

OTISVILLE TUNNEL (1908)

The idea of an Erie Railroad tunnel at Otisville lay dormant until 1906 when work finally began on the long awaited tunnel. Troubles beset the tunnel builders as they worked their way through the mountain in 1906. In August fighting broke out within the African-American crew that was digging the tunnel. The local Justice of the Peace and his constables had to be summoned to restore order. In September a blast of the explosives being used to excavate the tunnel caused the tunnel roof to collapse, killing one workman and trapping a number of others. That same month it was reported that the new tunnel was causing local water “veins” to dry up. This resulted in farmers’ wells running dry and in large amounts of water spilling into the tunnel (Skye, 2009). As inscribed on the east portal, the tunnel was completed in 1908.

The Otisville Tunnel trends WNW-ESE through Shawangunk Mountain at Deerfield Gap, a short distance north of the original Erie grade over the ridge just west of Otisville, Orange County. The elevation of the gap is ~850 ft at the east end, rising gently to ~900 ft. At the west end a mountain spur juts into the gap from the northeast, sloping off from an elevation of ~1090 ft to ~1025 ft at an imposing quartzite cliff high over the tunnel. Elevation of both portals is ~780 ft. Therefore, the eastern 0.75 mi of the tunnel is only ~100-120 ft beneath the floor of the gap, but under the spur ridge at the west end nearly 250 ft of rock lies overhead. The tunnel is 5,314 ft long (Wikipedia, 2011). At the west portal the 1908 grade curves to the south and joins the 1847 grade ~2 mi to the southwest.

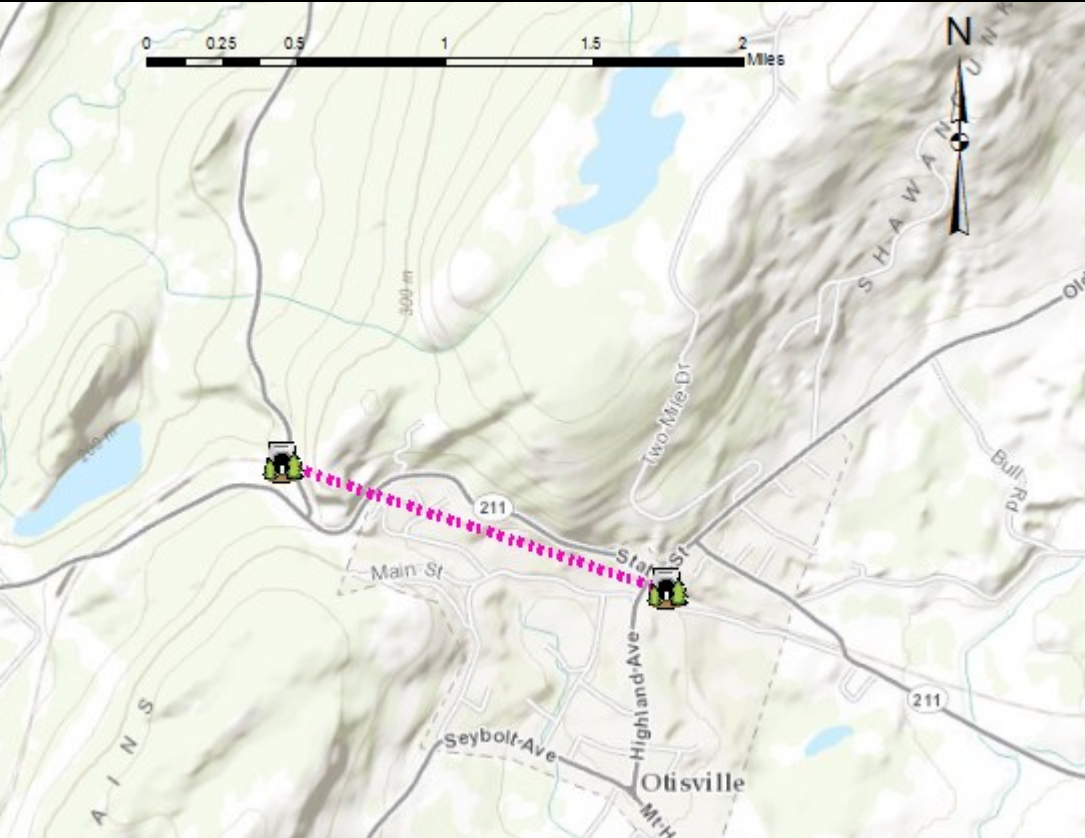
The Martinsburg Formation at the east portal of the Otisville Tunnel is spectacular exposed in cuts on both sides of the tracks leading into the portal. While generally within the open-fold Taconic frontal zone in the Otisville area, the Martinsburg at the east portal is complicated by a faulted overturned fold. The formation here consists of shale and interbedded thin- to thick-bedded graywackes. Sole marks (grooves, flutes, and loads) are prominent on the undersurfaces of bedding in the overturned limb. Cleavage is well developed and is axial-planar to the fold. The axis of the fold trends about N10E and is overlapped by the Shawangunk ~1.3 mi to the north. Because the Shawangunk does not appear to be folded at the unconformity, the fold, faults, and cleavage in the Martinsburg here must be Taconic in age. Outside the area of this fold, cleavage is generally not developed (Epstein and Lyttle, 1987).

