

## **Part XIII**

### **Rapid Channelized Erosion**

In this new volume and part, we change gears so to speak. Most of the features described earlier are features typical of the Sheet Flow Phase of the Flood. As more and more mountains and plateaus are exposed above the Floodwater, the more the flow transforms from sheet flow to channelized flow, since the water needs to go around these obstacles (see Chapter 3). The transformation is expected to begin first in the areas that are first exposed, which mostly would be the current high altitudes. As time progresses, the transition from sheet flow to channelized flow descends to current low areas of the continents and even offshore, as we will see. It is important to realize that sheet flow erosion and erosional features are formed first, then channelized flow features would be *superimposed* on top of the sheet flow landforms. We will begin in this part with the origin of continental valleys.

## Chapter 59

### The Origin of Valleys

Continental valleys come in all sizes and shapes. Some are shallow, steep-walled vertical canyons and others are as deep as the Grand Canyon. Some valleys have a V-shape, they too can be either large or small. It appears V-shaped valleys form slowly while vertically walled canyons are formed more rapidly.

#### The Great Debate over the Origin of Valleys

Surprisingly, valley formation is very rarely seen and only in association with a flood catastrophe. Theories about valley formation, therefore, are a non-scientific enterprise and depend largely upon what the theorist believes about the past.



*Figure 59.1. Zion Canyon in Zion National park, Utah, is more than 2,000 feet (600 m) deep.*

The origin of valleys was strongly debated around the 1800s. Uniformitarian scientists in the enlightenment said it would take millions of years to form broad deep valleys. Their existence (Figure 59.1) was one of the more forceful arguments presented to support an old age for the

earth and uniformitarian assumptions.<sup>1</sup> Catastrophists as they were called in those days, held the valleys were carved by catastrophic flows of water. Some thought they came from the Genesis Flood, other scientists said they were from another source, like huge tsunamis. But this argument is no longer significant as an argument for uniformitarianism and against the Flood, as Dr. John Reed has shown.<sup>2</sup>

The debate was basic: which came first, the valley or the river?<sup>3</sup> Figure 1.8 shows an illustration of the two concepts. In Scotland, Hutton and Playfair, claimed streams and rivers slowly eroded the valleys, and cataclysmic events, like a global Flood, had nothing to do with their formation. Uniformitarian geologists won the day and simply declared streams or rivers came first and eroded the valleys slowly over millions of years.<sup>4</sup> To this day the vast majority of geologists accept this conclusion.

The change in thinking in the late 1700s and early 1800s allowed scientists to reject the Genesis Flood as the agent responsible for valley formation. This was *not* a reasoned argument based on objective fieldwork. It was an *arbitrary, subjective* decision; a philosophical rejection of the history recorded in the Hebrew Bible. There was no clear scientific evidence (despite their claims) and there is no real proof that valleys were eroded slowly over millions of years. Although some features of some valleys could suggest long periods of river erosion and landsliding from the valley walls, many others indicate a catastrophic excavation of valleys. On balance, that explanation is the most consistent with the evidence, as we shall see.

### **But Some Valleys Modified by Ice**

Ironically, in Scotland where uniformitarian got its start with James Hutton and where scientists convinced everyone that valleys were eroded by water over millions of years, scientists soon discovered *ice* had carved the valleys or at least modified a water-carved valley.<sup>5</sup> Hence, a process no longer observed today (ice) was responsible for some valley carving, challenging the concept of uniformitarian from its conception.

The valley of Rock Creek in the northeastern Beartooth Mountains of south-central Montana (Figure 59.2) provides an example of a valley initially carved by water and then modified by glaciation. Early erosion was responsible for the widespread planar erosion at the top of the granite core, but it did not stop there. Later, the erosion was channelized carving linear valleys. The valleys were further modified during glaciation ending with a U-shaped valley.

Modern geologists handle the many exceptions to uniformitarianism under the heading of “actualism”. This can be defined as “uniformitarianism except when the evidence demands otherwise” (see Chapter 2). They have to admit the rock record often demands processes that are *no longer observed* in the area and rates of processes *much greater* than today. They even

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<sup>1</sup> Chorley, R.J., A.J. Dunn, and R.P. Beckinsale, 1964. *The History of the Study of Landforms or the Development of Geomorphology—Volume One: Geomorphology before Davis*, Methuen & Co LTD, London, U.K., pp. 63-64, 125-139.

