

coat of superior graphite natural color; 2nd, field coat of No. 72 superior grey paint. The steel encased in the concrete was not painted.

The contract for the structural steel work was let to

author on December 2nd, before a meeting of the University of Toronto Engineering Society, the paper afterward appearing in "Applied Science," the official publication of the Society.—EDITOR.]

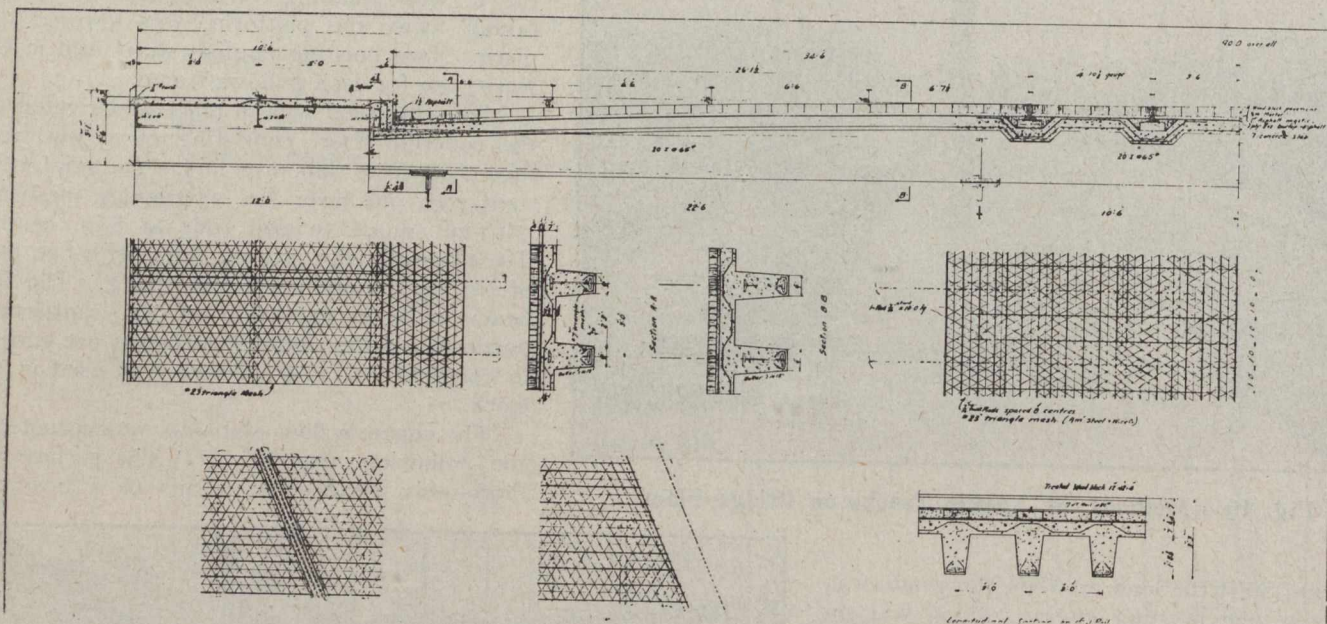


Fig. 13.—Concrete Floor Details.

the McGregor & McIntyre Co. at the following prices:  
 836,346 lbs. steel at 4.3c. per lb. ....\$35,962.88  
 455 lin. ft. handrail at \$3.25 per ft. .... 1,478.75  
 \$37,441.63

The contract for the substructure and floor, exclusive of paving, was let to Scott & Law for \$27,000, piling at 40c. per ft. and extra concrete at \$9 per yd. and extra excavation at 50c. per cubic yard. The waterproofing, included in the \$27,000 contract, was laid by the Canada Floors Company, Limited, Sarco waterproofing being the brand used. The price paid for this work was \$2,450, being at the rate of \$1.75 per sq. yd. The concrete quantities were as follows:

2 abutments ..... 1,566 cu. yds.  
 2 piers ..... 710 cu. yds.  
 Floor ..... 629 cu. yds.

2,905 cu. yds.

Reinforcing steel—53,400 lbs.  
 Piling—596 piles—15,542 lin. ft.

Summary of cost:—

Steelwork .....\$37,441.63  
 Concrete ..... 27,000.00  
 Piling ..... 6,216.80  
 Engineering, extras, etc. .... 9,341.57  
 Total .....\$80,000.00

The designing, supervision and inspection of all the work was done by the staff of the railway and bridge section of the Works Department of the City of Toronto. R. C. Harris is Works Commissioner.

[The subject matter of this article and most of the accompanying illustrations are from a paper read by the

## COPPER PRODUCTION IN JAPAN.

Copper is the most important mineral product of Japan. Its production has been increasing for many years in a steady ratio to the number and growing efficiency of the plants. The year 1913 was not favorable for copper mining, the prices throughout the world fluctuating so that producers were unable to foresee market conditions. Nevertheless, the production of copper in Japan increased by 3,410 metric tons in 1913 over the previous record of 61,471 tons in 1912. The value of the copper production in 1912 was \$20,045,526, and in 1913, \$20,716,800. The greater part of the ore mined in

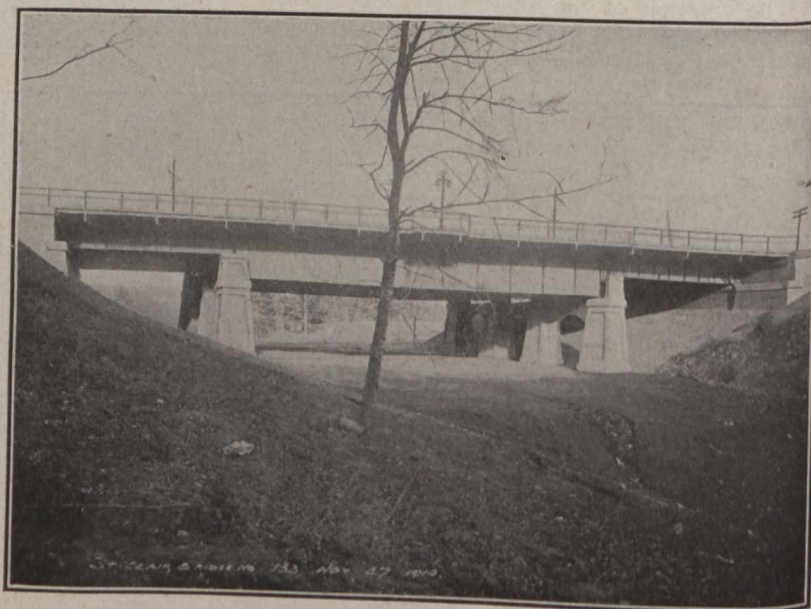


Fig. 14.—General View of Completed Bridge.

Japan is smelted at the mines and exports in 1912 and 1913 were less than \$1,000.