Mr. Thomson stated that the Municipal Life Building had been one of the most extensive undertakings in caisson work. Going down about 140 feet below street level, there had been 106 caissons put in in this job. During a mishap, in which the air-pipe broke, 46 feet of water collected in the shaft in 16 minutes. Going down about 112 feet below water, concrete and cast-iron blocks were used to overcome friction. A pressure of 48 pounds to the square inch was exerted.

The sevenceen-storey building Mr. Thomson referred to was moved to make room for the new Bankers' Trust Building, in process of building. The old building was 23 by 75 feet; the new will be 100 feet square. In preparing to pull down the old building a 5%-inch steel cable was placed around the building, a 11/4-inch mesh wire netting placed on this over the street pavement, then a net of a finer mesh placed over this. To test this safety precaution a crowbar was let fall 150 feet upon it, and it held it. The old building had been built of first-class material, but in any spaces between the brick and steel a serious rusting of the steel was detected. Nine feet of steel which was below the water line, that had tar, red paint and lead on it, was in good condition. Some serious defects were found in the concrete work not being solid. The building was torn down in forty-five working days.

During the lecture, in illustrating and amplifying his remarks Mr. Thomson showed about ninety excellent views of places and active operations. There was a large and appreciative audience present, both from the Society and the School of Practical Science.

Mr. Thomson, in reply to a question, stated that 45 to 48 pounds was about the greatest pressure thought safe to have in the air chamber. At that pressure the men work in shifts of three-quarter hour's duration. There are two shifts, and seven and one-half working hours a day.

## The Engineers' Club of Toronto 96 KING STREET WEST TELEPHONE MAIN 4977

## Programme for November, 1910

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THURSDAY, 3rd, 8 p.m.

Postponed Illustrated Address on "St. Andrew's Dam, Winnipeg," by Mr. A. H. Harkness, Consulting Engineer, Toronto.

THURSDAY, 10th, 8 p.m.

General Meeting, as per notice, for consideration of By-Laws and other business.

THURSDAY, 17th, 8 p.m.

- Illustrated Address on "Municipal Bridges in Europe," by Mr. R. E. W. Hagarty.<sup>1</sup>
- THURSDAY, 24th, 8 p.m.
- Meeting of the Toronto Branch of the Canadian Society of Civil Engineers.

## The Executive meets every Thursday at 7.30 p.m.

C. M. CANNIFF, President, L. J. STREET, Treasurer, 15 TORONTO ST. 209 STAIR BLDG. R. B. WOLSEY, Secretary.

25 LOWTHER AVE.

## THE TRUE COST OF POWER.

That the real cost of purchased power includes not only the price paid for the purchased power but also the fixed charges and running costs of whatever make-up power plant is maintained by a factory, is a fact that seems to elude the grasp of many business men when they face the problem of power supply. When nothing but outside power is used, there is, of course, little difficulty in the reckoning; but in many instances factories of various sorts have expanded in such a way that the purchased power is sometimes insufficient or unreliable, and constant operation of the factory means the installing of a full-power independent plant. When it becomes necessary to install a full-power plant for make-up use it is nearly always cheaper to depend altogether on the independent plant and give up the purchased power.

This fact is shown with particular clearness in a recent report by F. W. Dean, mill engineer and architect, of Boston, on a plant which was buying electric power which was often insufficient during the hours of the heavy lighting load, and sometimes failed entirely. An 80 k.w. generator, run from the company's own steam plant, had been used for make-up power, but a prospective need for the output of a 300 k.w. generator, or fully double what had been purchased, brought up the issue of installing a full-power independent plant. Mr. Dean showed that under the conditions the company could make a large saving by making all its power in its own plant.

The purchased power cost \$24 per horse-power per year, the charge being based on the maximum reading of the ammeter each day. The average actually used was 123 horsepower, while the maximum reading was 138 horse-power. The former is 89 per cent. of the latter, and the real cost of power to the company was, therefore, \$24, divided by 0.89, equals \$27. The real cost of power to the company if it installed a full-power plant for merely make-up use would be this \$27 plus the fixed charges on its own engine plant, together with some other charges, such as a portion of the coal used, part of the labor costs, etc., of the steam plant that was required apart from power needs.

Mr. Dean made detailed estimates for three different types of independent full-power plant, providing for the needs that were reasonably within sight in view of the rapid expansion of the company's output. A 1,000 horse-power Corliss steam plant, with generators, house and all auxiliaries, including flue and chimney, gave a cost per i.h.p. per year of \$19.19, which, by separating the portion of the charges due to non-power use of steam, came down to about \$18 per i.h.p. per year. A producer gas plant, with engines and two 300 k.w. generators, gave a cost of \$17.18 per i.h.p. per year. Steam turbines were not figured to such detail in operating costs, but the estimates, providing for two 300 k.w. steam turbines and a complete plant, including generators, showed an installation cost of over ten dollars less per i.h.p. than either gas or reciprocating engines. The cost of operation would be less than that of a reciprocating plant and not higher than that for gas engines; the turbines were, therefore, recommended. It is plain that in any one of these three ways the company could provide itself with full power at much lower cost than by purchasing power at the rate named, even without installing a make-up plant; and that if the needed make-up plant was to be of full capacity the cost under those conditions would be nearly double the cost of independent full power.

> THE CANADIAN SOCIETY OF CIVIL ENGINEERS WILL MEET AT WINNI-PEG, MAN., JANUARY 24th, 25th, 26th and 27th, 1911.