Devils Tower can be explained by floodwater runoff

Michael J. Oard

Devils Tower, Wyoming, is likely the conduit of an eroded volcano, but there are three other hypotheses for its origin. Regardless, more then 300 m of High Plains sedimentary rock was eroded with the Tower hardly touched. The uniformitarian story, as formerly stated on a road sign north of the Tower, is that erosion of the High Plains sedimentary rocks took more than 40 Ma. That sign has been replaced, and it now says it took only 1 to 2 Ma. However, the erosion of such a vertical tower should be rapid and complete well within 100,000 years. Although the Tower is actively eroding today, it has not decreased much in size, implying a very recent exposure. Such a deduction is consistent with the sheet flow erosion during the runoff of the floodwater: a contention contrary to the uniformitarian paradigm.

Devils Tower in the Powder River basin of northeast Wyoming, United States, is one of the most impressive erosional remnants on Earth (figure 1). It stands 390 m high above the Belle Fouche River, reaching an altitude of 1,560 m above sea level. It is about 275 m above the general altitude of the plains. Because of its scenic beauty and scientific interest, President Theodore Roosevelt established Devils Tower and a small area surrounding it as the first national monument in 1906.

The vertical, round tower is 300 m in diameter at its base and is composed of phonolite porphyry, a hard igneous intrusive rock. The same rock also intrudes elsewhere through sedimentary rocks in the region.[1] For instance, just west of Devils Tower are the Missouri Buttes with the same kind of rock.

When the igneous rock of Devils Tower cooled and contracted, vertical columns with regular cracks were formed similar to those in the large basalt flows cooled in the extensive Columbia River Basalt flows in Washington, northern Oregon, and adjacent Idaho (figure 2). A Kiowa Native American legend suggests the vertical columns were caused by a great bear raking the sides in trying to get to some children at the top of the Tower. The phonolite porphyry is believed to be 33 to 55 Ma (million years) old and therefore erupted in the early to middle Cenozoic of the uniformitarian timescale.[1]

Figure 1. Devils Tower in northeast Wyoming, United States. Note the vertical fractures, called joints, that should result in rapid erosion from the freeze-thaw mechanism.

The origin of Devils Tower

The circular shape of the Tower and the vertical columns has led most geologists to believe that Devils Tower is the conduit or "throat" that was once below a volcano.[2,3] If so, it had to *erupt through sedimentary rocks* that were near or above the top of the tower. Thus, over 300 m of sedimentary rocks have been eroded from around the Tower, and by inference, from this entire region of northeast Wyoming. This much erosion is reinforced by reference to the Pumpkin Buttes, a sedimentary erosional remnant, farther south in the middle of the Powder River basin.[4]

However, there are two other hypotheses for the origin of Devils Tower. A second hypothesis is that the Tower represents an igneous intrusion, called a stock, that solidified deep underground. A third hypothesis postulates that Devils Tower is an

Figure 2. The "feathers" of eastern Washington, United States, composed of a single row of large columns from the Columbia River Basalt. The features were exposed by erosion on either side by the Lake Missoula flood.

eroded laccolith, which is a mushroom-shaped, igneous intrusion. A fourth idea, shown on the new road sign (see figure 4) states that Devils Tower is a remnant of a sill, which is lava squirted and solidified between two layers of sedimentary rocks.

However, the erosion of a stock or laccolith is unlikely to produce such a circular feature as Devils Tower, and the suggestion that erosion of a sill would result in such a circular tower is forced. The first hypothesis, that of a volcanic neck, is the most reasonable explanation.

Regardless of which hypothesis is correct, the important point is that Devils Tower was once *completely* covered by sedimentary rocks, and this rock was eroded to expose Devils Tower. A sign in the visitor's center even states that the sedimentary rock was once 2.4 km thick and eroded over 50 Ma, which means that the sedimentary rock is believed to have been six times the height of Devils Tower. I do not think there is any evidence for this uniformitarian belief, but we do know that the sedimentary rocks had to be thicker by 300 m to cover the Tower.

