A somewhat similar method of mixing and placing concrete is carried out on Contract No. 31, but the excavation in this case is being done partly by stationmen and and partly by Thew steam shovels, mounted on trucks and specially built to work in the narrow trench and to deposit the excavated material on the side.

The excavation on Contracts Nos. 32, 33 and 34, most of which is in clay overlaid with muskeg material, is carried out by means of specially designed drag line excavators. These excavators are provided with superheaters in order that full economy may be obtained from the coal. The drag lines stand at the end of the trench and work backwards, the bucket being dragged towards the machines and then swung out to the side of the trench. They dump the material along the south side in most cases to form an embankment upon which a narrow-gauge construction track is placed for carrying trains of cars containing mixed concrete to the work. The draglines are supported on the bogs by means of plank platforms made in sections each 8 ft. 0 in. x 20 ft. 0 in. Concrete mixing plants, in the case of Contracts Nos. 32, 33 and 34, are located adjacent to the contractors' storage platforms on the District railway. Narrow-gauge tracks are built from the mixing plants along the aqueduct trench on the spoil bank left by the dragline for a distance of about one-half mile in each direction. Concrete is conveyed to the work by small dump cars drawn by gasoline-driven locomotives. Chutes deliver concrete from the cars on the construction track to the forms in the trench.

Engineering Organization.—For carrying out the engineering direction of the aqueduct, five division headquarters' camps, one for each contract, have been established, each with a division engineer in charge, having under him an assistant who is responsible for the lines and grades, an office man to look after field records and sketches, an instrument party, a stenographer and senior and junior inspectors. These inspectors, in order that they may be present at all times on the work, live in tents at each point where work is in progress.

Each division engineer is provided with a light gasoline-operated track speeder, and each party with a large speeder capable of carrying six men with instruments, so that even on Contract 30, which extends over a distance of twenty miles, the work is handled with expedition, and by means of a comparatively small staff of men.

The engineering work is under the direction of James H. Fuertes, consulting engineer. M. V. Sauer is assistant chief engineer in charge of designs. The division engineers in charge of construction under the different contracts are: C. J. Bruce, Contract 30; R. T. Sailman, Contract 31; G. F. Richan, Contract 32; W. R. Davis, Contract 33; A. C. D. Blanchard, Contract 34. F. G. Haven is an assistant to the chief engineer.

[NOTE—This paper was supplemented by studies regarding concrete mixtures employed in the work. An abstract of these studies appeared in *The Canadian Engineer* in the October 26th, 1916, issue.—EDITOR.]

The exhibition of enemy samples loaned to Canada by the British Government will be taken to Halifax and St. John. During the two weeks in Toronto the exhibition was attended by 2,600 people. It was in charge of Herbert Kershaw of the British Board of Trade, assisted by A. E. Bryan and A. W. Kennedy, both of whom are graduates of the University of Toronto. Messrs. Bryan and Kennedy will make a tour of Canadian industrial centres next summer, after which Mr. Bryan will likely go to Japan and Mr. Kennedy to South America as Canadian trade commissioners.

QUEBEC BRIDGE DISASTER.

ON the opposite page are shown a number of views pertaining to the Quebec Bridge disaster. These particular photographs have not previously been published in any other paper, and are printed here by courtesy of Mr. John Nash, of Quebec, P.Q., who was in a position to take same from points of vantage not available to some of the other photographers.

Fig. A586 was taken at 7.45 a.m., and shows the connection of the hoisting links of the central span at the northeast corner. This photograph marks the second stage of the lifting operations as the strain is just coming onto the chains. The six scows were named after the chief engineers, and the name "Duggan" can be seen on the nearest scow.

The structure in the centre of Fig. A582 is one of the two mooring frames which served no purpose other than to act as mooring bases for the floating span until it could be lifted clear of the scows. This photograph was taken from directly below the end of one of the cantilevers, and shows the chains drawn back to allow the tugs to place the span. These chains consisted of links 30 ft. long, made up of two strips 30 in. x 2¼ in., with 12-in. holes at 6-ft. intervals, these holes taking the pins that held the weight as the span was lifted.

The car ferry, which was to have been replaced by the Quebec bridge, is shown in Fig. A592. This ferry was present during the morning of the accident, bearing private cars of Canadian Government Railway officials.

Fig. A577 is an end view of one of the cantilevers which well illustrates the arrangement of the hoisting jacks and chains for one end of the central span. The jacks work in pairs between the short box-girders at the top of the chains. As explained in previous articles in *The Canadian Engineer*, the lower box-girder was held at a fixed level and carried the two jacks which alternately lifted and lowered the upper girder (in lifts of 2 ft. each). On the up-stroke the chains were attached to the upper box-girder and so lifted the span, while on the down-stroke they were released from the upper girder and held by the lower girder while the jacks were being lowered for another lift.

About an hour after the collapse of the central span, Fig. A604 was snapped, showing the broken gear trailing in the water. One of the hoisting chains, slightly damaged, can be seen at the extreme right of this view. The water in the middle of the river is 200 ft. deep, and the fallen span, as shown by soundings, is all more than 150 ft. below the surface of the water, which shows that the span is a wreck. It is at a depth too great to permit of any salvage operations.

Fig. 581 is a view of the hoisting apparatus, looking up-stream just as the central span was being drawn into position by the tugs. Workmen and engineers may be seen on the operating platforms connected to the box-girders.

These views are six of a set of twenty-two unmounted photographs, each 3⅛ ins. x 5⅜ ins., which are being offered by Mr. Nash for $1.00 per set. Each set is accompanied by a folder which describes each picture, and the set makes a very good souvenir of this unusual and unlucky engineering enterprise. Mr. Nash's address is P.O. Box 112, Station B, Quebec, P.Q.

What is claimed to be the tallest chimney stack in the world will be completed soon at the Kuhara refinery, Saganosekei, Japan.