What the Land Needs

How to Use Farmyard Manure and the Artificial Fertilizers

"To hold what we have"—that is why the British Empire and Canada is at war with Germany. Progressive farmers will follow a similar line of action in regard to the fertility of their soils. Loss of fertility cannot be prevented, but by a proper rotation and the use of farmyard manure and artificial fertilizers the fertility of the soil can be maintained at that level that will give the maximum profit from the crops that are produced. Some of our agricultural advisers seem to think that the farmer should spend a lot of money in increasing the potential supply of plant food in his soil for the benefit of future generations. Regarding this one is very apt to ask, like the Irishman when he was told to think of posterity, "What has posterity done for me?" This is a very natural feeling, but there is no doubt that on the majority of farms it will be profitable for the present owners to not only replace, but even increase the fertility that is taken out of the soil by the crops.

No Hard and Fast Rule.

It is impossible to lay down hard and fast rules as to how one should fertilize one's soil. So much depends on the fertility of the soil, its physical condition, the climate, the nearness of markets, and numerous other factors. As a rule, however, the higher priced the land the better it will pay to use artificial fertilizers. Thus it probably would not pay to use fertilizers out West on land that is only worth fifteen dollars an acre, but it would very likely pay very well to use them on land in Eastern Canada that is worth seventy-five or one hundred dollars an acre, even if the latter were more fertile. In dealing with fertilizers one has to consider the kind of crop that it is desired to grow. Thus wheat, which is a deep-rooted crop and most often sown in the fall, is able to get from the soil the mineral constituents—the phosphoric acid and potash—it requires; but unless the land has been well manured for the previous crop, it is benefited by a top dressing of nitrogen. Oats and barley, on the other hand, are shallow-rooted crops, and cannot make such good use of the mineral matter in the soil, and they are specially benefited by an application of some mineral fertilizer. Roots and corn are gross feeders, and do best when lots of farmyard manure is used. Corn and turnips also respond well to a liberal application of some phosphatic manure, such as basic slag or acid phosphate. Mangels, on the other hand, require lots of nitrogen and potash, and therefore farmyard manure and wood ashes or some other source of potash, should form the chief manure here.

The soil has also to be considered, and will modify and alter our methods of fertilizing. Thus clay soils are rich in potash, but often deficient in phosphoric acid. Suppose we are going to grow a crop of mangels on a soil of this type. Mangels, as has been said, require a liberal supply of nitrogen and potash. Lots of farmyard manure will be required to supply the nitrogen, but no potash fertilizer will be required, as the soil already has an abundance of this constituent. If we were growing mangels on some sandy soils, which are often deficient in both potash and phosphoric acid, an extra amount of potash would have to be used, and some phosphatic fertilizer as well, though, as a rule, phosphatic fertilizers are not required on mangels.

Thus the kind of crop grown and the nature of the soil have to be taken into consideration before we can use fertilizers to the best advantage.

As an example of how the type of soil and the original state of its fertility modifies the method of treating the soil, it was found that in the State of New Jersey, when corn was grown on good, loamy soil, that phosphoric acid and potash were of much more importance than nitrogen. On the sandy soils, however, nitrogen and potash were of relatively more importance than phosphoric acid. Corn, as has been said, is a crop that, as a rule, requires nitrogen and phosphoric acid more than potash.

The peculiarities of the different farm crops as regards fertilizer requirements and the elements of fertility that are most likely to be deficient in the various types of soils have been dealt with in recent issues of The Countryman. The different fertilizers have also been described and their properties and effect discussed. It but remains now to consider how these fertilizers can be most profitably used in ordinary farm practice.

