Chapter 76

Sensational Water Gaps North America

There are numerous large and small water gaps in North America. This chapter will briefly describe some of the major water gaps found in western United States, Canada, and Alaska. There are only a few wind gaps of note in this region.

Some water gaps like Hells Canyon between Oregon and Idaho, the Green River through the Uinta Mountains, and the Grand Canyon through the Kaibab Plateau are gigantic gorges that cut through mountain barriers or plateaus. Madole and others wrote:

> In numerous places, especially in the Southern and Middle Rockies, rivers cut across uplifts cored by resistant rocks in preference to what appear to be more logical courses on softer rocks around the uplifts.[1]

Thornbury corroborated the large number of water gaps in the western United States: "A striking aspect of stream courses in the Rocky Mountains is the large number of streams that flow directly across mountain uplifts through deep gorges…"[2] Charles Hunt in the scholarly book *Physiography of the United States* wrote, "Many of the rivers in the Rocky Mountains have developed anomalous courses 'through the mountains, not around them.'"[3] What could have driven so many rivers to cut through mountain ranges?

The Snake River through Hells Canyon

One of the most significant water gaps in western North America is Hells Canyon. It cuts through the Wallowa Mountains in northeast Oregon and the Seven Devils Mountains in Idaho.[4] On the Idaho side, the walls of Hells Canyon reach a height of 8,000 feet (2,440 m), making it the deepest canyon in North America,[5] even deeper than Grand Canyon. On the Oregon side near Hat Point, the canyon is only about 100 feet (30 m) deeper than Grand Canyon. Hells Canyon is about 90 miles (145 km) long, about 1/3 the length of Grand Canyon, measured from the Oxbow to the mouth of the Grand Ronde River.

The canyon was made famous by daredevil Evel Knievel, who tried unsuccessfully to "jump" it on his "skycycle" in 1974. Uniformitarian scientists believe the canyon was cut between two and six million years ago while the mountains uplifted. It was aided about 2 million years ago by the emptying of "Lake Idaho," supposedly an ancient lake that occupied the lower Snake River Basin in southwest Idaho.[6] The Snake River flows westward through southern Idaho. Before Hells Canyon was cut, the easiest path was from southwest Idaho westward through Oregon, but instead the river takes a northward turn and passes through the high mountains. There does not

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[1] Madole, R.F., W.C. Bradley, D.S. Loewenherz, D.F. Ritter, N.W. Rutter, and C.E. Thorn, 1987. In, Graf, W.L. (editor), *Geomorphic Systems of North America*, Geological Society of America Centennial Special Volume 2, Boulder, CO, p. 213.
[2] Thornbury, W.D., 1965. *Regional Geomorphology of the United States*, John Wiley & Sons, New York, NY, p. 330.
[3] Hunt, C.B., 1967. *Physiography of the United States*, W.H. Freeman and Company, San Francisco, CA, p. 270.
[4] Vallier, T., 1998. *Islands & Rapids: A Geological Story of Hells Canyon*, Confluence Press, Lewiston, ID.
[5] Vallier, Ref. 4, p. 7.
[6] Vallier, Ref. 4, pp. 26-27.

appear to be any evidence the river ever flowed through eastern Oregon.[7] We should see evidence of the ancient river, if it flowed even for a short time before cutting through Hells Canyon. It is claimed that volcanism and tectonics have destroyed the evidence of the old course.[8] But, the absence of evidence is not proof of anything.

Figure 76.1. A water gap through the Rattlesnake Mountains west of Cody Wyoming. The Shoshone River flows east toward the viewer.

The Shoshone River Water Gap

Another significant water gap is the Shoshone water gap that cuts through the Rattlesnake Mountains west of Cody, Wyoming (Figure 76.1). The Rattlesnake Mountains are a narrlow north-south range east of Yellowstone Park along the western edge of the Bighorn Basin. They are cored by hard granite and covered by sedimentary rocks that drape the core. As the mountains were uplifted, the sedimentary rocks were also lifted forming an anticline or ridge. The Shoshone River starts in southeast Yellowstone Park and flows east. It continues its easterly

[7] Wheeler, H.E. and E.F. Cook, 1954. Structural and stratigraphic significance of the Snake River capture, Idaho-Oregon. *Journal of Geology* 62:525-536.

