

rigidity against side pressure from the wind. There are no guys for this purpose, as in a suspension bridge, but the structure is complete within itself. The total length of the bridge is 895 feet. It has a double track and is built strong enough to carry upon each track at the same time a freight train of the heaviest kind extending the entire length of the bridge, headed by two "consolidation" engines, and under a side pressure of thirty pounds per square foot, which pressure is produced by a wind having a velocity of seventy-five miles per hour, and even then will be strained to only one-fifth of its ultimate strength.

The foundations rest on the solid rock; four blocks of most substantial masonry are carried up fifty feet above the surface of the water and from these the steel towers supporting the canti-levers rise 130 feet. The load of 1,600 tons that come upon each pair of steel columns is so distributed that the pressure upon the foundation rocks is only 25 pounds per square inch. From the tower foundations up, the whole bridge is steel, every inch of which was subjected to the most rigid tests from the time it left the ore to the time it entered the structure.

The structure has very much the appearance of an ordinary truss bridge, but, in view of the conditions and surroundings, very different in the manner of its erection. The towers on the water's edge and the shore arms of the canti-levers have, of course, been erected with the help of temporary scaffoldings and a resting point on *terra-firma* and the superstructure is easily put in place from the shore to the steel towers. But after this comes the difficult portion of the work, i. e., to span the 500 feet across and 245 feet above a roaring river whose force no earthly power can stay. No temporary structure could survive a moment, and here the skill of the engineer came in to baffle nature and laugh at her powers. The design of the canti-lever is such that after the shore arm is completed and anchored, the river arm is built out, one panel or section at a time by means of great traveling derricks, and self-sustaining as it progresses. After one panel of twenty-five feet is built and has its bracing adjusted, the traveling derrick is moved forward and another panel erected. Thus the work progresses, section by section, until the ends of the canti-lever are reached, when a truss-bridge is swung across the gap of 125 feet, resting on the ends of the canti-lever arms, thus forming the connecting link. This great work will remain for ages a fitting tribute to the earnestness, enterprise and energy of the Michigan Central management, and its successful completion in so short a time reflects great credit upon the advancement of American engineering and the ability and skill of the contractors the Central Bridge Works, of Buffalo, N. Y.

