Locomotive Trials on the D.L. & W. and New York & Erie in 1853

By Richard Palmer

Much has been written over the years about the famous Rainhill Trials of 1829, a public spectacle to determine what locomotive was best suited to become the first to be operated by the Liverpool & Manchester Railway in England. This involved comparatively small homemade locomotives.

At a much later period, a similar event was staged on the Boston & Lowell Railroad that tested the capacity, speed and pulling power of 10 commercially-built locomotives. This was, more or less, also a public event sponsored by the New England Association of Railway Superintendents. Prizes were awarded to the winning locomotives. This event occurred in October, 1851.

Very few are aware that locomotive trials were also staged on the Cayuga & Susquehanna; Delaware, Lackawanna & Western; and the New York & Erie in 1853.
In May, Engine No. 25, on the New York and Erie Railroad, hauled 100 coal jimmies loaded with 500 tons of anthracite coal, between Great Bend and Binghamton, a distance of 15 miles, in an hour. It then proceeded to Owego, another 22 miles.

At Owego the 4-6-0 engine "Tunkhannock," built by the firm of Rogers, Ketchum and Grosvenor, took 100 cars containing 502 tons of anthracite coal, over the Cayuga & Susquehanna Railroad to Ithaca, a distance of 35 miles, at a speed of nine miles per hour, without incident or slippage . Ten miles of the distance was over an ascending grade of 21 feet to the mile, and two thousand feet on an ascending grade of 30 feet per mile.

The trials on the D.L. & W. between Great Bend and Tunkhannock, Pa.were supervised by H. L. Martine, superintendent of the railroad's machine shop in Scranton, Pa. , on June 18, 1853.

Two 4-6-0s, the"Wyalusing" and the"Ontario," were chosen for the experiment since they were of almost the same size and weight. The "Ontario" was built by Danforth Cooke & Co. and the "Ontario" by Rogers, Ketchum & Grosvenor, locomotive builders of Paterson, N.J. It was noted at the time by the American Railroad Journal that the D.L.& W. "seems to challenge the world for its equal in the capacity and draught of locomotive engines."

Dimensions of the "Ontario" were:
Drivers: 4 feet, 6 inches
Cylinders: 17 inches in diameter, 24 inch stroke
Weight on drivers, 50,500 lbs.
Weight on trucks 17,700 lbs.
Total weight of engine 68,200 lbs
Weight of tender with wood and water 40,400 lbs.
Weight of engine and tender 108,600 lbs.

Dimensions of the "Wyalusing" were:
Drivers: 4 feet, 6 inches
Cylinders: 17 inches diameter, 24 inch stroke
Weight on drivers 48,200 lbs.
Weight on trucks 17,600 lbs.
Total weight of engine 65,800 lbs.
Weight of tender, wood and water 40,400 lbs.
Weight of engine and tender 106,200 lbs.

In the first experiment, the "Ontario" was coupled at Tunkhannock station to 100 four-wheel coal jimmies whose gross weight was 790 tons loaded.The train started up a grade of 21 feet in the mile, at the rate of five miles per hour for one mile, and came to a stand on a reverse curve. There, nine cars were cut off. leaving 91 cars, weight 725 tons. The train then proceeded to Hopbottom at seven miles per hour on the same grade

The "Wyalusing" was then attached to the whole train of 100 cars, at 10:28 a.m., and arrived at Oakley's Station at 10:55, making the run up a grade of 21 feet, through continuous curves of about one thousand feet radius, at four miles per hour.

The "Ontario" was again attached to the same train of 100 cars at Oakley's, and drew the train at the rate of six miles an hour, under circumstances similar to the "Wyalusing," grade and curves continuing the same.

At New Milford, another 100 cars of coal were added to the train, making a train of 200 cars, 2,652 feet long. or over half a mile. The total weight of the train, including the engine, was 1,653 tons. Then the "Ontario" started the whole train on a level, out of a switch, both ends of the train being on a curve at the same time. The trip was made from New Milford to Great Bend, a distance of six miles, in 30 minutes, being at the rate of 12 miles an hour, overcoming in the distance a grade of 15 feet to the mile, for about three quarters of a mile.