<sup>2</sup> Reed, J.K., 2011. Three early arguments for deep time—part I: time needed to erode valleys. *Journal of Creation* 25(2):83-91.

<sup>3</sup> Powell, J.L., 2005. *Grand Canyon: Solving Earth's Grandest Puzzle*, PI Press, New York, NY, p. 28.

<sup>4</sup> Schumm, S. and F.G. Ethridge, 1994. Origin, evolution and morphology of fluvial valleys. In, Dalrymple, R.W., R. Boyd, and B. A. Zaitlin (editors), *Incised-Valley Systems: Origins and Sedimentary Sequences*, SEPM Special Publication No. 51, Tulsa, Oklahoma, p. 11.

<sup>5</sup> Baker, V.R., R. Greeley, P.D. Komar, D.A. Swanson, and R.B. Waitt, Jr., 1987. Columbia and Snake River plains. In, Graf, W.L. (editor), *Geomorphic Systems of North America*, Geological Society of America Centennial Special Volume 2, Boulder, CO, pp. 403-468.



grudgingly admit to occasional catastrophes. As long as billions of years are affirmed and the Genesis Flood denied, any interpretation seems to be valid. That is what is meant when geologists aver that any reasonable “naturalistic” process can be invoked to explain a phenomenon. Biblical history is automatically considered to be unreasonable. The *ad hoc* or arbitrary, subjective nature of this approach is obvious.



Figure 59.2. Rock Creek Valley cut about 4,000 feet (1,220 m) into the northeast Beartooth Mountains. The valley later widened to a U-shape by glaciation.

### **Rapid Excavation of Valleys**

The eruption of Mount St. Helens has taught us much about catastrophic processes and the subsequent volcanic mass movements, called lahars.<sup>6</sup> Scientists observed the rapid, catastrophic formation of canyons with vertical or near-vertical walls in both unconsolidated sediment and solid rock.<sup>7</sup> The old valley of the North Fork of the Toutle River consists of up to 600 feet (180 m) of volcanic debris, most of it from lahars. Some of this debris was layered, some are quite thin, identical to what we find in sedimentary rock. On March 19, 1982, a small eruption of Mount St. Helens melted snow within the crater and formed a large mudflow. The mudflow eroded back and downward, forming a 140-foot (43 m) deep canyon with vertical walls. It is approximate 1/40th that of the Grand Canyon—and was carved in a single day! Moreover, the

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<sup>6</sup> Morris, J.D. and S.A. Austin, 2003. *Footprints in the Ash*, Master Books, Green Forest, AR.

<sup>7</sup> Morris and Austin, Ref. 6, pp. 78–77.

canyon has dendritic tributaries feeding into the main canyon giving the appearance of tens of thousands of years of landscape development. A small stream now flows down the canyon, appropriately called the Little Grand Canyon. If a geologist knew nothing of its formation, he would most likely conclude the canyon was slowly eroded over many thousands of years by the small stream. But he would be misled by his uniformitarian assumptions. The canyon came first!



Figure 59.3. Burlingame Canyon, Walla Walla Valley, southeast Washington. The canyon is about 125 feet (38 m) deep and formed in six days. Dennis Bokovoy (arrow) provides the scale.

### **Vertical-Walled Valleys Young**

It is well known that vertically-walled canyons form today in floods and are young. This has been observed and inferred many times. Such observations show us that deep, vertically-walled canyons must have been caused by a catastrophic flow of water.

### **Post-Flood Carving of Vertical-Walled Canyons**

The youth of Little Grand Canyon is shown by its vertical walls. Innumerable recent valleys formed in soft sediments possess vertical walls, such as Burlingame Canyon, southeast Washington (Figure 59.3), formed in six days by the diversion of water from an irrigation ditch down a side channel.<sup>8</sup>

During the Lake Missoula flood, dozens of vertical-walled valleys cut in hard basalt were formed in days.<sup>9</sup> Grand Coulee has vertical walls up to 900 feet (275 m) high (Figure 59.4). Moses Coulee, about 10 miles (16 km) to the west of Grand Coulee, has vertical walls over 500 feet (150 m) high (Figure 59.5). Frenchman Coulee near Vantage, Washington, cut by a receding waterfall during the Lake Missoula flood, has 300-foot (90 m) vertical walls (Figure 59.6).