[8] 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, p. 412.

course without deviation through the Rattlesnake Mountains. It appears the river excavated a gorge 2,500 feet (760 m) deep.

Figure 76.2. Buffalo Bill Reservoir showing wide low point to the south (view southeast). The arrow shows Shoshone water gap.

The most interesting aspect of this gap is the river could have easily gone around the Rattlesnake Mountains across a much lower area than the tops of the Rattlesnake Mountains, which end just 2 miles (3 km) south. When you drive west through the water gap, you can see just how easily the river could have shifted south and flowed around the southern edge of the Rattlesnake Mountains. Figure 76.2 is a view to the southeast across Buffalo Bill Reservoir, which is 325 feet (100 m) high, just west of the gap. The west end of the narrow water gap through the south end of the Rattlesnake Mountains is shown by the arrow. The wide gap to the south is so low that engineers had to build a dam to keep the reservoir water from spilling south. There is an irrigation canal that starts at this southerly dam and flows into the Bighorn Basin. When the valley sediments were higher in the past, the river should have *easily* gone south around the Rattlesnake Mountains. Why did the Shoshone River appear to continue its easterly course through the Rattlesnake Mountains?

Figure 76.3. Lodore Canyon of the Green River entering the eastern Uinta Mountains in a slot Canyon 2,300 feet (701 m) high. The river could have easily gone around the mountains toward the east and is considered only 5 million years old within the uniformitarian timescale.

The Green River Water Gap through the Uinta Mountains

Another significant water gap is associated with the Green River. It flows through southwest Wyoming to the Uinta Mountains, an east-west range which has almost a dozen peaks exceeding 13,000 feet (4,000 m). On the north side of the Uinta Mountains, the Green River first flows east, parallel to the mountains, before turning south, flowing through entrenched meanders cut into hard quartzite in the core of the Uinta Mountains.[2,9,10] This water gap is named Lodore Canyon or Gates of Ladore (Figure 76.3), a narrow slot canyon:

> But in the Canyon of Lodore, not only is the valley not wider than the river; there is no valley. Call Lodore what you will—arroyo, canyon, chasm, cleft, defile, gorge, gulch, rift—a "valley" it is not.[11]

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[9] Bradley, W.H., 1936. Geomorphology of the North Flank of the Uinta Mountains. *U. S. Geological Survey Professional paper 185—I*, Washington, D.C.

[10] Oard, M.J., 2013. The Uinta Mountains and the Flood: Part II. Geomorphology. *Creation Research Society Quarterly* 49(3):180–196.

[11] Powell, J.L., 2005. *Grand Canyon: Solving Earth's Grandest Puzzle*, PI Press, New York, NY, p. 48.

The river could have flowed only a few more miles (3 km) east and *passed around* the eastern end of the Uinta Mountains at a much lower elevation.[12] To add to the puzzle, the water gap is considered young, only about 5 million years old, within the uniformitarian timescale.[13]

How and why the Green River made it through the mountains is unknown, although there are a few hypotheses. John Wesley Powell, who first floated down the Green River through Lodore Canyon and into the Grand Canyon in 1869, was puzzled over the course of the river:

> Powell was struck by the manner in which the Green River *ignored and often bypassed* low-lying open valleys, only to *turn headlong into solid bedrock canyons*, such as the Canyon of Lodore on the east flank of the uplifted Uinta Mountains (emphasis mine).[14]

Bradley stated that the river ignores both the topography and structure (there are also other water gaps on the Green River), and that meanders are the same whether cut in hard or soft rocks:

> Likewise Sears has shown that the course of the Green River upstream and downstream from Lodore Canyon was superimposed through the Browns Park Formation. Its present course is *almost independent of topography and structure*. It flows in wide, well-formed meanders whose amplitude is approximately the same where the river flows through hard Uinta Mountain quartzite as where it flows through the soft Tertiary rocks (emphasis mine).[15]

