The Fall of Ableman's Wall

A Classic Geologic Exposure Yields to the Elements

Written by: ***Steven D.J. Baumann***

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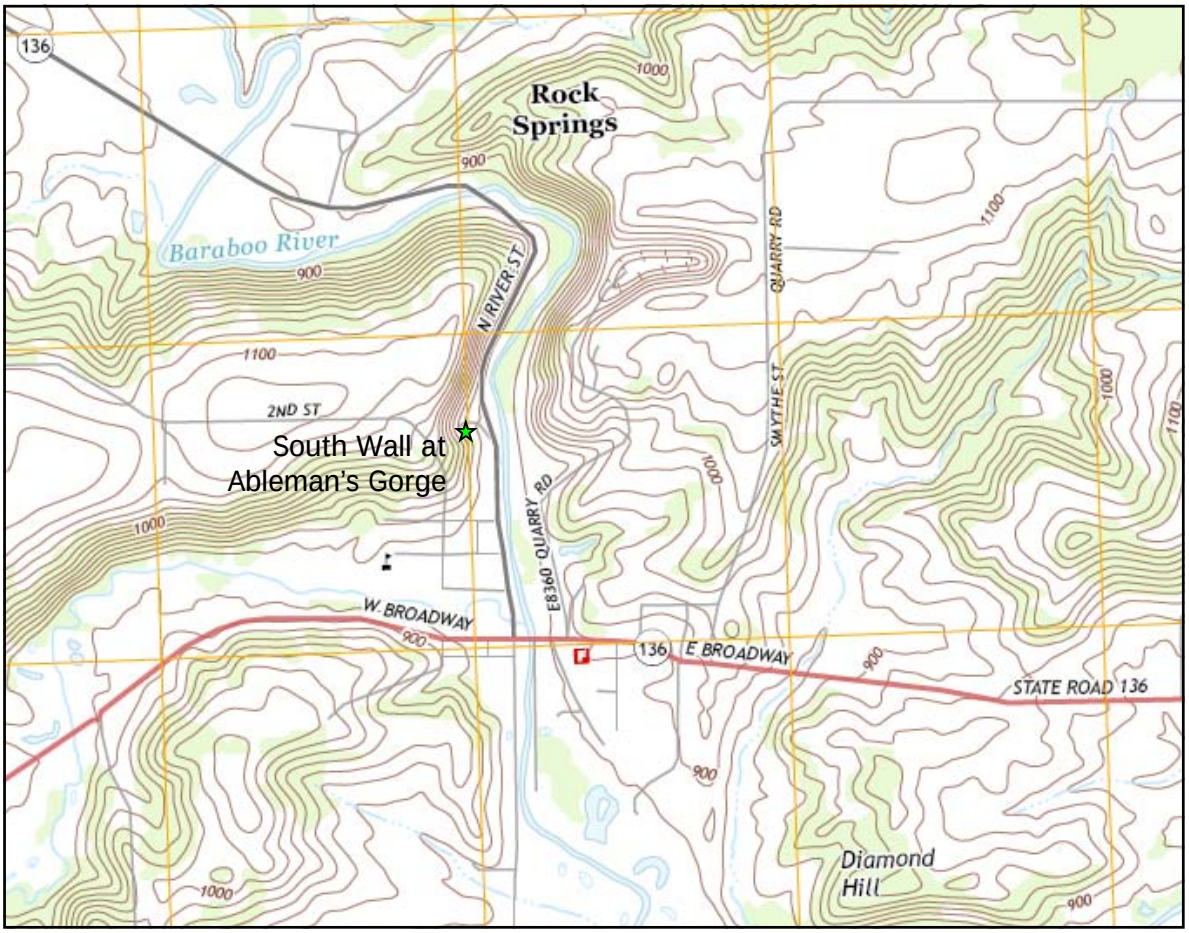
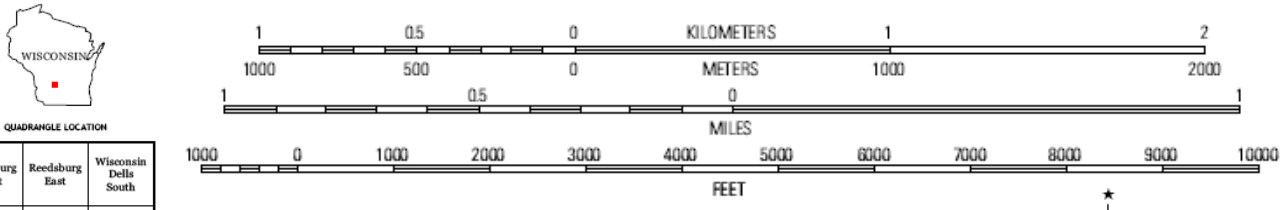
LOCATION:

Ableman's Gorge is located 0.39 miles north of the intersection of State Route 136 (East Broadway Street) and County Road DD, along the west side of State Route 136. Parking to the gorge is located at GPS: 43.48342° –89.91753°, just north of the tan colored aluminum building used for the loading of spring water. The South Wall at Ableman's Gorge is located at GPS: 43.48355° –89.91864°, approximately 300 feet west of the entrance.



