

THE DAIRY.

Fall and Winter Feeding of Milk-Cows, Science.

Editor "The Farmer's Advocate":

The feeding of cows, as of all farm animals, may be considered from two viewpoints—the scientific and the practical. If one only, is to be taken into consideration then we should say, let this be the practical. An ounce of good practical sense in feeding cows is worth a pound of science when it comes to results, and these are what most dairymen are looking for. Of two men, one a good practical feeder who keeps his eyes open, and the other a trained scientist, who is lacking in cow sense, we should prefer the former, although both can and ought to learn something each from the other.

Let us briefly consider a few of the scientific aspects of the question, then deal in our next article with some practical phases of the problem.

Scientists have set for themselves a solution of the problem of economic feeding, in order that they may help the man on the farm, and in the feeding stable. One German scientist has stated the problem in this form,—“The work of science is to ascertain how much of the gross energy of the food passes over into stored energy—flesh, fat, milk, etc.” Thus stated, we learn that it is a study of energy and the transference of energy in the form of food, to another form,—milk, in the case under consideration. If you ask what “energy” is, we answer, it means work—all farmers know what “work” is. An example of energy in a potential form, is that of a boy 10 or 12 years old, full of life and spirits, or what we may call energy, although it is not easy in some cases to get the boy energy transferred into effective work—it is more likely to take the form of play, which is a form of work or manifested energy.

In order to get a practical basis to work on, scientists have put forward, or proposed various theories in the feeding of live stock. A theory is something supposed,—a speculation. No one ever saw a “theory,” but theories have helped to solve many practical difficulties, including the feeding of cows.

Four leading theories with reference to cow-feeding have been suggested. One of the first, and possibly the best known at present, is the “Balanced Ration,” as set forth by German scientists. While it is true that the “Balanced Ration” theory has been over-worked in many cases, and the writer has gone so far as to say that a successful feeder may entirely disregard it, if he has cow-feeding sense, it is also true that a theory may be an aid in compounding rations if used with sense and judgment.

In a word, this balanced ration theory assumes that in order to have good results in feeding milk cows, each cow must be supplied with so many pounds of “dry matter,” digestible “proteids,” “carbohydrates” and “fat” daily, according to live weight, and the ration must have a certain “nutritive ratio,”—that is a fixed ratio or proportion of proteids or muscle-forming food, to carbohydrates and fat, or heat-forming food. The German standard per 1,000 lbs. live weight, for cows giving a moderate flow of milk, is—24 lbs. dry matter, 2.5 lbs. protein, 13.4 lbs. heat formers—starch, fat, etc., and the whole, with a nutritive ratio (N. R.) of 1:5.4. Various other scientists have worked out similar standards.

In order to make use of this standard, it is necessary to have a table showing the composition and digestibility of various farm foods. Such a table will be found in works on feeding, animal chemistry, etc. There are a number of bulletins, which can be got free, that give tables showing the amounts of digestible matter in common foods found on a farm. Bulletin No. 206, published by the Ontario Dept. of Agriculture, Toronto, contains such information. Many people do not know how to make use of such a table as is given on page 10 of this bulletin. Suppose we take ration No. 2, as given on page 9, and make an application of the principles involved. We need to make a skeleton or blank table form, containing four columns as follows:

