

Province of British Columbia

horse power, and those powers nearer the lower figure make them an economical possibility for successfully undertaking electro-chemical industries. Considering this fact together with the wonderful possibilities of transport by water freight to the markets, the advantages in competing with less favorable districts is obvious.

In the utilization of atmospheric nitrogen for the production of nitric acid and the manufacture of nitrates, great developments have taken place during the last decade in Norway and Sweden;* an original small plant established in Norway of 25 H.P. in 1903 has now grown so rapidly that water-power amounting to 400,000 H.P. is used at the present time in its production. The world's consumption of nitrogen in its various combinations is about 750,000 tons, representing a value of \$250,000,000, with a yearly increase in the demand of 5% or 6%. Four-fifths of this supply has been produced hitherto from Chili saltpetre. This natural saltpetre contains from 18% to 60% of nitrogen, but it is well known that at the present rate of consumption these fields are rapidly becoming exhausted. This great source of the world's fertilizers, which in 1870 yielded 147,000 tons per annum now yields over three million tons per annum. With the exhaustion of these fields the fixation of atmospheric nitrogen has become a great national duty in every country possessing economical means of producing these fertilizers. In 1898 Sir William Crookes, the great British chemist, sounded a note of warning in his address before the British Association when he said:—

"The fixation of nitrogen is a question of the not distant future. Unless we can class it among certainties to come, the great Caucasian race will cease to be the foremost in the world and will be squeezed out of existence by races to whom wheaten bread is not the staff of life."

That problem which for so long has been the dream of chemists had, however, not long to wait for its solution, and in 1902 a plant was erected at Niagara Falls by the Atmospheric Products Company. From this small beginning has developed a great industry with unlimited possibilities for the future.

At the present rate that the consumption of fertilizers is increasing, in less than five years it will reach the great total of 6,000,000 tons per annum and on the basis of six-tenths of a ton per H.P., this represents 10,000,000 H.P. to manufacture this quantity. Apart, however, from the exhaustion of the Chilian fields, it is possible for British Columbia to compete seriously in the world's markets in the industry in competition with the natural saltpetre.

The principal method† used for extracting nitrogen from the atmosphere is by heating the air in an electric furnace to a temperature of 2,000 degrees Centigrade, when some of the oxygen combines with the nitrogen, forming oxides of nitrogen. These gases coming from the furnace are cooled and led through water, which absorbs the nitrogen oxides and forms nitric acid. The nitric acid is then utilized as the base for the manufacture of the

* See "Utilization of Atmospheric Nitrogen," by T. H. Norton, U. S. Bureau of Manufactures.

† See "Fixation of Nitrogen from the Air," by B. Thomas, Seattle, 1913.