

is not the case, a great portion of the bulk of green crops is obtained from atmospheric sources; and, after a green crop is ploughed in, the soil necessarily contains more of the organic elements essential to vegetable nutrition than it did before the crop was grown; it is richer, in fact, by the carbon, oxygen, hydrogen, and nitrogen, which the green crop has obtained from sources independent of the soil. In like manner, the crop grown after a green crop has been ploughed in, has the advantage of a ready supply of mineral elements, which have been worked up by the roots of the fertilizing crop from the soil and the subsoil, and which in many instances, owing to their sparing solubility, are with difficulty obtained under ordinary circumstances.

The practice of restoring fertility to exhausted soils by laying down to pasture for several years, and the advantage to succeeding green crops, from the introduction into the rotation of depastured seeds, or even clover mown and carried off the field, illustrate the manner in which green crops are beneficial as manures. It is evident, that if such crops did not return to the soil some other elements than those which they found there, no length of time under green crop, would restore fertility to an impoverished soil; but, that on the contrary, under the constant abstraction of phosphates in the bones, and of valuable organic elements in the flesh, fat, and blood of animals depastured upon it, deterioration would take place.

But the practice of green manuring, is one sanctioned by the authority of experience, as well as of theory. In the remains of stems and roots of clover crops, of depastured seeds we receive the advantage of a green manure, the value of which, in promoting the growth of oats and wheat, is well understood by every farmer. Perhaps from no single crop does the agriculture of Great Britain reap a greater advantage than from this. Without it, the alternate system of green and grain cropping cannot be effectually carried out; and, indeed, it is only after a good crop of depastured seeds, that a full crop of wheat can be grown upon the high and dry wolds, and the limestone and chalk hills that are now brought into cultivation in this country. After turnips, barley upon such soils succeeds, but it is only upon the lea that wheat can succeed fully, where the texture of the soil is light. No direct manuring will answer upon fallow. The green sod when ploughed and furrow pressed, offers a firm and compact bed for the seed, and furnishes by its gradual decay, a continued supply of food for the wheat plant, through every stage of its growth. But green manuring, if we except the case of clover, is not common in this country.

In certain localities, sea-weed is collected and applied to the fallows in its fresh state, and in occasional instance, the tops of turnips,

potatoes, &c., are ploughed into the soil, instead of being carted off to the dung heap; or, as is most usual, being permitted to decompose upon the surface of the land. But in other forms, the practice appears to be hardly recognized in this country.

The tardiness of vegetable growth, and the necessity which the farmer finds for making every inch of available space produce food of some kind for his stock, upon which the continued fertility and the profit of his farm materially depend, render it difficult for him to find a place in the rotation for a crop of this kind, without displacing a feeder crop, by which he usually secures two valuable objects instead of one. Speaking on this point, an American writer, Judge Buel, (*Cultivator*, vol. ii. p. 13.) says, "the practice is chiefly suited to warmer countries, where vegetation is very rapid, and even there it argues a somewhat low state of the art, and is not the best way of producing decomposing matter. When we are able to raise green food of any kind, it is better that we apply it in the first instance to the feeding of animals, for then it not only yields manure, but performs another and not less useful purpose."

That there are, however, circumstances under which these objections do not apply with sufficient force to prevent the adoption of the system, will be seen when we treat of the *modus operandi* of the practice.

The condition of state in which vegetable substances should be applied to the soil, is a question of some importance. Plants of quick growing habit, when they have attained their full vigour, and are coming into flower, contain a larger proportion of organic matter, which they have obtained at the expense of the air, than at any other period. At this period they are quick of decomposition, and appear to be best adapted to the purpose of a manure of this kind, which, to be useful, must be alike *quick in its growth*, from the period of sowing to that of ploughing in, and in its decay.

The kind of vegetable substances that are available as manures, may be considered under two classes. First, Crops ploughed into the soil upon which they are grown. Second, Such as are collected from other sources and applied as manures.

Crops ploughed into the soil upon which they have grown are of two kinds. Such as have been partially consumed or reaped, and such as have been grown for the special purpose of manure.

Of green manures that have been partially consumed—old sward, clover stubble, clover aftermath, pastured seeds, which are ploughed in for a green crop, are instances familiar to all in practice.

In addition to the matter these plants collect from the air and from the subsoil for the use of the future crop, we must not overlook the physical influence which they possess.