

with few exceptions, it is both safe and wise to allow weanlings all the oats they will eat, especially if treated as above, and the colt given regular exercise.

Colts over one year, idle or comparatively idle horses, brood mares and stallions, can be treated differently as regards food. Of course, horses that will be needed for work next spring, stallions that are needed for stud service, and brood mares nearing full terms of pregnancy, should be well fed on first-class food for a few weeks before these functions will be required.

During the winter months, a mixture of foods, many of which if given alone would be neither palatable or satisfactory in results, can be given with reasonable satisfaction. Straw is generally of good quality this year, roots a fair crop, and in many sections silage corn a fair crop, and many farms have full silos. While silage is not generally considered a suitable food for horses, a reasonable quantity can be used in a mixture of foods. It is palatable, and tends to make dry foods moist and palatable, but it should not be fed pure, or even in large quantities in a mixture. In mixtures, of course, all food, as hay, straw and corn, should be cut, all grain chopped, and roots pulped. A mixture of, say, 1 part by bulk of silage, 1 part pulped roots (turnips, mangels or carrots), 2 parts cut hay, and 4 parts cut straw (oat or wheat straw preferred, but barley or even good pea straw may be used), with a quart of chopped oats or its equal in weight of other chopped grain, to about every one-half bushel of the mixture. Where bran is a reasonable price, the addition of as much as of the grain can be added with advantage. For the average-sized horse, a half bushel of this mixture three times daily should suffice and keep him in good condition, small or young animals being fed in proportion. In cold weather, sufficient of this mixture can be made to last three or four days. Experience will teach the feeder how long it will remain sweet. Of course, it must not be mixed in sufficient bulk to become too hot, nor allowed to stand long enough to ferment too much and become too sour. The length of time it will remain fit for food will depend largely upon the weather and the temperature of the compartment in which it is kept. Of course, it must not be allowed to freeze. Where silage cannot be procured, cut cornstalks may be substituted; and when neither can be had, a larger percentage of roots may be used, and, when roots are absent, of course, the mixture must consist of cut hay and straw and chopped grain, in which case it is probably wise to moisten with water, in order to insure a more thorough mingling of the food. Sufficient moisture is supplied by silage or roots when present. It is good practice to vary the monotony of the ration by occasionally giving a light ration of whole hay or straw occasionally, but full feeds should not be given, as we must never forget the danger in making violent or sudden changes.

We might add that, where wheat chaff is procurable, it will give better results than cut straw. "WHIP."

LIVE STOCK.

ECONOMIC CONDITIONS AFFECTING THE PURCHASE OF FEEDERS.

Address by Prof. G. E. Day at the Ontario Winter Fair, December, 1906.

There are at least four important factors to be taken into consideration in the purchase of steers for feeding, viz.: (1) Breeding (including conformation and quality); (2) age; (3) weight; (4) condition.

The importance of the first point will, no doubt, be conceded. It is true that a well-bred steer, possessing superior quality, may not make any cheaper or larger gain in weight than one not so well bred and decidedly lacking in quality. Such a result may not be the case, or may be the case, but when it comes to selling the steers, the steer with quality always commands a premium. If we are looking forward to the time of marketing, therefore the question of quality is of very great importance. The man with steers of high quality, properly finished, does not need to peddle his cattle, for there are seldom enough of such to go round.

As to the question of age, it has been demonstrated on many occasions that young animals make cheaper gains in weight than older ones. Age, however, is only one consideration, and the case may be stated as follows: Quality, weight and condition being equal, young steers are preferable to older ones, in that they make better use of the food consumed.

The items of weight and condition are of the greatest importance, so far as feeding is concerned. To illustrate the importance of these factors, we shall refer to an experiment conducted at the College last winter with short-keep and long-keep steers. By a short-keep steer we mean one which has sufficient weight and flesh at the time of purchase to admit of his being finished for export in from two to three months of stall feeding. By a long-keep steer we mean one which requires five or six months of stall feeding before being ready for export.

