

crops, and so increasing the production of feeding stuff for their animals. Well, success to all such exhortations; no one would like to see more tillage carried on than the writer, but as I reflect upon things as they are—and principally upon the great variability of our climate (and dear knows the present and past season have given us fair, up-to-date samples of the mischievous pranks which our atmosphere can play), I do not feel at all inclined to too harshly upbraid the Irish farmer for displaying a hesitancy in breaking up his land. Even if the climate were more reliable and more favorable than it is for the growth of grain, roots and green crops, there is that other tremendous obstacle to face—the great difficulty of obtaining an adequate supply of skilled labor. Regarding this, however, it must be admitted that there are two sides to consider, and economic laws teach us that if the demand existed the supply would be forthcoming. Add, however, some allowance for the partial absence of enterprise and self-reliance which generations of a depressing and discouraging system of land tenure have inbred in many of our farmers, and one must come to the conclusion that even in these better days, there are real hindrances to the spread of tillage. Combined with this fact, Ireland is admirably endowed with grass of the best kind; some of our pastures, indeed, could, under no system of tillage, prove so remunerative; indeed, in the County Meath, there are pastures which alone are sufficient to fatten stock.

I need not dwell further, I have tried to show the part which stores play in the Irish farmer's practice, and the conditions that have contributed to their occupying so prominent a place. The obvious conclusion is that the embargo is a great safeguard of the industry, and that so long as there are no outsider suppliers the demand for Irish stores will continue to justify their sale as such.

EMERALD ISLE.

LIABILITY FOR CONDEMNED HOGS.

A lawsuit of very general interest to farmers was tried in London, Ont., recently, in the Ninth Division Court, before Judge Edward Elliott. We quote the statement of case and decision, as reported in the Free Press:

"It appeared that the defendant, Smith, bought three hogs from a farmer named Morris. These hogs he immediately resold to the Canadian Packing Company. The hogs were about six months old, and, to all appearances, and so far as anyone knew, perfectly healthy, but, on being slaughtered at the Packing Company, certain glands showed traces of tuberculosis, and the animals were condemned by the Government inspector. The Company then demanded back their cheque which they had given to Mr. Smith for the price, \$31.80, which Mr. Smith refused. The Company thereupon telephoned the bank to stop payment. Mr. Smith, however, presented the cheque in due course, and the teller, forgetting that payment had been stopped, paid the cheque. The Company then declined to allow this payment out of their bank account, and the teller was forced to put up the money. He thereupon sued both Smith and the Packing Company for return of the money. Judgment has now been rendered directing the Packing Company to return the money to the teller, it appearing that the defect in the animals was entirely latent and unknown to the defendant, Smith.

"The law appears to be that a person selling diseased animals innocently, not knowing them to be diseased, is not only not obliged to refund the price to the purchaser, but if the price be not paid he can compel payment. Where, however, the retailer sells foodstuffs to the consumer, the case is different, there being an implied warranty that the goods are fit for food."

THE FARM.

LASTING EFFECTS OF MANURE.

Years ago, the hired man on a certain Middlesex Co. (Ont.) farm was sent out with the first few loads of manure to be applied on a specially hard field. He applied it on the one side of the field a good deal more liberally than could be continued and have the whole field covered, so that an immediate and considerable reduction in the amount applied had to take place. As was to be expected, the corn crop on the field the following season was much heavier on the strip receiving the extra quantity of manure, but for many years after the crops on the strip in question were also distinctly superior to those on the rest of the field. While this result would not, by most farmers, be looked for, it is in keeping with experiments conducted at Rothamstead, England. Results there showed that the effect of the manure was perceptible in the yield for at least twenty years after the last application. The full value of manure is not returned in the first crop. Careful observation will note a residual effect apparent for many years.

EXPERIMENTS IN CROP ROTATION.

The Agricultural Experiment Station of the University of Minnesota have for ten years been conducting a series of experiments on rotation of crops. An elaborate arrangement of plots, with a corresponding variety of rotations, was decided on and followed out. The results are given in a bulletin, No. 109, well illustrated with photographic reproductions. We quote as follows:

THREE CLASSES OF CROPS.

To simplify the planning of rotations, field crops are divided into three general classes, according to the effect on the physical condition and available plant food of the soil. These three classes of crops are grain crops, grass crops, and cultivated crops.

Under grain crops are placed such crops as wheat, barley, oats, millet, etc. These crops grow but one season, are usually sown in the spring, and are harvested without intermediate cultivation. They do not develop heavy root systems, consequently leave but little crop residue to keep up the supply of humus in the soil. During the years when grains are grown, weeds increase, and the productivity of the soil decreases.

Grass crops include such crops as clover (though it is not a true grass), timothy, bromus, etc. These crops grow two or more years from one seeding, consequently develop quite extensive root systems. When plowed up, the roots add materially to the supply of vegetable matter in the soil, and, in decaying, leave open spaces between the soil particles, which allow the entrance of air. These crops may be termed soil-building crops.

The cultivated crops are those planted so as to allow intertillage during their growth. In this class are found corn, potatoes and root crops such as mangels and sugar beets. The cultivation of these crops destroys weeds, loosens the surface of the soil, conserves moisture by the formation of a surface mulch, and allows the entrance of air, thus making conditions favorable for the decomposition of vegetable matter.

It may be seen that a far better condition of soil is maintained by a good rotation of crops than by continuous cropping to corn or grain. The grass crops maintain the supply of humus, and the cultivated crops retain moisture, destroy weeds, and help to aerate the soil.

