

(B.) The amounts of nitrogen, ash or mineral matter and organic matter in the plants from pots H.H., soil-inoculated, were, in most instances, considerably greater than those from the seed-inoculated pots I.I.

(C.) The plants from pots I.I., "seed-inoculated," furnished nitrogen, ash constituent and organic matter in amounts intermediate between those from G.G., not inoculated, and H.H., seed-inoculated.

We may, therefore, conclude that in this experiment there has been a decided advantage accruing from the use of *Nitragin*, especially when employed for "soil-inoculation," and that "seed-inoculation," while not giving such marked results, has nevertheless been beneficial in increasing the growth. I further think we may fairly conclude that the additional nitrogen in the plants of the pots H.H. and I.I. has been obtained through the agency of the *Nitragin*."

Sir John Lawes' farm.—The great laboratory farm at Rothamsted is still carrying on its useful work, and the scale of its labours does not seem to grow less. A large number of trained aides are constantly employed for measuring the experiment plots, mixing manures, keeping the meteorological records, counting samples, and so on. There is a lot of or least 45,000 bottles of samples of soil in every condition from the beginning of the work, every one of which is labelled so as to tell the tale in full of its life, so to speak.

The "mixed mineral manure", mentioned in the tables below, consists of phosphoric acid, in the form of superphosphate, muriate of potash, and soda in some shape or other; in fact, of the representatives of the ashes of the plant. This was tried to show the error into which the great German Chemist, Liebig, had fallen in stating that "to produce a good crop of any plant, it is only necessary to supply it with a dressing of the ashes it contains," or words to that effect.

The rainfall is carefully studied. Results prove that the "fertilising rain" is an incorrect phrase, for the rain washes out the nitrogen which is the fertilising element from the soil! Nitrogen is the principal element, it appears, in the fertility of land. Arable land treated only with mineral manures without nitrogen becomes impoverished. Conversion to permanent grass is needed to restore the nitrogen, which is, however, also restored by its fixation from the atmosphere by growing leguminous crops. Even when nitrogen is present in

manures, the plant cannot assimilate it except the soil be "infected" with the power to do so; and this power is supposed to be the work of bacteria. These bacteria flourish in the roots of leguminous plants, and, once present, enable the plants to take up nitrogen freely from the air. Hales, two hundred years ago, found that a plant growing in a pot of soil increased in weight out of all proportion to the very slight diminution in weight of the soil. The Rothamsted chemists have shown that 95 per cent, of the weight of the plant comes from the air, not the soil.

Experiments with and without manures on wheat have yielded the following results:

AVERAGES.	14 Tons Farmyard Manure every year	Without Manure every year	Mixed Mineral Manure alone	Ammonium Salts alone
	Bushels	Bushels	Bushels	Bushels
8 years, 1852-59	34½	16½	19	3½
8 " 1860-67	35½	13½	15½	31½
8 " 1868-75	35½	12½	14	28½
8 " 1876-83	28½	10½	12½	27½
8 " 1884-91	39½	1½	13½	32½
20 " 1852-71	35½	14½	17	31½
20 " 1872-91	33½	11½	12½	29½
40 " 1852-91	34½	13	15	30½
50 " 1844-93	33½	13½

The average without manure for fifty years is above the average of the United States, and about the average for the whole world.

Feeding experiments on more than five hundred animals, with subsequent analyses of some of their carcasses, lead to important discoveries:—

It has been shown that for maintenance, for *increase*, and to the exercise of force, the exigencies of the system are characterised more by the demand for the digestible non-nitrogenous, or more especially respiratory and fat-forming constituents, than by that for the nitrogenous or more especially flesh-forming ones.

CROPS IN IRELAND—1898

ANTRIM.

Oats, average. Hay, good average, and well saved. Early potatoes, over average; late ones, bad. Turnips and mangel, average. Harvest, about first week in September.—E. J. Charley.

ARMAGH.

Wheat and oats, good. Hay, over average. Potatoes, average. Turnips and mangel good.—Thos. Wynne.