The west portal of the Otisville Tunnel is quite picturesque, being cut into the Shawangunk ridge beneath wooded cliffs high above and a deep roadcut on NY Route 61 just overhead. Bedding in the Shawangunk quartzite on the north side of the tracks at the portal strikes N47E and dips 45 NW. The tunnel is lined for ~100 ft directly in from the concrete portal, then unlined for ~750 ft. The unsupported rock bore apparently extends to some point just west of the Shawangunk-Martinsburg contact, with concrete and corrugated metal lining from there through the Martinsburg to the east portal.

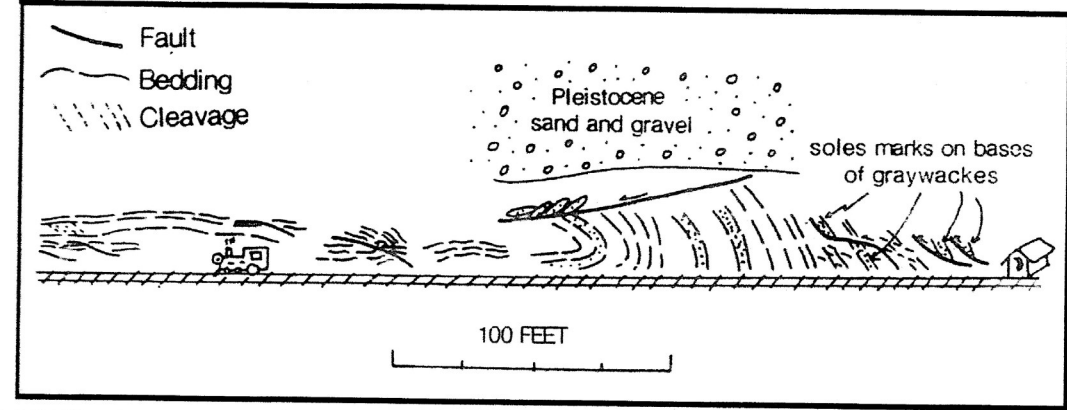
The Otisville Tunnel remained in the hands of the Erie Railroad until 1960, when the financially strapped Erie merged with the Delaware, Lackawanna and Western Railroad to form the Erie-Lackawanna Railroad. In 1976 The Erie Lackawanna became part of Conrail; and finally in 1999, on the split up of Conrail, the Norfolk Southern Railroad took over the line through the tunnel (Wikipedia, 2011, 2012a, 2012e). In 2003 the Metro-North Railroad began leasing this “Port Jervis Line” for commuter service from Suffern to Port Jervis, NY.



East portal of Erie Railroad tunnel at Otisville (GPS 41° 28' 25.1" N / 74° 32' 13.2" W). Intensely deformed Martinsburg shale and sandstone are exposed on both sides of the cut leading into the tunnel.



Steeply dipping, overturned Martinsburg beds with sole markings on the north side of the tracks near the east end of the cut. Attitude of bedding is N25E/62 SE (overturned). Jeff Chiarenzelli for scale.

