

make a trial ration of the foods we wish to use, find out how much of the different nutrients it contains, and if the nutrients are not in the right proportion we can add to or take away from the quantities of foods used in the trial ration. Suppose we wish to form a ration from clover hay, ensilage and bran; for a trial ration we might take bran, 8 lbs.; clover hay, 6 lbs.; and ensilage, 40 lbs.

By referring to the table we can find the amount of digestible nutrients in 100 lbs. of each food, and, therefore, to find the amount in 1 lb. we must divide the numbers given in the table by 100. Thus we get:

	Protein.	Carbohy- drates.	Fat.	Total Organic Matter.
1 lb. bran contains.....	.126	.441	.029	.596
1 " clover hay contains.....	.065	.349	.016	.430
1 " ensilage contains.....	.013	.140	.007	.160
Therefore—				
8 lbs. bran contain.....	1.008	3.528	.232	4.768
6 " clover hay contain.....	.390	2.094	.096	2.580
40 " ensilage contain.....	.520	5.600	.280	6.400
	1.918	11.222	.608	13.748

Comparing our trial ration to the American standard, we see that it is too low in all its constituents, especially in carbohydrates and total organic matter. If we try to make up the deficiency by means of ensilage or clover hay, our ration will become too bulky; while if we attempt to make it up with bran, the protein will be unduly increased. This would indicate that it is impossible to make a well-balanced ration from the food stuffs selected, and the simplest way out of the difficulty would be to select some grain that is rich in carbohydrates and organic matter, with only a moderate amount of protein and fat. Looking over our list of food stuffs, we find that barley fulfills these conditions, while we might also slightly increase the amount of ensilage. We shall therefore add to our trial ration 2 lbs. of barley and 5 lbs. of ensilage.

Referring to our composition table, we find:

	Protein.	Carbohy- drates.	Fat.	Organic Matter.
1 lb. barley contains.....	.095	.661	.012	.768
Therefore—				
2 lbs. barley contain.....	.190	1.322	.024	1.534
5 lbs. ensilage contain.....	.065	.700	.035	1.210
Trial ration contained.....	1.918	11.222	.608	13.748
	2.173	13.244	.667	15.562

As it now stands, the ration is intermediate between the German and American standards, and may be counted approximately correct.

If we wish to find the nutritive ratio of the above ration, we first multiply the fat by 2.2 and add the result to the carbohydrates, thus:

$$(.667 \times 2.2) + 13.244 = 14.711$$

Therefore nutritive ratio is 2.173 : 14.711
or 1 : 6.75

The above is only an example of how the standard may be used in formulating a ration, and, from what has been said, it will be seen that a great variety of rations may be compounded, which are practically the same in composition, and which will give equally good results. In every case the feeder must be guided by the kinds of food which he has at his disposal.

The digestibility and nutritive value of a food may vary very much, and the feeder must take this into consideration. Especially is this true of coarse fodders, such as hay, straw, ensilage, etc., the grains being more constant. For example, hay that is well cured is more nutritious than that which has become very ripe, or that has been exposed too much to the weather.

Then, again, animals vary with regard to the amount of food which they are able to assimilate, making it necessary for the feeder to study the individual animals under his care, and to modify his methods according to results.

It will therefore be understood that while a feeding standard is valuable as a general guide, it cannot be blindly followed, and a great deal must be left to the intelligence of the feeder.

In Bulletin 38 of the Wisconsin Experiment Station, there are given a large number of rations used by successful American and Canadian dairymen, of which the following are a few examples:

- (1.) 10 lbs. clover hay, 35 lbs. ensilage, 2 lbs. oat straw, 5 lbs. cornmeal, 5 lbs. bran, 5 lbs. oats.
- (2.) 25 lbs. corn silage, 7 lbs. mixed hay, 4 lbs. cornmeal, 5 lbs. bran, $\frac{1}{2}$ lb. oil meal, $\frac{1}{4}$ lb. cotton-seed meal.
- (3.) 40 lbs. corn silage, 10 lbs. timothy hay, 5 lbs. bran, 3 lbs. cornmeal, 2 lbs. oil meal.
- (4.) 40 lbs. corn silage, 3 lbs. cotton-seed meal, 15 lbs. corn-starch feed.
- (5.) 30 lbs. corn silage, 12 lbs. clover hay, 8 lbs. wheat middlings, 1 lb. oil meal.
- (6.) 10 lbs. clover hay, 5 lbs. timothy hay, 2 $\frac{1}{2}$ lbs. corn fodder, 6 $\frac{1}{2}$ lbs. cornmeal, 2 lbs. oats, 3 lbs. bran, 1 $\frac{1}{2}$ lbs. oil meal, 15 lbs. carrots.
- (7.) 30 lbs. corn silage, 8 lbs. hay, 5 lbs. corn fodder, 4 lbs. oats, 2 lbs. peameal.
- (8.) 45 lbs. turnips, 7 lbs. wheat chaff, 15 lbs. silage, 2 $\frac{1}{2}$ lbs. oats, 2 $\frac{1}{2}$ lbs. peameal.
- (9.) 40 lbs. corn silage, 30 lbs. turnips, 8 lbs. clover hay, $\frac{1}{2}$ lb. straw, 3 lbs. oats, 2 lbs. wheat bran.
- (10.) 30 lbs. corn silage, 12 lbs. hay, 10 lbs. ground oats.

