

THE HERESY OF J. HARLEN BRETZ

By Rick Hull

Former Seattle school teacher J. Harlan Bretz had no idea about the controversy he would ignite when he spent his summers exploring the area west of Spokane, Washington in the 1920s. It would be more than a half century before the University of Chicago geologist's discovery of a massive, prehistoric flood were accepted.

Bretz was investigating the mystery of eastern Washington. The area has vast lava flows overlain with rich farmland known as the "palouse". But something had stripped sections of soil, exposing boulder-strewn bedrock. The contrast was so stark that "scab lands" was the only apt description.

Initial theories connected the erosion to the ice age, though the continental ice sheet had not reached that far south.

Bretz saw something much bigger than mere erosion. First, there were numerous narrow lakes that ran southeast and were always located in the scab lands, not on the surrounding palouse. The lakes were always in deep channels or coulees, and often stair-stepped down one after another.

And the scab lands coulees split and wandered, like channels of a river delta. Finally, instead of the usual V-shape of river valleys, the channels were U-shaped with steep walls.

Particularly impressive were Grand and Mose coulees. Grand Coulee was as wide as three miles and a 1,000 feet deep. A 400-foot drop now known as Dry Falls stood between the upper and lower sections of Grand Coulee .



J. Harlan Bretz



Dry Falls at Coulee, Washington, with its 400-foot drop.

Washington State Park's Dept.

Bretz accepted the idea that ice-age streams had carved the landscape. His maps of the scab land clearly showed the braided channels.

But his summer expeditions soon pointed to the massive volumes of water required. Isolated canyons were miles from any river, with their walls cut into 200 or 300 feet of solid rock. Elevation surveys showed the water spilled simultaneously over gaps 30 miles apart.

And the flows had been short lived. Waterfalls had failed to cut back into their headwall before drying up. Gravel deposits indicated the Snake River had been forced to flow backwards.

Bretz was proposing cataclysmic flooding – perhaps larger than the world had seen – that he called the Spokane Flood. "All other hypothesis meet fatal objections," he wrote in an 1923 paper.

During later summers he followed the flood downstream, showing how it carved the Columbia River gorge, and backed up the Willamette Valley past Portland.

The struggle was finding a source for all the water. One hint came from Joseph Pardee, who worked for the U.S. Geological Survey at Missoula. Pardee wrote Bretz that he had evidence that an ice-age glacier had plugged the Clark Fork River, creating a temporary lake he called Glacier Lake Missoula. Shorelines of the lake are still visible on Missoula's hillsides, especially after a spring snowstorm. However Bretz doubted Lake Missoula formed in the same time period as the flood. Instead he favored a undiscovered volcano that had melted the ice cap across the border in British Columbia. It was a theory based on similar episodes in Iceland.

After summers of work and interim papers, Bretz was invited to present his findings before the Geological Society of Washington, to be held Jan. 12, 1927, in Washington, D.C.

Bretz was surprised to see W.C. Alden, head of the U.S.G.S., on the conference's panel of prestigious geologists.

At first the presentation went well. He showed slides of the flood features and discussed why ordinary glacier runoff did not have the volume to carve the landscape.

Then the panel tore into his findings. One by one they attacked Bretz's findings in what appeared to be a planned ambush. Charges like "presposterous," "incompetent," and "inadequate" were thrown out.

Bretz had crossed a forbidden line. For a century geologists had fought against the idea of "catastrophism," which explained features in terms of cataclysms, such as the Biblical flood. Instead they preached "uniformitarianism," where the world was shaped by slow-moving forces identical to those that could be observed today.

In attendance at the conference was Joseph Pardee. Geological folklore says that Pardee whispered to a fellow attendee that he knew the source of Bretz's flood. But Pardee was not going to challenge his bosses in the U.S.G.S. and didn't publish anything on his Lake Missoula findings for years.

The assault essentially undermined Bretz's theory for nearly 50 years. Bretz continued to explore the scab lands and solidify his evidence. He fought back with a 1928 paper, in which he wrote, "Ideas with precedent are generally look on with disfavor and men are shocked if their

conceptions of an orderly world are challenged."

The consensus continued against him, though no one had a viable alternative. Bretz eventually turned his interests to Greenland, and then to the ice-age history around Chicago. His studies included exploration of caves, and he began wearing a hard hat as head protection. It became his signature style whenever he did fieldwork.

Pardee finally broke his silence in the 1940s. He had discovered ripple marks nearly 50 feet high in Camus Prairie, just south of Hot Springs, Montana. And



Sculptured lava outcroppings along the Spokane River are products of the Ice Age floods.

Photo by Rick Hull

Pardee had increasing evidence that a glacial dam had created Lake Missoula and had failed catastrophically.

Nearly 70 years old, Bretz returned to the scab lands for the last time in 1952. This time he realized that there were likely repeated floods. His last paper on the scab lands was in 1969.

Bretz won several prestigious awards and numerous converts in the meanwhile, but no vindication.

That changed in 1972. First, NASA launched the Landsat 1. From more than 500 up, the satellite vividly showed the scab lands as a braided, but unified, drainage. Then Mariner 9 returned pictures of similar channels on Mars. And NASA used aerial photos of the Camus Prairie ripple marks to compare to similar features on Mars.

Bretz's findings received official recognition from the U.S.G.S. when it published *The Channeled Scablands of Eastern Washington* for tourists at the 1975 World's Fair in Spokane. Finally, Bretz received the Geological Society of America's Penrose Medal in 1979 at age 79. He passed away two years later.

Bretz's legacy was sealed in 1994 when his bust was erected at Dry Falls State Park at Coulee City, Washington.



Ripple marks at Camus Prairie, south of Hot Springs, Montana

Photo by Rick Hull

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