Chapter 19

Quartzite Gravel Locations in Oregon

Figure 19.1. Location of quartzite gravels in western Idaho, Oregon, and Washington. The triangles are small areas while the large green areas are large areas of quartzite gravel, cobbles, and boulders. The slanting red lines signify the quartzite is mixed with glacial debris.

Hundreds of billions if not trillions of well-rounded quartzite were carried hundreds of miles east and southeast from the western Rocky Mountains. Quartzite gravel was also transported west, all the way to the Pacific Ocean.[1] Figure 19.1 shows the numerous quartzite locations west of the Rocky Mountains in western Idaho, Oregon, and Washington. This chapter will describe the quartzite gravel found in Oregon and Chapter 20 will describe them in Washington.

The quartzites west of the Rocky Mountains commonly mixed with basalt and other types of rocks. They are also mixed with finer-grained sediments that were eroded in transport. Sometimes there are so many smaller-grained particles that the quartzite rocks appear to be floating within the sediments, as if the last transport was by mass flow, which is a downslope transport of rock, sediment, or both (see Appendix 10 on mass flow). Such quartzites, nevertheless, are still well rounded, indicating water transport earlier in their transport history.

Central Oregon

Quartzite gravel was spread southwest into central Oregon. One of the most impressive locations for well-rounded gravel is the top of Gold Hill, about 28 miles (45 km) north of Burns in central Oregon. Gold Hill has an altitude of 6,427 feet (1,959 m) msl and is at the

[1] Oard, M.J., J. Hergenrather, and P. Klevberg, 2006. Flood transported quartzites: part 2—west of the Rocky Mountains. *Journal of Creation* 20(2):71–81.

Figure 19.2. Quartzite gravel from on top of Gold Hill, Blue Mountains of central Oregon (John Hergenrather provides the scale).

top of the Blue Mountains. Quartzite cobbles are also found on the ridges and hills about a mile west and northwest of Gold Hill. A two-wheel drive road up to Gold Mountain is open during the summer. Small gullies and dirt forest roads have exposed cobbles that have been covered with around 10 inches (25 cm) of soil (Figure 19.2). The cobbles rest on andesite lava dated as Miocene by uniformitarian scientists. The quartzites are mixed with about 50% local types of rocks. The average rock size is about 2 inches (5 cm) in diameter with a maximum of about 6 inches (15 cm). Very few of the rocks contain percussion marks, unusual for quartzite gravel locations, and none were iron stained, also rather rare. Gold dust occurs amongst the quartzites—the main reason it is called Gold Hill. John Hergenrather and I saw numerous pits dug by gold diggers within the quartzite gravels. These quartzites are several mountain ranges from their nearest source in central Idaho, which tells us something about the tectonic events during and after the quartzites were spread (see Chapter 23).

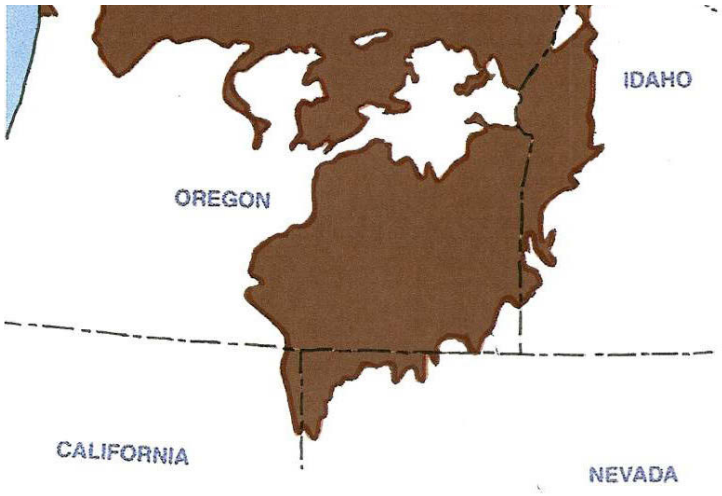

Figure 19.3. Area of the Columbia River Basalts (CRBs), including the Steens Volcanics of southeast Oregon that are now correlated to the CRBs (drawn by Mrs. Melanie Richard).