<sup>8</sup> Oard, M.J., 2004. *The Missoula Flood Controversy and the Genesis Flood*, Creation Research Society Monograph No. 13, Chino Valley, AZ, p. 45..

<sup>9</sup> Oard, M.J., 2004. *The Missoula Flood Controversy and the Genesis Flood*, Creation Research Society Monograph No. 13, Chino Valley, AZ.



Palouse Canyon has vertical walls 500 feet (150 m) tall (see Figure 85.7). All these hard rock canyons were carved in a few days by the Lake Missoula flood.



Figure 59.4. Upper Grand Coulee with vertical walls 900 feet (275 m) high cut in hard basalt in a matter of days by the Lake Missoula flood.

### U-Shaped Valleys Transform into V-shape with Time

Geomorphologists know that vertical-walled valleys soon develop a more V-shaped profile with time as the valley slope decreases.<sup>10,11</sup> Twidale noted:

...valleys incised in a new surface tend to be relatively deep and steep-sided ... It is safe to predict, however, that with the passage of time, the valleys will be widened, and that eventually they will develop a narrow V-shaped cross section...<sup>12</sup>

Pazzaglia wrote: “Erosion rates are most rapid where slopes are steep—a concept not fully popularized until Ahnert (1970).”<sup>13</sup>

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<sup>10</sup> Twidale, C.R., 1968. *Geomorphology with Special Reference to Australia*, Thomas Nelson LTD, Melbourne, Australia, pp. 148-203.

<sup>11</sup> Bloom, A.L., 1978. *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice-Hall, Englewood Cliffs, NJ, pp. 163-196.

<sup>12</sup> Twidale, Ref. 10, pp. 164-165.

<sup>13</sup> Pazzaglia, F.J., 2004. Landscape evolution models. In, Gillespie, A.R., S.C. Porter, and B.F. Atwater (editors), *The Quaternary Period in the United States*, Elsevier, New York, NY, p. 249.



*Figure 59.5. Vertical walls of Moses Coulee, 10 miles (16 km) west of Grand Coulee, that are commonly over 500 feet (150 m) high (view south from north end of Jameson Lake).*



*Figure 59.6. Frenchman Coulee, carved 300 feet (90 m) deep into Babcock Bench, a ridge on the western edge of Quincy Basin, during the Lake Missoula flood.*

There are rare exceptions to this general rule, however. For instance, when a slope is capped by a resistant layer, a V-shaped profile can change to a U-shaped one. The bottom of the slope



can be more eroded than the upper slopes by river erosion and greater weathering at the base.<sup>14</sup> However, these exceptions are local and temporary—insignificant within the millions of years assumed by uniformitarian geologists. With greater time, V-shaped valleys broaden—as describe by most of the geomorphic models discussed in Part X.



Figure 59.7. Grand Canyon.

### **“Old” U-Shaped Valleys Catastrophically Carved and Young**

Most valleys are V-shaped.<sup>15</sup> Some of these valleys are indeed shallow and young, but others are considered many millions of years. However, there are also *hundreds of vertical-walled canyons* that are also thought to be very old, including the Grand Canyon (Figure 59.7)! Zion National Park is known for its exquisite vertical-walled canyons incised up to 2,000 feet (600 m) in sandstone, for instance near and at The Narrows, a slot canyon that is only 30 feet (9 m) wide at the bottom in some locations (Figure 59.8).<sup>16</sup> Deep vertical-walled canyons with hanging tributary valleys are cut through the tableland of eastern Australia forming the Blue Mountains (see Figure 11.2). Steep valley walls was one of the reasons that King (1982, p. 27) considered the rivers of eastern Natal, South Africa, to be geologically young.

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<sup>14</sup> Twidale, Ref. 10, p. 171.

<sup>15</sup> Crickmay, C.H., 1972. Discovering a meaning in scenery. *Geological Magazine* 109:173.

<sup>16</sup> Oard, M., T. Vail, D. Bokovoy, and J. Hergenrather, 2010. *Your Guide to Zion and Bryce Canyon National Parks: A Different Perspective*. Master books, Green Forest, AR.





