

have not been touched on, and no apology is needed for a somewhat detailed account of the management of a Kirkcudbright stud, which has an enviable record for its success in rearing foals. Mr. Houston, Overlaw, has a stud of seven breeding mares, all of which do their full share of farm work, and are not exempted from labor for an hour, until they come to the foaling. For feeding during pregnancy they get bruised oats and linseed cake, with Swedish turnips and fodder in abundance. A little boiled food seasoned with "horse powder" is given to each mare twice a week. Mares, while nursing, are not hand-fed, but after a mare has again been stunted, she may get a proportion of bruised oats and linseed cake, both for her own sake and the foal she is nursing, as well as to strengthen the future offspring. One remarkable feature in the mares in this stud is that they are not infrequently spoken of as being too fat, and in spring, when the foaling season is coming near, breeders of experience have often had misgivings as to the foaling results amongst the Overlaw mares. The issue, however, has invariably belied these gloomy forebodings, as there is probably no collection of mares of a similar class in Scotland that have bred so regularly, and with so small a percentage of deaths. In the six years, 1885-90, inclusive, 34 mares have been served by the horse, and of these 29 proved in foal, bringing forth live, thrifty progeny in nearly every case, several of which lived to be prominent prize-winners.

The lesson to be learned from the results in this stud would seem to be that, given steady, cautious work and careful handling, breeding mares are all the better off to be liberally fed. A state of body verging on that produced by "high" feeding is rather beneficial to the breeding mare than otherwise, when her whole frame is in a state of training from regular work.

In a stud of sixteen mares owned by Mr. Chapman, in Berkshire, England, all of them that are in foal are regularly wrought until within a fortnight of the foaling date; but for a month previous to that they get the lightest part of the work, and are never allowed to be put between shafts from the moment they are seen to be in foal. After foaling, they are fed with chaff, bran, and a few oats, until the foals are strong enough to be out. The reason of this is, of course, that the foaling season is much earlier in England than in Scotland, and hence, no doubt, in some measure, the earlier maturity of English-bred horses. An intelligent American, who buys largely, has expressed the opinion that, while the yearlings and two-year-olds in England are bigger and heavier than horses of the same age in Scotland, the difference is almost entirely removed amongst three-year-olds and aged horses, and there can be no doubt that Scotch horses, in general, grow at least until they are six years old.

(TO BE CONTINUED.)

FARM.

Soil Exhaustion and the Restoration of Fertility.

BY JAMES MILLER.

The want of knowledge of the character and the office of the soil, is the greatest farming blunder of the present time. It is not understood. At a Farmers' Institute meeting, one speaker expressed his erroneous idea somewhat as follows: "Professors come here and tell us that continual cropping, without returning an equivalent, will exhaust the soil, but I say there is no truth in that assertion. Look at the large trees of the forest, how they have grown in their present position for centuries, and they are to-day as luxuriant as ever." Which is very true. But allow an explanation. Through lack of knowledge, this man did not understand that about 95 to 99 per cent. of the growth, from year to year, was supplied by the organic substances of the atmosphere, either through the leaves or the roots, and when those giant trees shed their verdant coats every fall, it only added an abundant increase to the organic matter of the soil, and the land became richer and richer all the time by the increased supply captured from the atmosphere. But the case would have been different had the leaf mould been raked carefully off from year to year.

All kinds of farm crops and plants in general are composed chiefly of 4 organic and 8 inorganic substances. At any rate, these are all that are of importance to the farmer. If the land be deficient in any of these, it is not a fertile soil. These are supplied by our Creator in abundance, and it appears that He has left it to the agency of man to supply the increased demand required and make them available, still true to His word "that man should earn his bread by the sweat of his brow." Suffice it to say that all the substances to be supplied by man are contained in our barnyard manure, which should be as carefully handled and dealt with as a very precious asset, which is not done, generally, and we are safe in saying that farmers have lost in ten years more value through their manure being badly managed, than would pay off the large farm mortgage. Still, people will complain of hard times on account of bad crops and low prices.

This brings to mind a story I read the other day: "A preacher was called upon to pray for the barren fields of his flock. He passed from one enclosure to another, and offered his supplications, until he came to a most unpromising case. He surveyed the barren acres in despair. 'Ah,' said he; 'brethren, no use to pray here; this needs manure.'" So it is that God helps those who help themselves.

