

the proportions of 5, 3, 1 and 1 parts; during the third period, corn, bran, oats and oil-cake, in the proportions of 6, 2, 1 and 1 parts; during the fourth period, corn, bran and oil cake, in the proportions of 6, 2 and 2 parts; and during the fifth and last period, corn, bran and oil cake, in the proportions of 6, 1 and 3 parts.

In determining the kinds of meal that should be fed the aim was to feed those that were cheapest and that would, at the same time, make a food properly balanced to meet the end sought. Bran was gradually decreased and corn was gradually increased until the fourth period was reached. Oats were fed with much moderation, and were finally dropped out in the fourth period. They were fed not so much because of relative cheapness, but because they seem to be an excellent food adjunct where animals are fed heavily on corn in leading them up to such heavy feeding without impairing the digestion. Oil cake introduced in the second period was gradually increased since it is particularly well adapted to being fed along with corn, the latter half of the feeding period. It may thus be advantageous in some instances to feed a certain proportion of food that is dear to keep things in balance.

The meal was fed directly, and was gradually increased in quantity as the feeding progressed. It was fed in the ground form, and without admixture with other food. The fodder consisted of cultivated hay, mixed in character; that is to say, it consisted of timothy and clover. They were fed of this all they would eat with reasonable cleanliness. The meal was fed morning and evening, and hay was given three times a day.

**Estimated Value of the Food.**—The food was estimated at what may be termed approximate average market values. They were as follows:

|                |                 |
|----------------|-----------------|
| Hay .....      | \$ 5 50 per ton |
| Corn .....     | 22 per bush.    |
| Oats .....     | 21 per bush.    |
| Bran .....     | 10 00 per ton   |
| Oil Cake ..... | 24 00 per ton   |

Five cents per 100 pounds, the average price, was allowed for grinding the corn and oats. This charge is not included in the price of the grains given above. The oil cake was fed in what is termed the nutted form.

The total consumption of food by the individuals in lot 1 was more than ordinarily uniform. With the exception of the steers Nos. 4 and 7, the greatest difference in the total consumption of food in the 140 days of the experiment was only 81 pounds. The steers 4 and 7 in lot 1, low in consumption of food, were also relatively low in gains. But No. 3, relatively high in consumption of food, does not show results corresponding. It is an illustration of what happens occasionally in lots of cattle well chosen for being fed, but fortunately it happens so infrequently as to form the exception rather than the rule.

It was observed that the steers in lot 2 consumed 556 pounds less hay than those in lot 1. This, however, is of but little account in comparison to the whole amount fed. But the steers in lot 2 consumed 2,820 pounds more meal; that is to say, 403 pounds more per animal. The exercise obtainable by animals thus fed, together with the lower temperatures to which they were exposed, renders them capable of consuming more meal than when confined. And when given the liberty of choice they consumed the added food in the form of meal rather than forage.

There was a virtual increase in the amount of meal consumed during each period, and this was accompanied by a slight decrease in the amount of hay consumed. This was not so much the outcome of preferences of appetite on the part of the steers as of design in feeding them. They were not fed at the first all the meal they would have consumed lest their capacity to consume grain should be weakened, and because it was believed they would become more capable of turning to good account increasing quantities of meal as the feeding period advanced. But of meal and hay together they were given at all times what they would consume. The steers in lot 2 consumed 2,820 pounds of meal more than the steers in lot 1. On the other hand, they consumed 556 pounds less hay, a difference, however, that is inconsiderable.

The steers in lot 1 consumed daily 11 pounds of hay, and those in lot 2, 10.74 pounds, or an average of 10.87 pounds. Of grain the steers in lot 1 consumed daily 13.36 pounds of meal, and those of lot 2, 16.21 pounds, or an average of 14.78 pounds. The average daily consumption of meal was thus far below 28 pounds, the amount of shelled corn frequently fed per day to cattle in western feed lots when followed by swine. It will also be noticed that the average daily consumption of food, hay and meal was 25.81 pounds; that is to say, steers with an average weight of 1,085 pounds at the commencement of a period of feeding which lasted 140 days, consumed daily on an average through the said feeding period 25.81 pounds of hay and meal.

**Conclusions.**—That at the prices of food and meat, as in this experiment, a good profit can be made from fattening a suitable class of steers.