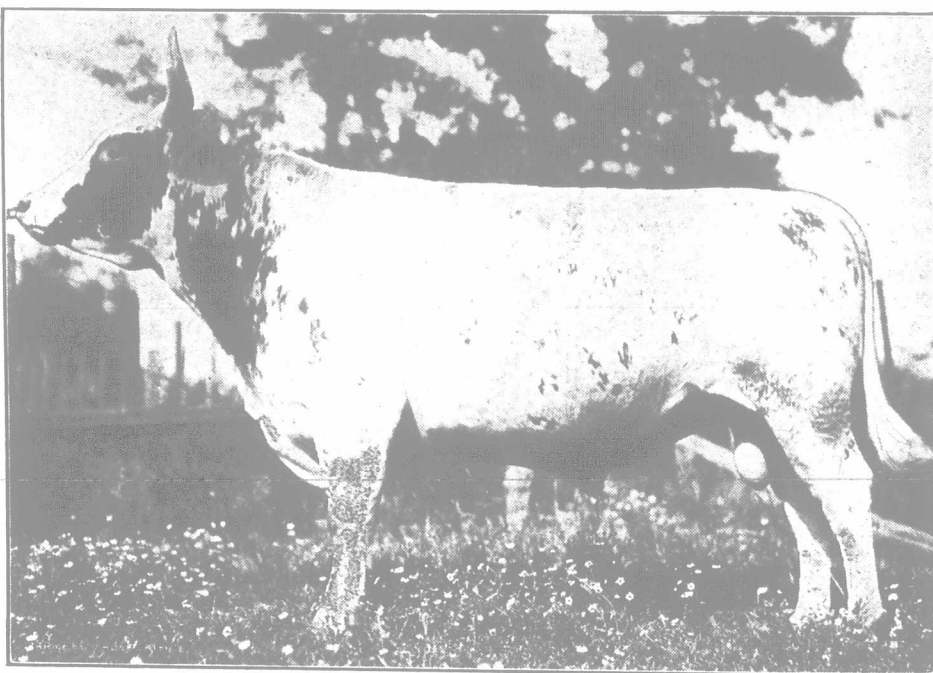
Feed.	Lbs. Dry Matter.	Lbs. Proteids.	Lbs. Carbohydrates and fat.
40 lbs. corn silage.....	8.40	.360	5.160
15 lbs. alfalfa hay.....	13.80	1.650	6.348
8 lbs. corn meal.....	2.67	.237	2.292
Totals	24.87	2.247	13.800

By the table on page 10 we learn that 1 lb. corn silage contains .21 lb. dry matter, therefore, 40 lbs. would contain 40 times .21, or 8.4 lbs., and this we set down in its place in the table. Referring again to the table we find that 1 lb. corn silage contains .009 lbs. digestible protein; 40 lbs. would contain .009×40=.36 lbs., which we

place in the table under the heading, lbs. protein. The table tells us that 1 lb. corn silage contains .129 lbs. digestible carbohydrates and fat; 40 lbs. would contain, .129×40=5.16 lbs., which we place under lbs. c and f. We do the same with each of the other two feeds given, add the figures in each column and get the results as shown. The ration contains 24.87 lbs. dry matter, 2.247 lbs. proteids, and 13.8 lbs. carbohydrates and fat, which corresponds fairly well with the German standard, except that it contains too little proteid or muscle-forming material. This ration would be improved by the addition of one or two pounds of cottonseed meal. On referring to the table in the Bulletin we find 1 lb. cottonseed meal contains .372 lbs. digestible protein, which added to the 2.247 lbs. protein already in the ration, brings it slightly above the German standard. The nutritive ratio of the original ration is 1:6.2, which is too wide according to the German theory, but after adding 1 lb. cottonseed meal, the N. R. is 1:5.4 or the same as the German standard.

For those who do not know how to determine “nutritive ratio” (N. R.), we may explain: to determine this, divide the total pounds of digestible carbohydrates and fat by the total pounds of digestible proteid material. The result is the number of pounds of heat formers (carb. and fat) for one pound of muscle formers (protein) in the ration. For instance, in the ration we have been studying, there were 2.247 lbs. proteids and 13.8 lbs. carb. and fat, 13.8÷2.247=6.2, therefore, there are 6.2 lbs. heat formers for each pound of digestible muscle formers; or, the nutritive ratio is 1 to 6.2, usually expressed 1:6.2.

With a careful understanding of the foregoing and a suitable table showing the digestible nutrients in farm feeding stuffs, any feeder can know whether or not he is feeding a “balanced



A Young Canadian Ayrshire.

ration,” and this knowledge he will find of use to him in the economic feeding of milk cows, though we do not think a feeder should blindly follow ration theories, but use them along with common sense. The latter is more important than any theory.