A second location in central Oregon is about 38 miles (60 km) west-northwest of Gold Hill in the Beaver Creek drainage, 9 to 15 miles (15 to 25 km) east of Paulina, central Oregon. Large, well-rounded quartzite rocks outcrop on the surface over an area of around 10 mi^2 (25 km^2). They are also found around 10 feet (3 m) deep in terraces along the south fork of Beaver Creek. The quartzites are mixed with about 50% local volcanic rocks. Their average size is around 5 inches (12 cm) in diameter with a maximum of about 12 inches (30 cm). About 5% of the rocks have percussion marks, and

there is very little iron staining. The rocks appear to have a lot of fine-grained particles surrounding them. Could the iron stain and percussion marks have been rubbed off during transport? These quartzite rocks have been transported about 280 miles (450 km) from the nearest source to the east-northeast in central Idaho.

Figure 19.4. 33 feet (10 m) thick outcrop in foreground of well-rounded mostly quartzite boulders just southeast of Lookout Mountain, 8,200 feet (2,500 m) msl high, Wallowa Mountains of northeast Oregon. There are numerous locations of quartzites on top of the Wallowa Mountains.

Northeast Oregon

There are extensive outcrops of quartzite gravel in northeast Oregon. One of the most remarkable places is on the top of the mountains and ridges in the Wallowa Mountains.[2,3] The Wallowa Mountains are about 25 miles (40 km) east of La Grand in northeast Oregon, and overlook Hells Canyon, the deepest Canyon in North America, to the east. The quartzites are at elevations ranging from 4,600 feet to 8,718 feet (1,402 to 2,658 m) msl. They are also found on top of the Columbia River Basalts but sometimes underneath a capping basalt flow. The Columbia River Basalts consist of about 300 lava flows that issued from cracks in southeast Washington and northeast Oregon. They flowed over most of eastern Washington and Oregon, western Idaho, and westward toward the Pacific Ocean (Figure 19.3).

Figure 19.5. Polished quartzite boulder weighing about 440 pounds (200 kg) from the location of Figure 19.4 (photograph by Paul Kollas with my youngest son, Nathan, as scale).

Figure 19.4 shows a ridge just southeast of Lookout Mountain, 8,200 feet (2,500 m) msl in the Wallowa Mountains that contains a layer of large quartzites about 33 feet (10 m) thick. Although there should be a quartzite boulder that is 3 feet (1 m) in diam-

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[2] Allen, J.E., 1991. The case of the inverted auriferous paleotorrent—exotic quartzite gravels on Wallowa Mountain peaks. *Oregon Geology* 53(5):104–107.

[3] Weis, P.L., J.L. Gualtieri, and W.F. Cannon, 1976. Mineral Resources of the Eagle Cap Wilderness and Adjacent Areas, Oregon, *U.S. Geological Survey bulletin 1385-E*, U.S. government Printing Office, Washington, D.C.

eter,[4] the largest rock that we found had a diameter of about 2 feet (60 cm) and weighed about 440 pounds (200 km) (Figure 19.5). We failed to find any larger quartzites, possibly because a snow bank covered part of the outcrop. The larger boulders commonly have percussion marks (Figure 19.6), one of the reasons why John Elliot Allen, former professor of geology at Portland State University, suggested they were deposited in a torrential stream (see Chapter 21).[2]

Figure 19.6. Percussion marks on a fractured boulder just southeast of Lookout Mountain, Wallowa Mountains of northeast Oregon.

One cobble displayed an unusual chattermark trail encircling it (Figure 19.7). Chattermarks are any mark or pit made on a rock surface by frictional sliding or indentation.[5] A chattermark trail is a linear set of marks. They are mainly formed during glaciation as rocks in the base of the glacier slide against bedrock. The rock in Figure 19.7 must have rolled against the bedrock during a mass flow event causing the ring of chattermarks to form. There are always oddball observations in geology.

