DESCRIPTION OF PLATES.

PLATE I.
MIDDLE BROOK BRIDGE.

This structure carries the four tracks of the New Jersey Central and Bound Brook Divisions of the Philadelphia and Reading Railroad across Middle Brook, near Bound Brook, N. J. The trusses are 28 feet apart between centres, and the span is 128 feet, divided into seven panels of 181 feet. The depth of 32 feet is so taken as to preserve the proper balance between economy of material in the bridge as a whole and judicious design and arrangement of the individual truss members. The extraordinarily heavy load carried by the centre truss, as well as the somewhat unusual characteristics of the traffic, give to the design of this structure more than ordinary interest. The anthracite coal region finds one of its main outlets over the New Jersey Central Division, and thus puts upon the bridge a continuous and very heavy traffic, while the New York and Philadelphia express trains over the Bound Brook route move at a speed certainly not surpassed in this country. There is thus combined in the duty performed by the structure essentially the highest limits of requirements respecting rapidity of movement and weight of passing loads. The floor system, composed of twelve lines of longitudinal stringers rigidly secured between the transverse floor-beams, admirably fulfills the requirements of such exceptional conditions. The depth of trusses gives very stiff transverse bracing, and the construction of the floor system increases very materially the lateral stability.

The heavy loads carried by this bridge involve the use of the eight segment Phoenix column and a number of heavy eye-bars of 12 square inches in sectional area.

PLATE II.
SUNBURY BRIDGE.

The single track of the Mahanoy and Susquehanna Division of the Philadelphia and Reading Railroad crosses the Susquehanna River at Sunbury, Pa., on the through structure shown in this plate. Ten spans of 192 feet each are on a tangent, while four of about 156 feet each are on an eight-degree curve, making a total length of about half a mile. All the trusses are 32 feet deep, but a separation of 16 feet between truss centres for the spans on the tangent is changed to 21 feet for those on the curve. The 192-foot spans have each eleven panels of 17 feet 5/8 inches, while each of the other spans are composed of ten panels 15 feet 7 inches in length. The bridge was designed to meet the requirements of the heavy traffic of the Philadelphia and Reading Railroad, and its general proportions are such as not only to fulfill those conditions, but also to form a most graceful structure, adding a very agreeable feature to its picturesque location. The pleasing effect is increased by the ornamental character of the Phoenix column.

The principal features of the construction are sufficiently well shown by the phototype to render unnecessary a detailed description. Perfect lateral and transverse stability are secured, and the floor system meets the highest requirements of the best practice. It is an excellent illustration of the most modern form of single track through bridge.

PLATE III.
CHAUDIERE BRIDGE.

The Ottawa River is spanned at Ottawa, Ontario, by this bridge, which was built for the Quebec, Montreal, Ottawa and Occidental Railway, now forming a portion of the Canadian Pacific system. Although the plate shows but six spans, there are thirteen, seven of which are separated by an island from the six that are shown. In all the spans the trusses are 16 feet 6 inches apart centres, but the depth of 34 feet 6 inches of the 235-foot spans is reduced to 30 feet for the others. The panel length of 17 feet 1 inch is uniform for all the spans except the longest, in which it changes to 17 feet 3 inches.

It is a "through" structure carrying a single track, and is nearly 2100 feet in length. The method of securing the floor-beams to the posts, by riveting just over the lower pins, is the only peculiar characteristic of the construction, and was required by the railway company. This feature, in connection with the placing of the stringers between the floor-beams, gives rise to a very stiff floor system, and materially increases the lateral stability.

The track rests on ties carried by a system of four longitudinal stringers, constituting a floor of sufficient continuity and strength to provide for any ordinary derailment. These stringers are 4 feet apart between centres; the two adjacent to the centre of the track are, therefore, heavier than the others.

The track is about 50 feet above the water at ordinary stage.

PLATE IV.
CATSKILL BRIDGE.

Of the many picturesque locations along the line of the New York, West Shore and Buffalo Railroad, there is, probably, none in which the art of the engineer combines more harmoniously with the quiet beauty of the natural scenery than at the site of this structure. The village of Catskill, prettily located on the bank of the Catskill Creek, and at a considerable elevation above it, in one of the most charming portions of the valley of