In the experiment mentioned, the short-keep steers

were divided into two groups, the heavier ones being put into one group, and the lighter ones in another. There were 11 steers in each group. The object was to market the heavy steers first, and they were, therefore, fed a heavier meal ration than the lighter steers; but, as it turned out, both groups were ready for market at practically the same time, and both went away together. They were fed for a period of 60 days.

To represent long-keep steers, a lighter and thinner group was purchased. The steers of this group were fed the same kinds of food as the others, but the meal ration was increased much more slowly. There were seven steers in this group, and they were fed for 153 days.

Foods were valued as follows: Meal, \$20; hay, \$8; roots, \$2, and silage, \$2 per ton. This method of valuing foods may be open to criticism, but the values given will answer just as well as any others for the purpose of comparing the different groups of steers.

The following table gives particulars of experiment:

TABLE SHOWING WEIGHTS, GAINS, FOOD CONSUMED, COST OF GAIN, ETC.

	Group I. 11 steers. Heavy short-keep.	Group II. 11 steers. Lighter short-keep.	Group III. 7 steers. Long-keep.
Average weight of steers at commencement of experiment ..	1451.1 lbs.	1267.7 lbs.	1053.5 lbs.
Average weight of steers at close of experiment ..	1550.9 lbs.	1357.7 lbs.	1302.1 lbs.
	In 60 days.	In 60 days.	In 153 days.
Average gain per steer ..	96.8 lbs.	90.0 lbs.	248.6 lbs.
Average daily gain per steer ..	1.61 lbs.	1.50 lbs.	1.62 lbs.
	Lbs.	Lbs.	Lbs.
Food consumed ..	Meal, 6025 Hay, 4820 Roots, 9560 Silage, 13100	Meal, 4905 Hay, 4700 Roots, 9280 Silage, 12910	Meal, 6181 Hay, 10529 Roots, 23563 Silage, 19970
Value of food...	\$102.18	\$90.04	\$147.46
Cost of 1 lb. increase ..	9.5c.	9.09c.	8.47c.
Average meal consumed per steer per day per 100 lbs. live weight.	.607 lb.	.566 lb.	.489 lb.

EXPLANATORY NOTES.

1. It will be noticed that the gains are not large. This is probably due to some trouble we had with the steers. The silage on the top of the silo contained very little grain; but, after about six weeks, silage was reached that was rich in grain, and the result was that the steers commenced to scour. The proportion of silage in the ration was reduced, and the trouble stopped in a very short time, but we feel sure that it interfered very materially with the gain in weight.

2. It will be noted, also, that the cost of a pound of increase in weight was highest in the case of the heavy short-keep cattle, and lowest in the case of the long-keep steers. This result is quite in accord with previous experiments, where we found that, invariably, a heavy meal ration resulted in higher cost per pound increase in weight.

3. The cost of producing the increase in weight, however, is not the only factor in determining the relative profits or losses in feeding the different kinds of steers. The weight of the steer when purchased is an important factor, as is also the condition of the steer when purchased. This can be shown by working out an example. Let us assume that all these steers were sold at the same price, say 5c. per pound, and that the long-keep steers cost 4c. per pound. This assumption happens to fit the facts of the case, as the long-keep steers cost 4c. per pound, and both long- and short-keep steers were sold at 5c. per pound. Let us take the average long-keep steer (weight, when bought, 1,053½ lbs.; weight when sold, 1,302 lbs.) and determine the profit or loss according to the values we have attached to the foods:

Cost price of steer, 1,053½ lbs. at 4c.	\$42.14
Value of food ..	21.06
Total cost ..	\$63.20
Selling price, 1,302 lbs. at 5c.	\$65.10
Profit above market value of food ..	1.90

Now, let us take an average heavy short-keep steer, and determine what we could afford to pay for him so that we can sell him at 5c. per pound, and get back the value of food, and a profit of \$1.90 above the value of the food, as in the case of the long-keep steer. Thus:

Selling price, heavy short-keep steer, 1,551 lbs. at 5c.	\$77.55
Deduct: Value of food, \$9.29; profit, \$1.90	11.19

Value of steer when bought, to give same results as long-keep steer.\$66.36

That is to say, we could have paid \$66.36 each for this bunch of heavy short-keep steers, and have secured the same profit per head above value of food, as we did in the case of the long-keep steers.

