

about two pounds of sulphur to a gallon of linseed oil. Some of the coal-tar sheep dips also answer very well for scurvy pigs, or a weak solution of creolin, say about two parts of creolin to one hundred parts of water. The quantities of grain for horses and cattle, as given above, are only approximations, and the feeder must use judgment in adapting the ration to individual cases.

O. A. C.

G. E. DAY.

Dairy Shorthorns in the West.

Farmers in the Prairie Provinces evince a keen interest in Dairy Shorthorns. Whether these cattle are called dual-purpose or Shorthorns of milking strain makes little difference to the man who wants a big, strong cow that will give a reasonable flow of milk and produce a calf that develops into one that can be fed to advantage.

Discussing prize-list changes, as proposed at Brandon recently, whereby there would be two distinct classes of Shorthorns at fairs, Stephen Benson, of Neepawa, expressed the opinion that there should be distinct prizes for beef and dairy types. "Show-ring breeding," said Mr. Benson, "is gradually transforming the Shorthorn to a beef type. At present, many Shorthorn herds in Canada and elsewhere stand low as milk producers—in fact, they cannot feed their own progeny."

"There is no satisfaction in trying to improve the milking qualities if the calves are allowed to stay with their dams. We must plan to feed skim milk. I have found it best to have heifers drop the first calf before they are two years old, and continue to milk for ten months or a year. Eighteen months should elapse before the second calf is dropped. This gives the young cow a chance to develop. With this treatment it takes longer to mature than if she were not bred so young, but the frame is large, and she is a most satisfactory dual-purpose animal."

"Those that do not give good promise at the end of the first milking period are sold. It is not difficult to discern those that tend to flesh from those that produce well at the pail. When married hired men are kept, and cottages provided, it is not difficult to make arrangements with the women to care for the calves, and also give special attention to young cows."

"Our calves are fed skim milk until they are six or seven months old. In fact, we work along the same lines as do breeders of dairy cattle. For the first year or two the calves get good care. It is difficult to get too much flesh on when the heifers are bred to freshen at about two years of age."

"Our experience indicates that it is not hard to have Shorthorns that do well as milk producers, and also produce a crop of calves that suit well for stable feeding."

Prof. W. H. Peters, of the Animal Husbandry Department, of Manitoba Agricultural College, has intimated to the students his intention of taking a team to Chicago this year to compete in the stock-judging contest.

THE FARM.

Fertilizers.—II.

(Continuation of address by Prof. W. P. Gamble, before Niagara District Fruit-growers' Association.)

APPLICATION OF FERTILIZERS.

On a soil containing large quantities of lime, use superphosphate as a top-dressing in the spring, and at the rate of 300 to 500 pounds per acre. On soils containing clay or humus, apply basic slag in the autumn, and at the rate of from 500 to 600 pounds per acre. In many cases, still better results follow if a moderate dose of basic slag be followed by an additional dressing of superphosphate in the spring. Avoid bones, unless finely ground. Use steamed bone flour for special purposes.

Nitrogenous manures must be used with great care, and their successful use depends on good judgment, and the provision of a simultaneous supply of potash and phosphates.

Plants grown for leaf and stem production, such as cabbages, asparagus, celery and rhubarb, can be liberally dressed with nitrate of soda in successive small doses, and, provided that phosphates have been applied, and there is no deficiency of potash, as much as 200 to 300 pounds of nitrate per acre can be applied profitably. A light dressing of nitrate in spring has been found of assistance to fruit trees at the time of setting the fruit.

Nitrate is injurious to the foliage of many garden plants, and to vegetables with flat leaves, but does not harm upstanding blades of grass. In applying nitrate to plants in active growth, care should be taken not to scatter it on the leaves.

Sulphate of ammonia is even more caustic to foliage than is nitrate, and requires careful sowing, but, as it is comparatively permanent in the soil, it can often be applied before the plants show leaf. Nitrate, however, has the preference for top-dressing purposes, where a prompt and practically instantaneous result is desired. In wet seasons the sulphate of ammonia may be used to advantage.

Caution.—It must be remembered, however, that it is an easy matter to put on several times the intended dose of commercial fertilizer, unless care be taken to regulate the amount. Excessive doses may, of course, result in killing the plant germ entirely, or in severely burning the growing plant. All fertilizers, therefore, must be carefully weighed, and the amount per acre applied should not exceed the quantity usually recommended. Chemical fertilizers, it must be remembered, are very concentrated forms of plant food, which may act as direct plant poisons when present in strong soil solution. The plant can only make use of food in a very diluted form, else the tender root-hairs and rootlets are destroyed.

In order to secure uniform distribution of chemical fertilizers, it has been frequently found advantageous to increase the bulk of material by mixing the fertilizer with dry earth, sand, or sifted wood ashes. This plan is especially to be recommended to beginners, for reasons already pointed out.

CULTIVATION ESSENTIAL.

Good cultivation, and all it means to the tiller of the soil, has for its chief end the maintenance of sweet and aerated tilth, in which soil organisms can grow and work freely. In order to secure this condition in general farm practice, it is not necessary to cultivate deeply, as agricultural plants have become accustomed to a shallower depth of tilled soil; but, for the garden, where the



Masculine Ovine Character.
Head of a Dorset ram.

produce is so much more valuable, and where such stringent conditions of cost of production do not obtain, deep and thorough tillage is essential. Fertilizers can only give their best returns when good cultivation is carried on at the same time; they cannot take its place.