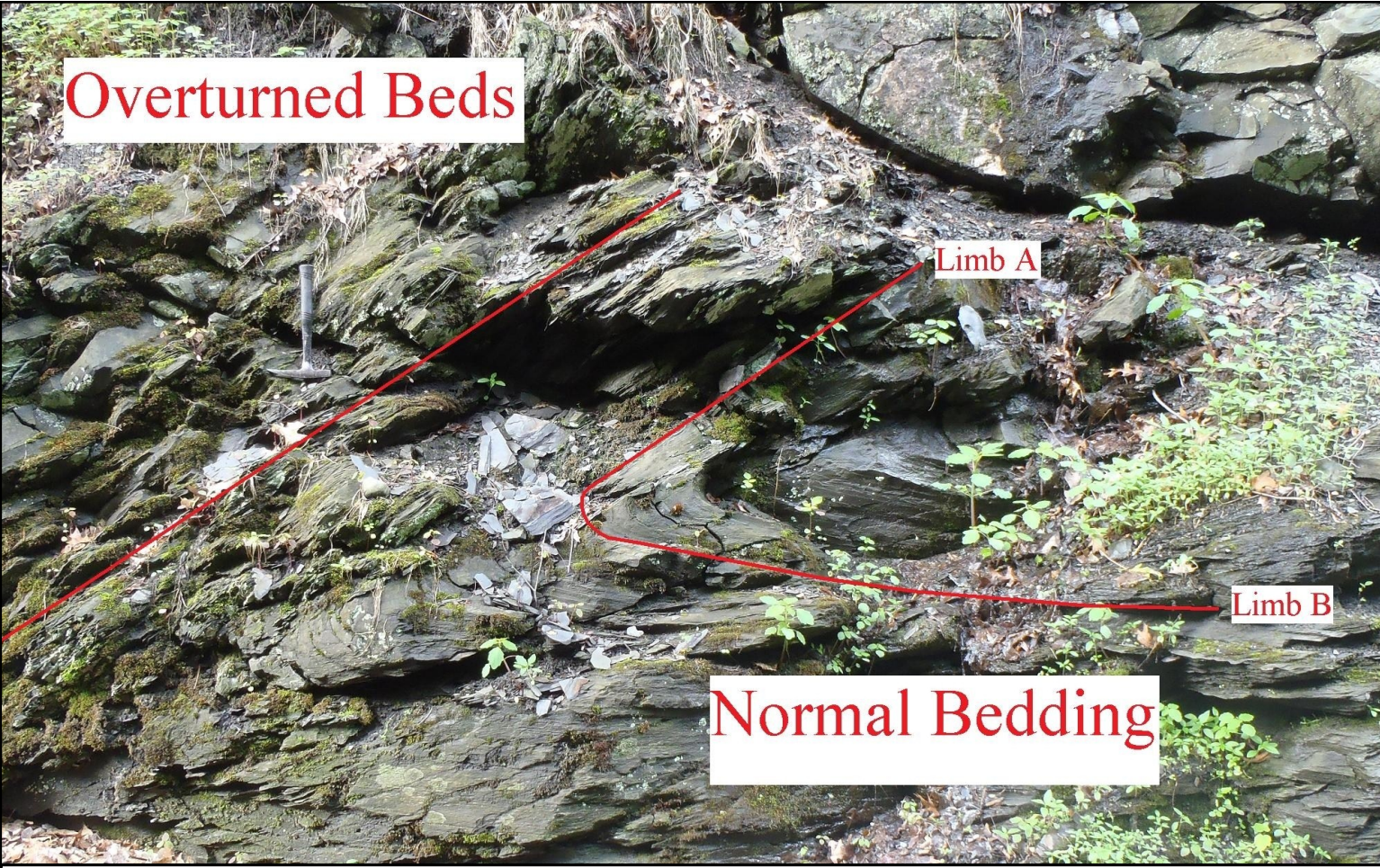


Above: Field sketch (looking to north) of faulted overturned syncline along old Erie (now Norfolk Southern) Railroad at the east portal of Otisville Tunnel (Figure 17 of Epstein and Lyttle, 1987).

Left: Location map of the Erie Railroad’s tunnel through Shawangunk Mountain at Otisville, Orange Co., NY (Otisville, 7.5’ quadrangle).



Unlined west part of the Erie Railroad tunnel at Otisville. The Shawangunk conglomerate here forms a ragged, but solid, arch that does not require lining.



West-verging, overturned (recumbent) syncline predominantly in sandstone on the north side of the cut at the east portal of the Otisville Tunnel.



Overturned, west-verging syncline in Martinsburg sandstone and shale on the north side of the cut at the east portal of the old Erie Railroad tunnel at Otisville.



