

## Barn-yard Manure.

RESTING the report of Mr. McLellan's lecture on manure, we now come to the second branch of the subject as treated by him, namely, the nature and principle of barn-yard manure. There is no manure so valuable as this: and its superiority over all others is owing to the fact that it contains all the elements necessary to the production of plants, while other manures, such as guano, super-phosphate of lime, &c., contain only certain portions of those elements. Only in a soil where those particular elements were deficient would it be of any use to add any particular artificial manure. Now, every field has a maximum of one or several, and a minimum of one or several nutritive substances, and the crops are always governed by the minimum. If, therefore, we always knew what that minimum was, we could supply it alone, which would be all that was required. But in this knowledge lies the difficulty, often insuperable. By applying barn-yard manure, however, all the constituents are added, and that which is most needed amongst them. This statement, nevertheless, requires a certain limitation, which will be presently explained.

It is only that portion of the barn-yard manure which supplies the deficiency that is effective in increasing the amount of the crops. To apply to the soil that which already exists there in excess, cannot help the land, and hence the difficulty of applying artificial manures. There is a great diversity in soils even in the same locality; and hence it is found that a manurial application beneficial to one farm or field is utterly useless to another, perhaps adjoining.

Now, it is evident that if a constant drain is made upon certain elements of the soil, without a corresponding return, those elements must in time constitute the minimum, and will govern the crops, as has been already stated. This, indeed, is the result of the constant cultivation of the cereals. Where cereals are cultivated, the grain is nearly all sold off the place, and only the straw retained and used on the farm. This straw is made into manure, and returned to the field yearly, an application which keeps up the maximum quantity of the straw constituents, while the grain constituents are constantly being taken away without return. A decrease of these constituents must therefore eventually take place, and a corresponding decrease of grain in the crops must be the result, whilst that of the straw suffers no diminution. Hence, in time, the application of a manure of this sort becomes equivalent to no manuring at all, as far as the production of grain is concerned. It may be mentioned here, in passing, that occasionally, even when the grain constituents are added to the manure, the result may be only or chiefly an increase of the straw: but this is owing to what we call accidental circumstances of the season. For instance, it is well known that in a wet, cool season, the proportion of straw far exceeds that of the grain; and the reason is this: in the cool, moist season the flowering of the plant is retarded; and the tendency of plants before flowering is to shoot out new branches and leaves; but after flowering, no more new leaves or branches are formed, and the food is then appropriated to the formation of seed. When, therefore, the flowering is retarded, the food that should be applied to the production of seed is used for the formation of straw, a certain amount of grain constituents being always employed in this process. It is evident that whatever shortens or hastens the period of flowering, other things being equal, is beneficial to the formation of grain, and vice versa.

But to return to the point under immediate consideration. It has been shown that an increase of straw will not effect a corresponding increase of grain. Now, by the constant production of cereals and selling off the grain, the constituents of the seed must become exhausted; and as a consequence, such a system of farming must eventually come to

an end. A luxuriant growth of straw is produced, with a lamentable deficiency of grain. These effects are indeed only too palpable in many parts of Canada. For, while we not unfrequently see the fields of growing wheat, with their beautiful tints, rustling in shining waves before the western wind, and holding out to the farmer visions of wealth, how often are his hopes disappointed when the harvest discloses the golden ears containing little else than chaff.

The question naturally arises, can this be remedied? Undoubtedly it can. A better system of farming will do it; and the time has now come when the farmers of Canada are adopting a better course, by raising more turnips, clover, and such like crops, and keeping more stock. True, in many cases they deserve little credit for the change, for they have been driven to it by sheer necessity. It was with extreme reluctance that they relinquished or even moderated the exhaustive growth of wheat, to which they have been compelled by the destructive ravages of the midge. In this way we may come to regard these insect plagues as a blessing to Canada rather than otherwise. And thus it will ever be found in the scheme of Providence, that a seeming evil is employed to work out some comprehensive good; and this not the less because short-sighted mortals fail to discern either all the benefit evolved, or the divine hand at work.

It has been before stated, in reference to the cereals, that all of them more or less derive their nutriment from the surface soil, taking none whatever, under ordinary circumstances, from the subsoil. Hence, an unvarying course of cropping with cereals necessarily exhausts the superficial soil. Often the farmer seeks to remedy this by what he calls a "rotation of crops." If his fields have grown wheat for a year or two he then sows barley, followed, perhaps, by oats, and so on, all the fresh crops, however, being cereals, and all, equally with wheat, deriving their nourishment from the arable soil. He tells us that such a system is easier upon the land, because these different crops extract different elements from it. But such is not the case; for the various cereals are composed, with only slight modifications, of the same elements, and consequently take up the same ingredients from the soil. One cereal, therefore, exhausts the soil as much as another; and a change of cereal is of advantage only as far as the exhaustion of the soil is concerned. "But," replies the advocate of this kind of rotation, "experience, the best teacher, has convinced me that I can grow some cereal crops (oats, for instance,) on a field which has failed to produce wheat." This we admit; but the explanation is not that oats require different elements from wheat; nor does the circumstance prove that oats are at all less exhaustive to the soil than wheat. Nay, rather, it shows that the former crop is even more severe, that its power of robbing the land is much greater,—for the correct explanation of its comparative luxuriance where wheat has failed to grow, is to be found in the fact that the ramifications of the roots of oats extend more widely than those of wheat. They spread in all directions, and reach out further in search of the little food remaining in the soil.

