

Although nitrogen is one of the most prevalent elements forming over seventy-eight per cent. of the air we breathe, the remainder being oxygen, it is very elusive, and therefore difficult to capture and imprison in a marketable form. Foods may vary, and so do explosives, but when analysed there is ever present one chemical element in both, and that is nitrogen. It is true there are other constituents, possibly in greater proportion, so why single out nitrogen? Because in nature's workshop and in man's munition factory nitrogen is the scarcest of the indispensable materials. The others are just as essential, but they can be obtained more easily. The supply of nitrogen is usually the first to give out, and when that happens the production comes to a standstill, either in the soil or the factory. Experience has shown that land holding three-tenths of one per cent. of nitrogen will prove very fruitful, other things being equal. It may produce from thirty to forty bushels of wheat to the acre. Soil containing two-tenths of one per cent. will probably be good for about twenty-five bushels per acre. If one-tenth of one per cent. it may produce fifteen bushels, but if this essential plant food be as low as one-twentieth of one per cent. the ground will be too poor to produce a profitable crop. In so far as the North Island is concerned there is not so much need for this fertilizer as in agricultural countries. As a rule virgin lands contain a fair percentage of this element.

In the early eighties a yield of one hundred and thirty bushels of potatoes per acre was considered a prime crop in Germany, but by 1914 the application of Chili nitrates had made it possible to count upon an output of two hundred and ten bushels per acre. Because the same course was not followed by the farmers in Russia, Austro-Hungary, France and Italy with similar, if not better soil, they have not improved upon their crops of thirty or forty years ago. On the other hand Great Britain, Belgium and Holland, profiting by Germany's example, were able to increase their production from fifty to one hundred per cent.

Experience has shown that every pound of nitrogen rightly applied to the soil increases the yield of wheat, rye, barley or oats, by about twenty pounds of grain and forty lbs. of straw. In the case of potatoes one pound of nitrogen will better the yield of about eighty-five pounds.

Hitherto nitrogen fertilisers have not been much in demand in New Zealand. This is accounted for by the fact that virgin soils are not so deficient in this element as ground which has had a number of crops taken off it. Another, and a very good one, is the fact that Chili nitrates have been too costly as compared to phosphatic manure. It is estimated that calcium nitrate can be produced at the Bowen and sold to the farmers within the Dominion at about one half the price previously charged for Chili sodium nitrate. It should not be overlooked that when nitrate of soda, the natural product of Chili gives up its nitrogen to plants sodium is left behind, and may be deleterious to the soil. On the other hand electrically produced fertilisers containing calcium, leave only lime in the soil, which is usually advantageous.

Before closing this paper it should be mentioned that Prof. John E. Bucher, of Brown University, New York, has brought out a patent for the fixation of atmospheric nitrogen without the aid of electricity. It seems to be a modification of the Haber process largely used in Germany. The substance of his discovery is that nitrogen will combine with an alkali and carbon in the presence of iron as a catalyst producing the cyanide. Reduced to concrete terms this means that he mixes soda ash and powdered iron with powdered coke; upon heating this mixture in an ordinary furnace and running air over it, the result is cyanide of soda, leaving the iron uncombined. It is obvious that soda ash, powdered iron and coke cannot be obtained for nothing, and that coal must be consumed in heating the furnace. I am therefore inclined to think that the Norwegians, with their cheap power, will not be greatly alarmed, nor will the promoters of the Bowen Falls scheme. The chief advantage of this discovery is that a factory can be quickly installed and may be producing nitrogen before the surveys of a large hydro-electric scheme are completed. There is an enormous demand for nitrogen in the United States at present for explosives, as well as for fertilisers, and it appears that the Government are devoting four million dollars for the fixation of atmospheric nitrogen, possibly adopting Prof. Bucher's scheme. A twenty million dollar vote was passed some time ago for the establishment of a hydro-electric factory for nitrogen fixation, but from the latest accounts the committee were still considering the question of a site. A great deal of preliminary survey work is involved before the best selection can be fixed upon.

Houses that will not Burn.

Why should we build combustible dwellings and then pay insurance companies to reimburse us in case they should go up in smoke? If they do not burn, we have had no "run for our money," while if they do, we usually lose many things that money will never replace. Why not build an incombustible house to start with? A writer in "Expert American Industries" (New York) assures us that such a thing is now a reality, and he gives a description of it in minute detail, the salient parts of which we quote below. The interesting thing is that a house that will not burn costs only a little over 30 per cent. more than a quick burner, the respective prices, as given in the magazine named above, being 21 and 16 cents per cubic foot. The frame is of steel, and all walls, partitions, ceilings, floors, and roof are steel and cement. The roof is of concrete and over the concrete is placed a waterproofing which is so elastic and pliable that contraction and expansion have no effect upon it. The waterproof film is always perfect and protects the concrete. The partitions are two inches thick and are of solid concrete reinforced with a special material. In addition to being fire-retardant, like the entire structure, and proof against fire, flood, wind, and earthquake, the partitions are wonderful space-savers. Conduits, water-pipes, etc., are taken care of as easily as with hollow partitions. We read on:—