That in this experiment the steers fed in the shed as compared with those fed inside, consumed on an average 2.28 pounds more food per day, at an increased cost for food of 1.7 cents per day, but they also made a greater average gain per day of .52 pounds, and a greater net profit per animal of \$1.72 from 140 days' feeding, and at a considerably less outlay for labor.

### Steer and Heifer Beef.

In the Old Country, it is usually considered that heifers are to be preferred to bullocks for beef production, the claims put forward in support of this view being that they feed faster, their beef is of superior quality, and the selling price higher. In America, steers are looked upon as the better beef producers, and, with the object of ascertaining how far this supposition is correct, a series of trials have been carried out at the Iowa station.

For the first test, fifteen Shorthorn yearlings were used, five being steers, five spayed heifers, and five unsplayed heifers. The heifers were all thought to be clear of calf when bought, but four of the unsplayed and three of the spayed calved during the spring and summer, and this, of course, placed them at a disadvantage as far as gain was concerned. They were dried as soon as possible, and began to make satisfactory gains. The experiment lasted eleven months. The steers made an average gain of 806 lbs. each, equal to 2.44 lbs. per day; the open heifer, clear of calf, gained 775 lbs., equal to 2.35 lbs. per day; four open heifers that had calves gained an average of 628 lbs., equal to 1.9 lbs. per day; two spayed heifers, clear of calf, made an average gain of 736 lbs., equal to 2.23 lbs. per day; three spayed heifers that had calves averaged 645 lbs. each, equal to 1.95 lbs. per day.

The steers were sold at 1c. per lb., live weight, more than the heifers, but the latter killed nearly as well as the steers, the average proportion of beef in the carcass being 63.2 per cent. for the steers, 62.4 for the unsplayed heifers, and 62.8 for the spayed heifers.

From the weight of different parts of the carcass the heifers gave a higher percentage of prime cuts (ribs and loins) and a correspondingly lower percentage in the cheaper cuts than the steers. The difference amounted to one per cent. more live weight and .8 per cent. more rib in the spayed heifers than in the steers. The open heifers were also better in these parts than the steers, though the advantage was not so marked. Crediting each lot with the actual value of the different cuts and the by-products, and not including the expense of killing and handling, it was calculated that at the prices which the butcher paid, he made three times more profit on the heifers than on the steers.

The second trial was made with fifteen calves, steers, spayed and open heifers, and lasted fourteen months, during ten of which the animals were in the yards. The steers made an average daily gain of 1.71 lbs. for the entire period, and 2.07 lbs. when in the yards. For the open heifers the gains were 1.86 lbs. and 2.26 lbs., and for the spayed heifers 1.7 and 2.03 lbs. The conclusions drawn from this and previous work are that the merits and relative value of heifer beef have been underestimated. The heifers made a slightly greater average gain from correspondingly less feed, and at less cost, than the steers. Carefully conducted slaughter and block tests showed hardly any material difference in the character, composition or quality of the meat from the steers and heifers, but in both the experiments the heifers gave more profitable carcasses on the block, even when granting the higher valuation put on the leading cuts from the steers. So far as can be gathered from these experiments, little, if any, benefit is derived from spaying.

### Provide Winter Feed.

Judging from reports and observations, there will have to be some careful feeding done this winter. Cattle, sheep and hogs appear to be about as numerous as in other years, but some of the crops that usually furnish considerable fodder are quite light, notably wheat and corn. The value of the supply of corn also suffered deterioration from the effects of the heavy September frosts, consequently the feed on hand will have to be handed out with more than ordinary intelligence and care. Every farmer will endeavor to meet the peculiar conditions in which he finds himself in his own way, but a word of caution with regard to the treatment of the straw stack should not come amiss. The man who is in the least doubt as to whether or not his supply of fodder will carry his stock through the winter can do no better than to begin as soon as the threshing is done to economize with his straw. By cutting it and mixing with ensilage or hay, the supply of roughage can be very largely increased, and by a little foresight sawdust can be procured in many instances to help out the supply of bedding. At this time of the year one can never tell what the needs may be before the next year's growth of fodder is ready, and a little care of the food supply now may save many a care later on.

Do not forget that while the business college, the university and its colleges of law, medicine, pharmacy, engineering and divinity all want students from the farm, that the farmers' college is a college of agriculture.

