

### HALIFAX DIVING BELL

Sir,—The writer has just received *The Canadian Engineer* of October 31st, 1918, in which are published extracts from a letter from John Taylor, of Hamilton, Ont., regarding a paper read by J. J. Macdonald on the floating caisson or diving bell used in preparing foundations for quay walls at Halifax, N.S. The writer has not yet seen Mr. Macdonald's paper or his statements, but Mr. Taylor's letter, and especially his concluding statement that "he feels it is only just that the facts should be made known to the engineers of Canada as a whole and he fully expects this to be done," causes him (the writer) to write in this matter, as he is probably the one best personally acquainted with all the facts.

The Halifax-Ocean Terminals quay walls were designed for the Canadian Government Railway by F. W. Cowie, of Montreal, as consulting engineer, and the writer, as superintending engineer, in 1912-1913. Many designs and schemes were studied before the type (of original design) finally adopted was decided upon early in 1913, and needless to say, much detailed consideration was given to the foundation work and to the new types of plant and appliances that would be required for the proposed works, including rock drilling, dredging and concreting plants, helmet and bell diving outfits, block setting cranes and lifting tongs, etc.

The writer had in 1911-1912, with Foley, Welch & Stewart as contractors, successfully used as diving bells, the large pneumatic foundation caissons designed by him for the river piers of the Skeena River bridge on the G.T.P. Railway in British Columbia, for removing large boulders and obstructions in fast flowing deep water on the sites of the piers, by working in the working chambers with the caissons grounded or afloat and made movable as desired by displacing or pumping out water. Other people, he believes, have done the same with other caissons.

The writer discussed this with Mr. Cowie, and together they developed and sketched out the floating caisson or large mobile diving bell idea for their foundation work. The doubtful elements of the scheme were cost and rate of progress. It was therefore decided that in letting the docks contract, the choice of methods should be left to the contractors, subject to stipulated rates of progress and qualities of finished work.

In November, 1913, the contract for the first unit of the Halifax docks was let to Foley, Welch, Stewart & Fauquier, who brought to Halifax as their superintendent, James Taber, a well-known Canadian expert with wide experience in deep foundation and compressed air work.

The floating caisson or diving bell method was then again taken up, and was thoroughly examined by R. B. Porter and Fauquier of the contracting company, Mr. Taber, Mr. Cowie, and the writer, further detailed sketches of the bell and estimates of cost of construction being made. It was felt by all these parties that better work could be done, with better inspection and more certainty, with the large diving bell than by other methods, though not at less cost.

The contractors, with a spirit and enterprise for which they deserve great credit, decided to adopt the diving bell method, and in view of the advantages to the work, the writer, with the approval of Mr. Gutelius, general manager, Canadian Government Railways, prepared the working drawings for the bell in his office at Halifax. Mr. Macdonald was then the writer's assistant and office engineer there, and he, along with the late Lieut. C. S. DeGruchy, M.C., and other assistants, did excellent work on the completion of the design and of the working drawings.

The tender scow with its air compressors, etc., and the air locks, etc., of the bell were designed and constructed, or supplied and fitted by the contractors, mostly under Mr. Taber's direction and supervision.

The general plan and details of the Halifax Bell were certainly original in that they were designed for a definite purpose on scientific first principles and from practical personal experiences, and were not copied from any other plans or plant. The designers, were, however, aware of, and were naturally supported in their decisions by the knowledge and precedents of the large bells or floating caissons that had

been successfully used in dock works in years past at Marseilles, Antwerp, Rotterdam, Bilbao, etc.

In the winter of 1913-1914, when the Halifax Bell was designed in its present form, none of those responsible had, so far as the writer knows, any knowledge of Mr. Taylor's scheme, plans or plant. Unlike Mr. Taylor's apparatus, the new Halifax Bell of new design and working under new conditions in fairly open tidal waters, for the first few days, as was to be expected, was the cause of some little anxiety and revealed some minor defects. The skill and energy, however, of J. P. Porter, who had then taken charge for the contractors, rapidly overcame these troubles, and the writer may safely say that the bell for two years without mishap did excellent work under his personal supervision and made steady progress and good time.

Writing from the field in France, the writer is at the disadvantage of having no notes or means of reference at hand, but the principles and applications of compressed air in working chambers of caissons, diving bells, etc., for subaqueous work must be familiar to many engineers, and he thinks that they will agree that Mr. Taylor unduly flatters himself if he claims to be the sole anticipator, originator or inventor of large diving bells of the Halifax type.

The writer regrets he has never had the privilege of seeing Mr. Taylor's plant, but he has a hazy recollection of having heard, probably in 1914, about an outfit, which he thinks may have been Mr. Taylor's, for cutting off and capping piles on the lakes a foot or two below water level in still water, subject to no rise or fall or range of tide; that is, for application to work and conditions quite different to those at Halifax.

JAMES MCGREGOR, Major.

3rd. Battalion, Canadian Railway Troops.

In the Field, B. E. F., France, December 3rd, 1918.

### AMERICAN ENGINEERING SOCIETIES IN CANADA

UPON receipt of a letter from Prof. Peter Gillespie of the University of Toronto, suggesting that the Engineering Institute of Canada should co-operate with the Canadian branches of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers, the Council of the Engineering Institute of Canada at its last meeting discussed the matter fully and decided that there was no way in which the Canadian branches of the American societies could be affiliated with the Engineering Institute of Canada.

A committee consisting of Walter J. Francis, Julian C. Smith, H. H. Vaughan and Fraser Keith was appointed to meet A. D. Flinn, secretary of Engineering Council, this week at Ottawa, in order to discuss the question of Canadian branches of United States societies. It is officially stated that the question will also be discussed with Mr. Flinn of the possibility of the Institute's joining Engineering Council.

### ENGINEERS' CLUB OF TORONTO

AT the annual meeting last Tuesday the following officers were elected for 1919:—President, J. R. W. Ambrose; first vice-president, Melville P. White; second vice-president, Tracey D. le May; third vice-president, J. B. Carswell. Directors—William A. Bucke, A. B. Cooper, E. G. Hewson, Chas. H. Heys, Arthur L. Hull, J. H. McKnight, Walter R. McRae, L. V. Rorke, James R. Wainwright, Major Ward Wright and T. S. Young. Secretary-treasurer, R. B. Wolsey.

Through several American and Canadian bond houses, the Riordan Pulp and Paper Co. is selling \$4,000,000 bonds to finance its subsidiary, the Kipawa Fibre Co., which is erecting a 30,000-ton sulphite pulp mill on Lake Temiskaming.