how the geological layers were formed and when this occured.

The Age of the Earth and Genesis 1

How old is the earth? How long has this planet been here? Ask most Christians this question and you will likely receive a quick, self-assured answer. All would be well if you could count on receiving the same answer! However, some will very quickly tell you that the earth was created during creation week and can be no more than six to ten thousand years old. Other Christians will tell you, with just as much confidence, that the earth is 4.5 billion years old. This is no minor discrepancy! What adds even more to the confusion is the fact that you can find both opinions within conservative evangelical circles. You can even find both opinions within the ranks of the few Christian geologists with Ph.D.s! Let me assure you that this is just as confusing for me as it is for you.

The age of the earth is a question both of biblical interpretation and scientific investigation. Unfortunately, neither Christian conservative Old Testament scholars nor Christian scientists are in universal agreement. This topic covers a broad spectrum of issues so I am going to try and narrow the focus of the discussion. I will first briefly discuss the biblical aspects of the question, then move on to geology, the flood, and the Grand Canyon.

First, how do the “young-earth” and “old-earth” positions view the Scriptures? Let me emphasize right at the start that both young- earth and old-earth creationists bring a reverent and submissive attitude to Genesis. The difference is a matter of interpretation. Well-known young-earth creationists Henry Morris, Duane Gish, and Steve Austin, from the Institute for Creation Research, interpret the days of Genesis 1 as literal 24-hours days, the genealogies of Genesis 5 and 11 as consecutive or nearly consecutive generations, and the flood as a universal, catastrophic event. This leaves little room for much more than ten to thirty thousand years as the true age of the earth.

Old earth creationists such as astronomer Hugh Ross of Reasons to Believe see the days of Genesis as long periods of time, perhaps even millions of years. Genesis 1, then, describes the unfolding of God’s creation through vast periods of time. God still does the work, it is still a miracle, but it takes a lot longer than seven days. The flood of Noah necessarily becomes a local event with little impact on world-wide geology. Other old-earth creationists simply suggest that what is communicated in Genesis 1 is a literary form of the ancient Near East describing a perfect creation. Genesis 1 was never intended to communicate history, at least in their view. Personally, my sympathies lie with a Genesis interpretation that is historical, literal, and with 24-hour days in the recent past. But the testimony of science, God’s natural revelation, is often difficult to correlate with this view. The earth has many layers of sediments thousands of feet thick. How could one year-long catastrophe account for all this sediment? The answers may surprise you!

The Grand Canyon

The Grand Canyon is almost three hundred miles long, a mile deep, and four to twelve miles across. One’s first view of the Grand Canyon is a humbling experience. You truly have to see

it to believe it. I was mesmerized and could hardly contain my excitement when I caught my first glimpse of the canyon. I was there to partake in a six-day geology hike into the canyon with the Institute for Creation Research, a young-earth creationist organization. ICR believes that the strata, the layers of rock in the Grand Canyon, were primarily formed during Noah's flood perhaps only five thousand years ago. Most geologists, including Christian old-earth creationists, believe that the strata were laid down over hundreds of millions of years. What better way, then, to equip myself for the study of the earth's age, than to spend nine days around the Grand Canyon (six of them in it) with ICR geologists, physicists, and biologists. ICR has been conducting these tours for over ten years, so everything runs extremely well. Though I was a member of a hiking group, they also sponsored a group going down the Colorado River in rafts and a group touring the whole area by bus. All were accompanied by ICR scientists. Each day we received mini-lectures from the leaders as we broke for lunch or at points of interest along the trail. Topics included the sudden appearance of fossils, the complexity of the earliest canyon fossils such as the trilobites, the age of the earth's magnetic fields, the role of continental drift in the onset of the flood, where does the ice age fit into a young-earth model, water- canopy theories, carbon-14 dating, and the dating of the Grand Canyon basalts (rock layers derived from ancient lava flows).