Figure 19.7. Unusual chattermark trail on a quartzite cobble, which goes all the way around the rock, from just southeast of Lookout Mountain, Wallowa Mountains of Northeast Oregon.

We examined the boulders on Jim White Ridge just east of Lookout Mountain, where 90% of the boulders are quartzite that almost completely cover the ridge. Many boulders show abundant percussion marks, and a few have pressure solution marks (Figure 19.8). As you recall, pressure solution marks are a result of rocks thickly piled in a deep crack with rocks strongly pressing upon other rocks (see Chapters 16 and 17). Very few quartzites have an iron coating. On Jim White Ridge, the cobbles and boulders extend for 2 miles (3 km) north and northwest

[4] Allen, Ref. 2, p. 107.

[5] Neuendorf, K.K.E., J.P. Mehl, Jr., and J.A. Jackson, 2005. *Glossary of Geology*, Fifth Edition. American Geological Institute, Alexandria, VA, p. 110.

and cover an area of about a square mile (3 km2). Most of the cobbles and boulders appear to be a lag that was thinly laid down in running water. But one quartzite deposit is up to 180 feet (55 m) thick on Jim White Ridge with rocks up to about 10 inches (25 cm) in diameter. The boulders have a lot of fine sediments between them.[5] Gold is sometimes found within the fine particles. One thick layer of gravel had been actively mined for placer gold, until the mine was forced to close when the area became a wilderness area. It is strange to find a placer mine on top of a mountain.

Figure 19.8. Quartzite cobble with pressure solution marks from Jim White Ridge, Wallowa Mountains of northeast Oregon. The pressure solution marks are faintly visible as whitish circles on the lighter part of the rock.

We have found quartzite boulders in other locations in the Wallowa Mountains that were not mentioned in Allen's report. One area is 2 to 5 miles (3 to 8 km) southwest of Moss Springs Guard Station. This discovery widens the extent of the quartzites and creates further problems for Allen's "torrential stream" hypothesis of transport (see Chapter 21). And, quartzites are thinly scattered under the ridge tops of the Little Minam River drainage. There are probably more locations yet to be discovered in the Wallowa Mountains.

Quartzite does not outcrop in the Wallowa Mountains, which are composed of granite with a cap of Columbia River Basalts. The nearest source of quartzite rock is about 125 miles (200 km) to the east or northeast in central Idaho across Hells Canyon, an 8,200-foot (2,500 km) deep water gap (see Volume III on water gaps).

Allen did recognize that the quartzite gravels had a wider extent in northeast Oregon. Allen stated in referring to the placer gold deposit on Jim White Ridge: "Similar placers containing quartzite boulders have been mined for gold at numerous localities in northeast Oregon."[4] Carson reinforces this statement: "Quartzite-rich alluvium and scattered boulders and cobbles are known from a wide area of northeastern Oregon."[6]

Personal communication from Kevin Pogue and Robert Carson from Whitman College in Walla Walla, Washington, to John Hergenrather reinforces Allen's statement. They said there are many abandoned placer gold mines in the Elkhorn and Blue Mountains that also contain quartzite boulders and cobbles. One is in the vicinity of Greenhorn, which is 30 miles (50 km) west southwest of Baker. Brent Carter, a creation geologist from Boise, Idaho, states that there are several gold mines in quartzite gravels in the northern Blue Mountains, southeast of Pendleton.

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[6] Carson, R.J., 2001. Where the Rockies meet the Columbia Plateau: geologic field trip from the Walla Walla Valley to the Wallowa mountains, Oregon. *Oregon Geology* 63(1):25.

The Columbia River Valley from The Dalles to the Pacific Ocean

Quartzite gravel outcrops in numerous locations from the vicinity of the Dalles, Oregon, to the Pacific Ocean. I will also include quartzite locations that are at low elevations on the Washington side of the Columbia River. The gravels or conglomerates sometimes have been given different names, such as the Troutdale Formation, Satsop Formation, Hood River Conglomerates, and Snipes Mountain conglomerate. Uniformitarian scientists have generally settled on the Troutdale Formation for the Columbia River area. I will start the survey around The Dalles and move west.

