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The acetic fermentation occupies from three to eighteen months, or more, according to the conditions under which the fermentation is carried on. When the apple juice is stored in cool cellars, and left there until it becomes vinegar of legal standard, it requires from 21 to 24 months, or even more. When the alcoholic fermentation is allowed to take place in a cool cellar, and the casks then removed to a warmer place, the time of vinegar formation may be reduced from that given above to fifteen or eighteen months. Where the alcoholic fermentation is hastened by the use of yeast, and the acetic fermentation favored by the proper temperature and addition of vinegar "starter," it is possible to produce good, merchantable vinegar in casks in six to twelve months.

When the acetic fermentation has gone far enough to produce 4.5 to 5 per cent. of acetic acid, then the barrels should be made as full as possible with vinegar, and tightly corked, in order to prevent destructive fermentation of acetic acid, and consequent deterioration of the vinegar.

A word of caution is in order as to keeping cider in tins. When it is allowed to come in contact with either iron or tin, the acids, particularly tannic acid, react on the metal, forming dark-colored substances. It should be boiled, therefore, in granite or copper dishes, tin giving it a very bad flavor.

Liming the Soil.

The practice of liming soils is as old as any operation in primitive or modern agriculture, yet the fundamental principles underlying its use are not known to many, neither are the conditions of soil easily recognized where lime would be a direct advantage.

M. A. Bachtell, of the Ohio State University, has compiled some practical information in a bulletin called "Liming the Soil," and it should be read by all who are ambitious to increase their yield and maintain withal the fertility of the soil and good mechanical condition.

Lime itself is not a direct fertilizer. It does not, of itself, nourish the plant, but it severs the bonds and manacles which hold genuine plant food a prisoner in the soil; it renders them available to the plant, increases the yield and takes the credit. Potash, phosphoric acid and nitrogen are the three ingredients that constitute the important part of the diet of plants. They sometimes are not in the soil, sometimes they are combined with other minerals and cannot be utilized. In the former case lime would not show results at all, in the latter case a chemical reaction would convert the compounds into food acceptable to the plant.

Clay soils are often rich in potash, but too often they lose their lime supply, and the potash remains unassailable by the small rootlets.

The nitrogen, so necessary in the vigorous growth of foliage, is housed in organic matter, such as manure, stems or leaves of plants. In order that it may join with some substance to become a nitrate, a form of plant food most acceptable to vegetation, little underground helpers called bacteria work day and night, causing this transformation to take place. All they ask in return for their efforts is a neutral or alkaline soil, some heat, a little air and moisture. They will not work in a sour soil. This often accounts for black soils, bearing every resemblance to fertility, being quite indifferent to crop production. It is seldom the condition in limestone soils, but it often occurs in muck lands or clay belts.

Too much lime will ultimately so deplete the land that little food will be left for subsequent crops. It attacks the organic matter with such vengeance and is so enthusiastic over the liberation of other foods that the crops flourish luxuriantly for a time, but a few years will see them suffer from a depleted soil unless green manures have been plowed down or barn-yard manure liberally added. The Scotch used to say "Lime enriches the father and impoverishes the son." They learned the truth of the saying only too well, because in their eagerness for heavy crops, lack of judicious rotations and failure to return some recompense to the soil for crops received, they saw the land weaken, crops diminish and fertility go.

Many ways and means of diagnosing the soil are prescribed. Litmus paper will turn from blue to red in a sour soil, but this test is more applicable in the laboratory. Mosses and sorrel will sometimes indicate a lack of lime, but to demonstrate in a practical way the husbandman can apply lime to a small area and leave a similar area unlimed. Grow clover or potatoes or grain on both plots, and if lime is beneficial it will show beyond a doubt. Lime is available in many forms, and one's location and local conditions would largely influence him in his choice. Quick lime or burnt lime is procurable almost everywhere at nominal figures and is conveniently applied. The slaked lime is good as well, but, in a slight breeze, the neighbors get a large percentage of the benefit. Ground

