FOUNDED 1866

CO., ONT.

tion of any one own to a more ry. We have ry. e antediluvians they cultivated e same crop the tifully. The first n or something was when the the land every Egypt, as well would lead to

Little light is agriculture in m may be obks and corners, ght of amid the Coming ences. f Britain, and ne campaign of hat corn grew one thousand History of the d barley were ern steppes of es with bread. that when the y they had re-ece of land or

necessary adfailed to ascerfects had been generally pracwe understand stic animals in of comparatively sheep and Cain tice that Abranerds, and Jacob wing a kind of tlement in the m raising grain. her's, or at least knew as well as ow, but possibly e much, as long the demand for population, and eir reach, a new e of agriculture. an axiom, that agriculture, and suitable to the crops our soil and which the anding, that one allow or a crop Let us now take le of rotation. two plants of elements of food is of practically l over when not posing matter, nic acid, water ozone. Oxygen greater bulk and present in much lent, then, that air to draw from It follows, then, rowth and lux The the soil. plants when l parts of wheat parts ; beans, 3 parts. This ash become soluble nt food. Every s sucking, as it s a plant cannot insect, in search h what is within is not sufficient arfed, if not acplants that rethan others in ips and potatoes orn delights in olenty of humus; re a good deal of calcareous soil. lime. A soil must cure a good crop bundant in most he glaze on the en the head and less impervious rincipal agent in It is quite ng. ield very rich in more apt to be all down for lack

JANUARY 16, 1899

kind of trees, indicating that a large amount of the ash necessary for its growth has been re-moved. It becomes, then, a logical conclusion that the further apart in a rotation crops of the same kind be kept the more abundant will be the food available. Thus we see that the plant is dependent available. Thus we see that the plant is dependent on the soil for its saline or earthy food, and the soil in turn derives its constituents from the abundance of mineral matter contained in nature's great store-house, the earth itself, which is being continually disintegrated by the action of the atmosphere, frost, and the percolation of water through the soil.

In many counties in England where grain-grow-ing obtained principally what is known as the four years course was and perhaps is yet pursued. Commencing with turnips 1, barley and oats (seeded) 2, clover 3, wheat 4. This plan produced much engine and turning the turning being fed off much grain and turnips, the turnips being fed off during autumn and winter to sheep raised on higher and poorer land, often from a distance. In the five years' shift oats followed the wheat, and in the six years' shift it was turnips, barley, grass, grass, wheat, and oats. In other counties they have adhered for many years to the seven years' shift, or a modification of it, and this rotation once unior a modification of it, and this rotation once uni-versally practiced in Aberdeenshire I will particu-larly notice. Whatever was the size of the farm, it was divided into seven equal parts as nearly as possible. Commencing with turnips as the fallow or cleaning crop 1, barley 2, then grass 3 years, oats 2 years, completing the rotation. Every farmer was bound by his lease to adhere strictly to this rotation, and it was thought to be the magnuum homum for and it was thought to be the magnum bonum for both laird and tenant. But times changed, and with it facilities for sending fat cattle from the north to the London market became common, consequently the London market became common, consequently the demand and price increased, also a stimulus to produce more beef. Turnips being the principal element of food, it soon became apparent that the element of food, it soon became apparent that the more turnips they could raise the more cattle they could feed. Farmers then got liberty, when entering on a new lease, to choose the five years' shift or con-tinue the old seven. After a number of years in the four years' course the turnips became affected with "finger and toe"; the cereals failed, especially wheat; the clover became puny, or, in the ver-nacular, the land became "clover sick." Science attributes the failure to too close cropping. attributes the failure to too close cropping.

To lay down any permanent plan of rotation for any large extent of country would be absurd. The soil is so variable even in a Canadian town-ship that a rotation that would be successful on one farm might not be so on another. When cattle feeding or dairying is the main object or view, I think a modification of the seven years' shift would in time be more profitable than any of the other rotations mentioned. I am personally acquainted with a few farms in the Counties of York and South Ontario that have been wrought under a modification of the rotation for at least 60 years, and last year's crop showed no sign of diminution. What-ever the size of the farm, it would be divided into eight fields or four plots representing two fields each. eight fields or four plots representing two fields each. Beginning with corn or turnips, or mangels and corn, as the fallow or cleaning crop, 1st; barley and peas, or all barley or all peas, 2nd; oats, 3rd; then prepared for wheat and manured; wheat and seeded with clover, 4th; hay, 5th; pasture, 6, 7 and 8. On a farm of 90 acres cleared there would be 8 eleven-acre fields clear of fences. The crops would stand thus: 11 acres wheat; 33 acres pasture; 11 acres hay; 11 acres oats; 11 acres corn; 11 acres barley or peas. These crops can be alternated in harley or peas. These crops can be alternated in different ways without violating the main principle, so that none except the grass will come on the same field but once in the eight years.

FARMER'S ADVOCATE. THE

DAIRY.

Buttermaking in Canada on the Creamery Plan.

SEVENTH PAPER.]

COLD STORAGE. I. - ICE.