### Advantage of Fall Calves.

There are many advantages in having calves born in the fall months. If the calves are to be raised by hand, there is more time to attend to their feeding and care than in the busy months of spring. They will soon learn to eat from the manger and rack, and by the time grass comes are ready to be weaned from milk and to find for themselves on the pastures. In the case of steers, they will be a good size at two years old, to be fed and finished in their third winter for the best market; and the heifers, if well cared for, sufficiently matured to produce their first calves any time after they are two years old. The price of butter is generally a good deal higher in the winter months than at any other season, and the cows, if kept comfortable and liberally fed, will milk well all winter, and will flush up again on the fresh grass in the spring, and thus milk well for a longer period than will cows that calve in the spring. In the case of pure-bred stock, the bull calves born in the fall attain a good age and size by the end of the next year for service, the evil of using them at too young an age may be avoided, and they are in greater demand, and sell at higher prices at fourteen to sixteen months old than do younger ones. Both bulls and heifers are also at a better age and condition, whether of the beef or dairy breeds, for showing at the fall fairs in the under-a-year section. Another advantage is that, as a rule, the cows are more sure to conceive in winter than in the hot summer months, and, hence, breed more regularly, and, having ample exercise on pasture in summer while carrying their calves, the youngsters are born more healthy and vigorous than if the cows are tied up during the most of the period of pregnancy and receive but little exercise. A mistake that is too often made by purchasers of young bulls is putting them to service at too young an age, and waiting to make their purchase until they actually need a bull for immediate service. A young bull removed from his customary quarters and surroundings, shipped a considerable distance, excited by the experience of shipping, and subjected to a change of diet, and to homesickness, is very liable to be unsure as a calf-getter for some months after a change of ownership, and in many instances, no doubt, bulls are rendered permanently sterile, or, at least, unsure, owing to excessive service under these trying circumstances. For the best results, present and permanent, a bull should not be put to service for two or three months after changing hands, and not at a younger age than fifteen months, and, in the meantime, should be handled with kindness and kept within sight of other cattle in the stable, to avoid fretting and a feeling of loneliness, while his feed should be such as he will take with a relish, and which will put and keep him in the best of health and condition.

### Why Canadian Hogs are Healthy and Prolific.

The Live-stock Report comments on the statements of Armour's head hog buyer, a man of forty years' experience, as follows:

He has pointed out the fact that Canadian hogs remain healthy while ours succumb to disease. He might have added that the Canadian hog, of bacon type largely, is vigorous, a good rustler, a good milker, and the producer of large litters. All of this is due to the simple fact that the Canadian hog is fed a mixed ration, rich in protein and possessing a due but not superfluous amount of starch (carbonaceous matter). A hog thus fed naturally takes more exercise than a sluggish corn-fed hog. Clover thrives well in northern climates, and furnishes the next best green pasture to alfalfa for hogs. Rape is also much used in Canada as a hog pasture, and with plenty of exercise on clover and rape, fed an abundance of milk, oats, bran and peas, or other nitrogenous foods, the system of the hog is built up strongly on a frame of normally developed bones. Corn excessively fed, on the contrary, produces fat in excess, and when used for growing pigs lays that fat upon an imperfectly-developed bony skeleton. It is for this reason that so many of our lard hogs "break down" at the pasterns or go down paralyzed. "Rickets" is induced by food lacking earthy salts. Corn favors the inherent tendency to this disease possessed by every inbred, incompletely-nourished pig. Filth, inadequate shelter, damp or bad ventilation, impure water, stagnant wallows, general lack of good care, cleanliness and sanitary surroundings, all contribute to the effects of excessive corn feeding in weakening the constitution of swine so that disease proves prevalent and virulent. The result of excessive feeding of corn to stock boars, to pregnant sows, to suckling sows and then to new-weaned pigs is to create fat, sluggishness and weak bone, and with these come sterility, lack of prolificacy and susceptibility to disease of all sorts. The system of the hog is vitiated, weakened. Power to throw off disease or withstand its ravages is lost. When disease strikes, the herd is decimated or wiped out. Perfect nutrition of animals demands a full supply of every requisite of growth. A mixed ration, comprising all of the products of the fields, together with by-products of the mill and the packing-house, supplies every requisite of growth. In other words, as corn is abnormally rich