*Figure 59.8. The Narrows in Zion National Park, a slot canyon about 30 feet (9 m) wide with walls about 1,500 feet (455 m) high.*

The Rio Grande River flows through Santa Elena Canyon in Big Bend National Park, Texas. The lower seven miles (11 km) of this canyon has vertical walls 1,700 feet (520 m) high. In

places, the walls are no more than 30 feet (9 m) apart.<sup>17</sup> Although these vertical-walled valleys are geomorphologically young, they are often considered many millions of years old!



Figure 59.9. Little River Canyon, Alabama.

Little River Canyon is cut into Lookout Mountain in northeast Alabama.<sup>18</sup> Lookout Mountains is 80 miles (127 km) long and varies in width from 1.25 miles to 10 miles (2-16 km). This narrow mountain or ridge is around 1,600 feet (488 m) above the valleys to the southeast and northwest. The top is actually a plateau. Interestingly, Little River runs parallel to the long axis of the plateau and even comes within 500 feet (150 m) of breaching the eastern rim! Given immense amounts of time, this short distance should have been completely cut through by erosion. In its lower reaches, the river flows in a vertical-walled canyon cut up to 500 feet (150 m) deep into the hard sandstone capping the plateau (Figure 59.9). This canyon also has hanging tributary valleys. Entrenched meanders also have formed (see Chapter 61), and the river seems too small to have eroded the canyon. Hence, Little River is an underfit stream (see Chapter 62). All these features add up to a youthful river, much younger than uniformitarian scientists would claim.

Crickmay noted that there are vertically-walled canyons and scarps that show little or no wasting of their sidewalls.<sup>19</sup> Such canyons should be quite young. Crickmay was puzzled by this disparity:

And another question—indeed, a burning one—how scarps credited with long-continued retreat, such as Vermilion Cliffs, Utah, can stand at angles much steeper than those attributable to long-term wasting, and be almost free of debris at their feet.<sup>20</sup>

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<sup>17</sup> Williams, E.L. and G.F. Howe, 1996. The Formation of Santa Elena Canyon, Big Bend National Park: origin speculations. *Creation Research Society Quarterly* 33(2):89-96.

<sup>18</sup> Akridge, A.J., 1998. A Flood-based origin of Little River Canyon near Ft. Payne, Alabama. In, Walsh, R.E. (editor), *Proceedings of the Fourth International Conference on Creationism*, technical symposium sessions, Creation Science Fellowship, Pittsburgh, PA, pp. 9-20.

<sup>19</sup> Crickmay, C.H., 1974. *The Work of the River: A Critical Study of the Central Aspects of Geomorphology*, American Elsevier Publishing Co., New York, NY, p. 141.

<sup>20</sup> Crickmay, Ref. 19, p. 225.



The lack of talus is a sign of a youthful cliff. Maybe this 2,000-foot (610 m) cliff, as well as the vertically-walled valleys, was not eroded slowly over millions of years. Such features are actually consistent with a recent global flood during the Channelized Flow Phase.

### **Late Flood Incision of Valleys**

Does the biblical worldview have a recent event that can cause deep, vertically walled canyons? Yes, indeed, it is the Genesis Flood, during the Channelized Flow Phase. Such features reinforce a large number of other landforms that provide evidence that the Genesis Flood was responsible for the geomorphology of the earth, including the formation of large valleys, rather than streams and rivers over millions of years. While water is known to have shaped the land (we agree here), it was not the kind envisioned by uniformitarians!

When you think of a mudflow at Mount St. Helens forming a canyon 1/40<sup>th</sup> the scale of the Grand Canyon in a *single* day, and then you think of the scale of the Genesis Flood covering the whole earth, then it becomes very clear how valleys and canyons could be rapidly excavated during the Channelized Flow Phase of the Retreating Stage of the Flood. This recent event explains the scale of the features, their apparent youth, and the absence of debris at the base of the cliffs.

Uplifting continents and sinking ocean basins would accelerate the water flowing off the continents to high velocity. Downvalley flowing currents may have been moving at velocities in excess of 100 mph (160 kph) transporting large rocks that would be the excavating “tools” for rapid valley erosion. Valley erosion was so rapid that in some valleys tall, narrow inselbergs were left hanging, such as Spider Rock in the upper part of Canyon de Chelly, northeast Arizona (Figure 59.10). Such vertical walled valleys and inselbergs in valleys would not occur if erosion were slow over millions of years.



*Figure 59.10. Spider Rock in Canyon de Chelly, northeast Arizona.*