Cost of Building.-If a room of a creamery is available that may be used as a storage room and ante-room for the same, then the cost of insulating these will not exceed \$150-\$225; that is, for a creamery whose summer make does not exceed 800-1,000 ery whose summer make does not exceed 800-1,000 pounds butter daily. But there is a storage room, over or beside these, to hold the ice that must be supplied. This will about double the cost men-tioned. These figures are from careful estimates made by a competent and experienced contractor. If a separate building has to be put up the cost will be about one-half more than that necessary to line the rooms, the insulation being the expensive part

of cold storage building. Material and Insulation.—Pine may be used for the outside of the building-if one has t , be put up but not for the insulation work, on account of the strong odor. Spruce or basswood we esteem the best for this purpose, together with the use of a best for this purpose, together with the use of a good quality of building paper, mineral wool, and dead-air spaces. The arrangement of these may vary somewhat, but there should be at least *two* dead-air spaces. The insulation necessary in a creamery cold storage room to entitle the owner to the Government (Dominion) house of \$100 is as the Government (Dominion) bonus of \$100 is as follows: Next to the existing wall one layer of building paper; then $2^{\mu} \ge 3^{\mu}$ strips; building paper (tac paper must not be used); 1" rough boarding; building paper; $1^{\mu} \ge 2^{\mu} \le 3^{\mu}$ strips; building paper; 1" rough boarding; building paper, two thicknesses; 1" rough boarding; building paper, two thicknesses; 1" tongued-and-grooved boarding. We are of the opinion that the six layers of building paper here used would give better satisfaction if put in as follows: Two on existing wall, then strips, boards, two of paper, boards, strips, boards, two of paper, and the finish or inside lining of tongued-and-grooved material, and we think, too, that the paper would be easier put on, and with less probable injury, if tacked to boards than if tacked to strips. In any case the paper and the hollow spaces must the Government (Dominion) bonus of \$100 is as In any case the paper and the hollow spaces must be continued from the sides right over the ceiling and under the flooring, that the insulation may be



LEICESTER YEARLING EWE. Winner of 1st prize at the Provincial Winter Show at Brant-ford, 1898. Owned by J. M. Gardhouse, Highfield, Ont.

complete. At least six inches of mineral wool should be placed in the bottom of all dead-air spaces to make more thorough the insulation.

from \$1,000 to \$1,500. This outlay should be within the range of any creamery that handles \$40,000 to \$50,000 worth of product annually.

Cost of Operation .- One charge of ammonia (if on the ammonia-compression system) annually is all that is required, and this will cost about \$10-\$15. The fuel bill is more difficult accurately to estimate, but we can come within a little of it.

To do this work of cooling in this manner the compressor should be operated about 10-12 hours daily, and the extra fuel bill will be just about what it requires to drive the engine during the time that it is not needed in the regular creamery work. This

it is not needed in the regular creamery work. This outlay, we think, would not be greater than that needed to put in the ice each year. Summary and Comparison. As far as cost is concerned, it may be taken for granted that the cost of operation of the two systems is not materi-ally different. The cost of the plant for chemical refrigeration is the matter for the creamery to consider and settle. The efficiency of the chemical system stands unquestioned, and the evidence is from all quarters of the globe. The temperature of the various rooms is readily and absolutely control-lable. The ice does not run out at some inoppor-tune time in this system and leave the maker at the mercy of the elements. There is no undue damp-ness, nor any leakage.

mercy of the elements. There is no under damp ness, nor any leakage. There is one great advantage resulting from the chemical system to which we have not yet referred, viz., that it may be used to cool the water supply. With a water supply at 45° Fahr. (or lower if you want it), what is not possible in the creamery, even in July! And, too, the churning room and working room can be kept at a moderate temperature, so that the butter is not injured by heat before it ever in July! And, too, the churning room and working room can be kept at a moderate temperature, so that the butter is not injured by heat before it ever reaches the storage—a very vital point. In short, the one system—the ice—stands to the chemical system as the man with a half-balky, untried team, of nondescript rearing, hitched to a cubic yard of gravel in a river bed, stands to his neighbor who draws rein over a team of true, tried Clydes. The latter is sure of his ground, and never more sure than when most tried. A break in the proper con-trol of temperature in a creamery may (and often does) mean a loss of 4c. per lb. on the day's output— a serious matter, and not only in its present or im-mediate aspect, but also eventually, since, when we face a glutted market (as we are frequently called upon to do), it is "extras" only that sell, and past reputation is a bank on which to draw. To him who makes and markets "seconds" there will surely come a reckoning day. All praise to our Dominion Government for their soundly workable refrigera-tion system from creamery to consumer. And if Canadian creameries do as well by themselves, "Canadian " will soon be as choice a brand as the Englishman can buy. F. J. SLEIGHTHOLM. Western Dairy School. Englishman can buy. Western Dairy School.

The Use of a Cream Separator on the Farm.

