

In cheese making, on the other hand, the object is to get as much of the albuminoid and casein out of the milk as possible and with it a large proportion of the fat; hence, whey is not so valuable for feeding purposes as skim-milk. It, however, contains valuable ingredients, and if fed carefully, sweet and warm, with the constituents in which it lacks, supplied in other foods, it gives good results. One hundred pounds of whey will contain about 93 lbs. water, 1 lb. albuminoids or muscle formers,  $\frac{1}{2}$  lb. fat,  $\frac{1}{4}$  lbs. sugar and 3-5ths of a lb. of ash. We thus see that it is chiefly valuable on account of the sugar it contains, so that in feeding it to growing animals we should add a liberal supply of a buminoids and fat. These can be given in flax seed, oil meal, shorts or pea meal. Sweet whey is generally estimated at about 15c. per 100 lbs. for feeding purposes; but it must be sweet, for directly it turns acid a portion of the sugar, its most valuable constituent, has become converted into lactic acid and thus loses its feeding value.

In feeding a heifer calf for dairy purposes much less forcing food is required or even desirable than when feeding for beef. Rich milk or fatty pods are not required, but food which will build up a good frame of bones covered with solid muscular tissue. If a calf intended for the dairy is so well fed on fat-producing foods when young that it gets into the "habit" of putting fat on its ribs, this habit will very likely follow it through life, with the result that the milk pail suffers. If a heifer becomes fat on liberal feeding, instead of enlarging her growth and retaining her milk form, she should be discarded from the herd, as she will rarely prove a profitable milch cow.

When feeding skim-milk and whey to calves much trouble and loss has been occasioned by not giving proper attention to the small matters of detail. It is these small matters that determine the difference between profit and loss every time. It cannot be expected that the calves will thrive when fed these foods cold or sour; they must be fed warm and in small quantities at a meal. Overfeeding, especially when the calf is young, is to be avoided, for if sucking the cow it will only get a small meal at a time, and its digestive organs are not yet developed sufficiently to dispose of several quarts at once. Feeding much milk and other concentrated foods does not give that large development of stomach which will be necessary in after-life, when the cow will need to consume and assimilate large quantities of bulky and coarse foods. Hence the calf should have access to good clover hay at all times; it will thus soon develop its first stomach and commence to chew the cud.

Several of the successful breeders of thoroughbred stock in Ontario are feedingskim-milk to their calves with good results. A prominent breeder near Ailsa Craig, feeds his calves as follows:—For two weeks they get a full allowance of new milk; then skim-milk and flax seed tea is gradually introduced, until at four weeks they get all skim-milk; at this age two calves get about half a pint of flax seed between them; this is increased until two calves get one pint between them. They are also allowed all the meal they will eat and early cut clover hay cured in cocks. The calves have grown remarkably well under this treatment.

Smith Bros., near Churchville, the large breeders of Holstein cattle, allow the calves to suck for three days, three times a day; they are then weaned and five to six pounds warm new milk given three times per day for the first month; this is then reduced to seven pounds new milk fed twice a day until the calves are three months old, when skim-milk is fed, eight to nine pounds twice a day; this is continued as long as possible. Meal (mixed oats and oil cake) and good hay are placed within reach at all times. The calves are kept in lots of six or more in pens, tied up before giving them their milk and kept tied for a half hour after feeding to prevent them sucking one another. This is an important point, as many calves are ruined by forming this habit of sucking after drinking their milk.

A good plan in feeding dairy calves is to give whole milk for the first week; then skim-milk three times a day, fed blood warm, mixed with flax seed gruel, in proportions of three parts of

milk to one of gruel. This gruel can be made by boiling one pint flax seed and one pint oil meal in ten or twelve quarts water, or flax seed alone in about six times its bulk of water. If flax seed is difficult to procure, about two tablespoonfuls of oil meal per day, dissolved in hot water, can be added to the skim-milk. This oil meal can be increased up 1 to lb. per day. This will be sufficient until the calf is about two months old. Oats, bran or middlings can gradually be fed as the calf grows and improves. If diarrhoea occurs one quart of new warm milk will stop it if no other food is given.

If whey is the only part of the milk that can be reserved for the calves, then it must be supplemented by foods rich in muscle formers and fat. Oil meal is probably the best food for this purpose, as it contains 28 per cent. albuminoids, 10 per cent. oil and nearly 8 per cent. ash, the very constituents which are lacking in whey. Pea meal and shorts are also rich in these materials. If about  $\frac{1}{2}$  lb. of oil meal or cake, dissolved in hot whey, be added to each gallon of whey it will be found a good food for the calf ten days to two weeks old; after that add an equal amount of bran, ground oats or barley to each gallon and increase the amount fed. After the calf is about two months old about  $\frac{1}{2}$  lb. wheat middlings may be used in the mixture.