Quartzite Gravel Near The Dalles

About 9 miles (14 km) east of White Salmon, Washington, on an old highway that runs parallel to and north of Highway 14, quartzites are found in what is called the Balch Lake conglomerate that forms a 6-foot (2 m) high cliff about 200 feet (60 m) above the road. However, quartzite rocks make up only about 1% of the tightly-cemented conglomerate and are about an inch (2.5 cm) in diameter with a maximum of 2 inches (5 cm).

One very easily accessible place to view bedded quartzites is about 330 feet (100 m) west of the bridge over the White Salmon River about 2.5 miles (4 km) west of White Salmon along Washington Highway 14 (Figure 19.9). The planar-bedded gravel has been called the Underwood gravel.[7,8] The gravel is located at the base of a cliff near river level. It was trapped below the local Underwood Mountain volcanic flows, keeping them from being subsequently eroded. There are many small lava flows in northwest Oregon, and in this case the flow occurred after the Columbia gorge was carved. Most of the gravel is composed of local volcanics but consists of about 25 to 30% well rounded, polished quartzites. The quartzites are up to about 10 inches (25 cm) long. The formation most likely was truncated by the Lake Missoula flood.[9]

Figure 19.9. Planar-bedded, rounded volcanic conglomerate with about 25 to 30% quartzite rocks in the lower section from just west of the bridge over the White Salmon River, Washington. The largest rocks are volcanic.

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[7] Kollas, P.J., 1994. An analysis of an anomaly (unpublished manuscript).

[8] Tolan, T.L., M.H. beeson, and B.F. Vogt, 1984. Exploring the Neogene history of the Columbia River: discussion and geologic field trip guide to the Columbia River Gorge—Part II. Road log and comments. *Oregion Geology* 46(9):111.

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

There are also quartzites across the Columbia River from White Salmon, just east and west of Hood River Oregon (personal observation).[10] More are found upriver between The Dalles and Hood River west of Rowena.[10] There are also quartzites below the Dalles Formation around and south of The Dalles.[10]

Quartzite Gravel West of Hood River

Many exposures of the Troutdale Formation outcrop along the foothills and mountains of the Columbia River from Hood River to Portland, and on the Washington side from White Salmon westward to Vancouver. Although not formally named, rare quartzites are found between the Pomona and Frenchman Springs basalt flows of the Columbia River Basalts at Mitchell Point just west of Hood River in the Columbia Gorge.[11] One impressively thick exposure of basalt and quartzite gravel is in the Bridal Veil Channel about 11 miles (18 km) east of Troutdale, Oregon. This "channel" is believed to be an old Columbia River channel that flowed westward and a little south of its current location. Mount Hood lies over this "channel" today. The total thickness of basalt and quartzite in the "Bridal Veil Channel" is 1,100 feet (335 m).[12,13,14]

J Harlen Bretz claimed the quartzites, mixed with local types of rocks, are scattered across the Oregon Cascades at high elevations south of the Columbia River from the town of Hood River west to the Sandy River outside Portland.[15] Benson Plateau lies midway across the Cascades at about 3,835 feet (1,170 m) msl. There the gravel is 720 feet (220 m) thick. Lowry and Baldwin reinforce Bretz's claim in that they report quartzites two miles (3 km) south of the town of Wyeth at about 2,790 feet (850 m) msl in the Cascade Mountains and to the east in the upper reaches of Viento Creek.[16]

Quartzite Gravel Portland Area

The Troutdale Formation outcrops extensively east of the Willamette Valley, especially in the foothills north of the Clackamas River (Figure 19.10).[17] We have observed quartzites on the bluffs and road cuts next to the Sandy River Highway, just southeast of Troutdale, Oregon. At 2.5 to 4 miles (4 to 6 km) southeast of Troutdale, quartzite makes

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[10] Warren, C.R., 1941. Course of the Columbia River in southern central Washington. *American Journal of Science* 239:106–127.