Yakima River Water Gaps

Most western United States water gaps are in the Rocky Mountains, but a few are located west of the Rockies. Probably the most significant of these is a series of water gaps on the Yakima River between Ellensburg and Pasco, Washington. Logically, the Yakima River should have continued flowing from Ellensburg, Washington, eastward through a low pass into the Columbia River.[16] Instead, the river takes a southerly turn and cuts *incised meanders* through about five basalt lava ridges of the southwest Columbia River Basalts (See Figure 80.1)[17]

The uniformitarian conundrum is highlighted by the last lava ridge; the river breached the Rattlesnake Hills on the east and the Antanum Ridge on the west at Union Gap, just south of Yakima. The top of the lava ridge at Union Gap was over 1,640 feet (500 m) msl with a maximum height of 1,965 feet (600 m) msl before being breached. However, there is a lower gap, Konnowac Pass (arrow), about 4 miles (6 km) to the east that is only 1,245 feet (380 m) msl, approximately 655 feet (200 m) lower (Figure 76.4). Given uniformitarian conditions, a lake should have formed in the upper Yakima Valley that either drained eastward between the lava anticlines, or flowed south over the Rattlesnake Hills at Konnowac Pass. If the sediments in the upper Yakima valley were thicker in the past, the river could have simply taken a slight left-hand detour and flowed through Konnowac Pass. There is no evidence of a former lake nor is there any indication that the Yakima River ever flowed through Konnowac Pass. Apparently, the Yakima River decided to continue flowing *straight south* without regard to elevation!

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[12] Powell, Ref. 11, p. 8.
[13] Powell, Ref. 11, p. 152.
[14] Ranney, W., 2005. *Carving Grand Canyon: Evidence, Theories, and Mystery*, Grand Canyon Association, Grand Canyon, AZ, p. 63.
[15] Bradley, Ref. 9, p. 189.
[16] Baker et al., Ref. 8, pp. 408-411.
[17] Oard, M.J., 1996. Where is the Flood/post-Flood boundary in the rock record? *Journal of Creation* 10(2):270-271.

Figure 76.4. Konnowac Pass (arrow) and Union Gap, right center, are wind and water gaps, respectively, through the Rattlesnake Mountains east of Yakima, Washington.

Miscellaneous Water Gaps Western U.S.

Among the many other water gaps in western North America, several are worth mentioning here. Wyoming has many impressive water gaps, including the Sweetwater River in central Wyoming that cut a 330-foot (100 m) vertical notch, 30 feet (9 m) wide at river level, at the end of a granite ridge (see Figure 75.1). The river should have simply gone around the ridge only one-half mile (1 km) to the east.[18,19] (This gap is especially puzzling because the river cuts through the snout of a breached, plunging ridge or anticline.[20])

Another example is the Wind River, which flows first through the Owl Creek Mountains of north central Wyoming, a water gap about 3,000 feet (900 m) deep, and becomes the Bighorn River in the Bighorn Basin. Then the river passes through two more water gaps: (1) the Sheep Mountain anticline in the northeast Bighorn (Figure 76.5) and (2) through a saddle between the northern Bighorn Mountains and the Pryor Mountains (see Figure 61.5).[21] Entrenched meanders occur at the top of the ridge within the saddle.

All these rivers in Wyoming could have easily flowed around these barriers before the sediments in the valleys or basins were eroded to their present altitude. The water gaps in Wyoming are difficult to understand: "Drainage of the Wyoming basins is problematical because the rivers appear to disregard the structure."[22]

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[18] Thornbury, Ref. 2, pp. 332, 359.
[19] Hunt, Ref. 3, pp. 270–271.
[20] Twidale, C.R., 1976. *Analysis of Landforms*, John Wiley & Sons Australasia Pty Ltd, New York, NY, p. 444.
[21] Thornbury, Ref. 2, pp. 330-332.
[22] Short, N.M. and R.W. Blair, Jr. (editors), 1986. *Geomorphology from Space: A Global Overview of Regional Landforms*, NASA, Washington, D.C., p. 46.

Figure 76.5. Water Gap of the Bighorn River through the Sheep Mountain anticline just northeast of Greybull, Wyoming, in the Bighorn Basin. The anticline is about 1,000 feet (300 m) high.