Instead of being a complex matter difficult to understand and impractical to follow, a systematic rotation of crops is one of the simplest and most easily carried out of any of the suggested improvements in methods of farming.

The essentials of a good rotation are that the net yields in money value per acre be maintained or increased; that vegetable matter be kept in the soil, and that the land be kept in good physical condition and reasonably free from weeds. Grass crops must be grown or barnyard manure applied, or both, to keep up the supply of vegetable matter. A cultivated crop occasionally and good tillage are necessary to kill out weeds and help put the soil in good tilth. These things are naturally brought about by alternating the three classes of crops—that is, one or more grass or clover crops should appear on each field every four to eight years. Corn or other cultivated crops and manure should appear one or more years in the same period, and the remainder of the time grain may be grown.

This treatment cannot fail to keep the soil in much better condition than can be done by growing any one crop continuously, and it may be brought about by a very little planning, and without very seriously changing the acreage devoted to each crop.

When a plan of rotation is adopted, the view of the farmer is changed. Instead of thinking only of the one crop he is seeding, he is looking ahead and planning to have that field prepared for crops one, two or even ten years ahead. By knowing what will be sown on a field for several years in advance, labor may be saved, the yield increased, and arrangements made for making the best use of the crops grown.

It was found that, where any one crop was grown continuously, the yield steadily decreased. A five-year rotation that was tried and is recommended, begins with spring wheat seeded to clover and timothy, then meadow, meadow, oats and corn. For Canadian conditions, the rotation would be improved by having the corn come after sod. Indeed, it would be further improved by reducing it to a three-year or four-year one of grain seeded to clover, then one or two years in clover and grass, followed by corn, then grain again seeded down.

The different rotations found profitable were all modifications of this. They varied in time from four to eight years. We give below short extracts from results of experiments.

In these investigations much attention has been

given to the physical condition of the soil, as modified by the rotation of crops. Briefly stated, it has been found, on the plots where the rotations were followed, that the soils, when wet, are somewhat darker in color than where grain or root crops were grown continuously.

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Cultivation cannot take the place of manures, neither can manures take the place of cultivation. Both are important in crop production. It is undoubtedly the sum of all these factors, physical, chemical and bacteriological, that enables larger yields of crops to be secured from the rotated plots.

The use of the farm manure at the rate of eight tons once in five years, and the production of two clover and timothy crops have been sufficient to maintain the humus and organic compounds of the soil. The rotation fully maintained both the nitrogen and humus content of the soil.

Systems of rotation in which clover (and other legumes) forms an essential part, and in which farm manures are used, should be practiced to prevent depletion of the nitrogen and humus of soils, because the humus takes such an important part, chemically, physically, and bacteriologically, in maintaining the fertility.

HARVESTING ROOTS.

As the season for harvesting roots is at hand, discussion as to the best methods of prosecuting the work, with a view to economy of time and labor, and the safe keeping of the crop, is now in order. Mangels and sugar beets, being more subject to injury from frost than turnips, are generally harvested about the middle of October, while turnips, which will endure considerable freezing and thawing without injury to their keeping or feeding qualities, may generally be safely left in the ground till the last of this month or the first week in November. A good deal depends upon the prevailing local climatic conditions. The common practice in taking up mangels and the larger varieties of sugar beets, which grow well up out of the ground, is to pull them by hand, twisting the tops off and throwing two or four rows together for convenience in loading, where, if there is no danger of frost, they are the better for lying for a day to dry. If there are indications of frost, they should either be housed or covered at night, as three or four degrees of frost will injure them. Some growers of mangels and sugar beets save labor and do fairly good work by cutting the tops off with a sharp hoe, and pulling the roots up with an implement called a dung hook, used for unloading manure from a wagon, putting two or four rows together.

The laborious task of pulling turnips by hand and topping them with a knife, which was once the common practice, has been generally abandoned, and the custom of topping with a hoe and turning the roots out with a sharp-sharred plow, with the mouldboard removed, has been adopted. By striking the tops of two rows together, the roots can be plainly seen, and, if turned inward on the row of tops, are clearly visible for picking up to be thrown into a wagon. With three men loading, the wagon straddling one row, one man on each side and one behind, loading is rapidly performed; but if only one or two hands are available, one row at a time may be as convenient. If the plow is well managed, most of the taproots will be cut off, but it is well, where soil clings to the roots, to rap two together to knock off the dirt before throwing them into the wagon. A slatted chute should be provided on which to shovel the turnips, to screen the dirt out from them as they roll into the cellar. It is well, also, when the cellar is full, to pick back the turnips from the place they fell into, and remove any earth which may have accumulated there, as, otherwise, they will almost certainly heat and rot for lack of ventilation. Doors and windows of the cellar or root house should be left open for ventilation whenever severe freezing is not to be feared.

Where cellar room is insufficient for storing turnips, roots may be safely pitted. Mark out a pit five or six feet wide; plow and shovel out to sides the depth of the furrow; build roots up to a point four or five feet high. Cover with straw to the depth of eight or ten inches, then with earth to about the same depth. For ventilation, set three-inch drain tiles on top, with one end resting on the roots, 10 or 12 feet apart, or leave an opening to the straw along the ridge, to be covered with boards to carry off rain, and place two-inch tiles near the bottom to cause a draft. Fill the tiles with straw before severe freezing. There are other methods of managing the harvesting of these crops, and readers of "The Farmer's Advocate" are invited to contribute for publication their modes of doing the work, if considered better than those above indicated.