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The Field.

Experiments of M. Ville.

Some time ago we gave a brief account of a course of investigations pursued by a French savan, M. George Ville, as detailed in six lectures, published in France under the rather inappropriate title of "High farming without manure" The account in question was condensed from reviews and notices in the British agricultural journals. Having lately obtained and carefully perused the English translation of the work, we return to the subject, which is one of much interest and great practical importance

The results arrived at by M. Ville go far to render agriculture one of the exact sciences, and to remove it from the region of speculation and uncertainty He has demonstrated the soil to be just a storehouse of moisture and nourishment for plants, and has proved that the particular nutriment needed can be at all times supplied by artificial means. Taking pure sand which had been burnt so as to destroy all organized matter, and leave nothing in the shape of manure or nourishment, he sowed seed in it, which he watered with distilled water. The seed grew, but did not come to maturity, or produce fruit of any consequence. He then took other portions of the same burnt sand, and applied to them separately the four great principles of manure, viz., potassa, lime, phosphates, and nitrates; all being supplied in their purest form, that of chemical salts, and without any foreign admixture whatever. He found that neither of these elements alone sufficed for the nourishment of plants. He then tried various combinations of these elements, and ultimately ascertained, that for a general manure, capable of producing any kind of crop in the artificial barren soil he had prepared, the four elements required to be mingled in certain proportions Thus, in order properly to fertilize an acre of barren sand, the following compound is requisite.

Phosphate of Lime.	352 lbs.
Carbonate of Potassa	.352 "
Quick Lime..... ..	...132 "
Nitrate of Soda	...488 "

M. Ville tried various kinds of crops in his burnt sand, fertilized with what he calls the complete or perfect manure, compounded as above. On examining the condition of the soil after the production of each crop, he found that the cereals (wheat, barley, &c.,) fed chiefly on the nitrates; the pulse (peas, beans, clover, &c.,) fed chiefly on the potassa, and the roots (turnips, &c.,) fed chiefly on the phosphates. A portion of lime, however, was needed with all these various constituents, in order to ensure the best results, and the assistance of the whole four elements was needed in a greater or less degree. He ascertained that the same crop could be grown year after year, for any number of years, in the same ground, by supplying the particular kind of food which it required, in as great a degree as it had been abstracted by the crop of the year preceding. He also found that none of these four elements are wasted. If a crop does not take them up one year, they remain in the soil for future use as called for by plants of a different order, but the absence of any one element in due proportion is fatal to success.

M. Ville condemns the practice of analyzing soils in the ordinary chemical way, maintaining that it is both unnecessary and apt to mislead. He contends that the true analyzers of the soil are the plants which grow in it, and the failure of any kind of crop at once shows the absence of the particular element which it most requires. Thus in a soil which has been dressed with the perfect manure, any of the three great classes of agricultural products will do well both as to quality and quantity, but on repeating the same crop, deficiency shows itself. Thus the want of luxuriant growth in the case of turnips or other roots, indicates lack of phosphate; failure of the cereals indicates absence of nitrates or nitrogeneous matter, and a short crop of leguminous plants such as peas, clover, &c., betrays a deficiency of potassa. If success is to be had, these deficiencies must be supplied.

As all soils which are at all fit for farming purposes possess within themselves more or less of the elements, which found in full proportion constitute a perfect manure, a much smaller addition of the salts enumerated in the foregoing table than is there mentioned will suffice to restore failing or lost fertility. M. Ville's experiments furnish a clue to the state of things frequently to be seen in this country. Where the forests have recently been swept away, carbonate of potassa abounds, from its having been plentifully supplied by the wood ashes of the first clearing, and it takes a number of years of bad farming to exhaust that element. So, also, lime is generally present in abundance, and some phosphates. But in burning over the land, we have removed the accumulations of nitrogeneous matter, which have been withdrawn from the soil and air by the action of the forest trees and plants, and which had been for centuries collecting on the surface. This may account for the sudden barrenness which seems to fall on certain descriptions of new land, after the first crop or two have been taken off. At any rate, every farmer can, on the principles laid down by M. Ville, ascertain what sort of dressing his land needs. He has only to consult the growing plants to find out from them what is deficient in the soil. If the root crop does not flourish, a dose of super-phosphate, which can be readily had will supply what is wanted. If the cereals do not grow, nitrates in the shape of nitrate of soda, or nitrogeneous manure, will do the business. If the leguminous plants do badly, potash must be furnished. A small dressing of quick lime, which is necessary to the best effects of the other elements, is always within the reach of every one.

In all this there is nothing remarkably new. Farmers have long been aware that various products were especially benefitted by certain manures; that bone-bust, for example, was good for turnips, and that clover ploughed under, and which contains large quantities of nitrogen, was excellent for wheat, and so on. But the matter was never before set forth with such scientific accuracy, and while we do not expect that the land will ever come to be physicked with minute exactness, it is plain that a sick soil can have its diagnosis taken, and a suitable prescription made up for it, as intelligently as these can be done for a sick person. We hail every contribution to agricultural science which helps to take practical farming out of the realm of uncertainty and haphazard. "Sir Humphrey shooting in the dark" is far from being the true ideal of a farmer. Let us understand what we are about; let us know the principles that underlie our practice, that we may map out our results with some degree of certainty. The right treatment of particular soils, and the judicious rotation and regulation of crops, are topics of constant interest, and much as they have been investigated and discussed, constitute a field of research in which there is yet a great deal to be learned, and a great deal to be done.

Deep And Shallow Ploughing.

MODERN experience has shown that deep and thorough cultivation is necessary to success in all agricultural operations, but many misunderstand the question, and imagine that those who advocate deep cultivation, advocate the turning up the under-soil and depositing it above, and upon that which was formerly the surface. Undoubtedly, if you plough deep you bring the under-soil to the top, and bury that which was before the surface; but because you do this, there is no absolute necessity that you should sow the crop on the newly-exposed soil. No one who ever thinks at all would do this. The under-soil must be exposed to the air or you cannot benefit it; the upper must be buried or you do not kill the weeds. But this operation is not necessarily done every crop, or every season, or, at all events, not at first. The right time for deep ploughing is in the fall, when you plough the wheat stubbles. Then tear up the ground to as great a depth as your team-power will allow, and if you can subsoil in the furrow after the other plough, so much the better.

Let the ground be thrown up as roughly as possible—never mind appearances—the rougher it lies the more surface is exposed, and the greater is the amelioration during the following winter. The next spring plough again with only a shallow furrow, two-thirds, perhaps, of the former depth, and so work it twice. By the time you plough the third time the former surface weeds, stubble, and other vegetable material, will be thoroughly decayed. Then put the plough down to the original depth, and bring the