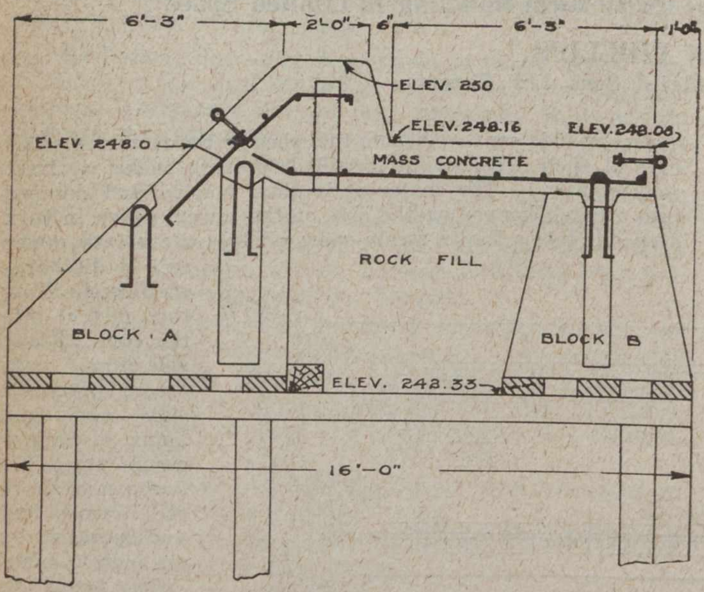
ing the hot sun to strike the concrete and materially assists in the drying and hardening. The parts of forms are all interchangeable and are set to permanent gauge forms located on floor and back wall, thus making it unnecessary to sort out forms when stripping or replacing. The forms are arranged in pairs similar to the position they will occupy when permanently set on the cribs. The large blocks which are placed on the lake side of the breakwater contain 8.9 cu. yds. of concrete and weigh 18.04 tons, while the smaller blocks which go on the shore side contain 5.25 cu. yds. and weigh 10.6 tons. No reinforcing is used in these blocks but keys and rods are provided for the anchors for the mass concrete which is formed on top of these and there are also U-bolts set in the blocks for lifting purposes.

Between the forms and the slip a 20-ton travelling derrick on a 12 ft. gauge track is located to handle forms, lift blocks and transfer to scows from whence they are



CROSS-SECTION OF SUPERSTRUCTURE OF BREAKWATER, SHOWING MASS CONCRETE OVER CONCRETE BLOCKS

towed to the location of the breakwater, where they are set by a derrick scow especially equipped for the job.

At the south end of the dock is a 10-ton travelling derrick for loading the one-man stone to be placed in the cribs.

The plant is well provided with the necessary smaller buildings, blacksmith shop, stores, office, carpenter shop, etc.

The plant is capable of pouring 200 cu. yds. per 8-hour day, which is equivalent to about 14 of each size of block. The entire plant and equipment, including the derricks, was built by Roger Miller & Sons, Ltd., and designed and supervised by A. E. Gibson of the same firm.

At a recent meeting of the branch of the Engineering Institute at St. John, N.B., the following resolution was passed: "Whereas, the people of Canada are confronted with the problem of carrying the very heavy national debt incurred by their participation in the great war for humanity, and whereas this burden can be borne only through the greatest thrift and industry on the part of the nation, through the conservation and development of our human and natural resources, so that we may be able to share in the world's markets against the strong competition that we shall have to meet, be it therefore resolved that the St. John Branch of the Engineering Institute of Canada do hereby declare their heartiest support of the establishment by the government of Canada of a National Research Institute, which shall carry on and direct research into such industrial, agricultural, commercial and medical problems as will best promote such conservation and development of Canada's resources, and that copies of this resolution be sent to the council of the Institute to be forwarded to the government."

ADVANCE IN CHLORINATION AND ITS EFFECT ON TYPHOID FEVER*

By John Kienle
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CHLORINATION of public water-supplies has been the most noteworthy single contribution to the art of water purification in recent years. The effect of this method of water treatment in reducing the typhoid mortality of the country at large is attested not only by the statistics but by the increasing demand of public health authorities for this method of protection.

Chlorination of water by the hypochlorite of lime method was first carried out successfully in the United States by George Johnson at the Union Stock Yards at Chicago in 1907, and almost immediately followed by the treatment of the Jersey City supply at Boonton. By the end of 1911, approximately 500 water plants had been equipped with hypochlorite installation. In 1912, the use of liquid chlorine was announced at the Minneapolis convention of this association. Although the increase in the use of hypochlorite was quite rapid following its appearance at Boonton, the rate of growth of the liquid-chlorine process was even more remarkable. From only one water plant (Niagara Falls), equipped at the end of 1912, the number at the end of 1918, had jumped to approximately 2,500.

In 1907, the United States Census Bureau tells us, the typhoid-fever death rate in the registration area, with a population of 41,758,000, was 30.3 per 100,000, and the estimated number of deaths within the year for the entire country was approximately 30,000. There were then no chlorinated water-supplies. In 1917, according to the United States Public Health Service, the rate had dropped to 12.3 per 100,000, with the estimated number of deaths stated at 13,000, and in this year there were at least 2,000 public water-supplies that were chlorinated. Thus 17,000 lives were saved from death by typhoid in one year. This is a saving of over $125,000,000 annually.

It has been aptly stated that the chlorination of public water-supplies is the cheapest municipal insurance that can be obtained, the average annual premium amounting to not more than 40c. per 1,000,000 gals. of water treated, or, for a municipality of 5,000 or less, an annual expense of $150 per annum ($36.50 operating, and $120.00 depreciation at the rate of 20%) or a cost of 3c. per capita, based on the same figure of 5,000 population.

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*From address before the American Water Works Association.

Wanted, copies of the June 5th, 1919, issue of *The Canadian Engineer*. Any subscribers who have no further use for their copies are requested to forward same to the Circulation Department, *The Canadian Engineer*, Toronto.

The Federal Highways Bill has passed through the committee of the House of Commons. Under its provisions, each province will receive an initial grant of $80,000. The balance of the $20,000,000 will be awarded to the provinces on a basis of population.

In discussing Mr. Breed's paper on concrete in road, culvert and bridge work, which was read at the good roads convention in Quebec, E. Drinkwater, consulting engineer, of Montreal, inquired regarding the use of box sections for culverts instead of pipe, asking whether Mr. Breed had not experienced trouble with water getting into the pipe and freezing. He also asked whether the 1: 3: 5 mix had been found suitable for box culverts. Mr. Breed said that he had experienced some difficulty in connection with concrete pipe culverts along the lines indicated by Mr. Drinkwater. He thought that a better mixture for the box culverts is 1: 2½: 5. The United States government specifies 1: 2: 4, but the New York State Commission prefers 1: 2½: 5 as giving the best results, and the only two failures that they have experienced in three years in using this mix were from dirty aggregate.