The above rations are not given as models, and many of them will be found very deficient if compared with the standard; but they are mentioned merely as examples of rations that are being used by successful dairymen, and no doubt many of them could be greatly improved.

Essentials to Success in Breeding and Feeding Dairy Cattle.

(A paper read before the Manitoba Central Farmers' Institute by J. C. Snell, Edmonton, Ont.)

(Concluded from page 340.)

Special care should be observed in the feeding of the dairy cow, both before and after calving. If she has been dried off before calving, she should be sparingly fed for a few weeks before calving, and rich food should be avoided; dry food, such as hay, and a little bran to keep her bowels loose, are good enough for those days, and, if she seems to need it, a dose of physic, say one pound or a pound and a-half of salts, should be given a day or two before she is expected to calve. After calving, she should be kept quiet and free from excitement or disturbance; water should be given in only limited quantities for two or three days, and that with the chill taken off it. The calf may be allowed to suck once or twice, but not more, when it should be taught to drink from the pail. After a few days the cow's feed may be increased gradually, beginning with light feed, such as bran and ground oats, adding stronger food as she becomes used to it, until she is put upon full rations of milk-producing food. What that ration shall be is a question which must, to a large extent, be worked out by each dairyman for himself, having in view the means he has of securing the most desirable foods, and their cost from the standpoint of the markets at the time. Of the grains commonly grown on the farm, oats and peas are probably the best adapted to the use of the farmer in feeding his cows; these should of course be ground, and, in my opinion, should be supplemented with bran, which is always a safe and profitable food when the price is at a reasonable figure.

Oilcake-meal in moderate quantity may profitably be added where the price admits. These fed dry upon cut straw or hay, or upon chaff, are perhaps best suited to the circumstances of the majority of farmers in the class of buildings they have, and I am not sure that there is any special advantage in wetting the food before feeding, except that a larger amount of straw or rough feed may, by this means, be disposed of, and when hay is scarce, and warm buildings are provided, this may be an advantage.

In sections where Indian corn can be grown to advantage, the silo and ensilage have been found to serve a good purpose in providing a large supply of succulent food at a moderate cost, and where roots cannot be successfully grown this is one of the best means we know of to provide a substitute. These remarks apply mainly to winter feeding. For summer feeding, while grass is plentiful and fresh, little else is needed to enable a milking cow to do good work, but even then a light feed of grain, say ground oats, with a little oilcake and bran fed at milking time, will add very materially to the milk and butter product of the cow, and she will thus pay for what is given her.

There are times in most summers when the grass fails and becomes dry and deficient in nourishment, when the flies torment the cows, and they are found to be failing in their milk. Provision should be made to meet such emergencies as these, and some green feed should be on hand to supplement the pastures. This may be a mixture of oats and peas or of vetches for the first feeding, and later on of green corn. It is a great mistake to let the cows begin to fail, as it will be hard to get them back to their best work again, and it is a real loss of money, as well as of flesh and milk and butter, which should be checked as soon as observed.

In order to get the best results from a herd of milking cows, separate tests should be made of each cow's milk, to ascertain with certainty just what she is capable of doing as to quantity and quality, either by the churn, which is always preferable, or by what is known as the Babcock test, to determine the amount of butter-fat which a cow's milk contains. By this means the unprofitable cows are found out, and can be removed from the herd, and replaced by such as will give better returns for the food they consume. There is no doubt in my mind that a large proportion of the cows that are being milked in this country are barely paying for their feed and making no profit, while the better cows are being handicapped by having to carry these weaklings, which reduce the average output of our dairies to an alarming extent, and should be consigned to their proper place, the butcher's block.

I have thus enumerated some of what appear to me to be the leading principles essential to success in the breeding and management of dairy cattle. First breed to type, breed for a purpose, and then let the treatment be such as will serve best the purpose. These, together with a rigid application of the principle of "the survival of the fittest," by weeding out and disposing of all which fail to come near to the standard of your purpose, are the surest and safest aids to success that I can conceive of or recommend.

Messrs. D. G. Hanmer & Sons, Brant Co., Ont., report securing this season a very successful catch of Alfalfa or Lucern clover. It was seeded in the spring with oats, which were cut for green feed. Their only regret was that they had not seeded a larger area, as it was practically the only grass that survived the drought. All the other clover seeded was killed out entirely. They will go more extensively in Alfalfa next season.