The changing story of high plains erosion

A previous road sign north of Devils Tower National Monument described the length of time for the exposure of Devils Tower (figure 3). Geologists believed that the top 25% was exposed 40 Ma ago. So, the remainder of the sedimentary rock took 40 Ma to erode to the present landscape. *But, this requires Devil Tower to remain with little change in its diameter or height for 40 Ma!* How could both hard sandstone and soft shale from the High Plains be eroded without any significant erosion of the Tower itself? Furthermore, the plains sediments are not found in some huge flood plain to the east or southeast (downslope). The sediments have been swept clean from the continent.

However, this story of slow erosion with the Tower hardly eroded in 40 Ma must have seemed outrageous even to uniformitarian scientists. In fact, the sign has been replaced (figure 4). Admitting that the origin of the prominent rock obelisk remains "somewhat obscure", the sign goes on to state how the Tower has become exposed in only the past 1 to 2 Ma! So, instead of the extremely slow erosion of the Plains sandstone and shale, 300 m of erosion has occurred within 2 Ma. This is a rather radical change of ideas on the High Plains erosion rate. Whereas the previous estimate was much too slow, compared to today's erosion rate, the new estimate now seems too fast, especially in view of the fact that the Tower has changed its diameter little in all that time.

Why should Devils Tower remain standing for millions of years?

The measurement of river sediment output into the oceans[5] indicates that all of North America would have been eroded flat to sea level in just 10 Ma. However, this does ignore a range of geotectonic factors. Regardless, a maximum erosion time to level North America is probably no more than 40 to 50 Ma.

The survival of Devils Tower is especially puzzling because vertical rock faces are more erosive, being affected by gravity with rock slides and falls. Furthermore, the extensive vertical cracks of the tower would be prone to destruction by freeze-thaw weathering. Cracks fill with water during storms, and as the water freezes during the cold months, the cracks enlarge. One would expect blocks of rock to frequently break free and fall to the base of the tower each winter. And indeed that is what is observed:

> "While living near the base of the Tower in November 1954, during periods of frost action at nights one could hear blocks crash onto the talus. This would happen typically after a snowfall … On a warm sunny day the snow would melt and the moisture would enter the joints [vertical cracks] in the Tower. After dark, the water would freeze and expand, which over time continues to force blocks from the Tower and build more talus."[6]

Devils Tower should have been destroyed quickly, surely in less than 100,000 years.

But, most perplexing (to uniformitarian geologists) is that the Tower appears to be close to the *same* size today as when it was first exposed:

"There is no evidence to support the idea that these masses of igneous rock were appreciably larger than they are at present, or at least larger than the present area covered by their talus aprons."[7]

