

## The Farm.

### MANURES

*A summary and practical conclusions of the experiment at Rothamsted Farm (Herefordshire, England)*

#### WHEAT.—*continued*

Mineral manures alone have added very slightly to the produce grown upon the unmanured land.

Manures containing nitric acid alone, or some compound of nitrogen which is easily nitrified, have considerably increased the crop.

The soil therefore contained a stock of minerals which the wheat crop were unable to use, owing to the insufficient supply of nitrogen in some available form.

Manures consisting of potash, phosphoric acid, and ammonia or nitrates, appear competent to grow large crops of wheat continuously.

A given weight of nitrogen as nitric acid, has produced more growth in the wheat crop than the same weight of nitrogen in salts of ammonia.

The amount of nitrogen supplied in the manures is very much in excess of the amount recovered in the increase of the crops.

After a certain amount of growth has been reached, each increase of crop requires a proportionately larger application of manure. When the price of grain is high, larger crops can be grown more profitably than when the price is low.

When barn-yard dung is employed to grow wheat, a considerably larger amount of nitrogen must be applied to produce a given increase in the crop, as much of the nitrogen contained in the dung is not in an active condition.

A given weight of nitrogen in the form of nitric acid, will produce more growth in the crop to which it is applied than the same weight of nitrogen in dung; but the influence of the nitrate upon succeeding crops will be much less.

There is no evidence to show whether the whole available effect of the nitrogen in one manure is greater than it is in the other.

In the absence of vegetation, or when applied to crops in excess of their requirement, both potash and phosphoric acid form insoluble compounds with the soil and become available for future crops.

In the absence of vegetation, or when the amount supplied is in excess of the requirements of the crop, nitrates and salts of ammonia do not appear to form permanent compounds with the soil, but, on the contrary, are liable to be washed out by rain, or to be otherwise lost.

The application of a larger amount of nitrogen, as nitrates or salts of ammonia, than the crop can make use of, does not appear to prevent the nitrification of the organic nitrogen of the soil.

The stock of nitrogen of the soil itself, therefore, may be reduced, although the amount of application of nitrogen may be much in excess of the amount of that substance removed in the crop.

When large crops of wheat have been grown by the application of nitrates or salts of ammonia, with mineral manures, the soil does not appear to have gained or lost fertility. Nitrification of the organic matter in the soil may have gone on as usual but the loss has been made good by the amount of the nitrogen stored up in the stubble and roots of the large crops so grown.

When dung is applied continuously to land, the accumulation of unexhausted fertility becomes very large, and the removal by the crops of the substance accumulated would extend over a long series of years.

Dung applied to land in the ordinary processes of agriculture will not be entirely exhausted until a considerable number of years have elapsed from the time of its application.

#### *Permanent pastures*

By the judicious employment of manures, both natural and artificial, arable land has been converted into permanent grass, not only without loss, but with some profit to the farmer.

The important constituents, nitrogen and phosphoric acid, were applied in the manures in larger quantities than they were removed in the crops; but potash in only about the same quantity as it was removed.

The application of dung not only compensates for much of the exhaustion from the removal of hay, but it has a beneficial influence on the botanical character of the herbage.

Although the grass has been mown every year for 30 years, there has been a considerable accumulation of fertility within the soil.

Analysis has shown that there has been an increase of nitrogen in the surface soil, beyond that which could be explained by excess applied in manure over that removed in crops, and by the