to the east badly shattered, and this end of the truss had crashed to the river bed. The west end still rested on the rocker shoe, which was its original support.

It was decided to salve what was left of the truss, to lift it back into position, and to fill in the remaining space with a timber trestle. The new end post and new end diagonal members were strengthened by adding extra steel to give the increased section required. Some difficulty was experienced in getting tackle strong enough to make the lift, but finally the navy loaned the proper material.

Truss Lifted Into Place

At the east end a straight pull was taken from a temporary and stationary derrick built on the completed trestle, and at the west end a lifting pull was made by fixing a stiff leg on the top chord of the truss and pulling back from it. The two hoisting engines, one at either end, provided the pull. After the tackle was placed, the bridge was lifted into place in a few hours.

At this crossing considerable strengthening had to be done to the east lattice girder truss, which was also badly shattered. This was done by building two trestle bents underneath to relieve the truss of most of its load. This bridge was completed quickly and without a hitch.

The third and last work was at Hama, about 200 miles north of Damascus, on the Alieppo line. Hama is situated in a very fertile valley on the Orantes river, from which it is irrigated. Immense wheels, some of them 60 ft. in diameter, lift the water to flumes, generally built of arched masonry, and it is distributed over the land from off-shoots. The wheels are built entirely of wood and their creaking can be heard for miles.

Used Mahogany Worth $60,000

Lieut. Helyer and 20 sappers were sent in advance to clear away the destroyed truss, which was of 30-metre span. The Royal Engineers had estimated that this would take two weeks, but on the second day he wired that the site was clear.

The bridge was replaced by putting in a pier, which consisted of a double bent on piles, and using an army standard type of trussed girder. These were shipped in units of 20 ft., and one 40 and one 60-ft. were used.

The C.O. finally went to hospital with malaria, and Capt. Muntz completed the bridge in record time.

All material for the three bridges was handled and placed by overhead travellers. The cable was salved from an old Turkish line, and a traveller was made by the company blacksmiths from any material available. The lumber used came from India, and was a species of mahogany, and over $60,000 worth was used in the first two bridges.

Upon completion of the third bridge, all lines of military importance were once more in commission, and the company was taken down country by train. After a short stay at Kantara, it sailed for Marseilles, en route to England.

In a recent issue of *The Canadian Engineer* the recent annual meeting of the Engineering Institute of Canada was referred to as the thirty-third annual meeting of that society. That was an error, as the meeting was the thirty-fourth.

Successful flotation of a bond issue of $800,000 for the purpose of consolidating the liabilities of the Taylor Engineering Co., in liquidation, will result, it is expected, in prompt payment of the claims of some 300 or more creditors of that concern.

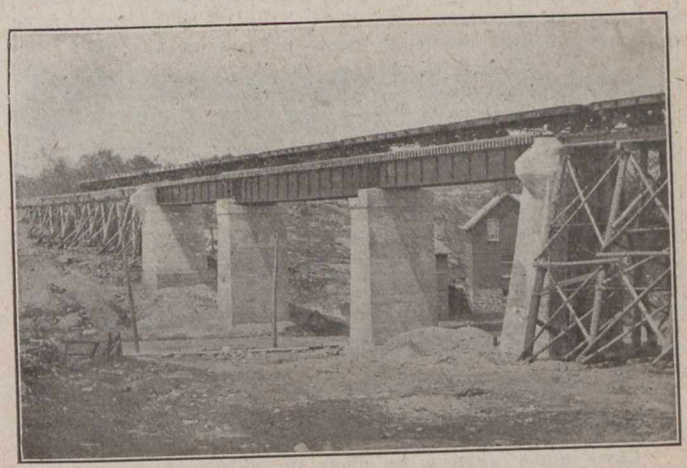
At a recent meeting of the Niagara District Hydro-Radial Union, Manager Yates, of the St. Catharines Hydro-Electric System, quoted F. A. Gaby, chief engineer of the Hydro-Electric Power Commission of Ontario, as having stated that when the present Chippawa-Queenston canal has been completed, the Commission will proceed to increase the production of the Queenston plant to 1,000,000 h.p., additional water to be procured under a new treaty with the United States government. Mr. Yates also quoted Mr. Gaby as having stated that the first 125,000 h.p. at Queenston would be ready for distribution in the fall of 1921, and a further 125,000 h.p. by the following spring.

SOME EXPERIENCES IN FOUNDATION FAILURES

By Reginald B. Evans
Engineer, Toronto Parks Department

WHEN a young engineer has to decide on safe foundations for a railway, road or bridge, too much care cannot be taken, not only for the safety of others but for his own reputation.

The construction of the Toronto-Sudbury branch of the C.P.R., through several different geological formations, gave ample opportunity for the engineers to study foundations.



The Foundations for This Bridge Were in Solid Clay, But When a Pier Settled It Was Found That the Entire Bank Was Sliding Toward the Creek

The northern part of this road was built through the granite country, where swamps lying between the rock ridges had to be crossed either on pile bridges or crossways, or by laying a temporary track and filling by means of gravel trains. On all occasions soundings were taken with iron pipe, and the depth to solid rock, or the character of the bottom, determined as closely as possible.

The first large swamp north of Parry Sound was about 900 ft. long, and although covered with evergreens and some

Building the C.P.R. Through a Swamp

birch, it was found very wet and considered unsafe for a track. Soundings were taken, and it was found to be from 12 to 15 ft. deep, with an uneven rocky bottom. It was decided to wait until winter, when the swamp would be frozen hard enough to support horses; then six rows of large logs were cut and laid lengthways with the line, at about 7 ft. apart, and across them sticks 40 ft. long were laid close