SCALE 1:24 000



QUADRANGLE LOCATION

Reedsburg West	Reedsburg East	Wisconsin Dells South
Loganville	Rock Springs	North Freedom
Plain	Black Hawk	Sauk Prairie

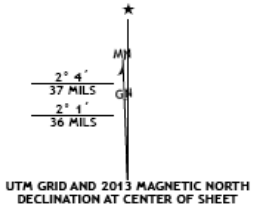
ADJOINING 7.5' QUADRANGLES

ROCK SPRINGS, WI

2013

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.12



UTM GRID AND 2013 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

HISTORICAL BACKGROUND:

Ableman's Gorge was originally a natural cliff face in the Baraboo Quartzite. In 1851, a man by the name of S.V.R. Ableman (a Colonel in the U.S. Army) decided to settle the area in what is now called the town of Rock Springs. The town that Col. Ableman would settle would bear his name until 1875, when the town's name was changed to Rock Springs, which reverted back to Ableman in 1879, and finally back to Rock Springs in 1947.

The Gorge itself opened as a stone quarry in 1870, in order to provide ballast for the Chicago and Northwestern Railway. The section of this railway that extends through the town still exists and is active today. I could not find any information on when Ableman's quarry ceased operations. However, E.O. Ulrich visited the quarry in 1916. It was apparently still active at that time.

In 1969, Ableman's Quarry became Ableman's Gorge State Natural Area and currently occupies 126 acres.

GEOLOGICAL BACKGROUND:

The geologic history of Ableman's Gorge begins about 1.75 billion years ago when the purple quartzite was deposited as a medium to course grained sand in an ancient shallow sea. The sand became buried and metamorphosed into quartzite during a mountain building event (orogeny) that occurred at 1.63 billion years ago. It was during this orogeny that the Baraboo Quartzite was turned vertical in the immediate area of Rock Springs.

1.1 billion years later, the mountains would erode and the quartzite stood as islands during the invasion of the Cambrian seas. The quartzite would then become buried by sediments once again until about 350 million years ago when the seas retreated and erosion once again took over.

The gorge itself was likely carved out slowly, beginning two million years ago. Floodwaters cut through the valley shaping it, as the glaciers melted just to the east and north of the area.

THE FALL OF THE SOUTH WALL:

The south wall of Ableman's Gorge exposes a long wall of ripple marks that formed 1.75 billion years ago. The ripple marks were turned vertical during metamorphism. These iconic ripples were especially well preserved on the east end of south wall. Van Hise himself looked at these ripple marks when he figured out the mechanics of mountain building during the early 20th century. Since then, generations of geologists have visited this outcrop on their structural and sedimentary geology class trips.

The ripple's fate was sealed from the moment they were exposed. The vertically tilted beds that bear the ripple marks are a weak zone within the quartzite. Sometime during the winter of 2014-2015 or the spring of 2015, these iconic ripples lost their battle with nature and came tumbling down. Their destruction can be attributed to a natural erosional process known as "frost wedging". This is a physical form of weathering in which water gets into small cracks in the rock (in this case along the bedding plane), freezes during the winter, the ice expands, thus slowly widening the cracks. Eventually the cracks open so much that the rock loses stability, and in the case of the south wall, it catastrophically failed.

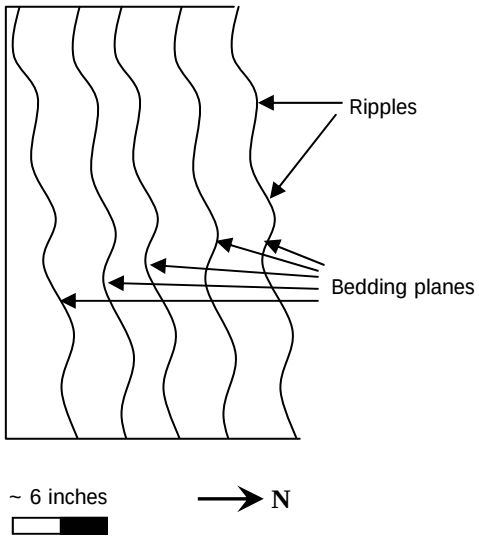
The exact date of the collapse isn't known. During the Illinois State University's 2014 structural geology field trip in autumn, the wall was still intact. When I visited the wall in late July 2015, the wall had failed and the iconic ripples had been strewn about as talus. New ripples were exposed, thus beginning the process all over again.