To sum up in one sentence all that has been said: Nature does not provide a sufficient yearly supply of plant food to replace that which is carried off in the shape of farm crops, and to supply that deficiency, artificial means must be resorted to.

This brings me to the second question to be answered, "What will restore the soil?"

We must enumerate one or two of the different agents to be employed, very briefly. To do otherwise would occupy a large volume.

The object of cultivating land is to obtain a heavy yield of farm crops, and the more successful the cultivation, the more quickly will the store of fertility in the soil be reduced. Great quantities of produce, secured by thorough tillage, hasten the poverty of the land, and while the rotation of crops allow time for the elements to act upon the soil, converting dormant into active matter, the fertility is merely lengthened, and does not prevent its ultimate exhaustion. To secure permanent productivity manuring is necessary, and this process should not be delayed until the soil has become impoverished, or the store of plant food becomes reduced below that level at which it will produce remunerative crops. When Canada was new, and the virgin soil produced in abundance, farmers seldom took any trouble to preserve and apply the manure made by their stock. And even up to the present time a great many do not use the manure upon their land.

Soils are rich because they contain a large amount of valuable plant food, that is, soluble substances which the plant can take up through its roots and utilize to advantage. This available plant food may be divided into two classes: that which decaying plants furnish, and that which is annually produced by the decay or rotting of the mineral matter of the soil itself. To the first we give the name of organics, and this includes oxygen, hydrogen, nitrogen and carbon, and to the second, inorganics, or mineral matter, comprising potash, soda, lime, magnesia, sulphuric acid, phosphoric acid, chlorine and silica. Plants contain other substances than the above, but only in very minute quantities, and these are all that the farmer requires to understand for successful operations, and to know how to make the above elements available as plant food is of the greatest importance, as we must, for the greater part, depend on the easily available plant food in the soil for that part of a plant substance which gives it the power to make use of and store up the greater amount of material taken indirectly or directly from the air, as carbon, in the form of carbonic acid and nitrogen or nitric acid. So that constant cropping with wheat removes most of this easily-dissolved plant food, and requires that future crops gather most of their food sparingly from that which is locked up and difficult to bring into a soluble form. The conclusion comes to us that we should return to the soil, in manure and fertilizers, enough of this available plant food, or that easily decomposed, to keep the quality of available fertility up to the original standard when the land was first broken up. If large crops be grown, and nearly all their fertilizing substance be returned in the form of manures, the land can gradually be increased in strength, since the accumulation in the soil from decomposition, and that gathered from the atmosphere, will more than equal the amount taken out in the form of beef, butter, etc. While making it into manure, animals of all kinds live upon and make the farmer money out of the excess of fertilizing elements the soil can manufacture, without exhausting itself, while wheat-growing takes the excess, or interest, and also reduces the regular supply, or principal. The production of live stock enables or compels the farmer to have a greater diversity of crops. Pastures and meadows are necessary, so also other fodder crops. These cheap, rough foods, in turn require that rich grain foods be used to balance them up, to make proper rations for stock. The rough fodders give to the manure bulk and humus-forming materials, together with the large amounts of other fertile elements, and the richer foods make of the properly managed manure heap a store of wealth. No country was ever robbed of its wealth so rapidly as Canada.

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"A good, enterprising dairy farmer is a blessing to his neighborhood, if he is a generous, public-spirited man. If he is willing to show his neighbors how he has won success, and where he made mistakes, he has won success, and where he made mistakes, he helps the community about him to earn and save many dollars every year. Too many successful men are selfish and narrow. They seem to think that they would be made poorer if they instructed less fortunate men how to succeed. Then, too, on the other hand, many are jealous of a successful farmer. This is little boys' work. No man is better off because his neighbor is poor, nor is any man the poorer because his neighbor is honestly rich. Law-poorers hang together, and hence lawyers are a power in the community. Farmers too often tear each other down, hence they have too little influence. Stand by each other."—Hoar's Dairyman.

The Stable Floor.