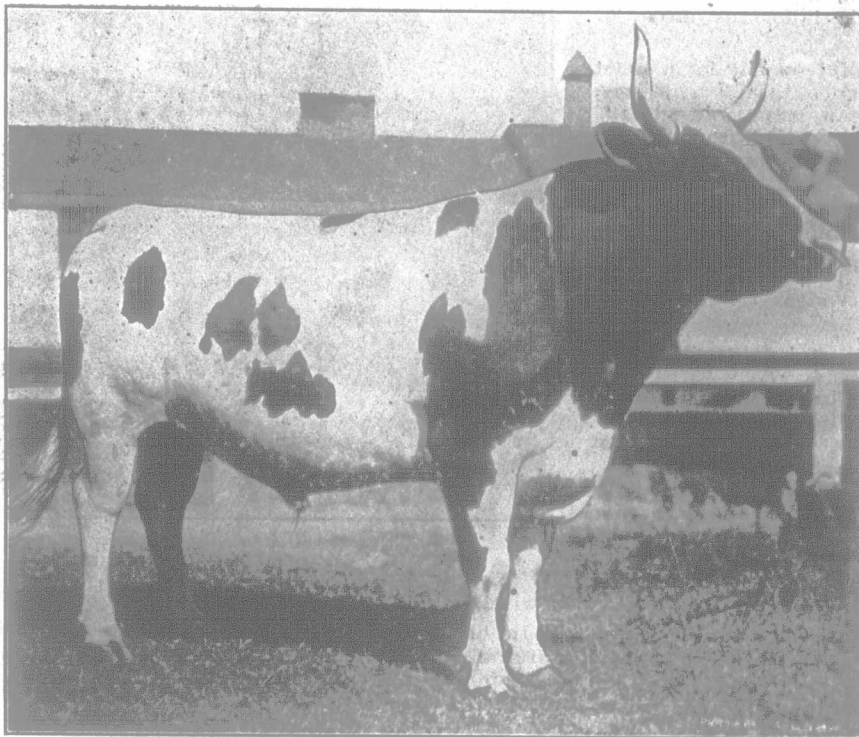
limestone and hydrated lime are now being manufactured, but limestone is only a little more than half as strong, and hydrated lime three-quarters as strong in the lime element as the burnt lime or quick lime. This characteristic of the two latter forms is not unfavorable; it is cheaper and more can be applied.

The most convenient way of applying the quick lime, we have ever found, is to put it in small piles in the field, and throw a little dirt up against it. The air, dew and rain will slake it in a few days, and then it can be spread with a spade or shovel, allowing a little soil to mingle with each shovelful to prevent it blowing away.

Fall or spring are convenient times for application. Before the spring working of the land, prior to the hoe crop in the rotation, is preferable, but another season in the crop rotation is alright and so is early fall for putting on the lime. Spreaders for applying lime are made, but every farmer has some home-made device or ingenuity enough to apply his lime in the experimental stages, at least, without additional expense.

It is generally recommended that one ton of quick lime or two tons of ground limestone be applied per acre where the soil is very acid in character. There are those, however, who favor only half that quantity, and repeat it every four or five years. Too generous a quantity of lime might liberate more plant food than was necessary for the immediate use of the crop, and, as the nitrates are soluble, they would leach from the soil and be wasted entirely.

Bear in mind that lime is a medicine, not a food. Your soil may require it and it may not. If your land has suffered from lack of judicious rotations; if it has been improperly or insufficiently manured and fertilized; if it requires another system of cultivation, then lime will only cause it to rally for a short period, like a sick person before the fatal moment. Ascertain by experiment if the land is sour, or, in case of clay soils, close in texture, under these conditions lime will repay the user.



Lessnessock Forest King Imp.

Champion Ayrshire bull, Western Fair, London, 1913. Exhibited by A. S. Turner & Sons, Ryckman's Corners, Ont.

Alfalfa and Tile Drains.