We examined many evidences for rapid formation of rock layers, which is essential to the young-earth model. We spent nearly two hours at the Great Unconformity between the Tapeats Sandstone, which is dated at about 500 million years old, and the Hakatai Shale, which is dated at about 1.5 billion years old. These two formations were formed nearly one billion years apart in time, yet one lies right on top of the other. Nearly a billion years is missing between them! The night before entering the canyon for the hike, I wrote these words in my journal:

> *If these strata are the result of Noah's flood and the canyon carved soon afterward, the canyon stands as a mighty testament to God's power, judgment, and grace. Even if not, what a wonderful world our Lord has sculpted for us to inhabit. His love is bigger than I can grasp, bigger—infinitely bigger—than even the Grand Canyon!*

Evidence of Noah's Flood in the Grand Canyon

One of the more obvious formations in the Grand Canyon is the Coconino Sandstone. This prominent formation is found only a few hundred feet below the rim of the canyon and forms one of the many cliffs in the canyon. Its distinctive yellow cream color makes it look like a thick layer of icing between two cake layers.

Evolutionary geologists have described this sandstone as originating from an ancient desert. Remnants of sand dunes can be seen in many outcrops of the formation in a phenomenon called cross-bedding. There are many footprints found in this sandstone that have been interpreted as lizards scurrying across the desert.

These footprints would seem to pose a major challenge to young- earth geologists who need to explain this formation in the context of Noah's flood. Since there are many flood-associated layers both above and below this sandstone, there is no time for a desert to form in the middle of Noah's flood. Recent investigations, however, have revealed that the cross-bedding can be due to underwater sand dunes and that some footprints are actually better explained by amphibians moving across sandy-bottomed shallow water. Perhaps this formation can be explained by sand deposited under water.

This explanation does not entirely solve the young-earth geologists' problem, because it is still difficult to

determine where the amphibians came from and how they could be crawling around in shallow waters on top of sediments that would have to be deposited halfway through a world-wide catastrophic flood. But let’s go on to another flood evidence. Earlier, I mentioned the Great Unconformity. This can be observed throughout the Grand Canyon where the Tapeats Sandstone, a Cambrian formation estimated to be 570 million years old, rests on top of any one of a number of Precambrian strata ranging from one to two billion years old.

Our group observed a location in the Unconformity where the time gap between the two layers is estimated to be one billion years. It is very unusual, even for evolutionary geology, for two layers from periods so far apart, in this case one billion years, to be right on top of one another. It is hard to imagine that no sediments were deposited in this region for over a billion years! Evolutionary geologists believe that the upper sandstone was deposited over hundreds of thousands of years in a marine environment. However, we observed large rocks and boulders from a neighboring formation mixed into the bottom few feet of the Tapeats Sandstone. This indicates tremendous wave violence capable of tearing off these large rocks and transporting them over a mile before being buried. This surely fits the description of a flood rather than slow deposition. We spent nearly two hours at this location and we were all quite impressed with the clear evidence of catastrophic origin of the Tapeats Sandstone.

That the Coconino Sandstone likely had a water-deposited origin and that the Tapeats Sandstone was laid down in a great cataclysm are necessary elements for a young-earth flood geology scenario for the Grand Canyon.

The Erosion and Formation of the Grand Canyon

Perhaps one of the most interesting questions about the Grand

Canyon is how it was cut out of rock in the first place. The answer to this question has a lot to do with how old the canyon is supposed to be. The puzzling factor about the Grand Canyon is that the Colorado River cuts directly through an uplifted region called the Kaibab Upwarp. Normally a river would be expected to flow towards lower elevation, but the Colorado has cut right through an elevated region rather than going around it.

The explanation you will still find in the National Park literature is that the Colorado began to cut the Grand Canyon as much as 70 million years ago, before the region was lifted up. As the uplift occurred, the Colorado maintained its level by cutting through the rock layers as they were lifted up. Thus the Grand Canyon was cut slowly over 70 million years! In recent years, however, evolutionary geologists as well as old-earth creationists have abandoned this scenario because it just isn't supported by the evidence. A major reason is that even at the present rate of erosion in the Grand Canyon, it would take as little as 71,000 years to erode the amount of rock currently missing from the Grand Canyon. Also, all of the sediment that would have to be eroded away during 70 million years has not been located. And lastly, evolutionists' own radiometric dates of some of the surrounding formations indicate that the Colorado River has been in its present location for less than five million years.

