Why Do We Have Waterfalls ?

Christopher Chui, Ph. D.

An interesting question occurred to me some time ago, i.e., why do waterfalls exist? For several years, I have conducted repeated experiments on many samples of rocks from many localities, such as those in southern California, northern California, Hawaii Islands, and those from the Colorado River near the Grand Canyon area. All rock samples show rapid rates of erosion. If the waterfalls exist for millions of years, or even 1 million years, we should not expect to see them exist at all, because water currents would have cut the falls into V-shaped channels. But since they exist, I conclude that the waterfall cannot be millions of years.

To account for the reason how I came to the above conclusion, I have to recap what I have done with those rocks from various localities. I made an assumption that the rock samples are typical of the environment where those rocks were collected. I am grateful to many dedicated people collected those rock samples for me, including a professional geologist, a fossil collector, and a tourist guide. Next, I assume that those rock samples are also representative of those found in riverbeds near the location where rock samples were collected. These assumptions are not unreasonable. I then use the agent of water to erode the rock samples.

The first set of experiments assumes that the rocks roll at the bottom of the river, where rapid river currents push them. To simulate rolling stone experiment, I placed the rock samples inside a cement mixer at a rotation rate of about 60 cm/sec. Normally, when river water runs at 60 cm/sec, there is no detectable erosion. But when the velocity of water reaches 100 cm/sec, erosion starts to occur (Leet and Judson 1965). However, the cement mixer forces the rocks to tumble, erosion must occur even at low speeds. The results of the tumbling experiment were curve fitted using the best exponential decay curves, assuming that the final product to be weighing 0.001 gram, which is about the size comparable to a grain of sand (A grain of rice is about 0.02 gram). In this way, test results show that the hardest rock took only 30 some hours to become sand or mud.

However, many big rocks do not move, either they are embedded at the bottom or at the side of the river. Only fast running water will erode them. A literature search showed that some researchers in Germany (Reineck and Singh 1980) have determined that a moderate rainfall will generate water speeds of about 500 cm/sec. The heaviest rainfall could generate river currents of up to 1000 cm/sec. For the British minded reader, 1000 cm/sec is equivalent to about 22 miles an hour, a very slow speed indeed, considering people in America race their cars exceeding 65 miles per hour on freeways. Even city driving speed is about 35 miles per hour.

I tested the water speeds using a flowmeter at a water hose in my backyard. I could only obtain speeds of about 30 cm/sec. This makes sense, because if the water speed exceeds 100 cm/sec, water pipes start to erode, implying catastrophic consequences for house water pipes. We will need a lot more plumbers to fix our broken eroded pipes!

The rescue came from the famous Newtonian equations. By using the force of gravity, I dropped the water from a height of about 6 feet. Gravity pulls the water down. I calculated that the velocity of the water is about 530 cm/sec when the water reaches the rock samples. Erosion must occur at such water speed. After data analysis and curve fitting, the results show that the hardest rock took about 90 years to erode. However, there is no rainfall that would last 90 years. I then assume that if it rains one week per year, it would take 90 x 52 years to erode the rock. Therefore, it would take less than 5000 years to erode the hardest rock. Repeated experiments also show that the tumbling experiment is about 180 times more rigorous than the dropping water experiment. In addition, the dropping experiment only uses a small water column of about 1 cm in diameter. In nature, the volume of water is hundreds to thousands times more than what I use. Therefore, my results are minimal results. That means nature will erode rocks much faster than what I have done. When the total effects of water erosion are taken into consideration, all rivers will erode deep into the riverbeds, which will translate into canyons. Now we know that canyons are rare on earth, when compared with rivers. I conclude that the rivers cannot be millions of years old, otherwise we should see for every river, there will be a canyon.

Vegetation usually protects against erosion. But trees do not grow in the river; trees grow at the sides of the river. This means that rivers will cut into the rocks and perhaps uproot some trees on riverbanks. While this situation does occur, especially in tropical rain forests, the rarity of canyons gives testimony for the youth of these rivers.

Those who want technical data to support the above claim should consult the Creation Technical Journal for details in a tumbling experiment (Chui, 1997) and Creation Research Society Quarterly (Chui, 1998) for technical details on the dropping water experiment.

Next time, if you see a river or a waterfall, praise God that He made them after the Flood of Noah, which is about five thousand years ago.

References:

Chui, C. (1997): Creation Ex Nihilo Technical Journal, Vol. 11(Part 3), 1997, pp. 335-343.

Chui, C.(1998): Creation Research Society Quarterly, June 1998, pp. 39-41.

Leet, L. Don and Judson, Sheldon. 1965. Physical Geology, 3rd Edition. Prentice-Hall. Englewood Cliffs, NJ. P. 136.

Reineck, H.-E. and Singh I.B. (1980): Depositional Sedimentary Environments, 2nd edition, Springer-Verlag Berlin-Heidelberg, New York, p. 9.

LOGOS GRADUATE SCHOOL

P. O. Box 9264, Canoga Park, CA 91309 (818) 718-7319 fax (818) 718-2819