But these heavy short-keep steers averaged 1,454 lbs. when bought; therefore, if 1,454 pounds are worth \$66.36, 100 lbs. would be worth \$4.56. In other words, if we had paid \$4.56 per cwt. for the heavy steers, and \$4 per cwt. for the long-keep steers, in this particular case, and sold them all at 5c. per pound, we would have had exactly the same profit per steer above market value of the food.

When we work out the lighter short-keep steers in the same way, we find that they would be worth \$4.55 per cwt., as compared with the long-keep at \$4 per cwt., and the heavy short-keep steers at \$4.56 per cwt.

4. The results of this experiment, and the discussion up to this point, suggest two important questions which should be perfectly understood by every man who buys cattle for feeding. The questions are as follows:

(a) Why is it that though the lighter short-keep steers were fed more economically than the heavy ones, and made their increase in weight at a lower cost per pound, they would still have to be bought at a shade lower price per cwt. than the heavy steers in order to give the same profit?

(b) Why is it that there should be such a difference (55c. per cwt.) between what a farmer could afford to pay per cwt. for the long-keep steers and the lighter short-keep steers, and such a narrow difference (1c. per cwt.) between what he could afford to pay for the lighter short-keep and the heavy short-keep, considering that the long-keep steers made their increase in weight 62c. per cwt. cheaper than the lighter short-keep, whereas the lighter short-keep made their increase in weight only 50c. per cwt. cheaper than the heavy short-keep steers?

The answer to question (a) is simple if we remember that the feeder's profit is made by increasing the value per pound of the original weight of the steer. Thus, if he increased the value of the original weight of the heavy short-keep steers by 1c. per pound, the increase would amount to 14.54 per head; whereas, in the case of the lighter short-keep steers, an increase of one cent per pound in the value of the original weight would amount to only \$12.67 per head, making a difference of \$1.87 per head in favor of the heavier steers. The more economical method practiced in feeding the lighter short-keep group, very nearly wiped out this difference, but there would still be a slightly larger profit on the heavier steers, if both groups had been bought at the same price and sold at the same price per pound.

Question (b) is more complicated. In the first place, the short-keep steers were heavier, and this fact counted in their favor as explained under question (a). But another important factor enters into this problem, viz., the long-keep steers had to be increased in weight 248.6 pounds per head before they were finished; whereas, the short-keep steers were finished by increasing their weight only 90 pounds per head. If this increase in weight could be sold for as much per pound as it costs, it would make little difference whether the steer were thin or fleshy when bought, but such is not the case. If both these lots were sold at 5c. per pound, there would be a loss of 4.09c. per pound of increase in the case of the short-keep steers, and a loss of 3.47c. per pound of increase in the case of the long-keep cattle. (See table for cost per pound increase.) Let us see how this works out:

Total loss per head incurred on increase in live weight necessary to finish cattle for export:

Long-keep steers, 248.6 lbs. at 3.47c.....	\$8.63
Short-keep steers, 90 lbs. at 4.09c.	3.68
Difference.	\$4.95

Thus, while the loss is less per pound of increase in the case of the long-keep steers, yet the total loss is greater, owing to the fact that more pounds of increase were necessary to finish them.

Now, the only way to make up this loss is to increase the value per pound of the original weight of the steer, and, therefore, the greater the loss to be made up, the greater must be the increase in the value per pound of the original weight of the steer.

From what has been said, it will be seen that the light short-keep steers, as compared with the heavy short-keep steers, labored under only one disadvantage, viz., they were lighter in weight; but the long-keep steers, as compared with the short-keep steers, were under a double disadvantage, in that they were both lighter and thinner.

5. The points brought out by this experiment may be summarized as follows:

(1) To feed steers cheaply, the meal ration should be kept as low as possible, consistent with securing a reasonable gain in weight.

(2) Heavy, fleshy (short-keep) steers may be fed a heavier meal ration per 100 lbs. live weight than