GRAND CANYON DATING UNDERCUTS CREATIONISM

Millions of people stubbornly refuse to believe that the Earth is older than about 10,000 years. Anything older is inconsistent with their understanding of the Creation, and is therefore rejected a priori. Oh, how wrong they are!

Within the United States, the most common psychological yardstick for Earth's antiquity is the Grand Canyon in Arizona. Seeing it from above is unforgettable. One is immediately struck by the mile-deep chasm beneath the Colorado Plateau. Seeing it from below is also unforgettable. The erosive power of its foaming, grit-laced rapids is self-evident. Could such a canyon be carved in only 5,000 years, as young Earth creationists suggest? Was it cut by single torrent when Noah's flood drained away?

The answers lie in an extraordinary paper published earlier this year in Science by investigators from the Department of Earth and Planetary Sciences at the University of New Mexico. Before their work, geologists had a pretty good idea of how and when the Grand Canyon formed. But they were unable to determine the rate of erosion beyond the last million years. The new paper applies recent advances in uranium-lead dating methods to a very old idea - that cave deposits could be used to date the vertical erosion of the canyon at any level, at any point along its length.

The growth rate of a human fingernail provides an example of slow, steady growth that can be compared with the slow, steady carving of a canyon. Fingernails grow at an average rate of slightly more than a tenth of a foot per year, which translates to slightly more than an inch and a quarter. According to the new paper, the Grand Canyon was cut at a rate more than 300 times slower than a fingernail grows. According to the young Earth creationists, the canyon was cut at a rate 10 times faster than a fingernail grows.

The scientists calculated the erosion rate for 10 sites extending the full length of the canyon. At each site, they sampled a bulbous type of cave deposit called a mammillary coating, a name that gives you some idea of what they look like.

Unlike classic stalagmites or stalactites, which form in open air, mammillary coatings form only when shallowly submerged by water. In a cave, shallow submergence indicates an elevation just beneath the water table in the adjacent aquifer. In turn, this closely approximates river level. Luckily, the coatings contain enough naturally occurring uranium so they can be dated by the radioactive decay of uranium isotopes to lead isotopes.

Plotting the elevation of a water table indicator above the river against the age at which it formed yields the rate of vertical erosion at that point. By plotting a number of such points, scientists worked out the style and rate of canyon cutting in both space and time. This methodology is unimpeachable. The results are completely consistent with what had been previously known.

It turns out that the Grand Canyon is really two canyons, an older one to the west and a younger one to the east. The western canyon began to form about 20 million years ago by the progressive erosion of a small river system toward its head. This erosion took place at an average rate of about one-quarter of one-thousandth of a foot per year. In the eastern canyon, the rate of erosion is double that rate, and didn't begin in earnest until about 4 million years ago. This was shortly after the eastern and western watersheds merged to become a through-going river.

Three points emerge from this study that should be heeded by those tempted to accept young Earth creationism as a matter of faith. First, the story of an older and younger canyon merging is
inconsistent with the notion of a single biblical deluge. Second, canyon cutting is a fairly steady process, not a catastrophic one. Third, the long-term rate of erosion demands that the process began 4,000 times earlier than the young Earth creationists would suggest.