Some old-earth geologists have tentatively adopted a new theory that requires a few rather strange twists. This theory suggests that the Colorado River flowed through the area of the Grand Canyon only recently. The Colorado originally was forced in the opposite direction of its current flow by the Kaibab Upwarp and actually flowed southeast toward the Gulf of Mexico. This ancestral Colorado River may have occupied the course of what is now the Little Colorado River, only in the opposite direction of its current course.

This theory further suggests that about five million years ago

a westward-flowing stream began to erode, upstream or towards the east, over what is today the Grand Canyon, through the Upwarp and capturing the ancestral Colorado River! If this sounds a little fantastic to you, you're probably right. In a recent volume on the Grand Canyon, a geologist, while maintaining this theory to be solid, admits a lack of hard data and that what evidence there is, is circumstantial. Into this controversy step the young-earth creationists, who need to explain how the Grand Canyon was formed, strata and all, in less than 5,000 years. They suggest, quite reasonably I think, that the canyon was formed when the Kaibab Upwarp acted as a dam for three lakes occupying much of Utah, Colorado, and northern Arizona. These lakes catastrophically broke through the Upwarp, and the Grand Canyon was cut out of solid rock by the drainage of these lakes through this breach in the dam. A small canyon was formed this way recently as a result of the eruption of Mount St. Helens. Grand Coulee in Washington state was formed when an ice dam broke at the end of the Ice Age. This breached-dam theory answers a lot of questions the old-earth theories do not, and it needs to be considered.

Uncertainties of Dating the Grand Canyon

I have noted that old-earth creationists believe that the Grand Canyon strata were formed over hundreds of millions of years and that the canyon itself was carved out in less than five million years. Young-earth creationists, on the other hand, believe that the strata of the canyon were formed as a result of Noah's flood and that the canyon was carved out catastrophically less than five thousand years ago. A critical question to ask is, how can we know how old the rocks in the Grand Canyon really are? The usual solution is to date the rocks by radiometric dating methods, which are supposed to be capable of dating rocks billions of years old. Rocks of volcanic origin are the best ones to use in dating rocks this way, since radiometric elements are plentiful in them. The Grand Canyon has volcanic rocks near the bottom and at the

top. ICR has been involved in a project over the last several years to date these volcanic rocks. Their results not only call into question the age of the Grand Canyon but also the reliability of radiometric dating.

The youngest rocks in the Grand Canyon are recognized by all to be volcanic rocks in western Grand Canyon that flowed from the top of and into the canyon. The oldest rocks that have been dated are volcanic rocks called the Cardenas Basalt, a Precambrian formation near the bottom of the canyon. The rubidium- strontium method, however, has dated the Cardenas basalt at one billion years and the lava flow on top of the canyon at 1.3 billion years. This is clearly impossible! Rocks on the bottom of the canyon are 300 million years younger than very recent rocks on the very top of the canyon! These dates were obtained by ICR from samples they sent to several independent dating labs. Something is amiss, either in the interpretation of the rocks, the dating methods, or both.

As we have seen, ICR scientists have come a long way in showing that many of the Grand Canyon strata could have formed rapidly, that erosion of the canyon by the Colorado River has not been going on for tens of millions of years, and that there are significant problems with the dating of the canyon.

However, there are still significant questions that remain to be answered if the young-earth model is to be taken seriously by old- earth geologists. For example, why are there no vertebrates among the fossils of the ocean floor communities of the Grand Canyon strata when vertebrates inhabit today’s ocean floors? How did the many different kinds of sediments in the Grand Canyon (limestones, sandstones, shales, mudstones, siltstones, etc.) find their way to Northern Arizona as a result of one catastrophe and become so neatly stratified with little mixing? I raise these questions only to indicate that there is much work to be done. I also want you to realize that when someone asks me whether the flood of Noah created the Grand Canyon, I have to say that I don’t know. And that’s

okay! The creation was a real historical event, Adam and Eve were real people, and the flood of Noah was real history as well. But finding the physical signs of these events can be tricky business. We need to encourage scientific investigation from both a young-and old-earth perspective because the testimony of God’s word and His revelation from nature will ultimately be in harmony. It may just be hard to discern what that harmony is right now.