The second theory, also that of a German, is called the “starch value” theory of Kellner, in which the heat produced by one pound of starch is taken as a standard or unit. This theory has not been so widely accepted as the “balanced ration” theory and with good reason, because foods must perform other functions than produce heat in the animal body. It has been found in practice, that a cow requires considerable proteid material in order to give good results in milk flow.

The same objection may be raised to Armsby's (American “Therm Theory,” in which the heat required to raise 1,000 lbs. water 4 degrees F. is taken as a standard or unity, and all foods are compared with this standard as to relative values in milk and meat production.

The fourth theory is known as “The Feed Unit,” of Danish origin. The Danes are a very practical people. Instead of using proteids, carbohydrates, starch, or terms as a standard, they adopted a pound of grain, such as corn, wheat, oats, etc., and called this a “feed unit.” They compared all other feeds with this standard. This Danish standard is fully and ably discussed in circular No. 37, of the Wisconsin Experiment Station, Madison, published in June, 1912. Those wishing to know more about the Danish Feed Unit system are referred to this publication.

In the foregoing we have briefly discussed the various theories, or scientific phases of the feeding of dairy cows. Feeding is an important question during the winter, especially this coming

winter when feed is likely to be scarce and high in price, more particularly in certain districts on account of the drouth and ravages of the “army worm”; but as previously pointed out, these theories need to be largely used as guides to the practical feeder, and in no case should theories take the place of sound practice—they should supplement it. It is also true that when Science lags Practice marks time. These two need to march along together for best results. The scientist can learn much from the practical feeder, and the man feeding cows can learn much of value to him from the scientific man who might have difficulty in telling a manger from a gutter in a cow stable.

O. A. C.

H. H. DEAN.

Butter Prizes at the Toronto Exhibition.

Editor "The Farmer's Advocate":

Sometime ago I saw an article in your valuable journal, about the reason why the most of the prizes on butter at the Toronto Exhibition went to the Province of Quebec, by Prof. Dean, of the O. A. C., Guelph, but to my mind he did not give a very good and sufficient answer. Nearly all the creameries in Ontario are what are called “cream gathered creameries,” while in the Province of Quebec the milk is delivered at the creamery and is separated there, and the maker has the cream under his control until it is churned. On the other hand in Ontario, each farmer (or nearly so) has a separator and he separates the milk at home, and the cream is gathered about three times a week in the summer season, and about twice a week in the fall and winter. A great many of the farmers keep their

cream in the cellar, and each lot of cream has a flavor of its own. It often arrives at the creamery in an advanced stage of ripeness, and the maker is unable to make as good butter as the Quebec man.

In years gone by when there was quite a quantity of butter exported from Montreal, Quebec creamery butter would bring about one cent per pound more than the Ontario creamery. To my mind the Ontario man makes just as much money out of his milk as the other fellow, as he has a much better quality of skim-milk.

During the summer season it takes 100 lbs. of milk to make about 4 lbs. of butter, this at one cent per lb. additional makes only four cents per 100 lbs. of milk, and the fresh separated skim-milk is certainly worth more than five cents per 100 lbs. over and above the skim-milk, which he would receive at the Quebec creamery. If you will look up the records at both the Toronto and Ottawa Fairs for the past fifteen years you will see that Quebec Province has taken the majority of the prizes at these places during that time. I thought someone more capable than myself would have given the reasons for the superior quality of the Quebec butter over Ontario before now. I certainly think that the creamery butter of Ontario is much superior to the average dairy butter made at the different farms throughout the Province.

N. S.

P. MacFARLANE.

POULTRY.

Menu for Winter Eggs.

Judging by the scarcity of winter eggs on our markets it is evident that our producers have a good deal to learn regarding feeding, and other factors that influence winter egg production. The foundation for a good winter egg yield must be laid during the summer season, but this must be followed up by proper feeding, proper care, and proper housing. Granting that the stock has been raised under the proper conditions and is sufficiently far advanced or well matured to produce winter eggs, the method of feeding that is followed will necessarily play quite as important part in the production.

Before going into detail in regard to methods

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