The iconic ripples were not the first. Before the collapse, there was a talus pile at the base, indicating that another set of ripples had collapsed from this wall sometime after the floods from the last ice age ceased, around 9,700 years ago. The timing of the first collapse is not known and the iconic ripples may have stood for as much as 9,000 years. We know for sure that they stood at least since the time Ableman settled the area with his family 145 years ago.

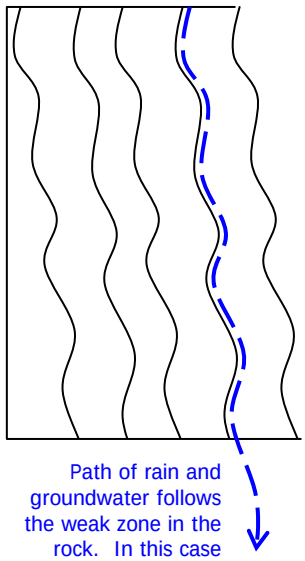
FROST WEDGING ON THE SOUTH WALL:

Cross Section of the South Wall

Initial phase: Unweathered rock



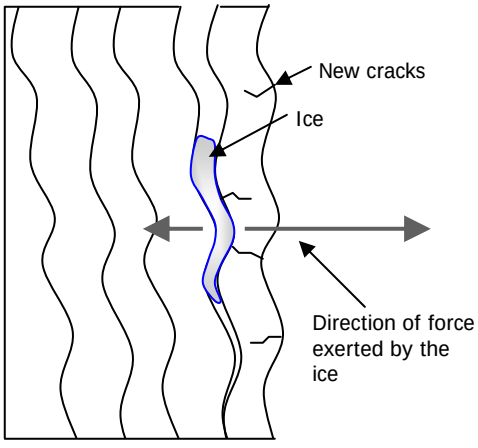
Primary phase: water erosion



Path of rain and groundwater follows the weak zone in the rock. In this case along the bedding plane.

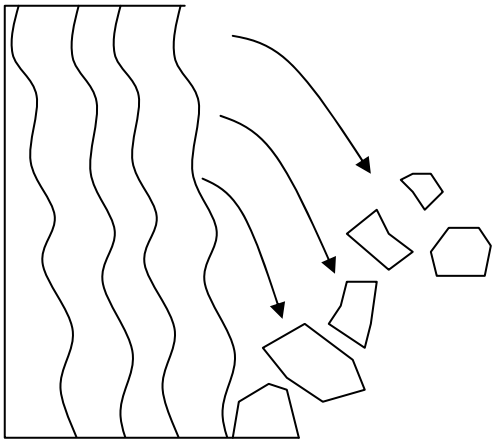
Cross Section of the South Wall

Secondary phase: ice erosion



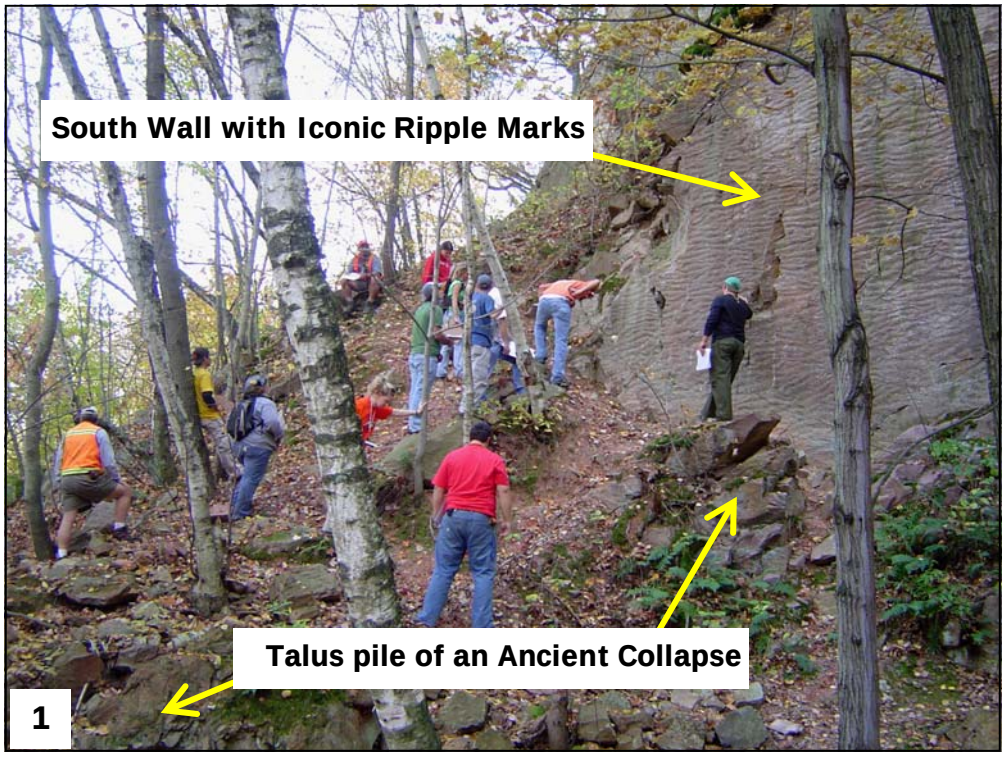
Over many years, the ice in the cracks freezes, slightly pushing on the rocks, gradually weakening the rock face.