To the Editor FARMER'S ADVOCATE :

SIR,-During the three years and a half experience using a cream separator we have found out many points in which it surpasses the old way of skimming milk. Time, strength, labor and money are saved, and the skim milk can be fed warm. In are saved, and the skim milk can be fed warm. In the first place, a great amount of cream is saved when a separator is used. In the winter time by the old method the cream is frozen (unless you have a frost-proof building), and is thus greatly deterio-rated in quality. By the separator all the cream is taken out of the milk at once and while warm, and is much superior in quality and will make better but-ter, which will sell for a higher price. We have tested and set the skim milk skimmed by a sepa-rator, but could find no trace of cream; but by the setting and skimming process a considerable the setting and skimming process a considerable amount is lost. Besides the loss of money there is amount is lost. Besides the loss of money there is a waste of time and labor in washing pans, cans, warming calves' milk and thawing out creamers in cold weather by the old way. This means drudgery and hard labor. When a separator is used the milk is skimmed as it is milked, and when the cows are milked their milk is alward advertised and the string milked their milk is already skimmed and the skim milk ready to be fed to the calves and hogs, and the only things to be washed are the milk pails and separator, instead of a host of pans. The separator is much more easily managed than skimming milk, and is done in less time. and is done in less time. There is a great advantage in having the milk separated while warm, because the skim milk is warm and the calves and pigs like it better, and it does them more good. The warm skim milk mixed with bran and shorts makes an excellent food for growing hogs. Calves do almost as well as upon whole milk. A little warm skim milk is good for poultry in winter. I might mention another point of importance. Where milk is skimmed with a separator at home and the cream sent to the butter factory the cost of manufacture would be reduced one-half or more. Besides, it would do away to a great extent with tampering with milk. I am convinced that a man with a herd of twenty-five cows cannot afford man with a herd of twenty-live cows cannot afford to do without a separator, for two reasons: (a) A large amount of time is wasted in hauling whole milk to the skimming station and skim milk from it; (b) the skim milk is often sour, and not so good for calves and hogs, especially in warm weather. A separator for from thirty to fifty cows and a one-horse tread power can be got for about two hundred dollars. A separator can be run by a horse

t different plants wth, experience that a continual same land will sing to respond Southern States tinuous tobacco has beem lumth the original

I do not recommend this rotation as a plan to get rich in a few years, but I have good reasons for believing that by the time three courses are run you will have secured for products sold as much if not a greater return, and have the land cleaner and more fertile than by having the crops closer together.

Re Commercial Fertilizers.

To the Editor FARMER'S ADVOCATE:

SIR,-The letter contributed by J. L., Grey Co., Ont., hits the nail pretty fairly on the head; he is only one of a good many farmers that are puzzling their brains on this problem A good deal of the free literature that is in circulation I think tends more to evade the direct question and to confuse the general class of farmers. I have been getting a few quotations and circulars of different brands of fertilizers, but the prices and percentage of the different ingredients vary to quite an extent. and some do not have all of the same ingredients, making it difficult to tell which would be best and most profitable to secure. If some farmer who has used commercial fertilizers would give his experience in that line it would perhaps help to solve the problem. I think the price of a good many of the brands of commercial fertilizer is too high. W. U.

Yours, etc,.

Prince Edward Co., Ont.

Mr. Geo. Isaac, Bowmanton, Ont., advertises for sale three imported Clydesdale stallions, one of which was a prizewinner in 1898 at the Royal Northern Show, and was sired by the noted Prince Alexander.

In very warm weather it will be necessary to use ice and salt in galvanized iron cylinders to keep the temperature sufficiently low, the ice being smashed up and mixed with about 3-6% salt.

Cost of Operation. - This include the annual storage of the ice and the daily filling of the cylinders during the hottest weather. Seventy-five to one hundred tons of ice will be needed to fill the requirements of a cold storage for a creamery of the capacity herein indicated. The cost of this will vary materially with the locality. The labor of smashing two to three tons of ice weekly for the cylinders during the major portion of the busiest season of the year is an undesirable item, and one, I find, not much appreciated by creamery operatives.

Efficiency.-This system of refrigeration may be made to give very fair satisfaction if well carried out. The dampness usually attending it is an objection. We find that it is a general experience that butter molds much more readily in ice storage than in chemical storage. Unless the construction of the building be A1 leakage frequently results. But the great drawback and inefficiency to ice cold storage is the fact that it is not easily enough controlled. The temperature very frequently reaches too high a pitch, and as a result the contents of the place suffer. Another drawback the writer has experienced is that the ice very frequently does not hold out until the new ice is available, and many do not realize that there is really only a very short period during the whole year when refrigeration is not needed.

II.-CHEMICAL REFRIGERATION.

Cost of Building.—This is at least one-third less than in the case of ice, as the storage for the butter and entry for the same is the only room needed.

Cost of Plant.—I have by me as I write, esti-mates of a complete chemical refrigeration outfit, large enough for creamery use, at prices varying

one-horse treat power can be so be so by a horse hundred dollars. A separator can be run by a horse or bull, or any animal having the proper weight, and the running expenses are almost nothing. Middlesex Co., Ont. S. C. MILLSON.

Middlesex Co., Ont.