

# NITROGEN FROM THE AIR.

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Mr. Orchiston's Paper on obtaining Nitrogen from the Air (a process that has been one of the main sources of supply of nitrates for Germany since she discovered it, which was published in condensed form in the newspapers, is here published in full, with an illustration of the plant required to carry out the scheme.

In 1785 Lord Cavendish and Mr. Priestley, an English chemist, discovered that by means of electrical sparks in a glass tube, nitrous vapours could be produced.

In 1902 D. R. Lovejoy and Charles S. Bradley published the results of their experiments at the Niagara Falls in the production of nitrogen from

Notodden and Rjukan Falls. At that period the demands so far exceeded the production that they had orders on hand for all they could produce for twelve months ahead. It was then decided to enlist fresh capital to duplicate the factory at Rjukan. The Germans were at one time interested, but the Scandinavians would not let them have control, and

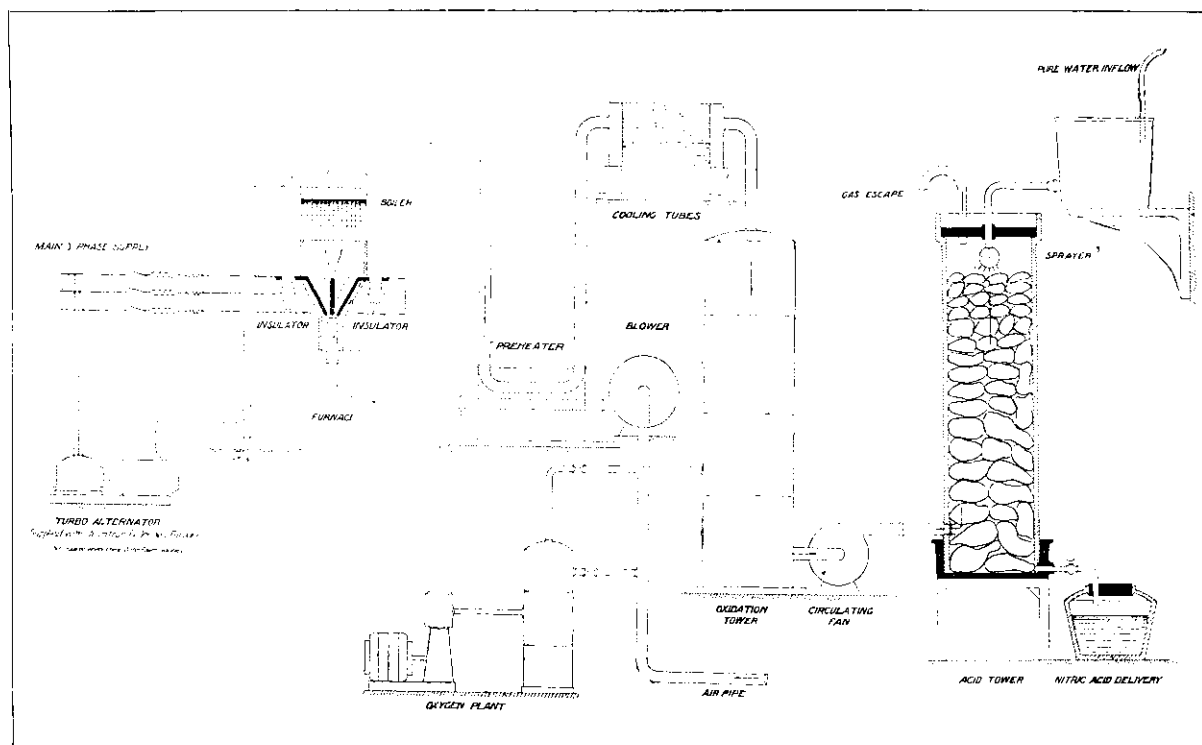


Diagram of Professor Kilburn Scott's three-phase Electric Furnace and Accessories for obtaining Nitrogen from the Air.

This furnace generates a temperature approximating 4000 degrees centigrade causing the nitrogen and oxygen of the air to combine forming nitric oxide. The gas then passes through the tubes of a steam boiler and other devices to procure rapid cooling, as it is reversible at high temperatures. After being reinforced with oxygen from the oxidation tower to form nitrogen peroxide, it then circulates through the acid fixation tower. This tower is filled with quartz or granite gravel, and has fresh water continually percolating through the gravel. The rising nitrogen peroxide gas combines with some of the hydrogen of the water, forming a dilute nitric acid. This dilute acid is next fed into other towers until it reaches a strength of from 55 to 40 per cent. of pure acid, the required standard for combining with calcium (limestone) to form calcium nitrate.

the air. They used 12 h.p. of electric energy, which cost them at the rate of 18 dollars per h.p. per annum. Although this can only be classified as a laboratory experiment they demonstrated the fact that given cheap power the fixation of atmospheric nitrogen by electricity was a feasible proposition.

Shortly after Lovejoy's and Bradley's experiments, two Scandinavian inventors, Professor Birke-land and Doctor Eyde, of Norway, developed a practical scheme, and by 1911 they had some two hundred thousand horse power harnessed at the

as the Norwegian Parliament passed laws having that effect, they withdrew. At the same time Lord Revelstoke was asked by French banks to appoint an expert to report on the process. The late Dr. S. P. Thompson, an electrical engineer, was chosen, and his favourable opinion caused the French to assist. They have had every reason to be satisfied with the investment, and their co-operation is fortunate for the Allies.

The duplication of the Rjukan plant which was commenced before the war, was completed last year.