Judging Dairy Products at Winnipeg Industrial.

An innovation introduced by the Winnipeg Industrial management, at the suggestion of Mr. J. A. Ruddick, will prove an incalculable benefit to exhibitors of dairy products, by showing them just in what particular their butter is lacking, whether in flavor, grain, color, salting or finish.

In judging butter and cheese, Mr. Ruddick uses a score card, the score being made up as follows (in the case of butter):—For a perfect sample, flavor counts 45 points; grain, 25 points; color, 15; salting, 10; finish, 5; making a total of 100. In whatever quality defects are detected a proportional percentage is cut off the maximum for that particular quality, and then the total added together.

Just to illustrate, we copy one or two of the lowest scores, and compare them with some of the highest scores.

In the section for 20 pound crock farm dairy butter, there was a very large competition. W. V. Edwards, Souris, got first prize with a score made up as follows: Flavor, 42; grain, 24; color, 15; salting, 10; finish, 5; total, 96. Whereas the lowest score in this section was 68, made up as below: Flavor, 20; grain, 22; color, 13; salting, 10; finish, 4.

In cheese the same plan was followed, and almost as great variation shown between highest and lowest. The Silver Plain Creamery Co., Morris, got the highest score in colored cheese, with a total of 93, while the lowest score made was 60. The scores were made up as below:

	Standard	Highest Score.	Lowest Score.
Flavor.....	45	42	20
Body.....	30	28	26
Color.....	15	14	14
Finish.....	10	9	9
Total.....	100	93	69

These score cards have been made out in full for each entry, and have been mailed direct to the post office address of each exhibitor, and will furnish an interesting subject of study, and greatly assist those who exhibited in improving the quality of their goods. A case in point: a prominent Western dairyman, when told by Mr. Ruddick that his butter was all off in flavor, with a strong, weedy taste, at once exclaimed, "Why, I never thought of it before, but for a couple of weeks, just while making our exhibition butter, we pastured our cows on a piece of summer-fallow that was getting ahead of the plows, and that is where the weedy taste comes from." This weedy taste cut all the butter of this exhibitor down from probably first place to third and fourth, and will be a lesson not soon forgotten.

Provincial Dairy Show.

At a committee meeting in Gananoque on August 20th, there were present from the Agriculture and Arts Association: J. Sissons, Barrie; Joshua Legge, Gananoque; R. McEwen, Byron; W. J. Westington, Plainville; D. P. McKinnon, South Finch; R. Mallory, Frankfort, and H. Wade, Toronto. From the Horticultural Society: M. McIntyre, T. C. Stark, F. Britton, J. T. Green, A. N. Parke, M. McParland, R. Elliott, and W. J. Nuttall. From the County of Leeds: John A. Webster, Lansdowne. From Eastern Dairymen's Association: R. G. Murphy, Elgin. From Creamery Association: D. Derbyshire, Brockville. J. Sissons acted as chairman, and H. Wade as secretary. The chairman explained that the meeting was called to arrange for the running of the show and the appointment of the judges.

Mr. Legge read a letter from the Agricultural Department of the Dominion Government, stating that they were sorry they could not give the Dairy Show any financial assistance this year. Applicants for booths and privileges were referred to the local committee. Mr. Legge explained that there would be stalls for 150 cattle when repaired.

Judges were appointed as follows: For cheese and butter, Prof. Robertson, Dairy Commissioner, Ottawa, and Prof. Ruddick, Ottawa. For dairy utensils, John H. Croil, Montreal. For dairy cattle—Ayrshires, John Douglas, Warkworth; Jerseys, J. C. Snell, Edmonton; Holsteins, J. H. Cook, Aultsville. All to act together.

Messrs. Derbyshire and Murphy were appointed to arrange for the erection of a refrigerator to hold the butter. Instructions were given for the issue of posters, etc.

It was resolved to invite Lieutenant-Governor Kirkpatrick, and the Hon. John Dryden, to open the show on Tuesday, the 1st of October, at 3 o'clock p.m.

The following local committee, by resolution, was appointed:—M. McIntyre, chairman; J. Legge, J. T. Green, M. McParland, and F. Britton as secretary to the committee, and were authorized to appoint a superintendent for the live stock department.

Adding Water to Cream.

Butter coming too fine in the grain is caused by the addition of water to the cream, used to thin it or to raise or lower the temperature. In order to reduce cream to a proper temperature for churning, place it in such a vessel that it can stand in another containing cold or warm water, as the case requires, the cream to be stirred and the water renewed until the right temperature is reached. By adding water to the cream the minute globules of fat are dispersed over a larger area, causing a longer time in "coming" and preventing the grains enlarging, because their surfaces are in contact with water, which has no affinity for oil.