

stocks and bonds in very large amounts based upon their business of distributing Canadian power. This applicant is now seeking to enter the same field. Without going into details, it seems sufficient to say that the prohibition of exportation from Canada of this present electric power which now comes into this country would paralyze business and industry of many kinds and would deprive numerous localities of electricity for light. American produced Niagara power is so far from supplying the vital needs of the sections of the State above described that the immediate results of such prohibition would plainly amount to a great public calamity.

The Electrical Development Company enjoys rights obtained from the Canadian Park Commissioners, and which were granted under authority of the Ontario Provincial Government, including the right to export electric current not to exceed fifty per cent. of its plant capacity. The form of securing a license yearly from the Dominion Government is required by the Dominion law, but such license has been granted yearly to the other great producing electrical corporations of Canada, and no reason appears for apprehension that any discrimination would be made against the Electrical Development Company or the Toronto Power Company, lessee. We have nothing before us but the suggestion that the Dominion of Canada may at some future time forbid this exportation. This Commission must assume that international relations affecting so important a subject as the means of continuing great industries which have grown up in reliance upon the use of this imported power, and as well the interests of the Canadian producing companies themselves, have become fixed and subject only to such changes as will fully protect the great commercial and industrial interests and rights now served by this power brought from Canada. The time has long since passed when governments proceed ruthlessly from pure national rashness or anger to destroy the settled accepted commercial relations and formally vested rights of persons and corporations.

It will be seen from this that the revocable permits of the Ottawa Government are looked upon as more or less formal and not designed to be withdrawn should occasion demand it. In other words, they are not protective, but simply for information.

Evidence is not wanting to show that the opinion is held by representatives of the people and men in authority that it would be a good business stroke to secure and use large amounts of power from the Canadian side under the plausible argument that its return would be impossible because of the jeopardy to established conditions which this return would entail. Legislation has been introduced at Washington having for its object the permission to import larger quantities of power than heretofore allowed, and other legislation has been put forward making the importation without limitation of any kind upon the ground that it is a natural commodity and its use very beneficial to industry. Fortunately, the situation now unfolding is revealed before the power generated upon the Canadian side is exhausted and turned to the benefit of manufacturies and developments which bring no advantage to the people of Ontario.

The question of procuring tonnage is said by Mr. E. Hamber, Vancouver, to be the great question now before the British Columbia lumber industry. Markets are in existence in Australia, South Africa and the Orient and still larger markets are looming up in the United Kingdom and Europe, but the ships are lacking for the conveyance of the cargoes.

GENERAL NOTES ON FOUNDATIONS.

IN a paper presented at the annual meeting of the American Society of Mechanical Engineers held in New York, December 7 to 10, Mr. Chas. T. Main discussed the subject of foundations. The following notes abstracted from his paper, present a general consideration of the subject that will be found of value:—

After the location of a plant has been decided upon, and the site selected, a sufficient number of borings should be made or test pits sunk to determine the character of the soil and its bearing capacity. Such exploration will reveal whether the site is suitable or whether the cost of foundations would be excessive. If the site is found suitable, the knowledge of the underlying soil or rock is necessary for the proper and economical design of the foundations.

The borings are made for the purpose of determining at what level firm soil is to be reached, if at all; the thickness of any stratum of firm soil; the character of the underlying material; the level of the ground water; whether piles will be required and the probable length of same.

It is of great importance to support all structures on a stratum of soil below silt or peat. If the structure is to be a heavy or an important one and it is found necessary to use piles, some of the borings should be carried to bed rock, if possible, and dry samples of the soil should be taken every few feet in depth. The samples should be examined as soon as taken, as the moisture in them evaporates and their character changes rapidly. If uniform conditions are found a few widely scattered borings will be sufficient, but where the conditions vary a greater number should be made.

If it is found necessary to drive piles, test piles should be driven and careful records kept. Piles should be tested by loading until marked settlement takes place and careful readings should be made before and after each increment of load. If possible, loads should be allowed to rest at least 24 hours after each increment, except the final load which should remain on at least 48 hours unless a failure of pile or testing platform prevents. All test piles should be pulled, whether load-tested or not, to determine their condition and suitability for the work.

From the accumulated data obtained from borings, test pits, test piles and from pile loading tests, it will be possible to select working loads for the piles suited to the building to be supported. In general, the working pile values should have a factor of safety of not less than $2\frac{1}{2}$ based on a load producing $\frac{3}{8}$ in. total settlement by test. However, it may be desirable to select a working load based on allowable settlements such as $\frac{1}{16}$ in. to $\frac{1}{8}$ in. The values of the factor of safety and working or ultimate settlement are all to be fixed to suit the class of structure to be supported.

Buildings which are to contain moving machinery or delicate instruments would naturally require piles with fairly large factors of safety, while in cheap one-story structures for storage purposes the safety factors could be much lower. Where piles are not load-tested, the values given by the Engineering News formulæ can safely be used. These formulæ are:

$$\text{For a pile driven with a drop hammer, } P = \frac{2WH}{S+1}$$

$$\text{For a pile driven with a steam hammer } P = \frac{2WH}{S+0.1}$$