No 18. Finished Bridge from Mouth of Dix River.

THE KENTUCKY RIVER BRIDGE.

In the *Railroad Gazette* of Jan. 19 of this year we gave a brief description of the progress made in this great structure up to that date. We have since received the series of excellent photographs taken by Mr. J. Mullen, of Lexington, Ky., from which engravings published in this and the two preceding numbers of the *Railroad Gazette* have been made.

No drawback occurred in the erection of the structure after the publication of our first account of it, and the final closure of the two halves of the bridge took place on February 20, and the bridge was subjected to a series of tests of great severity on April 20, which closed its history as a problem in solution. To recapitulate this history somewhat: The Kentucky River at the point where it is crossed by the Cincinnati Southern Railway, flows between two walls of limestone rock from 300 to 450 ft. high—almost perfectly vertical, and varying from 1,000 to 1,300 ft. apart. This canon is extremely tortuous, and the stream flowing through it is about 300 ft. in width at ordinary stages. The maximum rise above low water is 57 ft.; and the extreme flood speed observed during the construction of the bridge was eight miles per hour. Steamboats run up to and above the bridge site, and the lumber traffic is quite heavy, rafts frequently passing the bridge at the rate of twenty per hour during the freshet seasons. As the river makes a sharp bend just under the bridge, a pier in the waterway was inadmissable, and the fact that on the north shore the bed rock was covered with a treacherous soil, full of springs, easily scoured, and 58 feet deep, made the question of foundations on that side a very serious one both as to cost and safety. To meet all these contingencies it was decided, first, that three spans of 375 ft. each were required in order to give sufficient raft room and to avoid the costly foundations necessary on the north side; next, that as the great height rendered falsework costly for the shore spans, and the frequency of floods made it impracticable for the river span, the plan of erection must be one that involved no staging in the waterway; lastly, that while a continuous girder in three spans would fulfill all of these conditions during erection, yet the fact that the iron piers would rise and fall from the effects of temperature, while the cliff abutments would not, made it obligatory that the spans should be so hinged as to permit of this vertical motion of the piers without varying the strains in the truss. A careful investigation as to the proper point at which to hinge the girder showed that economy was best attained by cutting the lower chord of the end spans at one-fourth the span-length from the pier.