In dealing with the application of fertilizers to crops, no conclusions can be drawn as to the proper methods of manuring unless the place the crop occupies in the rotation is taken into account and also the character of the land and the style of farming considered. On some of the rich soils of the prairie provinces, where the wheat crop takes about thirty-five pounds of nitrogen per acre from the soil annually, nitrogen is being lost through cultivation at the rate of seventy pounds a year. These soils at present are very fertile, and fertilizers would be thrown away on them; but in a few years' time they will become so depleted that manure will have to be used if anything like a profitable crop is going to be grown. But just now land in these sections is so cheap that it pays better to grow wheat after wheat without adding any kind of manure at all, and then, when the soil reaches a certain stage of exhaustion, to move off to new land. But in ordinary farm practice we have to consider not only the particular requirements of the crop and soil with which we are dealing, but also, as has been said, its place in the rotation. For example, if we are dealing with wheat we have to take into consideration what crop it is grown after, as this will affect the fertilizer which would be appropriate for it. Coming after oats, the fertilizer required would not be the same as if it followed clover.

Furthermore, one man may have good land in high condition and be farming high for big crops; while another man, who is perhaps an equally good farmer, may have poorer land where it may be more economical to be content with lower yields and less expenditure. The manuring must be considered as a whole, as a system to be shaped as much by the widely-varying conditions of cost of production, markets, and condition of soil as by the requirements of the crop itself.

Fertilizers, as a rule, do not pay as well on land that is in a poor state of preparation as on land that is in nice, fine condition. The amount of labor available, then, is an important consideration in the question as to how far it is profitable to use fertilizers.

Systems of Fertilization.

Various systems of fertilization have been recommended—most of them with some useful points. One system is to add a large excess of the mineral elements of fertility—phosphoric acid, potash and lime—and add nitrogen in small doses as it is required by the crop. As we pay in commercial fertilizers about three times as much for nitrogen as for the mineral substances, it is claimed that this system will be very economical, as by applying the nitrogen as top dressing just at the time the plant can make most use of it a great saving in the fertilizer bill will be effected. Besides, as the clovers and leguminous crops are especially dependent on the mineral elements, large crops of these will be obtained, and this will result in the further enrichment of the soil, in the nitrogen obtained from the air.

This system could be used to good advantage where phosphates and potash can be obtained cheaply, as in some parts of the States, but with prices as they are in Canada at the present time it is very doubtful if it could be worked profitably.

Another system that has been advocated is to apply fertilizer heavily to the chief money crop—such as potatoes or wheat. The other crops in the rotation are dependent on the residues left in the soil after the chief crop has been taken off.

A system that is too often followed is—to use an Irishism—no system at all. Fertilizers are applied haphazard without any regard as to the nature of the crop or the condition of the soil at the time they are applied.

Ville of France was one of the first to put forth any ideas concerning systems of fertilization, and his teachings are the basis of all successful use of fertilizers at the present day. His idea was that for all plants there was a certain element of fertility that was more necessary than the others for the successful growth of the plant. This he called the dominant ingredient.

Thus nitrogen is the dominant ingredient for wheat, oats, barley, rye, mangels and meadow land. Phosphoric acid is the dominant ingredient for turnips and corn. Potash is the dominant ingredient for clover, potatoes and flax. This idea of dominant ingredients is a perfectly sound one, and is found to work out in practice pretty well.

Importance of Legumes.

In the older parts of Canada farming cannot be carried on successfully without a proper system of rotations. Clover or some other leguminous crop has to be used somewhere in the cycle, and usually the poorer the land is the oftener a leguminous crop will be introduced. At Rothamsted in England where experiments with fertilizers used in rotation of wheat, roots, barley and clover have been going on for the last sixty years, it has been shown that a yield of forty-one bushels of wheat and thirty bushels of barley can be maintained where the mineral elements are supplied and where the roots are fed on the land. Where no clover was grown but a bare fallow used instead the yield of wheat dropped to thirty-two bushels and that of barley to seventeen bushels.

This shows the effect of clover on the yields of the other crops, and the effect would have been still more striking if instead of the bare fallow a non-leguminous crop had been grown. A two-ton crop of clover hay will add fifty pounds of nitrogen per acre to the soil. In commercial fertilizers this nitrogen would cost about ten dollars. Growing clover is a cheap way to enrich the soil and get an increase in the yields of the other crops. The eastern part of Canada is chiefly a stock country. It is very seldom that one crop is grown year after year, as is done in the prairie provinces with wheat, and in the corn belt of the States with corn. In the older provinces a rotation is followed more or less systematically and live stock are kept to a greater or less extent.

