

## Fall Wheat Culture.

OWING to the difficulties attendant on its cultivation of late years, the farmers of Canada have come to raise but a very limited breadth of fall wheat. The difficulties referred to may be classed under three heads; poverty of soil; winter-killing; and insect ravages. Two of these difficulties, at least, are self-caused, and the third is not beyond human control. Over-cropping with wheat, conjoined with neglect of manure and disregard of the law of rotation, have impoverished soils that were once rich in wheat-producing elements, and might be so still and continue so for ever. Winter-killing is largely, if not wholly, the result of the unsheltered condition of our fields, arising from the wholesale destruction of the forest. In the newer sections of the country, where the land is but partially cleared, fall wheat is grown as successfully as it used to be in what are now the old townships. Had belts of timber been left in clearing off the land, and proper protection thereby secured, this evil would never have come to afflict us to the extent it now does. The planting of live screens and the selection of partly sheltered fields, next the woods, for this crop, are the expedients that must be resorted to under existing circumstances. Nearly every farm has its remaining piece of woods, under lee of which more or less fall wheat may be grown with success.

Even the insect pests that have of late preyed upon this crop, are not to be ranked among inevitable and incurable ills. By means of drainage the crop may be brought on earlier, so as to escape the midge. Various other devices have been resorted to in mitigation of this annoyance; among the rest, the cultivation of a species of wheat that can defy the foe. But the effectual means of deliverance is yet to be applied. Like the Hessian fly, the midge must be extirpated by those other insects, of which, we believe, there are no fewer than three sorts, that prey upon it, and so prevent its multiplication. We have the bane, but as yet the antidote has not made its appearance. It may, for aught we know, be at work, or at any rate quickly multiplying, so as before long to render us good service in subduing this enemy of our wheat crops. We might, no doubt, import the parasites of the midge, and a Government appropriation to employ some good entomologist to do this for us, would be one of the wisest outlays of public money that could be made. In all probability a thousand dollars thus expended would be sufficient for the purpose,—a trifling sum, indeed, as compared with the millions the midge has cost us. The introduction of new varieties of seed wheat deserves encouragement, if only by way of experiment. Heretofore great advantage has resulted from this, and what has happened once may happen again. Especially is it desirable that any new kinds found to be valuable in England should have a trial here. As one argument in favor of this, we may urge the probability of thus accidentally importing the insects whose operations hold the midge in check. Our seed-men have now direct and ready business connection and communication with British seed merchants, and if they would obtain for us, from time to time, the best samples of seed wheat to be had, they would render an important service to the farming community.

We ought not, without making every effort to prevent so dire a calamity, to allow this important crop to sink into disuse. Canadian fall wheat has had a high reputation abroad, and a feeling of national as well as agricultural pride should impel us as far as possible to maintain that reputation permanently. We hope our farmers will persevere in the judicious culture of the grain in question. The difficulties at present in the way are not such as to justify the abandonment of so important a crop, though they loudly call for a resort to every appliance within the scope of scientific and practical farming that may promise an effectual remedy.

## On the Proper Treatment of Barn-yard Manure.

Mr. McLellan's views on the proper treatment of barn-yard manure were the subject of the concluding portion of his Brampton lecture, the greater part of which has already appeared in the two preceding numbers of THE CANADA FARMER. The substance of his remarks was as follows:—

With regard to the proper treatment of barn-yard manure and the best mode of applying it there exists considerable diversity of opinion, both amongst practical farmers and other agricultural authorities. The greater number contend that it should be well rotted in the barn-yard; and that it should be turned over once or twice for the purpose of accelerating this process, before being applied to the soil. Others believe that it is better to apply it in a recent, unrotted condition. The latter was, in the opinion of the lecturer, the proper course. It should be drawn out and applied direct to the soil, in the condition in which it is generally found in the barn-yard in spring. Even if it is dry straw, it should be ploughed under in that state, without any piling, turning, or fermenting. All will agree that by such a course a great deal of time and hard labour will be saved; for it is no trifling matter to handle in the usual method the large accumulation of manure that is contained in many barn-yards in the spring. Yet many will be disposed to question the propriety of avoiding the trouble and applying it in its crude state to the land, and will scarcely be convinced that its beneficial effects and its fertilizing influences on the soil are greater, when thus applied, than if previously piled, turned, and rotted, perhaps even firefanged in the barn-yard. In fact, however, the farmer who spends time in turning his manure is not only working for nothing, but paying a large amount for the liberty of so doing, in the shape of valuable matter which will be evolved from the fermenting heap, escape and be lost to him altogether.