Trials on the New York & Erie

Considered one of the most ambitious series of trials ever staged on an American railroad occurred on the mainline of the New York & Erie between Owego and Corning on June 14 and 15, 1853. The experiments were conducted under the supervision of William R. Humphrey, Superintendent of the Cayuga and Susquehanna Railroad; William M. Mallory, of Corning; J.B. Gregg, Master Machinist, Susquehanna; C.D. Cooper, Machinist, Owego, and D.C. McCallum, Superintendent of the Susquehanna Division.

But the American Railroad Journal (July 2,1853) believed this event was a waste of time because the locomotives chosen were of different capacities. Although the article is somewhat technical, it shows the amount of knowledge that had developed regarding railroad operation by the 1850s:

"It was said that the trials were made with a view of testing the capacity of the road. if this had been the object, engines 57, 88 or 89, would have been the proper subjects for trial. The relative tractive power derived from steam in cylinder with a pressure of 100 lbs per square inch on piston, is as followed for each of the engines:

No. 86 - Rogers, Ketchum and Grosvenor.....9633 lbs.
No. 117 - Taunton Locomotive Manufacturing Co.....10800 "
No. 57 - M. W. Baldwin.....17122 "
No. 88 - Ross Winans.....18470 "

The weight of the engines is as follows:

No. 86	10	wheels,	six	connected	.....32 1/2 tons
No. 117	8	"	four	"	.....30 "
No. 57	8	"	all	"	....37 "
No. 88	8	"	"	"	.....28 "

of 2,000 lbs. each.

"If the object was to test the power of the two engines, 86 and 117, we do not regard the trial as fair, since the same train was not hauled the same way over the same road, except upon the curve in the second experiment. Engine 117 was designed for greater power than 86, in the ratio of 1 1-8 to 1. The engine 117, besides having 18 inch cylinder, had a separate cut off valve, 857 2-10 square feet of tube surface, 90 square feet of fire-box surface, and 16 1-6 square feet of grate.

"Engine 86 had link motion; 923 3-10 square feet of tube, surface, 67 57-100 square feet of fire box surface, and 13 3-10 square feet of grate. The extra weight of the No. 86 was not the weight of any parts necessary to increase the tractive power; it was merely the weight of an additional pair of wheels, axles, springs, boxes, crank plus and connecting rods, which could just as well have been taken from the engine, except for the fact that they distributed the weight upon more points and with less injury to the track. The simple fact of greater adhesion could not benefit the No. 86, since the No. 117 must have had sufficient adhesion for her cylinder capacity, which was greater than that of the 86. Had there been any want of adhesion the 117 would have been delayed by slipping the drivers.

"The pressure in the boiler should always be noted in any trials of locomotives, since the element of tractive force, or steam pressure is the basis of the whole expression the power of a locomotive. The adoption of weight in the estimation of practical performance cannot lead to any correct or satisfactory result, and for this reason should be rejected in the outset, except so far as to see that it is not inferior (a rare case) to the tractive pressure. This introduction of an irrelative element at the Lowell trial in 1851 led to some doubtful results.

"This trial, taken upon the whole, can prove nothing of importance. The capacity of the road to carry unnecessarily large loads made exceed that of narrow road, provided the resistances are less, which is not believed to be the case. The power of the engines is by no means as great as of some which are in use on narrow roads; the particular engines tried not having half, or much more than half the tractive power of engines now running on the Baltimore & Ohio road. We do not believe there is one engine upon the Erie road, leaving out Winans', which can draw 504 tons two and a half miles, up a grade of 82 feet per mile, at a speed of 10 1/2 miles per hour.

"We will conclude by quoting from the Railroad Journal of Sept. 11, 1852, p. 578.

The Schuykill Haven Miscellany mentions a train of 211 loaded cars, brought over the Mine Hill and Schuykill Haven railroad, some days ago by the locomotive No. 10. The coal weight 975 1/20 tons, this added to the weight of cars - 515 8-20 tons - makes a total weight of 1490 9-20 tons at one draught; the heaviest ever hauled over the road.

The tons in the coal trade are 2240 lbs. which makes 1490 9-20- equal to upwards of 1669 tons of two thousand pounds, - 2,000 lbs. being the standard of a ton adopted by most other roads.

Sources:

American Railroad Journal, June 15, 1853, June 23, 1853
Owego Gazette, July 2, 1853