Amount of Fertility Removed.

In considering a system of fertilization for our farm it is well to see how much fertility is removed by the crops. On a farm following a four-course rotation of wheat, roots, oats and clover where these crops yield thirty bushels of wheat, fifteen tons of roots, forty bushels of oats and two tons of clover hay, and where only the grain is sold off the farm, the annual loss of fertility would be about 30 pounds of nitrogen, 10 pounds of phosphoric acid and 6 pounds of potash. Fifty pounds of nitrogen per acre would be added to the soil by the two tons of clover hay.

This is somewhat more than is removed from the soil by the crops, but there are other ways in which nitrogen is lost, such as by bacterial action and oxidation, so that it is rather difficult to say with certainty just how much nitrogen is really lost. From Rothamsted results we may conclude that in such a system as this—where only the grain is fed off the farm and a leguminous crop is included in the rotation—that the soil would just about be maintained at the same level of fertility as regards nitrogen. If three hundred pounds of acid phosphate or basic slag per acre were used somewhere in the rotation, preferably on the root crop, all the losses of phosphoric acid would be made good, and with soils containing a fair amount of clay, the weathering of the soil and the consequent liberation of potash may be relied upon to make up any loss in potash. Thirty bushels of wheat and forty bushels of oats to the acre is not a very high average to aim for.

As has been said, we may expect to maintain an average of thirty bushels of wheat and forty bushels of oats to the acre by feeding everything produced on the farm, except the grain, where clover is included in the rotation, and once every four years three hundred pounds of acid phosphate is applied. But this is not a very high average to aim at. It is the man that does an ordinary day's work "and then some" that gets on in this world, and it is the man that grows an average crop "and then some" that is making money on the farm. It is the "and then some" part of the crop that usually produces the profit.

Fertilizers in Ordinary Practice.

The following system of fertilization is adapted for soils in fair condition, and where the conditions of markets and labor are such as are found in Eastern Canada to-day. It is taken for granted that live stock is kept on the farm and that a fair amount of farmyard manure is produced.

For purposes of illustration it is assumed that a five-year rotation of corn or roots, oats or barley, wheat, hay and pasture is followed. When the wheat is seeded down it is presumed that at least half of the grass mixture will consist of the clover.

Corn is a gross feeder and therefore can use a lot of nitrogen to advantage. It also requires a fair amount of phosphoric acid. After pasture when the sod is plowed up in the fall and the action of the frost allowed to act on it all winter, the land will be in very good shape for the corn crop. Part of the farmyard manure should have been applied in the fall or hauled out during the winter. In the spring all the fertilizer that will be required to give a good crop will be 200 pounds to the acre of acid phosphate, or basic slag.

When turnips follow pasturage a good dressing of manure should be applied, as before indicated, and 250 pounds of some phosphatic fertilizer applied. Mangels require abundance of nitrogen and a good supply of potash, so that a liberal application of farmyard manure should be made as before, and 200 or 300 pounds of wood ashes applied in the spring as soon as possible to supply the potash. A top dressing of 150 pounds of equal parts of nitrate of soda and salt will be useful afterwards as a top dressing, more especially if the farmyard manure is not plentiful.

Fertilizers For Grain Crops.

In the second year when oats or barley are grown the land will be in good shape from the residues of the manures applied to the roots or corn and from the cultivation these crops received. These crops are specially dependent on phosphoric acid, however, so a light application of 150 pounds of some phosphatic manure should be applied. For barley no nitrogenous manure should be used, as it will very likely spoil the quality of the grain, but for the oats fifty pounds of ammonium sulphate per acre applied with the phosphatic manure will increase the yield.

The third year, when wheat is grown, the soil has become somewhat depleted by the former crops and the remainder of the farmyard manure should be applied after the land has been plowed. In the spring, if the wheat does not seem to be coming along well, a mixture of equal parts of ammonium sulphate and nitrate of soda should be applied at the rate of 100 pounds to the acre.

