HOME COURSE IN SCIENTIFIC AGRICULTURE

FOURTEENTH ARTICLE. COMMERCIAL FERTILIZERS.

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THERE is perhaps no question of greater importance to the practical farmer than that of soil fertility. To produce profitable crops and at the same time to maintain and even to increase the productive capacity of the soil may rightly be termed "good farming." Many farmers are able to do this, and the knowledge of how to do it has been largely acquired through years of experience, during which the character of the soil, its adaptability for crops and the methods of its management and manuring have been made subjects of careful study, without, however, any definite and accurate knowledge concerning manures and their functions in relation to soils and crops. Experience is an excellent teacher. Still a definite knowledge of the fundamental principles may be substituted for years of experience in the successful use of manures.

The fertility of the soil would remain practically unchanged if all the ingredients removed in the various farm products were restored to the land. This is to a large extent accomplished by feeding the crops grown on the farm to animals, carefully saving the manure and returning it to the soil, and where it is practicable to pursue a system of stock feeding in which those products of the farm which are comparatively poor in fertilizing constituents are exchanged in the market for feeding stuffs of high fertilizing value the loss of soil fertility may be reduced to a minimum, or there may be an actual gain in fertility.

A careful study of the present condition of farming in the United States indicates, however, that as a rule the manure produced on the farm is not sufficient to maintain its fertility and that the need for artificial supplies is real, though the amount required may be considerably reduced by careful management.

In the system of so called "grain farming," which has obtained over large areas of this country for a long time and is still practiced, the live stock is often limited to a number sufficient only to the needs of the farm for labor and food. The grain is sold, and the manure is made up chiefly of the natural wastes or unsalable material, such as straw, stalks, etc. The grain contains proportionately greater amounts of nitrogen and mineral constituents than these wastes. Hence the practice continued for a long time results not only in a deficiency in the soil of organic substances containing nitrogen, but also in an exhaustion of the mineral substances. The original character of the soil and its treatment measure the rate of exhaustion. The less fertile soils of the east and south are rapidly depleted, while the rich prairies and river bottoms maintain their fertility for a longer period.

The continuous cotton and tobacco growing of the south and the wheat growing of the west are even more exhaustive, since here the demands upon the soil are not changed. Year after year the same crop is grown, and the same kind and proportion o constituents are required, while even slighter returns are made in the way of manure than in the system of farming just described. Under such conditions the decomposition of the organic matter in the soil is accompanied by proportionately greater losses of nitrogen. Moreover, the land is left bare for a large part of the year, and its fertility is thereby still further decreased. The crops become less abundant each year, not because the soil is entirely exhausted, but because it is so far exhausted of those constituents essential to the special crop grown that its production is no longer profitable.

Changed conditions of farming, which have an important bearing on this point, are, first, increased cost of labor and lower prices of many of the products of one crop farming, and, second, an increasing demand for market garden products and fruit. For example, in growing wheat, the labor of preparing the soil, of sowing and of harvesting is practically the same, whether the yield is ten bushels per acre or thirty bushels and the same is true of a number of other crops; hence in case of the larger yield the cost of labor per bushel is materially reduced. Meager crops of a relatively low value cannot be produced profitably with high priced labor. Soils of a high degree of fertility are required in order to produce large yields of these crops. The return to the soil of only the wastes of the farm leads sooner or later to a decreased fertility, however good the management may be; hence the need of supplies of plant food from sources outside the farm in order that maximum crops may be produced.

It has been demonstrated in the case of market garden crops that even very fertile soils contain too little available food to insure a maximum production. This is especially true where rapidity of growth, earliness and high quality of produce are important factors. The areas now necessarily devoted to these crops are so great that the amount of farm manures available is much too small. Besides, the constituents contained in such manures, being in part but slowly available, are less useful than the more active forms contained in commercial fertilizing materials. Market garden crops are in a sense artificial crops and, as a rule, need artificial supplies of plant food.

Fruit culture, an industry of growing importance, is profitable, particularly on the poorer soils near the eastern markets, largely in proportion to the amounts of the mineral elements applied in excess of those contained in soils otherwise well adapted to the crops. A proper supply of food not only enables the trees to resist unfavorable conditions, but improves the quality of the fruit and prolongs the bearing period of the orchards and vineyards.

It will be thus seen that commercial fertilizers can be used most advantageously either in re-enforcing farm manures in general or in providing a generous supply of quickly available plant food in specialized, intensive farming. It should be the aim in applying such fertilizers to supplement rather than to replace entirely the manurial resources of the farm, for the best results from their application may be secured only on soils well stocked with organic matter (humus), a material that can be maintained in the soil only by the systematic application of the bulky barnyard or green manures.

Nitrogen, phosphoric acid and potash are the constituents most likely to be deficient in soils or most quickly exhausted by the production and removal of crops. They are known as "essential" fertilizing constituents, and the value of a commercial fertilizer is determined almost exclusively by the amount and form of the nitrogen, phosphoric acid and potash which it contains. It does not follow, however, that all soils or crops will respond equally to applications of materials containing these elements, for the needs of soils and the requirements of crops vary.

Soils differ as to their needs for specific fertility elements, owing either to their method of formation or to their management and cropping. A sandy soil is usually deficient in all the essential plant food constituents—nitrogen, phosphoric acid and potash—while a clayey soil usually contains the mineral elements in abundance, particularly potash. On the other hand, a soil very rich in vegetable matter is frequently deficient in mineral matter, while a limestone soil is likely to contain considerable proportions of phosphoric acid.

These are the indications in a general way, and they explain why it is that different kinds of soil that have not been cropped differ as to their need of the different fertilizing constituents.

