improves the balance of trade by substituting home production for importation."

As regards New Zealand, it is estimated that as power can be produced at the Bowen Falls, Milford Sound, at less than 15s. per horse-power year, the corresponding cost to produce a ton of 100-per-cent. nitric acid by the Birkeland-Eyde process would be £7 16s. 2d., by the Rankin method £5 10s., and by the Kilburn Scott furnace somewhat less. It would, however, be well to add 20 per cent. for extra labour charges over that paid in the United States.

To produce calcium nitrate all that is required is to pass a dilute nitric acid (35 per cent. to 40 per cent.) through vats containing limestone or marble until the liquid becomes a saturated solution of calcium nitrate, after which it is crystallized by evaporating the surplus water by means of heat given off from the arc furnace during the process of burning the air.

Many people think that because nitrate of soda is found in a natural state in Chile it is hopeless to attempt to compete with the natural product. They overlook the fact that the nitrate deposit, locally known as caliche, occurs as a layer from 1 in. to 6 in. thick under a bed of conglomerate consisting of sand, feldspar, and pebbles, usually from 20 in. to 30 in. thick. The caliche is never pure nitrate of soda. It contains mixtures of nitrate of potash, common salt, iodide and bromide of sodium, alkaline sulphates, sulphate of lime mixed with sand, &c., and only averages 25 per cent. nitrate. Picked pieces contain more.

To extract the crude salt a hole 20 in. in diameter is dug in the ground. When the saltpetre bed is reached a chamber 35 in. to 40 in. in diameter by 12 in. deep is made, and 3 cwt. to 4 cwt. of powder inserted. By this means a radius sometimes reaching 40 ft. is laid bare. The crude salt is hand-picked to eliminate stones and fragments of little value. It is then conveyed by means of baskets or trucks, which camels transport or draw, to the works for treatment. To dissolve the crude caliche three kinds of apparatus are used, involving the use of coal for heating and raising steam. When the solution is concentrated enough it is run into cases or boxes, where it clarifies, and is then decanted on top of the depot into iron or wooden crystallizers. The resultant crystals average about 95 per cent. of nitrate of soda, and are then ready for packing and conveyance by rail to the coast.

It will thus be seen that the actual labour involved in turning this natural product into a marketable commodity is much in excess of that involved in the electric process, in addition to the cost of coal and explosives. Labour troubles on the nitrate-fields have been very pronounced of late years, and still more accentuated after the war began, resulting in a considerable increase in the cost of production. Added to this the Chile Government levies an export duty amounting to £2 5s. per ton. Prior to the war Chile nitrate of soda was delivered in Europe for about £10 per ton. At present it is quoted in New Zealand at about £25 per ton, but is practically unobtainable. There is every indication that it will never return to the pre-war figure; hence the greater need for developing our water-powers where conveniently located for transport facilities.