Immediately the wheat is harvested 100 pounds per acre of some phosphatic manure and some potassic manure that will supply 30 pounds of potash per acre should be applied. The clovers are able to get their nitrogen from the air and are more especially in need of the mineral substances.

By understanding the special manurial requirements of the different crops and taking into consideration the kind and condition of the soil on which these crops are grown and the position of the crop in the rotation farmyard manure and artificial fertilizers can be used with profit. By applying them as indicated above and knowing the requirements of the different crops the crop yield may be increased anywhere from 15 to 50 per cent.—Dan McKee, B.S.A., in Canadian Countryman.

Telephone as Hospital Aid.

Those of you who regard the telephone merely as an instrument for conversation will be surprised at a recent article in the British Medical Journal by Sir James Davisson. It describes the method of locating bullets by telephone, which is superseding X-rays.

To one end of the telephone wire is attached a small piece of platinum placed upon any part of the patient's skin, which is moistened with salt water; the other end of the telephone wire, in the form of a disinfected thread of silver, is attached to the surgeon's instruments, such as knife, probe, needle or forceps.

The surgeon then attaches the telephone receiver to his ear and begins to use the instruments upon the patient's tissues. He will hear with great distinctness the characteristic microphonic rattle the instant the instrument touches any metal imbedded in the patient's tissue.

Similarity.

"Bragson makes me think of a river."

"Where's the similarity?"

"When a river's head is swollen you are made aware of the fact by its mouth."

HOME

Selected Recipes.

This is a good recipe for cheese puffs: In a saucepan of boiling water melt two tablespoonfuls of butter. When the water and butter are boiling, stir into them four tablespoonfuls of flour, wet with cold water, and four tablespoonfuls of grated cheese. Cook for three minutes, stirring all the time. Remove from the fire, and when the mixture is cold add two eggs and beat hard for 15 minutes. Line a baking dish with greased paper and drop the mixture upon it, a spoonful at a time, leaving ample space between each puff for the swelling caused by baking. When puffed up and brown they are done and must be eaten at once.

When making toast it improves it both in taste and digestibility if the slices of bread are laid in the oven for a little while before toasting them. They will toast better and more evenly for the advance treatment.

To make chicken croquettes take some cold chicken, which should be cut from the bone and minced fine, then season with salt, pepper and juice of a lemon. Let this stand one hour, then make a batter of two eggs to a pint of milk, a little salt, and flour enough to make a batter not too stiff. Stir the chicken in this and drop it by spoonfuls in boiling fat. Fry brown, drain and serve.

These toasted cheese wafers are very nice for the afternoon tea table: Get the round soda crackers; with a thin knife split them in half and put them for a moment in cold water; remove from the water and place in a buttered pan. Dot with bits of butter and put in hot oven until a golden brown. Then sprinkle grated cheese over each wafer and replace in the oven until the cheese is slightly melted. Serve while hot.

Sweet potatoes stuffed and glazed form a tempting dish. Cut baked sweet potatoes and mash; return to the shells; boil one-fourth cupful of molasses and one level tablespoonful of butter together for three minutes. Brush the tops of the potatoes with this syrup, and put them back into a quick oven to brown. If properly done there should be a rich golden glaze over the top.

Mock terrapin, a tasty luncheon dish, may be made from cold calves' liver or from roast beef. Make a roux of two teaspoonfuls of butter and two teaspoonfuls of flour, and then add two cupfuls of gravy or two cupfuls of soup stock. Let the mixture boil up once and then add four cupfuls of cold meat, cut in cubes, and simmer slowly for half an hour. Season highly, adding a little cider or sherry, if one wishes. Pour on a hot platter and garnish with four hard-boiled eggs sliced.

The real Scotch scone is made with buttermilk as follows: Put a pound of flour into a basin and make a hole in the middle of it; put in a teaspooful of soda and half a teaspoonful of cream of tartar, then pour in a pint of buttermilk, or enough to mix to the constituency of common dough; roll out to the thickness of an inch; cut the scones out with a tumbler; place on a buttered and warmed griddle, and bake and turn until nicely browned on both sides.

