MR. MACDONALD REPLIES TO MR. TAYLOR'S LETTER REGARDING DIVING BELL

IN the October 31st issue of *The Canadian Engineer*, appeared a letter written by John Taylor, of Hamilton, claiming the invention of the diving bell and protesting against certain statements that had been made by J. J. Macdonald when the latter read a paper at the Halifax professional meeting of the Engineering Institute of Canada. Mr. Taylor's letter dealt very severely with Mr. Macdonald and intimated that the latter, when designing the Halifax Diving Bell, had adopted without authority the principle of the former's invention as used at the Hamilton Harbor.

In a letter received last week by *The Canadian Engineer*, Mr. Macdonald is very indignant about Mr. Taylor's attack, and strongly defends his own position in the matter, claiming that he had never heard of Mr. Taylor's caisson and that the contract for the Halifax bell was awarded before any description was published of Mr. Taylor's design, although the latter was in operation at Hamilton some months previously.

Mr. Macdonald points out differences in design and scope of work between his bell and Mr. Taylor's caisson, and intimates that Mr. Taylor's device lacks novelty so far as regulation of draft is concerned. The following excerpts from Mr. Macdonald's letter explain his position in more detail.—

"Mr. Taylor states that he invented and designed a floating caisson or diving bell in May, 1913, and put the device in operation in August, 1913; and that a description of this apparatus was published in the 'Engineering News' of April 23rd, 1914. Mr. Taylor goes on to say that this machine was in operation three years before the design of the Halifax caisson was prepared, and the letter insinuates that in all probability the principle of the Halifax apparatus was copied from his device.

"In rebuttal the writer begs to state that the detail drawings and specifications for the Halifax Bell were exhibited about March 15th, 1914. On March 23rd, 1914, the Maritime Bridge Company of New Glasgow submitted their bid for the construction of this bell, and on March 31st, 1914, the contract was awarded them. These dates may be verified by reference to the fyles of this company. The construction of the bell was started at once and it was completed ready for work in the autumn of 1914.

"The writer, and so far as he knows, the engineers associated with him on the Halifax work were totally unaware of the existence of the Hamilton apparatus when the design of the Halifax bell was made; and furthermore. when preparing the paper referred to, the writer had no knowledge, either from the article in the 'Engineering News' or elsewhere of Mr. Taylor's design.

"Mr. Taylor states: 'Mr. Macdonald calls his device a floating caisson or diving bell, and lays claim to being the originator of this type of apparatus'; and again: 'With regard to Mr. Macdonald's claim as to the unique and original features of the caisson, namely—the convertible buoyance and ballast chambers, if you will refer to the Engineering News,' etc.

"Referring to the paper, it states that 'for reasons of economy and adaptability to the conditions, it was decided to adopt a *self-floating*, *submerging* and *raising* type of mobile pneumatic caisson or bell,' and the whole context of the paper describes this apparatus as a self-floating, (self) submerging and (self) raising caisson.

"There is an essential distinction between this nomenclature, and the term 'floating caisson.'

"The last sub-division of the paper contains the only reference to personnel, and the features of the Halifax apparatus believed to be unique. Any reader will note that nothing is said about *invention*, and that there is no ostentation about patents, etc.

"The aim in writing this paper was, primarily, to explain and formulate the principles of design developed in connection with this apparatus, in the professional interests of engineers.

"Regarding unique features—after citing bells or caissons, which to the writer's knowledge, had been used on harbor work elsewhere,—the following statement was made:

"'The self-raising and self-floating features of the Halifax bell, the simplicity of its general construction, the method of ballast control and the great range of depth, 20′ to 55′ (a mis-print here gave 35′) at which it will work, coupled with its relatively small size in area, make it unique.'

"The writer has looked up the article re the Hamilton device in the fyles of the 'Engineering News,' and from the description given therein, would say that the following comparison of the two plants is obvious:—

"The Halifax caisson was designed for work while resting on the harbor bottom at depths up to 55 feet below the water surface, and the caisson, proper, has to be submerged and sunk, under control, to that depth after submergency, and by a reverse operation raised to the surface.

"In order to float the caisson when it was required to be moved, the buoyancy chamber was added, and this was its only function.

"The difficult problem was to take care of the sinking and raising of the caisson while submerged. This was solved by the device of a specially-proportioned vertical ballast chamber, which was separate in action and function from the buoyance chamber, and which handled the water ballast proper. This feature of the special ballast chamber is referred to in the quotation given above as 'the method of ballast control.'

"This fundamental problem was altogether absent in Mr. Taylor's design, and the principle of using separate buoyancy and ballast chambers is not even indicated.

"The Hamilton machine was a purely floating device for work about three feet below the surface of the water and was incapable of submergence; it was essentially a pontoon or scow, with a bottomless central well or compartment in which the water level could be lowered by turning in compressed air.

"The use of water ballast was not an essential principle of the plant, so far as its use as a floating caisson was concerned; a heavier scow would have served without water ballast. The real purpose of the water ballast in this case was to regulate the draft of the float, so that it could pass over the piling in getting into position, and this device of regulating or changing the depth of flotation of a pontoon, scow or floating device, by admitting water through sea-valves into chambers and forcing it out as required, is an old one used on floating gates for docks, scows carrying construction plant in tidal waters, etc.

"The problem of flotational stability while in the submerged condition was entirely absent in the case of the Hamilton apparatus.

"In speaking of stability, Mr. Taylor's statement that his machine was stable—'the metacentre being well *below* the centre of gravity for all conditions,' is surprising; but there is probably a stenographic error here."