[11] Anderson, J.L., 1980. Pomona Member of the Columbia River Basalt Group: an intracanyon flow in the Columbia River Gorge, Oregon. *Oregon Geology* 42(12):195–199.

[12] Tolan *et al.*, Ref. 8, p. 112.

[13] Tolan, T.L. and M.H. beeson, 1984. Intracanyon flows of the Columbia River Basalt Group in the lower Columbia River gorge and their relationship to the Troutdale Formation. *GSA Bulletin* 95:472.

[14] Beeson, M.H. and T.L. Tolan, 1987. Columbia River Gorge: the geologic evolution of the Columbia River in northwestern Oregon and southwestern Washington; in, Hill, M.L. (editor), *Geological Society of America Centennial Field guide—Cordilleran Section*, Boulder, CO, p. 326.

[15] Bretz, J. H., 1917. The Satsop Formation of Oregon and Washington. T*he Journal of Geology* 25:453.

[16] Lowry, W.D. and E.M. Baldwin, 1952. Late Cenozoic geology of the Lower Columbia Valley, Oregon and Washington. *GSA Bulletin* 63:9.

[17] Hodge, E.T., 1938. Geology of the Lower Columbia River. *GSA Bulletin* 49:873–877.

up about 2 to 3% (in spots 20%) of the cobbles in this conglomerate. We have foundcobbles up to 4 inches (10 cm) in diameter. They continue 25 kilometers southeast up the Sandy River before they disappear. Quartzites cap Rocky Butte in northeast Portland near the intersection of Interstates 205 and 84. Lowry and Baldwin report them in the Boring Hills at 935 feet (285 m) msl, southeast of Portland, and in the Portland Hills silt, west of Portland as well.

Figure 19.10. Outcrop of gravel with quartzite east of Portland, Oregon, and north of the Clackamas River (Steve Halley pointing to a quartzite cobble).

These conglomerates were not deposited by the Lake Missoula flood which laid down a huge gravel bar in the Portland-Vancouver area. In fact, the Lake Missoula flood eroded some of the quartzite conglomerate near the Columbia River.

There are also other extensive conglomerates in the area that are volcanic, mainly south of the Clackamas River, southeast of Portland, which will be quickly mentioned in Appendix 12 because these very likely are very late Genesis Flood gravels.

Quartzite Gravel West of Portland

There are many small quartzite outcrops near the Columbia River from the Portland-Vancouver area west to the Pacific Ocean. The quartzites are mixed with rocks from the basalt and andesite bedrock, which often form the majority of the rocks in the gravels. The quartzites are sometimes found on top of the lava substrate and sometimes interbedded within the flows.[10,18] J Harlen Bretz, of Lake Missoula flood fame, also reports gravels or conglomerates in the lower Columbia Valley west of the Cascade Mountains that surprisingly contained up to 50% quartzites.[18] Near the town of St. Helens, about 40 miles downstream from Portland, Oregon, the Troutdale Formation is said to be 1,000 feet (300 m) deep,[19] and probably contains quartzite rocks. The Troutdale Formation also accumulated intermittently from the town of St Helens to the Pacific Ocean. Lowry and Baldwin

[18] Bretz, Ref. 15, pp. 446–458.

[19] Orr, E.L., W.N. Orr, and E.M. Baldwin, 1992. *Geology of Oregon*, fourth edition, Kendall/hunt Publishing Company, Dubuque, IA, p. 180.

write of quartzites found on hills at 625 feet (190 m) msl about 6 miles (10 km) south of Chehalis in southwest Washington, which is 38 miles (60 km) north of the Columbia River at Longview.[20]

Bretz has observed quartzite in marine terraces along Willapa Bay, Washington, on the Pacific Ocean.[18,21] The quartzites have a base below tide and a surface up to 80 feet (24 m) above the ocean. This location represents a transport of about 440 miles (700 km) from their nearest source in central Idaho.

[20] Lowry and Baldwin, Ref. 16, p. 17.

[21] Bretz, J.H., 1919. The Late Pleistocene submergence in the Columbia Valley of Oregon and Washington. *The Journal of Geology* 27, p. 491.