In conclusion, every farmer or fruit-grower must be his own experimenter, and put questions to his soil. Only by conducting a series of small-plot experiments with fertilizers can he find out what his soil lacks, and thus he is enabled to supply it with the fertilizer which his soil stands most in need of, and from an application of which he will secure the most economical returns. He must also bear in mind the characteristics of crops, and profit by the experience of others in this connection. Thus, certain crops are found to respond to the action of nitrogen in the form of nitrate of soda, while others respond more readily to sulphate of ammonia.

PURCHASE OF FERTILIZERS.

It is usually far wiser, and also more economical to purchase the fertilizing ingredients needed singly, and to do the mixing at home, rather than to buy mixed fertilizers. It is also better to buy a high-grade fertilizer than a low-grade, for by doing so one saves the additional cost of packing, transportation, etc. It is more economical to purchase one ton of high-grade fertilizer than three tons of low grade. Remember, further, in purchasing, that the finer ground and the drier the substance be, the greater its value. Thus, the value of ground bone, bone dust, or ground rock phosphate, is largely dependent on the fineness of the particles. The finer the particles, the more available and readily soluble the material. The greater the amount of moisture, the less the amount of fertilizing ingredients.

Alfalfa.—III.

MAKING HAY, BREAKING, ETC.

Alfalfa may be cultivated, and when this is practiced, it gives good results. The surface soil becomes packed by machinery, the tramping of animals, and by heavy rains. This cultivating may be done by using a spike-tooth disk harrow regularly each spring. This opens up the soil, and allows the air to penetrate more freely to the roots, and it may also result in the destruction of some of the eggs and larvae of some of the insect enemies of the plant.

To destroy weeds which spring up the first season, the field should be clipped with a mower. This may also be done if a yellow rust attacks the leaves. Alfalfa fields should be kept free from animals in the winter, as trampling on the crowns of the plants will likely kill them if they are frozen.

Alfalfa should be cut for hay when it begins to bloom, and when the lower leaves have started to turn yellow, and when the buds are starting out from the base of the plant stems. This cutting should not be delayed, for at this time the plant has in it the greatest amount of nutrients. If it is allowed to stand longer, the stems become woody, and the leaves drop off. Thus, the hay is not as palatable, nutritious or digestible. If cut too soon, before the buds have set on the stems, the succeeding crop is sometimes injured.

If possible, the crop should be cut down within a week, if it is all ready at the same time; for, by thus doing, the hay is secured in the best possible condition, and the following crops will be benefited, as it will start to grow more quickly. After the alfalfa is cut, it should be closely watched, and just as soon as it shows signs of drying, it should be raked into windrows to cure. In rainy weather, it is better cocked up in small cocks. As soon as it is so dry that no moisture will exude from the stems of a wisp of hay when twisted, it may be drawn to the barn and put in the mows, or it may be stacked, if desired.

Alfalfa sod is extremely difficult to plow, owing to the number, the toughness, and the thickness of the roots. With poor implements, plowing is almost impossible. The plow used may be the same as used for any other plowing. That plow, however, should be in good repair, and the cutting edge or share should be sharp, or it will not cut off the roots. The sod should not be broken over three or four inches deep. If plowed too deeply, the roots will often contain enough life to start again. It is not usually best to plow, and cultivate directly the plowing is finished, but the furrow-slice should first be allowed to dry. The ground may then be worked with a spring tooth cultivator.

Crops following alfalfa, if they have a good supply of moisture, usually make a very rank growth of stalk and foliage, due to the abundance of available nitrogen which has been stored up in the soil through the agency of the alfalfa bacteria.

Therefore, annual forage crops, such as millet, corn, sorghum and Kaffir-corn, produce well after alfalfa. Wheat and other small grain crops should not, as a rule, follow alfalfa until the second or third year after breaking, for the best results in economical cropping.

O. A. C., Guelph.

G. S. HUNKIN.

Concrete Bridge Failures.

There are not many failures of concrete bridges, but there have been some, and a discussion of the causes of these failures was the topic of a paper given at the Canadian Cement Convention by C. R. Young, C. E., Toronto. He had obtained data—and in many cases, photographs—of eleven of such failures, and, after careful analysis, his conclusion was that only in one instance was there fault to be found with the concrete itself. With this exception, in which the gravel used was slightly dirty, the materials were good, proportions correct, and work well done.

Six of the failures were ascribed to unsuitable or incorrect design of the foundations. The engineer's plan had, in one case, indeed, been changed by authority of the municipal council. The other five failures were due to improper design of the superstructure. No other result than breakdown need have been expected. With one, in especial, a concrete slab bridge, the concrete simply crushed; the amount of compression had been miscalculated.

A German paper, the Deutsche Tageszeitung, discussing the Canadian tariff agreement with that country, says: "Canada has indeed understood her position and secured her own interests very well. It is certain that the direct imports of flour and grain from there into Germany will increase largely. Without doubt, we shall have to reckon with Canada in future as a serious competitor to the farmers of Germany. It is a bad lookout for agriculture in this country." Exporters of fresh and dried Canadian fruits are counting on a decided revival of trade in those products with the Teutonic nation.