

## NECESSITY OF SUPPLYING THE SOIL WITH THE CONSTITUENTS OF THE CROPS GROWN ON IT.

The new light which the improved state of science is throwing on agriculture, must be hailed by all *thinking* farmers with joy. At present this light is restricted in its radiance, but few, comparatively, out of the ranks of the learned, feeling its beneficial influence. But the time seems to be approaching—let us bid it speed—when in the culture of the earth, *science* will guide practice, and good farming, the most profitable farming, become an art which will require the skilful exercise of intelligent MIND, more than the exercise of physical power, to pursue it with the greatest success.

Chemistry, the patron-genius of agriculture, is now lending its aid as it never before lent it, to dispel the darkness which has too long enveloped the farmer in his pursuit, and teaching him to see, and enabling him to comprehend, the true processes by which his crops and animals are formed, and the necessary conditions required to make the one heavy and the other fat, at the least expense and with the most profit. The desirable light is being constantly diffused by scientific men, particularly in England and Scotland, in lectures and communications through the press, and thousands seek it as eagerly as they do their own prosperity, and, indeed, their prosperity depends in an important degree upon it.

To no one, we think, are the farmers on either side of the Atlantic, more deeply indebted for efforts to benefit them by imparting valuable scientific knowledge, than to Professor Johnston, of Scotland. The following abridged report of one of his late lectures before the *Dumfries Farmers' Club*, on the necessity of returning to the soil the constituents of the crops taken off, I think will interest many of our readers:

"The different substances of which plants are composed, must exist in the soil on which they grow: according to the nature of the plant to be reared, so ought the land to be manured. Thus, while wheat grain contained only two per cent. of ashes, hay contained ten per cent. Hence, the wheat required a much larger amount of combustible aliment than hay. It was true that the whole of the combustible matter was not obtained directly from the soil, as a large portion was derived from the air; but from five to ten per cent. of the straw of wheat was obtained from the soil: hence the provision made in cases, that no straw should be carried off the land. Different kinds of hay carry off different quantities of inorganic matter from the soil, and consequently have different effects upon the land.

Every plant grown, requires, in accordance with the nature and composition of the soil, the proportion of the ingredients in its ashes. If no alteration of crop is made, nature will become exhausted in some of her resources, and the plant for want of requisite nourishment from the soil, must die. We have facts to prove that nature will not forever grow the same plant on the same

soil. The Black Forest consisted first of oak, then of pine, and now it is again covered with broad-leaved trees; and as with trees, so with crops; and as on a large, so on a small scale.

Different modes of husbandry have been adopted. Instead of oats being grown fifteen or twenty years on the same soil, the rotation of three white crops and six years grass was adopted; this also, has become antiquated, and now the preferable alternation of white and green crop is adopted. Altering crops, and adding such manures as has been carried off by preceding crops, is the only profitable mode of cultivation, while nature will also assist by the going on of certain circumstances, such as the decomposition of minerals, &c.

A soil containing just sufficient lime for a luxuriant crop of rye-grass, would be far deficient for either clover or lucerne. The soil must contain in abundance what your crop specially requires, and consequently the necessity of selecting the manure to suit the crop wanted.

The ground becomes exhausted in many ways. By cropping too long with either one kind or different kinds of grain and straw, it becomes exhausted of some of its soluble matter by the action of the rains, just in proportion to the wetness of the soil. By the application of proper manures, the waste may be replaced. Feeding on the ground will replace a portion of the waste of solid matter, by the dung voided by the animals; but a great portion of the *soluble* is lost, both by being, to a small extent, irrecoverable, and because of the direct waste by carelessness or ignorance. Those soluble or saline substances, are principally contained in the urine of cattle, and just in proportion as it is lost, so is the direct waste. Guano is not a more valuable manure than the urine of cattle. By building suitable tanks, the whole of the barn-yard saline might be preserved, and 900 lbs. of good solid matter, equal to the best Peruvian Guano, would be the annual produce of one cow. We have frequently been astonished at the results of certain saline substances when scattered over unhealthy plants, and by the first shower washed into the soil and immediately consumed by the plant as its proper and necessary food; and just in proportion to the ease with which it gets the substances upon which it is supported, and of which it is composed, will it vegetate and flourish.

To resume: Suppose any of the substances of which a plant is composed, to be already in the ground in sufficient proportion, then any addition cannot do good. Suppose soda to be in sufficient quantity for hay, any addition would be unprofitable for a rye-grass crop, while it would be of immense benefit to clover or lucerne. And again, some soils contain it in sufficient quantity for every variety of crop, consequently any addition would be unprofitable. Hence the reason of so many conflicting opinions respecting the utility of various manures. One tries gypsum, in whose soil it is deficient, and finds it an invaluable manure; another applies it to his soil, which is al-