Final phase: rock failure



Eventually the rock weakens so much that it catastrophically fails, exposing a new surface, and the process starts over.

PHOTOS OF THE SOUTH WALL:



Illinois State University's structural geology field trip, looking east-southeast.

Photo was taken on October 8, 2006 by Steven D.J. Baumann.

South wall before the collapse of the iconic ripple marks, looking south and up. Notice the small ridges covering the surface. Those are the ripple marks

Photo was taken on June 25, 2013 by Steven D.J. Baumann.

PHOTOS OF THE SOUTH WALL (continued):

South wall showing the iconic ripples before the collapse, looking south. Person for scale.

Photo was taken on June 25, 2013 by Steven D.J. Baumann.

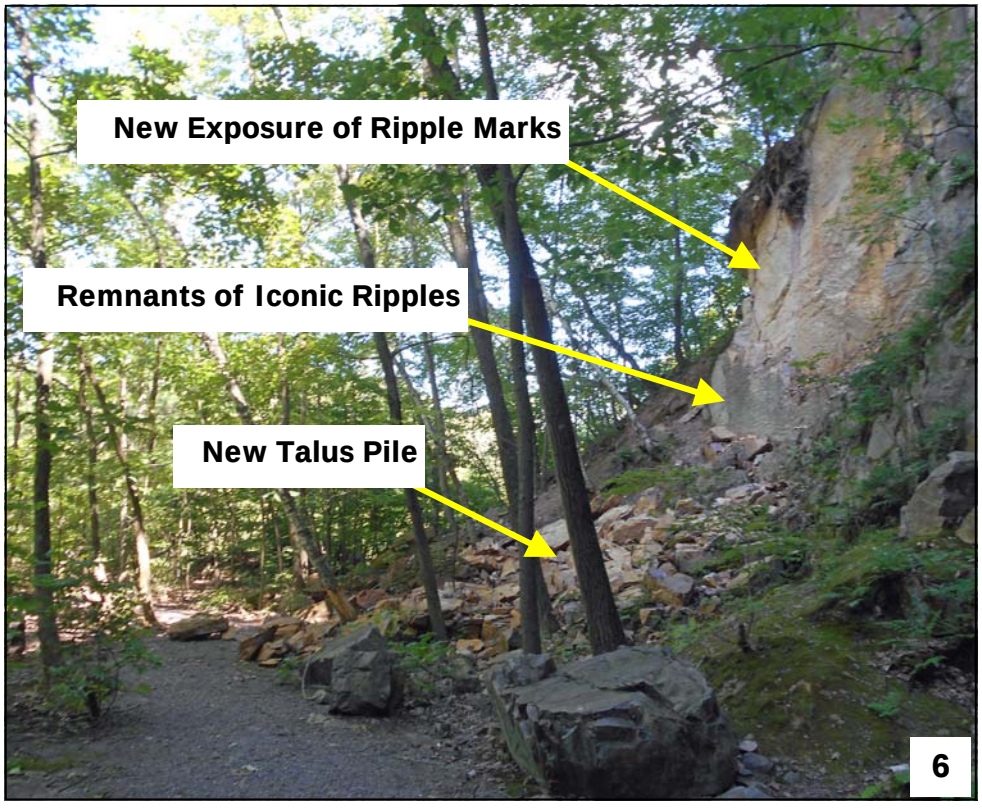
South wall after the collapse, looking south. Person for scale.

Photo was taken on July 25, 2015 by Rachel Raven.

PHOTOS OF THE SOUTH WALL (continued):

Zoom out of photo number 4.

Photo was taken on July 25, 2015 by Steven D.J. Baumann.



After the collapse, looking east-southeast.

Photo was taken on July 25, 2015 by Steven D.J. Baumann.

REFERENCES:

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Photo of the Baraboo Hills, showing the purple quartzite. Photo was taken along Wisconsin Route 33, looking west.

Photo was taken on October 13, 2013 by Steven D.J. Baumann