In Colorado, the South Platte River cuts through the Front Range from its headwaters to the west.[23] The San Rafael River in Utah passes through the San Rafael anticline, disregarding both geological structure and rock type.[24] The San Juan River in southeast Utah passes through the Monument Upwarp within many entrenched meanders, including the Goosenecks (see Figure 61.2).[25]

Black Canyon of the Gunnison River is a water gap that now comprises Gunnison National Monument between Crawford and Montrose, Colorado.[26,27,28] This water gap is entrenched through hard metamorphic rocks in a gorge 1,750 feet (535 m) deep and 1,300 feet (395 m) wide at the Narrows (Figure 76.6). The walls of Black Canyon are laced with impressive dikes. The gorge is 2,240 feet (685 m) deep at Painted Wall. Instead of cutting through this rock barrier, the river should have flowed around on either side through soft rock at lower elevation.

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[23] Madole, R.F., W.C. Bradley, D.S. Loewenherz, D.F. Ritter, N.W. Rutter, and C.E. Thorn, 1987. In, Graf, W.L. (editor), *Geomorphic Systems of North America*, Geological Society of America Centennial Special Volume 2, Boulder, Colorado, p. 215.
[24] Short and Blair, Ref. 22, p. 44.
[25] Baars, D.L., 2000. *The Colorado Plateau: A Geologic History*, University of New Mexico Press, Albuquerque, NM, pp. 92–101.
[26] Short and Blair, Ref. 22, p. 12.
[27] Williams, E.L., 1998. Rapid canyon formation: the Black Canyon of the Gunnison River. *Creation Research Society Quarterly* 35:148-155.
[28] Michael Shaver, 2000, personal communication.

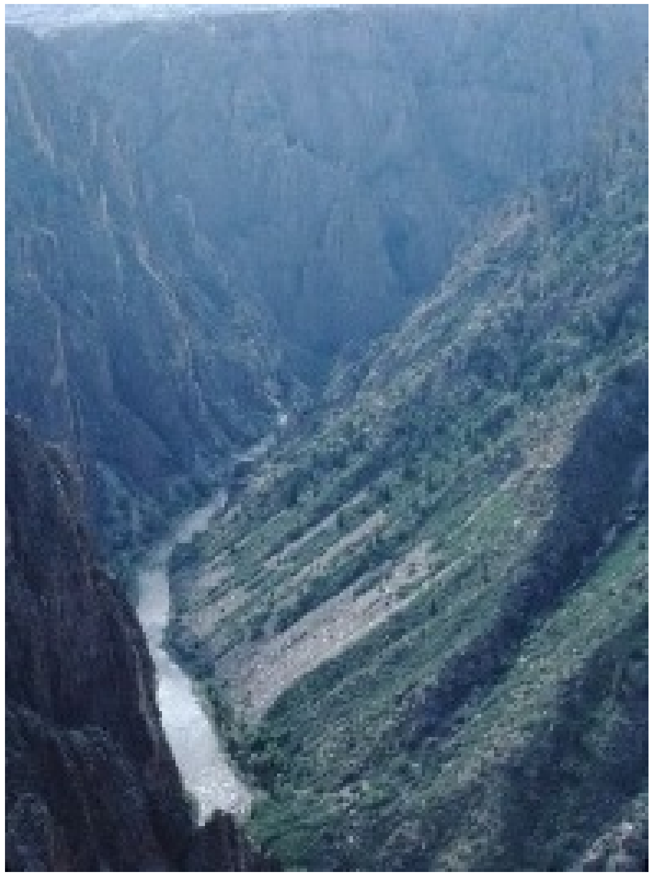

Figure 76.6. Black Canyon of the Gunnison River.

Unaweep Canyon Wind Gap

There are several good examples of wind gaps in the Rocky Mountains. One of the best example is Unaweep Canyon, a narrow canyon with *vertical walls cut about half way down* through the Uncompahgre Mountains of western Colorado (Figure 76.7).[29,30,31] The canyon is 25 miles (40 km) long and 3,000 feet (915 m) deep at the crest of the uplift of the Uncompahgre Mountains.[32] It is a mile (1.6 km) wide at the crest.

