ORDINARY IRON HIGHWAY-BRIDGES.

The most economic length of panel was at the same time investigated, and was determined, without preparing complete bills of materials, by considering only those portions of the structure which are affected by the variation in the number of panels.

Economy in pony trusses is an element which ought seldom to influence the design, for a good bridge of this kind will generally require more iron than the ordinary calculations demand. Instead of trying to avoid a little expense, regard should be paid to obtaining a good distribution of plenty of material, in order to partly compensate for the lack of rigidity which is characteristic of the pony truss. In very wide pony-truss bridges, especially when the length of span approaches its superior economic limit, it might be well to make a few calculations concerning the economic depth; but the number of panels should be regulated by the slope of the batter braces, which should never be less than two and a quarter horizontal to one vertical.

The superior economic limit of the pony truss is not a fixed quantity, but decreases as the width of the bridge and the load increase, and as the intensities of working stresses diminish. For example, comparing a pony truss and a through bridge of sixty-five feet span in four panels, sixteen feet clear roadway, designed according to Class C, there is found a difference of three hundred pounds of iron in favor of the pony truss; while with the same span, for a twenty-foot clear roadway, and bridge designed according to Class A, there is a difference of eleven hundred and fifty pounds of iron in favor of the through bridge. For a clear roadway of twelve feet, the superior economic limit of the pony truss would reach as high as seventy-five feet; and, for very wide bridges, the inferior economic limit of the through bridge would reach as low as fifty-five feet: but, on account of rigidity, the superior limit of the former may be placed at sixty-five feet; and, on account of appearance, the inferior limit of the latter at the same length.

After making out diagrams of stresses, and bills of materials, for over one hundred spans, the author came to the following conclusions: —