A rotation of crops of this sort, confined to cereals only, is equal to no rotation at all. The true element of success in the system of rotation is to alternate with these superficially-rooting crops others which send their roots deeper, and draw their sustenance from the lower soil. In short, we must introduce more clover, turnips, and such deep-rooted plants; and in addition, keep more stock. These latter crops do not draw upon the surface soil, but receive their nourishment from the subsoil; and when they are fed off to the stock on the premises, as they should be, and the manure returned to the land, they enrich the arable soil instead of impoverishing it, and add to the ground the elements of grain as well as those of straw.

The foregoing, Mr. McLellan contended, was the true and only system of manuring, and he, moreover, urged the importance of not selling off all the produce of the land under any circumstances, for in this way where no return was made, even the subsoil would in time, however remote, become exhausted. Indeed it is far easier to restore the fertility of the surface than of the subsoil; for the arable soil bears such an affinity for manures, and all elements of plant food, that, no matter what amount of manure might be

applied, it would all be arrested by the upper layers, and would not reach the subsoil. So retentive is the surface soil of its nutritious elements, that all the rains and floods of centuries will not wash them down into the deeper strata.

Hitherto, in Canada, the drain has been altogether too exclusively on the surface soil, which, however rich, is not inexhaustible. The restoration of the so-called exhausted land is to be sought by deeper cultivation, the growth of deep-rooted plants, the raising of stock, and the return to the soil of the manure thus made.

The conclusion of Mr. McLellan's lecture on the proper management of barn-yard manure must be deferred to another issue.

## A Crop of Alsike Clover

Mrs. H. THOMAS, of Brooklin, has sent us several fine stocks of Alsike clover, over four feet high, as samples of a crop grown by him on a small piece of land. The following statement, bearing date July 28th, accompanies the specimens:—"I had a small field of three and a half acres that I had summer-fallowed, and subsequently took a crop of fall wheat from it in the autumn of 1865. In the following spring I ploughed it once and sowed to spring wheat, and seeded it down to Alsike clover, putting on but five pounds of seed to the acre, harrowed in with the last harrowing. I should state that the field has had no manure since it was cleared; which is some eight or ten years. The clover germinated and came up well; and last fall I pastured it very lightly. In the spring of the present year, about the 20th of May, I sowed a barrel and a half of plaster on the field, and now I am cutting and securing the crop for seed. I have five good sized waggon loads in the barn, and there are fifteen or sixteen more in the field. The average length of the stalks is about two and a half feet, but in some of the hollows it is as high as four and a half feet. Of course, it was all down in one tangled mass, and it occupied eight long days for one man to mow it. It appears to be extremely prolific in seed. I think it would have been better to have pastured it until the first of June for a seed crop, as it would not then have grown so tall or been so badly laid.

In regard to its adaptation for bee pasturage I find it excellent, for during about four weeks it produced a multitude of blossoms, and the bees literally covered them from morning till night. Out of curiosity, on the 24th of June, I drove a common sized swarm of bees into a hive filled with empty comb, and having weighed them, set them in one corner of the clover field. After the lapse of a week I weighed them again, and found that they had gained twenty-seven pounds. This additional weight was, of course, all honey, for there was no comb to build, nor could there have been any weight of brood in that short interval of time."

## Soiling vs. Pasturing.

Let me recite the experience and practice of a friend of mine. Coming into possession of about nine acres of land, in the neighborhood of a good market, made by the demands of a large literary institution, he cast about as to what was to be done. Two cows and a horse was the stock in trade, for neat cattle. He was obliged to pay per season, men for pasturage, what they thought it was worth, and at the same time, it was no small job to drive his cows back and forth. That determined him to keep his cows in the barn. The greatest trouble was the rapid accumulation of manure. By good husbandry he properly secured that,—he kept feeding it to his crops. Finding his crops increasing, he added another cow. Another cow only made more manure. More manure, husbanded in the same way, made more crops, and the third year he added another cow. Now began another serious difficulty. His barn was too small. Still, at the end of the fourth year he put in another cow, and set himself to work to get up a new barn, and when I last saw him, he had a new barn with modern improvements, of good size, a horse, a pair of cattle, and five cows, and yet had not thought of buying more land, but wanted one more cow. Now people who do not want a large accumulation of manure and a gradual increase of crops, should not adopt that style. But it seems to me, that in our towns, where homesteads are in small lots and not easily procured, no better course could be pursued than soiling the cow, and at the same time fattening the soil.—*New England Homestead*