Clear soup is a stimulant rather than nutriment, and should be served either with a substantial dinner or have added to it such nourishing food as a poached egg. The egg may be poached in some of the soup, put on toast in the bottom of the soup plate and the clear soup poured about it.

The first essential in soup-making from meat is to draw out the juices of the meat and retain the flavor. The former is accomplished by putting the meat—cut in small pieces and the bones sawed or broken—to cook in cold water. A good flavor is obtained by slow cooking. Never boil but simmer for several hours, the length of time depending upon the meat to be cooked. The meat should cook to pieces and become colorless. The vegetables may be cooked with the meat and stock if enough time is given them so that they do not boil during cooking.

Gelatin things are always good when made right. Here is a good dessert recipe: Milk, one quart; gelatin, one ounce; flavoring, two heaping tablespoonfuls; white sugar, three-quarters of a cupful. One quart of milk, one ounce of gelatin, a tablespoonful of almond flavoring, with a tablespoonful of rose water, three-fourths of a cup of white sugar; heat the milk to boiling, turn in the gelatin, which should have been previously soaked for an hour in a cup of the milk; add the flavoring and stir all together 10 minutes before putting in the sugar. As soon as the gelatin has dissolved, remove from the fire, strain through a thin muslin bag, wet a mold with cold water, pour the blanc mange into and set in a cold place till solid.

Useful Hints.

Grass stains on any material can be removed if moistened with a solution of chlorate of tin, and then washed immediately in plenty of cold water. It is wise always to keep a bottle of this solution. If the stained article cannot be washed, then alcohol must be used.

Flowers wither quickly in the heat, but a small piece of camhpor in the water will keep them fresh much longer.

Freckles, if objected to, can be removed by taking a quarter of a drachm of powdered borax, half a drachm of sugar, and one ounce of lemon-juice, mixing thoroughly, and letting the mixture stand for two or three days in a bottle to clear. Dab on the face three times daily, and the freckles will go.

Cakes get very dry in warm weather, but if placed in a tin box with an apple, they will keep moist. Renew the apple when withered. The cake will not "taste."

Rain spots on cloth need not be regarded hopelessly. Wipe off the way of the nap with a silk handkerchief or very soft brush. If this be done quickly, no marks will remain.

Soup quickly goes sour in the warm days, but it will keep sweet if a pinch of carbonate of soda is added to every quart.

Sunburn is not becoming, but it can be removed by washing the face in warm water in which a lemon has been squeezed and a pinch of borax added.

Fruit stains are very "springish." To remove them from white material, boil milk and hold the stained part in it for a minute. On linen apply powdered starch at once, and leave for a few hours.

Hot and stuffy rooms can be made cool and fresh by suspending a sheet wrung out in cold water over the open doorway. If a visitor comes it can be removed in two seconds, and your friend will surely remark how deliciously cool your room is.

Perspiration — excessive — is a trial to many. Extreme cleanliness, and dusting with powdered boracic acid mixed with fine starch is the best preventive.

Face feeling is another warm-weather trouble. To prevent this beginning, lightly rub the face before going out with a little fresh cream. At night rub in a little good cold cream.

Untidy hair is, of course, more noticeable in sunny, hatless days than in winter. The following will really keep your hair in curl. You could make it yourself, but if you hand the recipe to a chemist he will do it quite cheaply. Carb. of potash, one drachm; powd. cochineal, half a drachm; liquid of ammonia, one drachm; essence of rose, one drachm; glycerine, a quarter of an ounce; rect. spirit, one and a half ounces; distilled water, eighteen ounces. Mix well, leave for a week, frequently stir, and then filter through fine muslin. Moisten the hair with it while dressing.

Sunstroke. — Cold-water rags should be applied to the head, which should be kept well raised. Clothing should be removed from the neck and chest. No stimulants must be given.

For bank messengers and others who carry large sums of money in the streets an inventor has designed a special handbag, in the handle of which a revolver is concealed.

The Bicycle is Playing a Big Part in the War.

A German bicycle squad carrying their wheels over an embankment in Poland. The bicycle corps of the German army has proved to be most efficient. The scouts can move about from place to place quickly and almost as much equipment can be carried as on a horse.