for the storage of grain, coal, etc., but which would not stand the tests of fluid pressures.

With a view to showing the difference between designing a bin or series of bins for the storage of grain or for the storage of a fluid, if we take a bin say 12 feet square and 72 feet deep, with a coefficient of friction between grain and the bin walls of .468 when filled with grain, the vertical pressure will be only 15% and the horizontal pressure only 9% of the pressure that would be produced by a fluid of the same specific gravity as grain. Therefore the bin bottom will only require to be 15% of the strength to carry the vertical load and the walls to resist the horizontal pressure only 9% of the strength. The walls, however, require to have sufficient strength acting as a column to support over 86% of the total weight of grain in the bin, while if used for the storage of a fluid, the walls would have no load to carry beyond their own weight. On the other hand it is quite practicable to design and build a tank or standpipe that will have an ample margin of safety when filled with water, and that would undoubtedly fail when used for the storage of grain.

In order to show the importance of the question from a financial standpoint, it may be stated that if the bin structure of the Montreal Harbour Commissioners elevator was designed and built to safely withstand fluid pressure and at the same time safely carry the grain loads, the cost would be at least $200,000 greater than if designed for the storage of grain with a factor of safety of 4. It would therefore seem that in cases where so much money was involved, and when the question of the proper design to meet the requirement of an important link in the transportation problem was at stake, the question would have been worthy of careful investigation.

We therefore have as the two extremes, tanks apparently designed to hold chaff, and those of the expert fluid pressure theorist, who would have grain storage bins designed to hold water.

In view of the wide divergence of opinion and the lack of accurate published data on which to base calculations for the strength of grain storage bins, the serious losses that have occurred and the consequent lack of confidence caused thereby, the Author believes that all engineers and owners interested in grain elevators and the storage and handling of grain, will agree that a full investigation and systematic series of tests to ascertain the manner in which grain loads are carried and the pressures produced by grain, are very urgently required.

The Author therefore proposes to present as clearly and briefly as possible the information gained by conducting a systematic series of tests, calculations, and investigations, to ascertain all possible information on this subject and in order to confirm the tests and