Editorial

ONTARIO'S WATER POWERS.

In this issue a copious abstract appears of a monograph relating to the water powers of Ontario. It is one of a series prepared under the direction of J. B. Challies, C.E., Superintendent of the Dominion Water Power Branch of the Department of the Interior on the general hydro-electric and power situation in the various provinces of Canada at the present time. Five brochures have been specially written for distribution among engineers attending the International Engineering Congress in San Francisco this week. They have been prepared by representative engineers, prominent in the profession in Canada and thoroughly familiar with the territory covered in their respective monographs. They are: "Water Powers of British Columbia," by G. R. G. Conway, Consulting Engineer, Toronto, (previously Chief Engineer of the B.C. Electric Railway Company); "Water Powers of the Prairie Provinces," by P. H. Mitchell, Consulting Engineer, Toronto; "Water Powers of Ontario," by H. G. Acres, Hydraulic Engineer, Hydro-Electric Power Commission of Ontario, Toronto; "Water Powers of Quebec," by F. T. Kaelin, Assistant Engineer, Shawinigan Water and Power Company, Montreal; "Water Powers of the Maritime Provinces," by K. H. Smith, Resident Engineer, Dominion Water Power Branch, Halifax, N.S.

The information regarding water powers in Ontario, to which considerable space is devoted in this issue, is, without doubt, the most authoritative and instructive that has been published to date. The summary of undeveloped and developed powers, as given by Mr. Acres, should dispel many erroneous ideas concerning the extent of this marvellous asset. A summation of nearly 5,000,000 horse-power capable of development, less than 15 per cent of which has already been utilized, indicates clearly the opportunities for manufacturing industries within the province. Of the 702,000 horse-power now in use, it is stated that about 574,000 horse-power is electrical energy sold for light and power; about 69,000 horse-power is used for pulp and paper manufacture, and about 59,000 horse-power is used for the most part in the form of hydraulic power directly applied.

Mr. Acres has analyzed the power possibilities of the province by grouping into districts those developments that fall together from a natural and topographical standpoint. Thus he has described the present and possible developments of the Ottawa River and its tributaries, the rivers tributary to the Great Lakes, the Winnipeg River and its tributaries, the rivers flowing into James Bay, and the international rivers of Ontario, and has outlined the hydrological and geological characteristics of each group. As a result of this, the reader is given a clear and impressive idea of the magnificent potentialities of the rivers of Ontario, together with an idea of the commercial feasibility of their early development.

The same is true of the other pamphlets relating to water power elsewhere in the Dominion. They outline its abundance and the feasibility in each instance of its utilization. Taken altogether, a more authoritative accumulation of information on Canadian water powers is not to be found, and no time could be more fitting for commending it to the attention of engineers, manufacturers and financiers of this and other countries.

DETERMINATION OF BIOCHEMICAL OXYGEN DEMAND BY A NEW METHOD.

The saltpeter method of determining the biochemical oxygen demand of sewage and polluted waters was lengthily referred to in an article which appeared in *The Canadian Engineer* for July 15, 1915. Briefly, the method depends upon the denitrification of a sodium nitrate solution by the sewage bacteria present. Experimental investigations have shown that the amount of saltpeter oxygen absorbed by the organic matters on incubation is the same as if fresh water oxygen were used. This, then, should prove a very important discovery, as the method lends itself to easy manipulation. After preliminary tests with varying quantities of saltpeter to ascertain the strength of the sewage, a definite excess of the nitrate may be employed, without resulting in an increased oxygen consumption. This obviates a great deal of the preliminary work attending fresh water dilution tests.

The saltpeter method cannot be applied indiscriminately, however. A municipal sewage may contain a considerable quantity of trade waste without losing entirely the characteristics of a domestic sewage, in which case the method may be employed without modification. However, sewage or trade wastes occur containing caustic alkali or acid, or a germicidal or antiseptic substance. Wastes from stock yards, tanneries and the corn products industry are examples.

According to Dr. Arthur Lederer, of the Chicago Sanitary District, who discussed this subject recently before the American Chemical Society, with the packing house waste mixed with domestic sewage, the method remains the same as with domestic sewage. This waste resembles somewhat a concentrated domestic sewage, with a high organic nitrogenous and carbonaceous content. In the case of cornstarch and glucose industries there is also an admixture of sewage with consequent high bacterial content. Here the presence of carbohydrates often results in a fermentation during the incubation, forming organic acids which inhibit denitrification. Again, the effluent may be slightly acid, on account of the presence of free sulphurous acid, but this acidity will quickly disappear on standing.

In tannery wastes caustic alkali is particularly likely to occur, varying considerably in strength and necessitating neutralization with hydrochloric acid. It is to be noted here that time must be allowed for the neutralization in the case of a waste strong in caustic alkali as the free lime in the sediment does not combine very rapidly with the acid. These particular effluents, resulting from the liming process in the tanning industry, do not lend themselves readily to biochemical demand determinations by either the saltpeter or the dilution method. In a mixed tannery waste, however, suspended lime is ordinarily not present in quantities sufficient to interfere with the reliability of either mode of procedure.