Methods of management and cropping also exert an influence. For example, soils of equal natural fertility may not respond equally to uniform methods of fertilization, because in the one case a single crop requiring for its growth proportionately more of one of the essential elements than of another is grown year after year, and it may be that the element required is the one that exists in the soil in least quantity.

On the other hand, crops may be grown that demand but minimum amounts of the element in question.

Summarizing the conclusions of science and practical experience in regard to the use of commercial fertilizers, it may be said:

First.—Commercial fertilizers are mainly valuable because they furnish the elements—nitrogen, phosphoric acid and potash—which serve as food, not as stimulants.

Second.—The kind of farming in the past and the demands for special products in the present make their use necessary in profitable farming.

Third.—In order to use them profitably the farmer should know—

(a) That nitrogen, phosphoric acid and potash are the essential manurial constituents.

(b) That the agricultural value of these constituents depends largely upon their chemical form.

(c) That these forms are contained in specific products of a well defined character and composition and may be purchased as such from dealers and manufacturers and may be mixed successfully on the farm.

Fourth.—The agricultural value of a fertilizer bears no strict relation to the commercial value. The one is determined by soil, crop and climatic conditions, the other by market and trade conditions only.

Fifth.—The variations in the composition and value of manufactured fertilizers which contain the three essential constituents are due to variations in the character and in the proportion of the materials used.

Sixth.—The ton basis alone is not a safe guide in the purchase of these commercial fertilizers. Low ton prices mean either low content of good forms of plant food or the use of poorer forms. Fertilizers, high grade both in quality and quantity of plant food, cannot be purchased at a low price per ton.

Seventh.—The best fertilizers cannot exert their full effect on soils that are too dry or too wet, too compact or too porous. They can furnish but one of the conditions of fertility.

Eighth.—The kind and amount to use should be determined by the value of the crop grown and its power of acquiring food.

Ninth.—A definite system or plan should be adopted in the use of fertilizers. "Hit or miss" methods are seldom satisfactory and frequently very expensive.

A LITTLE FARM.

Bill Acres bought a farm that was
The largest one for miles around
He couldn't till it well because
'Twas scattered over too much ground.
He could not keep the weeds cut down,
Nor could he keep the fences up.
He had to sell and move to town
And now owns nothing but a pup

Jim Homestead bought a little tract
So small that when he started out
Folks laughed at him, but 'tis a fact
That he is rich now and about
As free from care as he could be
And leads a life that's full of charm.
He tilled the soil so well that he
Just made it pay—that little farm.
—Charles H. Meiers in American Agriculturist.

TYING UP A FLEECE.

Directions For the Proper Care of the Wool Grower's Crop.

First, all the tag locks must be removed, whether they be dung or grease and dirt, writes W. C. Coffey of the Illinois station, describing the proper way to tie up a fleece; second, the fleece should be carefully rolled up by hand (not in wool box), with no ends or stray locks protruding and with the flesh side out; third, the fleece should be tied with a hard glazed twine, not larger than one-eighth inch in diameter. In tying the ends of the twine especial care should be taken to make a firm, hard knot that will not slip.

Tag locks are not so common that their presence in fleeces from farm flocks is the rule rather than an exception. The total effect of leaving them on fleeces is bad. It puts our wools in bad standing with wool houses and manufacturers. Long continued, it has led to the only logical result—namely, discrimination in price against our wools.

Careful rolling, with the flesh side out and no ends or stray locks showing, adds greatly to the appearance of the fleece. It also prevents mixing the wool from different fleeces, and, by the way, each fleece should be tied to itself. In the wool warehouse it is a pretty sight to see the heaps of graded wool faced with a tier of carefully rolled and tied fleeces.

GOOD FOR THE GRUNTERS.

This Handy Swill Barrel Doesn't Need Much Material or Labor.

A very handy swill barrel for feeding a lot of hogs when they come crowding around the trough is made as follows, says the Iowa Homestead, from which article and illustration are reproduced.

The barrel A is set on a small platform immediately above a trough, B, next to the hydrant D, which has a goose neck so that water can be drawn into the barrel directly from the hydrant. In the center of the bottom of the barrel is bored a two inch auger hole which is kept closed by means of a plug, C, the handle of which is

HANDY SWILL FEEDER.

made of an old broom handle and long enough to reach to the top of the barrel.

Swill is made of ground feed, and when it is desirable to feed the hogs all the operator has to do is to stir the swill and pull the plug, and the swill runs out into the trough without any trouble.

When enough has run out the plug may be returned to its place, and in this way there is no spilling or handling of swill. The trough may be of any convenient length.

Spring Culture of Wheat.

Harrowing wheat in the spring is a practice that is receiving considerable attention of late years. Where the ground is compacted hard from beating rains of early spring, followed by rather dry weather, the harrowing of wheat with a drag harrow is good practice.

So far experiments have shown at the Missouri station, however, the harrowing of wheat is not always sufficiently beneficial to pay for the work, although where one harrows in clover seed at the same time the practice is usually a paying one.

Where the wheat is badly "heaved" the use of a heavy roller in the early spring is a good practice. All depends, however, upon the extent of the "heaving."

Kill the Rats and Save Chicks.

In answer to a subscriber who complains of rats getting away with his young chicks and requesting a remedy for exterminating the rodents, a correspondent of the Kansas City Farmer says that if powdered sulphur and cayenne pepper are scattered around the rat holes the vermin will disappear. Another remedy is to scatter powdered lye around their holes. The lye will stick to the rat's feet. He commences to lick them, which causes death.

Why Rely on Corn?

In sections where corn has not proved a success it is folly to rely upon corn. In such sections there are crops which do succeed, and it is the part of intelligence to plant them. Kaffir, milo and other crops grow and do well where corn fails. Then why rely on corn?—Farm and Ranch.