Agriculture.

FROM FIRST LESSONS IN SCIENTIFIC AGRICULTURE, BY J. W. DAWSON, L. L. D., F. R. S., PRINCIPAL OF McGILL UNIVERSITY. JOHN LOVELL, Montreal.

CHAPTER IX.

Our table also enables us to understand the uses of special manures and mineral manures. If a soil is deficient in sulphuric acid, and contains all the other requisites of fertility, then gypsum (sulphate of lime) will be the special manure that it requires; but if it has enough of sulphuric acid and is deficient in phosphoric acid, then gypsum will do no good, but bone earth will produce or restore fertility. Again, after a heavy dressing of one of these substances, it may not be required for several years, but some other substances may be needed; and this all the more because the larger crops will exhaust such other substances more rapidly than the smaller crops did previously. It is evident that to apply such special and mineral manures with economy and success, requires much knowledge, and that the application useful on one soil may be quite useless on another, and the application useful on a soil in one season useless in another. In no point do practical men, who make experiments with mineral manures, err more widely than in this. Such errors can be best avoided either by having an accurate analysis of the soil, by making small experiments with special manures, or by comparing the composition of the plants which fail or succeed on the land in question, and inferring from this the substances deficient.

Lastly, this subject connects itself with the differences of good and bad seasons, and with many diseases of cultivated crops, which at first sight do not appear to depend on the soil. The farmer, whose land is becoming exhausted, often deceives himself by supposing that there has been a succession of unfavorable seasons, or that the seasons are becoming worse. His land may be in such a state that in an unusually favorable season it will produce a good crop, but not in an ordinary season, and since the large crop exhausts it more than the small one, it may be even worse than usual in the following year. Now, to be profitably cultivated, the land should be in such a state of fertility that it will yield good crops in ordinary years, and that failures should be the exception, not the rule. It is also not unfrequently the case that the unhealthy condition of a plant, depending on deficient nutriment from the soil, is the predisposing cause of diseases and failures. If the soil has the materials of the straw and leaves of wheat, and has not the phosphates required for the grain, the latter cannot be produced; but in this case it usually happens that the plant does not simply wither without producing grain, but that, unable to turn the stores of sugar and albumen, it has accumulated to this use, these become a prey to the fungi, which cause rust, mildew, and other diseases; and the loss of the crop is attributed to these, when the primary cause was a partially exhausted condition of the soil. In such a case it is even possible that the straw may be luxuriant without the plant having the means to perfect its seed.

These considerations embrace all the essential points relating to the soil which can be deduced from its composition; but one most important question remains, which cannot be answered by chemical analysis alone. This is, to what extent are the substances present in the soil practically available for the use of plants? On the one hand, the nutritive substances contained in the soil might be in a state so soluble that they might be exhausted in a single season. On the other hand, chemical analysis may, and, no doubt, often does, shew the presence in the soil of nutritive substances which are in a state so insoluble that they cannot be obtained by the roots of plants within the time to which they are restricted for their growth. Theory and experience concur in proving that soils differ very much in these respects, and that while all soils have considerable power of retaining in their pores even the most soluble substances, some part with them too readily, and others retain them too firmly, or only part with them when exposed to various preparatory processes. The management of the soil with reference to the use and retention of nutritive substances is one of the most difficult problems, both for the chemist and the practical farmer.

§6. *Absorbent or retaining power of the soil.*

The absorbent and retaining power of soil is one of its most remarkable properties; and much additional prominence has been given to it by recent experiments detailed by Baron Liebig, in his late work on "The Natural Laws of Husbandry." The arable soil is not a mere sieve through which any matter in solution can pass freely; but, on the contrary, it has a great power of retaining, as in a filter, all salts and other substances that may be present in the water permeating it. This power is very different in different soils, and in the same soil in the case of different substances. In passing through any ordinary soil, the dark water of a dunghill, or a saline solution, will lose large portions of its contents, which remain, so to speak, entangled among the particles of the soil, or adhering to their surfaces. In light and sandy soils this power of retaining nutritive substances is less; in heavier soils, greater; in soils having much vegetable matter it is strongly marked; and in light soils of a red or brown color, having the particles mixed with oxide of iron, it is greater than in colorless sandy soils. Extremely light and loose and extremely compact clays, possess this power in the smallest degree, so that the porosity of the soil seems to be mainly important in reference to this property.

Further, the absorptive of the soil appears to be connected with a chemical action upon the substances present in it; some solutions being decomposed in passing through it, so that one substance is retained while another is allowed to pass. Thus, salts of potash and ammonia are found to part with these bases to the soil, the acids present entering into other combinations.

AN EXTRAORDINARY STORY.—The London correspondent of Saunder's News Letter says:—"A most extraordinary story has just got into circulation here. It is so extraordinary that I only vouch for its currency, and am quite bewildered by the apparent reasons which have been furnished to me for believing it to be true.—It is asserted that a few days ago two brothers, the younger sons of a nobleman of exalted rank, lately deceased, quarrelled. From words, they proceeded to blows, and from blows to resort to knives, which, unfortunately, lay handy. In the scuffle, one received a dangerous wound, which, from the first, assumed so serious an aspect, that the assailant was counselled at once to leave the kingdom. He did so, and but just in time, for it is rumored that the injured man died last night. If this terrible tragedy be true, of course it will be speedily confirmed; if it should turn out an idle canard, I can only assure you that the account of it has come before me in so credible a form that I could not hesitate in informing you of it."