Editor of "The Farmer's Advocate":

In reply to the question "will alfalfa roots block tile drains?" I may report a little experience. We have been growing alfalfa for some years on one field that is tile-drained; cut four years yielding heavy crops, and have noticed no harm to the drains yet. The soil is clay loam. Drains are three feet deep, four rods apart, with a good fall. I chanced to meet the man recently who dug those drains and said "say that is a fine field of alfalfa your brother has up there, but do you know I am feared for the drains." I have a lot seeded with alfalfa for three years. Last spring my neighbor complained that his cellar drain was blocked; as it passed across this lot they thought it must be the alfalfa roots, so they dug it up and found it more or less blocked all the way across, some places completely filled. Previous to seeding, this lot was cropped with liberal application of manure each year, eight to twelve loads to the three-quarter-acre. The soil is a free loam, the drain is about two and a half feet deep. It was a good catch and made rapid growth from the first, but still the owner says that he would not be without it, for on this three-quarter acre of alfalfa and one-quarter acre of timothy he fed one horse and colt, two milch cows until

March, one cow till grass, and had one-quarter ton of timothy left. He is a good feeder. This drain was not near any trees or anything but the alfalfa.

Huron Co., Ont.

R. C. McGOWAN.

Peat for Organic Manure.

A cheap method of obtaining organic artificial manure has been discovered in England. It has been found that by the treatment of ordinary moss litter with bacteria, an organic manure is formed, a ton of which, it is claimed, is worth more than 80 tons of ordinary farm manure. It has been found that the insoluble humic acid present in large quantities in peat can be readily converted into soluble humate by the action of certain aerobic bacteria.

Peat, after treatment with these organisms, is sterilized, and then inoculated with a culture of nitrogen-fixing organisms. This prepared peat can then be used for soil inoculation, either by direct application to the soil, or preparing from it a culture solution.

Experiments made demonstrate the remarkable effect which this peat has on plant growth. A plot of radishes watered once with an extract of prepared peat gave an increase of 54 per cent. over another untreated plot. It has been tried in competition with farmyard manure, and it gave the following increases: Lettuce, 27 per cent.; turnips, 23 per cent., and potatoes, 41 per cent. Ordinary organic manure is getting scarcer in England, owing to the substitution of horses by motor-drawn vehicles, and peat, it was stated, may become a marketable substitute.

THE DAIRY.

Farmers and the Milk Question.

Editor "The Farmer's Advocate":

The vexing milk question seems to again be disturbing the harmony of the retail milk dealers in Toronto. The president of the Retail Milk Dealers' Association made a statement recently to the effect that he could obtain all the milk that he desired at \$1.60 per eight-gallon can. If the Retail Milk Dealers' Association is able to do so, surely this is scarcely leaving a fair margin of profit for the farmer or producer, who has hard and long hours for the mere pittance left him from his sale of milk at \$1.60 per eight-gallon can after paying expenses, such as cost of cows, hay, ensilage, roots, meal, stabling, labor and cartage to the retail dealers' depot. Taking the president at his own word, the retail dealer gets \$3.20 per eight-gallon can. Certainly he has his own expenses to meet out of this, but they cannot be as heavy as those which the farmer or producer has to meet.

It therefore behooves the farmer to protect his interests. Now, how is he to do this? Why cannot the farmers of Ontario, not only the dairy farmers but all the farmers, get together to meet this situation? It is a well-known fact that all the retailers of milk are combined against the farmers to beat them down in price, and they can only be met and argued with successfully by the farmers co-operating as a strong body with common cause of complaint, instead of allowing one or two of the more energetic to fight out a losing battle from the commencement for the rest.

In England a few years ago, a farmers' protection society was inaugurated which has now reached enormous proportions. For a certain subscription yearly the farmer is allowed to participate in the benefits to be obtained by belonging to such a society. The society is governed by a committee chosen annually from among the members, one man from each district, or branch society, as the case may be. Each branch society manages affairs in its own particular district, but anything of more than ordinary importance, such as the question under discussion, is referred to the head committee, which is thus in a position to deal with the purchaser. Besides taking up matters of this kind, this society also undertakes to protect the interests of its farmer members at all times, and employs a barrister