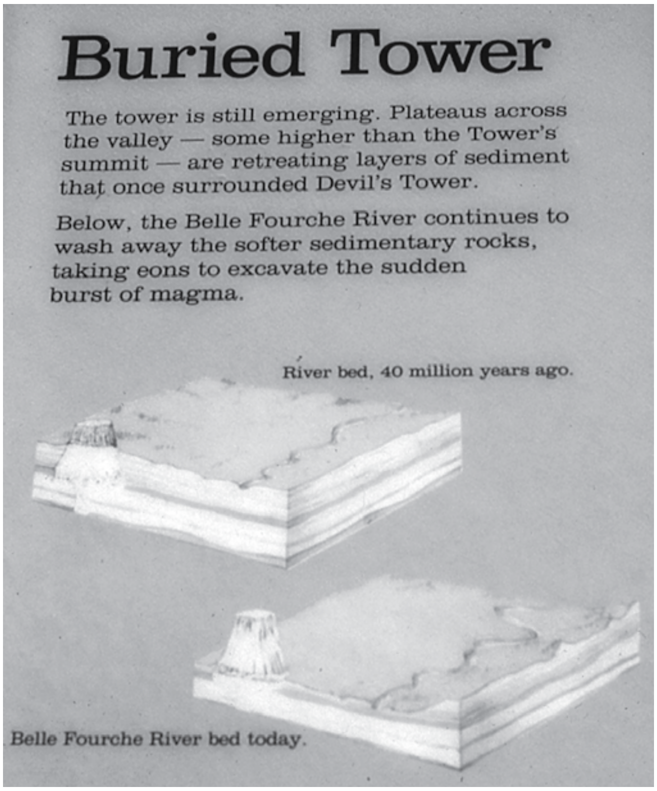

Figure 3. A road sign that used to be at Devils Tower National Monument showing the uniformitarian interpretation of slow erosion over millions of years. According to uniformitarianism, just the top 25% of the Tower was exposed 40 Ma ago. Erosion since then has lowered the hard sandstone and soft shales of the High Plains about 185 m, while the Tower remained almost untouched.

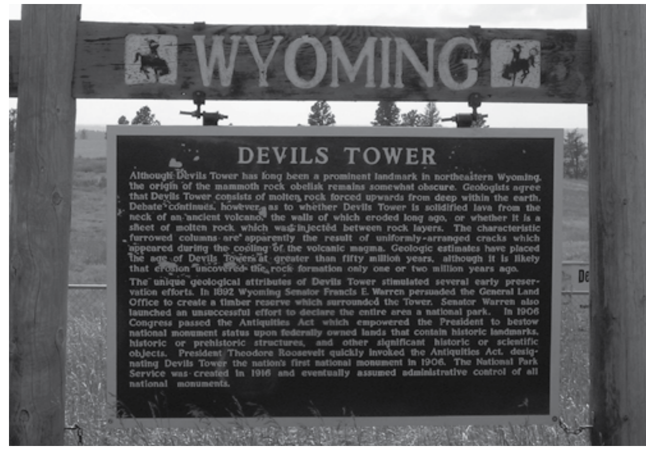

Figure 4. A new road sign which says that Devils Tower became exposed in only 1 to 2 Ma.

Furthermore, the amount of talus around Devils Tower is modest,[8] reinforcing the deduction that erosion was both *fast and recent*.

Flood explanation

It seems that the only way to explain Devils Tower is to allow for the rapid erosion of the High Plains sedimentary rocks by a wide sheet of flowing water, leaving behind an erosional remnant of the lava conduit. This is consistent with sheet flow erosion as the floodwater was draining off the continent.[9,10] The Tower remained tall after the Flood probably because the rock from the Tower was more resistant and/or the current erosion rates were reduced in the area.

Floods typically leave behind erosional remnants. For instance, the Lake Missoula flood in the upper Grand Coulee eroded through 275 m of basalt lava in a matter of

Figure 5. Steamboat Rock, a 275 m high erosional remnant of basalt lava in the Upper Grand Coulee, Washington. The lava around Steamboat Rock was eroded in a few days by the lake Missoula flood.

days. In the middle of the Upper Grand Coulee lies a 275 m erosional remnant left after the flood,[11] called Steamboat Rock (figure 5).

Figure 6 is a schematic of what should happen to Devils Tower if High Plains erosion occurred over millions of years in the uniformitarian paradigm, based on what we know of present erosion rates. In contrast, figure 7 is a schematic of erosion expected during Flood runoff, leaving behind a tall, little eroded, vertical tower that has not decreased in size much since it was exposed. Clearly, the Flood paradigm better fits the evidence.

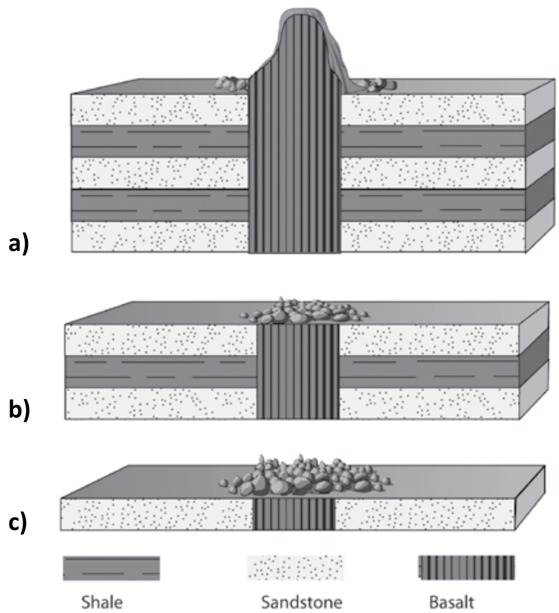

Figure 6. Schematic of Devils Tower erosion with realistic erosion rates over millions of years.

