THE bridge, represented in Plate LXI, was constructed to carry the Pennsylvania Railroad over the Little Juniata River. It was designed and erected during 1869, to replace a wooden structure of one span that had been in use since the construction of the road. The substructure was put up by the company’s own staff of masons. The superstructure is in two spans of three trusses each, arranged as a half through bridge for two tracks, the roadway resting upon rolled I beams, supported by the lower chords. The trusses are constructed upon the single intersection, triangular system, with vertical carrying rods and inclined lateral stays in each panel, the different members being held together at their intersections by connecting pins.

The following are the general dimensions of the structure:

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total distance, back wall to back wall of masonry</td>
<td>170 4½ in.</td>
</tr>
<tr>
<td>Width of bridge seat on abutments</td>
<td>4 3 in.</td>
</tr>
<tr>
<td>Pier</td>
<td>6 6 in.</td>
</tr>
<tr>
<td>Distance from centre to centre of end pins in one span, measured on the lower chord</td>
<td>82 6 in.</td>
</tr>
<tr>
<td>Number of panels in each truss</td>
<td>6</td>
</tr>
<tr>
<td>Length of each panel</td>
<td>13 9 in.</td>
</tr>
<tr>
<td>Height of truss, centre to centre of chord pins</td>
<td>8 3 in.</td>
</tr>
<tr>
<td>Distance between trusses, centre to centre</td>
<td>14 0 in.</td>
</tr>
<tr>
<td>Height from top of masonry to base of rail</td>
<td>2 7 in.</td>
</tr>
</tbody>
</table>

In proportioning the different parts of the structure the variable load was assumed at 1½ tons per foot linear for each track, the middle truss being calculated for both tracks loaded. The ultimate strain for wrought iron was taken at 30 tons per square inch of section for tension, and 18 tons for compression in the case of short prisms, the well-known formula of Gordon being used for the computation of columns. The factor of safety adopted throughout was six.

The upper chord, as will be seen by reference to Plate LXI, is composed of 9 in. deck beams united on the top by rolled plates. The section of these plates is increased towards the centre of the bridge to provide the proper area at the various points of the chord, and thickening pieces are also introduced on the sides of the webs of the deck beams for the same purpose.

The lower chord consists of links 7 in. deep, and of varying widths, upset at the ends with eyes for 4½ in. pins.

The main braces are formed of links having eyes at the ends for connecting pins, and arranged in sets, those sets which are required to resist compression as well as tension being bowed out, and connected together by rivets with distance ferrules between them.

The vertical carrying rods have each an eye at the upper end, fitting on to the upper chord pin, and at the lower end each passes through and sustains a cast-iron shoe, which supports the lower chord.

The lower chord connecting pins project out where necessary, and the projections are planed down on the sides to flat surfaces, so as to furnish connections for the lateral struts and bracing. The lateral struts are formed of two pieces of rolled iron 4½ in. by ¾ in., bulged and connected by rivets with distance ferrules. The lateral stays are formed of the same section of iron. The lateral bracing consists of round rods, each rod having a sleeve nut for adjustment.

The inclined end posts are of cast iron with cast-iron bolsters and pier and abutment plates, one end of each span being provided with rollers and the other end fixed. The rollers are chilled castings.

The floor beams are rolled 9 in. I beams, weighing 30 lb. to the yard, and placed 2 ft. 3 in. apart. The track stringers are 6 in. by 12 in. white oak, notched ½ in. on to the floor beams, and fastened by bolts to the latter.

The bridge has now (1872) been erected over two years, and under a steady and heavy traffic—the trains moving at their full rate of speed, and not slowing up when crossing—it has given complete satisfaction.

The engineers to the structure were Messrs. Joseph M. Wilson and Henry Pettit, and the contractors were the Keystone Bridge Company.