As in all feeding operations, calf feeding requires the greatest care and attention. To keep the feed boxes perfectly clean and sweet, and to handle the animals kindly and gently, are very important points. The calves should have plenty of exercise. Those calves in the spring should be kept in during the hot days of summer so as to avoid the flies, and allowed a pasture run at night until the cool autumn weather comes on.

In a well regulated dairy, when it is desired to keep up the herd of cows, about one-fifth their number of calves should be raised each year. These should be the pick of the lot and bred so as to "come in" at about two years old. The calves from the poorer cows can be sold for veal or destroyed.

### Is the Shorthorn the General Purpose Cow?

BY JAS. TOLTON, WALKERTON, ONT.

In which breed, or in the crosses of what breeds, can the general cow be found? is a question that has been many times asked, but so far as I know has not been definitely answered. Neither do I suppose will it be settled for all time by this paper. The cow that is bred for special purposes, such as for beef, either by stall feeding or grazing, or for dairy purposes, has and always will have its admirers; but after all, what the general or average farmer wants is a cow that has, to as large extent as possible, all these qualities combined.

Before endeavoring to answer the question, it might be proper to try to define briefly what would constitute the general purpose cow. Would it not, to as large a degree as possible, be the cow that when judiciously mated, the produce, if a cow calf, in type should be equal or superior to the dam, or if a steer calf, be fit for the market in the shortest possible time, making the highest returns for the feed consumed? Would it not also be the cow which for the feed consumed produced the greatest number of pounds of butter or cheese of the finest quality, and when she has answered her time for breeding and for dairying purposes, can be turned into beef of the highest quality at the least cost? If the line of argument so far is sound, we readily perceive that it would be of no avail to look for this cow in those breeds which are specially bred for beef purposes, neither will it be of use to look for her in those breeds which are bred exclusively for dairy purposes. Now, I presume it will require but little or no argument to de-

monstrate that the Shorthorn cow will nearly always produce her own type. If bred with the main object being for beefing purposes, she takes a prominent and conspicuous stand among the beef cattle fed in this country, and I think the same might be said of every other country where improved breeds of cattle are kept. As an instance, at the late Fat Stock Show held at Guelph, all the animals exhibited, with the exception of one or two, were Shorthorns or grade Shorthorns. Again, in early maturity she takes a prominent place among other breeds. A friend of mine last winter fattened a number of yearlings that were two-year-old steers when shipped in June last, and weighed from 1,400 to 1,435 lbs., and heifers of the same age that averaged 1,375 lbs., and there are many instances of them making from 1,100 to 1,200 lbs. at that age; and again, are there any finer specimens of cows, heifers and calves found in any of the breeds than we see among the Shorthorns exhibited at our agricultural exhibitions? Now, what is the record of the Shorthorn cow as a dairy cow? I am free to confess it may be difficult to prove that she comes up to the qualifications laid down in this paper, and if so, I think there are at least two causes why she does not. First, I think it may be safely asserted that Shorthorn breeders generally have paid more attention to their feeding and beefing qualities than to a good performance at the milk pail. With this I do not propose to find fault; it is not the intention of this paper to find fault, for the breeders may have good cause for the particular line of breeding which they have followed. Second, if there have been competitive tests in this country not only with other breeds of cattle, but individual records showing what can be done with a Shorthorn for a stated period—as I say, if there have been such competitive records, they have not come under my observation. I give the following, clipped from an agricultural paper, as the results of the British Dairy Show of 1890. At this show there were 437 cattle entered for the competition, and the tests were as follows:—Shorthorns, 121.1; Dutch, 115.5; Ayrshire, 93.8; Guernsey, 98.1; Jersey, 90.8; Red Poll, 69.1; Dexter Kelly, 68.1. The second prize-winning Shorthorn scored 117.9 points, but had the greatest milk yield of any in one day, being 61.3, but being under 3 per cent. in fat. So you see in Britain where some of the breeders breed for milking purposes the Shorthorn cow can show a good record. At a Farmers' Institute meeting which I attended lately, one gentleman stated that the best dairy cow was a cross between Shorthorns and Ayrshires. To get the best you will notice it required a cross with a Shorthorn. Now, is it not a fact that public opinion is a fairly safe guide in domestic matters as well as other questions? It is true that it may and does sometimes err. Well, how is public opinion on this general purpose cow question? Although we have in Ontario nearly all the breeding breeds of improved cattle, and have had them for many years, what do we find? Why, about nine-tenths of the cows kept by the general farmer are Shorthorns and their crosses. Now, you have noticed that the title of this paper was the query, "Is the Shorthorn Cow the General Purpose Cow?" I have endeavored to present some facts and figures with the view of answering the question in the affirmative, but will leave it with you to say whether I have done so or not.