West portal of Erie Railroad tunnel at Otisville (GPS 41° 28' 41.6"/74° 33' 19.9"). Note outcrop of Shawangunk conglomerate to left of portal and cliffs above. The inscription reads “19—Otisville—08,” the year of completion of the tunnel.

BIBLIOGRAPHY

- Epstein, J., 2012, STOP 9. Otisville railroad cut—an enigmatic diamictite: a tale of two unconformities, *in* Harper, J. A., editor, Journey along the Taconic unconformity, northeastern Pennsylvania, New Jersey, and southeastern New York, Guidebook, 77th Annual Meeting of the Field Conference of Pennsylvania Geologists, Shawnee-on-Delaware, PA, p. 354-361.
- Epstein, J., 2012, STOP 10. Ellenville arch—Taconic deformation zones, *in* Harper, J. A., editor, etc., 362-372.
- Epstein, J. B., and Lyttle, P. T., 1987, Structure and stratigraphy above, below, and within the Taconic unconformity, southeastern New York, *in* Waines, R. H., editor, New York State Geological Association, 59th annual meeting, Kingston, NY, November 6-8, Field Trip Guidebook: New Paltz, NY, State University of New York, College at New Paltz, p. C1-C78.
- Epstein, J. B., and Lyttle, P. T., 2012, A journey along the Taconic unconformity: interpretations, perplexities, and wonderments, northeastern Pennsylvania, New Jersey, and southeasternmost New York, *in* Harper, J. A., editor, p. 1-36.
- Epstein, J. B., and Lyttle, P. T., 2012, Some Taconic unconformities in southeastern New York, *in* Harper, J. A., editor, Journey along the Taconic unconformity, northeastern Pennsylvania, New Jersey, and southeastern New York, etc., p. 37-41.
- Fried, M. B., 2005, Shawangunk place-names: privately published, 196 p.
- Gray, C., The zinc-lead ores of the Shawangunk Mountain district, New York: unpublished Ph.D. dissertation, Columbia University, New York, NY, 102 p.
- Gray, C., 1961, Zinc and lead deposits of Shawangunk Mountain, New York: New York Academy of Sciences, v. 23, p. 315-331.
- Houck, M., 2006, Another visit to High View Tunnel, on a fall afternoon, nyow.org/wx.html (accessed May 2012).
- Inners, J. D., Ver Straeten, C. A., and Osborne, P., 2003, Blasting rock, building locks, and hauling coal: geological influences on the construction and operation of the Delaware and Hudson (D&H) Canal, New York and Pennsylvania: Geological Society of America Abstracts with Programs, v. 34, no. 1, p. 17.
- Inners, J., Skye, S., Epstein, J., Bierly, A., and O'Hara, A., 2012, Breaching the mountain barrier: history and engineering geology of the Shawangunk Mountain railroad tunnels, Orange and Sullivan Counties, New York, *in* Harper, J. A., editor, p. 118-129.
- Skye, S., 2009, The Shawangunk tunnels: The Towpath (Neversink Valley Museum), v. 26, no. 1, p. 2.
- Wakefield, M. B., 1970, To the mountains by rail: Fleischmanns, NY, Purple Mountain Press, 415 p.
- Wikipedia, [undated], NY & Oswego Midland RR, a brief history, nyow.org/midland.html (accessed July 2012).
- Wikipedia, [undated], Western New York Railroad Archive: Erie Railroad, nyrail.org/railroads/erie/-erie_home.htm (accessed July 2012).
- Wikipedia, 2011, Otisville Tunnel, en.wikipedia.org/wiki/Otisville_Tunnel (accessed July 2012).
- Wikipedia, 2012a, Erie Railroad, en.wikipedia.org/wiki/Erie_Railroad (accessed July 2012).
- Wikipedia, 2012b, New York, Ontario and Western Railway, 21 July 2012, en.wikipedia.org/wiki/-New_York,_Ontario_and_Western_Railway (accessed July 2012).
- Wikipedia, 2012c, Shawangunk Ridge, en.wikipedia.org/wiki/Shawangunk_Ridge (accessed July 2012).
- Wikipedia, 2012d, Port Jervis Line, en.wikipedia.org/wiki/Port_Jervis_Line (accessed July 2012).
- Wikipedia, 2012e, Erie Lackawanna Railway, en.wikipedia.org/wiki/Erie_Lackawanna_Railway (accessed July 2012).

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