What is the object the farmer has in view by piling and heating his manure? Doubtless his object is to improve its quality. But if you ask him how it has been improved, he cannot tell anything more than just that it has been heated and is better rotted. But to follow up the enquiry more closely, can any one say in what manner this process of rotting has improved the quality of manure? Is there one single element of nutrition added or supplied thereby? Reason, common sense and chemical science, alike decide in the negative, and show indeed that a large amount of valuable fertilizing ingredients has been abstracted by the common practice. A considerable proportion of the saline and volatile constituents of the mass has been dissipated by washing out or evaporation. For when manure is turned it is loosened, so that air penetrates it; and by the combined action of air and moisture decomposition is effected. Without both air and moisture there would be no decomposition. For this reason manure will not rot if left lying in the yard as it was trodden down by the cattle. It is pressed so tightly together that air cannot penetrate. Water alone will not cause decomposition, but will even, by excluding air, act as a preservative. Hence lumber and timber are often immersed in water for better preservation. Saw logs are thrown into mill dams, and are thus preserved from decay by the water, as it excludes the air. Again, the most delicate kind of timber will retain its soundness for a hundred years, if exposed to the air and kept perfectly dry. Moisture and air, acting simultaneously and jointly, are essential to the process of decomposition. Now, when manure is turned, it is exposed to the action of both these agents, and therefore decomposes. When decomposition or fermentation takes place in vegetable matter, either carbonic acid or ammonia, or both, are produced or evolved. In the fermentation, therefore, of a manure heap these important chemical agents are dissipated and

escape into the air, and are lost. The manure through the loss of these fertilizing materials, must necessarily become less valuable—less rich in ammonia, so important as a direct food for plants, and in carbonic acid, which is, as already explained, so beneficial on account of its solvent properties. Then, again, a large amount of saline matter is dissipated by being carried off in solution. The heavy rains, falling upon the heap, penetrate, by reason of its looseness, through all parts, leach it and wash out its saline matters, carrying them into the first ditch, thence to the rill, and afterwards into the river, where they are finally lost entirely to the land which they ought to have enriched.

Now, if instead of treating the manure in this way, the farmer were to apply it to his fields in its rough or unrotted state, plough it in, and allow it to decompose in the soil, which it will do, he would save all those elements which he otherwise loses; for when it decomposes in the ground these elements cannot escape, on account of the affinity of the soil for them. They would then furnish direct nutriment, would benefit the land by their solvent powers, and would, moreover, assist to break up and pulverize stiff clay and other soils.

Admitting the principle that this direct application of green manure is the proper course, the next point to consider is the best method and time of applying it. Taking all things into consideration—the scarcity of labour, the shortness of the summer, and the general hurry of that season, Mr. McLellan was of opinion that the best time to draw out and apply manure was during the winter, usually a slack time, and while there was yet snow enough on the ground to admit the use of sleighs. The manure should then be spread right on the field. If it leaches, it is just where it is wanted. A scorching sun will not injure it—will not take anything from it. Drought preserves it, by withholding or dissipating the moisture which is one essential agent of decomposition. In proof of the principle may be instanced the preservation of guano, which stands the scorching rays of a Peruvian sun for centuries without being impaired in fertilizing quality.

These views, which till recently it would have been the rankest heresy to avow, are now slowly gaining ground. Among those who hold them may be reckoned some of the most eminent men of science, and not a few of large practical experience. It may not be long before they become generally established, and cease to be matter of dispute.

## Value of Bones.

THE following, from the pen of S. Edwards Todd, agricultural editor of the New York Times, carries a "big hint" to the mind of every agriculturist in the country. If it will pay to collect bones for transportation—and we consider them a commercial article of much value—from a country where all labour and material is as high as it is in the United States at present, or export them some thousands of miles to countries where all labour and products are far cheaper than where these same refuse fragments are gathered, then it certainly will pay to employ them at home; and if once used, we feel assured that their value will soon be known. It is certainly time that some attention should be called to this subject in all parts of the country. Exceptions there are in many places where the value of bones is well known, but this value ought to be more generally and universally appreciated:—

"If there is any one practice among American farmers for which they deserve sharp rebuke, it is for permitting such immense quantities of bones to be exported for the improvement of the agriculture of foreign nations. Thousands of tons of bones are collected annually in Chicago, Buffalo, New York, and other populous cities, and shipped to European countries to fertilize the land for raising turnips, wheat, fat cattle, and sheep. And yet American farmers in stupid quietude look on and say, 'It don't pay to collect bones and apply them to the soil.'"

"It will pay. They have not tested the application of ground bone. There is not a meadow nor a pasture in the land—with very few exceptions—that will not be greatly benefited by a dressing of ground raw bone. Thousands of acres of the best farming land in New England are in a low state of impoverishment for the want of a liberal dressing of ground raw bone. Such fertilizing matter is the very life of the soil. European farmers understand and appreciate this fact. They know it pays to ship bones from America to enrich their farms. Every shipload of bones that is picked from our land injures the agriculture of our country. England delights in the excellence of