Uniformitarian geologists believe that the Gunnison River and probably the Colorado River once flowed through Unaweep Canyon when sediments were thicker in the valleys, but the continued uplift of the Uncompahgre Mountains diverted the rivers north around the mountains.[26,32] There are water-rounded exotic boulders in the wind gap just west of the highest point of the pass (Figure 76.8). The river's diversion is believed to have occurred in the late Pliocene, about 3 million years ago, which is very late in the uniformitarian geological time scale. It is interesting that the Unaweep wind gap is due west of an extension of the Gunnison River before the river turns north at Montrose.

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[29] Oard, M.J., 1998. Were the Colorado valleys cut during post-Flood or Flood times? *Creation Research Society Quarterly* 35:104-107.
[30] Shaver, M., 1998. Flood geology sheds light on Unaweep Canyon mystery. *Creation Research Society Quarterly* 34:218-224.
[31] Williams, E.L., 1999. Unaweep Canyon—another visit. *Creation Research Society Quarterly* 36:155-156.
[32] Cater, F.W., 1966. Age of the Uncompahgre uplift and Unaweep Canyon, west-central Colorado. *U. S. Geological Survey Professional Paper 550-C*, Washington D.C., pp. C86-C92.

Figure 76.7. Unaweep Canyon is a wind gap cut down about half way through the Uncompahgre Mountains of western Colorado. These mountains consist of a granite core draped by sedimentary rocks.

Figure 76.8. Rounded boulders just west of the crest in Unaweep Canyon wind gap.

Water Gaps Canada

In western Canada, there are many water gaps, attributed mostly to stream piracy (see Chapter 82).[33] Nine rivers start east of the coastal mountains and flow westward through the mountains in water gaps on their way to the Pacific Ocean.[34] Some of these water gaps are 5,000 to 8,000 feet (1,525 to 2,440 m) deep, *deeper* than Grand Canyon. Water gaps occur elsewhere in western Canada, for instance rivers that start west of the Rocky Mountains and flow east through

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[33] Holland, S.S., 1964. *Landforms of British Columbia: A Physiographic Outline*. British Columbia Department of Mines and Petroleum Resources Bulletin 48.

[34] Bostock, H.S., 1970. Physiographic subdivisions of Canada. In, Douglas, R.J.W. (editor), *Geology and Economic Minerals of Canada*, Part A, Geological Survey of Canada, Economic Geology Report 1, Ottawa, Canada, p. 26.

the mountains to the high plains.[35,36] One example is the Peace River, which flows from low areas of interior British Columbia northeastward *through* the central Canadian Rockies to the Canadian High Plains. The Mackenzie River of the Northwest Territory passes through the Franklin Mountains in a water gap 4,000 feet (1,200 m) deep.[37] The Dawson River cuts through ridges on the Yukon Plateau.[38] The Firth River and other streams completely cut through the eastward extension of the Brooks Range into the northwest Yukon Territory.[39]

In eastern Canada, rivers in the Torngat Mountains of northern Labrador cut through the central range on their way eastward to the coast.[40] Wind gaps also are reported from the Torngat Mountains.[41] In extreme northern Canada, the Horton River slices through the Smoking Hills upland.[42]

Water Gaps Alaska

The Alaska Range (see Figure 28.1) is an arc-shaped, generally east-west mountain range 600 miles (965 km) long in southern Alaska. It merges with the Wrangell and St. Elias Mountains on the east and the Aleutian Range on the west.[43] The highest mountain in North America, Denali (formerly Mount McKinley) at 20,135 feet (6,194 m) above msl, lies within the western Alaska Range. Most mountains are much lower with the crests of most of the range averaging between 7,000 and 9,000 feet (2,135 and 2,745 m) above msl. The lowlands north and south of the range are at low altitudes. The Tanana Basin to the north is a broad, swampy lowland with average elevation between 395 to 820 feet (120 and 250 m) above msl.[44]

