



V. For the information of those gentlemen who in these

columns and in the pages of *Van Nostrand's* have so vigorously discussed the properties of continuous girders and the modulus of elasticity, we will here state that in this bridge the greatest efforts were made to secure a uniform modulus. Iron mixtures were prescribed in the puddling furnace and in the rolling mill pile. Every plate was tested at the mill and all bars paired together by their moduli, while the workmanship was very exact. Despite all this, the moduli varied from 20,400,000 to 28,200,000 lbs. and during erection, the two trusses began to vary in height at three panels from the starting point, which variation exceeded one inch at several places. As has just been stated, the variation in length, arising mostly from this cause, between the east and west chords amounted to one inch in 1,125 ft.

The erection was commenced on the 16th of October and completed Feb. 20, four months and four days. At no time did the force exceed 60 men, and the average number was about 53 on duty.

The official test was made April 20 with a train having four engines in the middle and iron cars at either end loaded to 40,000 lbs. each. The equivalent uniform load was 2,073 lbs. per foot on the 300 ft. spans, and 1,977 lbs. per foot on the 375 ft. spans. The deflections were as follows :

| <i>Both end spans loaded.</i> | | Inches |
|--|--|--------|
| Greatest deflection of 300 ft. span..... | | 1.518 |
| “ “ “ cantilever point..... | | 1.944 |
| “ depression of pier..... | | 0.372 |
| Upward deflection of mid span..... | | 2.832 |
| <i>Mid span loaded—Ends unloaded.</i> | | |
| Greatest deflection of mid span..... | | 3.498 |
| Upward motion at cantilever point..... | | 1.580 |

As the longitudinal stability of the truss is derived from the piers, the last trial was for the purpose of testing this

- No. 8. Span No. 1.—Half of Span No. 2 and Pier No. 1.
- No. 9. Span No. 3 (south side) in course of construction.
- No. 10. Half of Bridge (north side) and both Piers.
- No. 11. Perspective view looking through Towers from north side.
- No. 12. Showing progress of construction, January 22, 1877, from mouth of Dix River.
- No. 13. Perspective view of Bridge from north side, January 23, 1877.
- No. 14. Looking through interior of Bridge from north side.

stability. An engine drawing 24 cars, loaded with railroad iron, was moved on the bridge at a speed of 26 miles per hour. There was a brakeman on each car, and at a given signal the engine was reversed and the brakes applied, the train being brought to rest in 104 feet. The extreme motion of the pier heads caused by this test was only one-half inch.

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