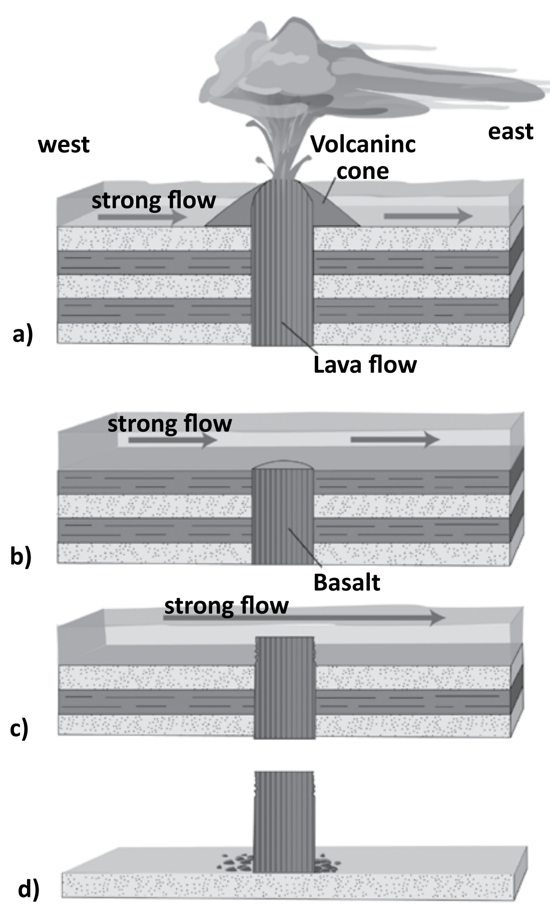

Figure 7. Schematic of Flood runoff erosion of the sedimentary rocks around Devils Tower, leaving the Tower as an erosional remnant after the Flood.

References

1. Robinson, C.S. and Davis, R.E., *Geology of Devils Tower, Wyoming*, Devils Tower Natural History Association, p. 1, 1995.
2. Blackstone, Jr., D.L., Traveler's Guide to the Geology of Wyoming, 2nd ed., *Geological Survey of Wyoming Bulletin 67*, Geological Survey of Wyoming, Laramie, WY, p. 42, 1988.
3. Lageson, D.R. and Spearing, D.R., *Roadside Geology of Wyoming*, Mountain Press, Missoula, MT, pp. 98–100, 1988.
4. Blackstone, ref. 2, pp. 94–95.
5. Roth, A.A., *Origins—Linking Science and Scripture*, Review and Herald Publishing, Hagerstown, MD, pp. 263–266, 1998.
6. Robinson and Davis, ref. 1, p. 36.
7. Robinson and Davis, ref. 1, p. 58.
8. Robinson and Davis, ref. 1, pp. 57–58.
9. Walker, T., A biblical geological model; in: Walsh, R.E. (Ed.), *Proceedings of the Third International Conference on Creationism*, technical symposium sessions, Creation Science Fellowship, Pittsburgh, PA, pp. 581–592, 1994.
10. Oard, M. J., *Flood by Design: Receding Water Shapes the Earth's Surface*, Green Forest, AR, 2008.
11. Oard, M. J., *The Missoula Flood Controversy and the Genesis Flood*, Creation Research Society Monograph No. 13, Creation Research Society, Chino Valley, AZ, p. 109, 2004.

Michael J. Oard has an M.S. in atmospheric science from the University of Washington and is now retired after working as a meteorologist with the US National Weather Service in Montana for 30 years. He is the author of *An Ice Age Caused by the Genesis Flood*, *Ancient Ice Ages or Gigantic Submarine Landslides?*, *Frozen in Time,* and *Flood by Design*. He serves on the board of the Creation Research Society.