Six rivers rise in the lowlands *south* of the range and flow northward across the range in water gaps to empty into the Yukon or Tanana River.[45,46,47] These rivers are located at semi-regular intervals of 25 to 100 miles (40 to 160 km) apart,[48] and from west to east they are the Nenana, Delta, Nabesna, Chusana, Beaver, and White Rivers. The northern foothills of the Alaska Range are a series of parallel east-west ridges, caused by folding and thrusting, and separated by long narrow valleys.[44] Just as mysterious, the drainage often passes perpendicular through these ridges and valleys:

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[35] Holland, Ref. 33, p. 109.
[36] Madole *et al.*, Ref. 23, p. 228.
[37] Bird, J.B., 1967. *The Physiography of Arctic Canada*. The Johns Hopkins Press, Baltimore, MD, p. 85.
[38] Bostock, Ref. 34, p. 22.
[39] Bostock, Ref. 34, p. 25.
[40] Odell, N.E., 1933. The mountains of northern Labrador. *The Geographical Journal* 82:322.
[41] Odell, Ref. 40, p. 208.
[42] Mathews, W.H., J.R. Mackay, and G.E. Rouse, 1989. Pleistocene geology and geomorphology of the Smoking Hills Upland and lower Horton River Arctic coast of mainland Canada. *Canadian Journal of Earth Science* 26:1,677-1,687.
[43] Wahrhaftig, C., 1958. The Alaska Range. In, Williams, H. (editor). *Landscapes of Alaska: Their Geological Evolution.* University of California Press, Los Angeles, CA.
[44] Bemis, S.P., 2004. *Neotectonic Framework of the North-Central Alaska Range Foothills*. M.S. thesis, University of Alaska, Fairbanks, AK.
[45] Thornbury, Ref. 2, p. 580.
[46] Thorson, R.M., 1986. Late Cenozoic glaciation of the northern Nenana Valley. In, Hamilton, T.D., K.M. Reed, and R.M. Thorson (editors), *Glaciation in Alaska: The Geologic Record*, Alaska Geological Society, Anchorage, AK, p. 99.
[47] Oard, M.J., 2008. Water gaps in the Alaska Range. *Creation Research Society Quarterly* 44(3):180-192.
[48] Wahrhaftig, C., 1965. Physiographic divisions of Alaska. *U.S. Geological Survey Professional Paper 482*, Washington D.C.

> Strangely enough, the drainage does not follow these valleys but has a dendritic pattern roughly at right angles thereto, the rivers cutting directly across ridges and valleys alike.[49]

In fact, the drainage of the rivers and tributaries is remarkably straight and parallel through these ridges.[50] The origin of this drainage pattern is a puzzle.

Figure 76.9. Delta River water gap (view north from Black Rapid Viewpoint).

The Nenana River is the first water gap to the west (see Figures 1.7). The main highway (George Parks Highway or Highway 3) from Anchorage to Fairbanks passes through this water gap, the highest point of which is only 2,363 ft (720 m) above msl. The next water gap to the east is the water gap of the Delta River in which the Richardson Highway (Highway 4) and the Trans-Alaska pipeline pass through (Figures 76.9). Both water gaps pass through a generally low area in the Alaska Range. How did such water gaps form?

Water gaps also occur south of the Alaska Range on the large Copper and Susitna Rivers. Muhs and others observed:

> The two largest rivers in the Alaskan PCMS [Pacific Coast and Mountain system] (the Susitna and Copper rivers) both cut directly across one or more mountain ridges as

[49] Wahrhaftig, Ref. 43, p. 52.

[50] Wahrhaftig, C. and R.F. Black, 1958. Quaternary and engineering geology in the central part of the Alaska Range. *U.S. Geological Survey Professional Paper 293*, Washington D.C.

narrow canyons more than 300 m deep, even though much lower drainage routes are available. These rivers are but two examples of hundreds of large streams with courses transverse to rock structure, that must have complex and polygenetic drainage histories…[51]

[51] Muhs, D.R., R.M. Thorson, J.J. Clague, W.H. Mathews, P.F. McDowell, and H.M. Kelsey, 1987. Pacific coast and mountain system. In, Graf, W.L. (editor), *Geomorphic Systems of North America*, Geological Society of America Centennial Special Volume 2, Boulder, CO, p. 523.