The condition of a stable floor has much to do with the purity of the atmosphere and comfort of the attendants, milkers and cows. A cobblestone floor is very objectionable, as it is rarely, if ever, dry. A smooth cement floor, graded to a gutter a foot wide, immediately behind the cows, answers very well. Bricks, if good and well laid, should answer about the same purpose. For the passage or drive-way behind the cattle, we have found a good clay floor perfectly satisfactory. It is graded with a slight fall towards the gutter, which is about one foot wide, and say eight inches deep, immediately behind the cows, sloping up a few inches towards the outer edge. It is made of cement, also, on a good foundation. The gutter is divided from the clay floor by a firm, durable scantling. Whatever the material is, it should be kept as clean as possible. A sprinkling of land plaster after each cleaning gives the stable an appearance and sweetness that cannot be obtained by any other method. It also retains valuable volatile manurial elements, which would otherwise be lost. If the cobwebs are swept down weekly, or once in two weeks, and the whitewash brush used occasionally, the stable will have an attractiveness that will tend to make attendants more interested in their work. By all means discourage the idea that it is simply necessary to put in a regular or an irregular hour or two, three times a day, in a careless, indifferent way, wishing all the time that the work was at an end.

DAIRY.

The Guelph Dairy School.

The prospects for a large attendance at the Ontario Agricultural College Dairy School, which re-opens on January 14th, 1895, are very bright indeed. In fact, more applicants have sought admission than can be accommodated in the regular Dairy Course, which has been extended so as to admit one hundred and twenty students. About fifteen to twenty-five will be admitted in the Home Dairy Course, which is especially planned for farmers' sons and daughters who wish to learn something of running separators, using the Babcock tester and making butter on the farm. There are a few vacancies yet for this course, which, to our mind, commends itself so highly that they should soon be filled.

Full information regarding either course can be obtained by writing Prof. H. H. Dean, B. S. A., Professor of Dairying. Following is the staff of instructors (in addition to Prof. Dean) for the coming term:—

1. CHEESEMAKING—A. T. Bell, Tavistock, Ont.
2. MILK-TESTING—T. B. Millar, London, Ont., Instructor and Inspector for Western Dairymen's Association.
3. CREAM SEPARATORS—Mark Sprague, Ameliasburg, Ont., Instructor for Creameries' Association.
4. BUTTERMAKING—J. B. Muir, Avonbank. ASSISTANT IN BUTTER DEPARTMENT—F. J. Sleight-holm, B. S. A., Instructor with Travelling Dairy for 1894.
5. HOME DAIRY—T. C. Rogers.

Cream.

BY F. J. S.

What is in the cream will be found in the butter. Good butter is only made from good cream, therefore it is not made from cream that is taken from the milk of cows fed on turnips, turnip tops, carrot tops, rape, green rye, mouldy or musty fodders, and like foods. Butter is made out of the foods which the cow eats, and is good or bad, accordingly. The water of cream is the water drunk by the cow, and not the water from your neighbor's well. Cows need all the salt they care to eat each day, if you would make good cream. Do not salt the cows once a week, and then put two ounces of salt to each pound of butter, thus spoiling the product in two ways.

CARELESSNESS AND LACK OF KNOWLEDGE give rise to the chief rocks upon which success founders in the handling of cream. Under the head of carelessness, we would note:

First: leaving cream in cans or pans longer than is necessary, and thus exposing it to possible contamination, unnecessarily. It may be that some do not know that twelve hours for deep cans and twenty-four for shallow pans is quite sufficient for summer setting. Twelve hours should be added to these periods for winter setting.

Secondly: not stirring cream frequently. Uniformity is one of the chief good things requisite in cream. It means more and better butter.

Thirdly: leaving the cream can open, thus allowing the possible introduction of objectionable forms of fermentation. The weight of good opinion prefers a tightly-closed tin can for the keeping and ripening of cream.

Fourthly: keeping cream in improper places—the root or vegetable cellar, beside the soap barrel, the onion chest or the meat bin, in the kitchen or bedroom, for instance.

Fifthly: ripening cream under conditions similar to the above, and raising the temperature of cream by dry heat, as by the kitchen stove, instead of setting it in hot water, stirring constantly, and thus preserving strict uniformity and exactness of temperature throughout the mass.