

uary or February if there is not much snow on the ground. The manure thus put on the crop serves as a retainer of the snow, and as a protection to the tender crop when the snowfall is light or wanting. In addition, the enriching of the land results in an increased crop and stronger vitality in the plants. A manure spreader will make the application more evenly and more satisfactorily than it can be done otherwise.

Mayhap some of our readers have experience upon this matter in alfalfa-growing. If so, their contribution to the general fund of knowledge will be welcomed as correspondence in these columns.

A Clean-farms Competition Suggested.

Some agricultural societies have adopted the custom of giving a prize to the school section exhibiting the finest collection of noxious weeds. The competitors for this prize must inevitably have learned a good deal about these pests as they made their collection.

Is it not time to make an advance in this direction? The weeds certainly are gaining ground, and a good many farmers will soon be obliged to exterminate the weeds or leave their holdings, for prolific weed production and profitable agriculture cannot be carried on on the same premises. Already the Government is doing something in the way of encouraging clean husbandry, by giving prizes for good clean fields of grain, thus rendering it possible for some to procure pure seed.

Is it not desirable that a little more should be done in the way of getting rid of the weeds themselves? Would it not be well for agricultural societies to ask for prizes to be given the men in the township who keep their premises neatest and freest from weeds? Along with this must go the thorough co-operation of the municipal authorities in the matter of an earnest enforcement of the law that we already have.

Indeed, the Ontario Government would be making a wise move in offering a substantial prize to the farmer in any township whose premises are cleanest. The whole competition may well be under regulations similar to those governing the field competitions for successful grain or root-growing. There is money in it for the farmers of the first township that takes this important matter seriously, as the township that establishes a reputation for clean and pure seed will have little difficulty in selling its grain at fancy prices. What society will be the first to move?

York Co., Ont. J. K.

THE DAIRY.

Fat-Casein Method of Dividing Money Among Cheese-factory Patrons.

Address by Prof. H. H. Dean, O.A.C., at Winter Fair, December, 1910.

In order intelligently to understand the question before us, it is necessary to know something of the nature and chemical composition of milk. This is the foundation of the whole question.

COMPOSITION OF MILK.

Milk is composed of water and solid material, the latter being partly in solution and partly in suspension in the liquid portion. The solids consist of solids not fat, and a solid called fat. The solids not fat are made up of casein, albumen, sugar and ash, or mineral matter. Stated in the form of percentage, we have about:

84 to 88 per cent.	water, averaging	87.5
16 to 12 per cent.	solids	12.5
3 to 4.5 per cent.	fat	3.6
2 to 3 per cent.	casein	2.5
	albumen	.7
4 to 5.5 per cent.	sugar	5.0
	ash	.7

For cheesemaking, we require two milk constituents, fat and casein; either of these being lacking it is impossible to make cheese as ordinarily understood. This being so, any system of paying for cheese milk which is equitable and just must take into account both fat and casein; nothing less will, or can, satisfy the demands of justice and fair dealing.

SYSTEMS NOW IN USE IN CANADIAN CHEESERIES.

Three plans or systems are now in use among Canadian cheese-factory patrons. The oldest, and the one most commonly adopted, is that of dividing moneys received from the sale of cheese, according to the weight of milk delivered, not taking into account any differences in the composition of milk or its relative cheese-producing capacity. The injustice of this plan is readily seen in the following table of results, based upon five years' experiments with milk ranging in fat content from 2.7 to 5.5 per cent. In this work

nearly 200,000 pounds of milk were used, and 250 experiments were made:

Per cent. fat in milk.	Lbs. cheese produced per 100 lbs. milk.	Lbs. cheese per lb. fat in milk.
3.0	8.89	2.92
3.5	9.54	2.70
4.0	10.36	2.57
4.5	11.08	2.47
5.0	11.77	2.36

The range in milk-fat percentages at factories will probably be from 3 to 4.5 per cent. This difference in fat content makes a difference of

to determine the relative values of milk for cheesemaking. This system, in varying forms, has been followed by a few factories in different parts of Canada, and, where the work has been done conscientiously, it has, generally speaking, given satisfaction.

However, we now have a practicable short method of determining casein in milk, hence we advise the use of both the Babcock test for fat and the Hart test for casein, in cheeseries. The casein test was perfected by Dr. E. B. Hart, of the Wisconsin Experiment Station, and great credit is due him, and also the Wisconsin Station, for this second important test for dairymen from the same Station. We look next for a single test which will combine in one the features of the Babcock and Hart casein tests, so that both milk fat and casein may be determined at the same time and at one operation. The man who does this will deserve the thanks of dairymen in all parts of the world.

HOW SHALL THE TESTING BE DONE?

We come to the practical application of the foregoing principles to our co-operative system of cheesemaking, as found in the Province of Ontario. We beg leave to suggest:

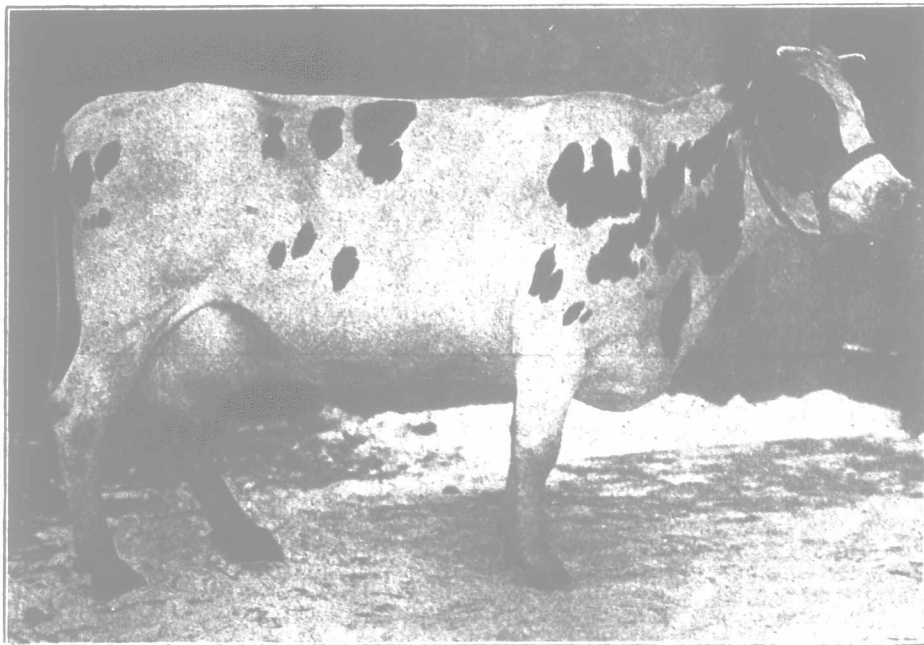
1.—That fat and casein shall have equal value, pound for pound, in determining the relative values of milk for the manufacture of cheese.

2. That, in large factories, where the business will warrant the employment of one man to do the testing, keep books, and generally supervise the business, the testing shall be done at such individual factories.

3. That, in the smaller and majority of factories, a system of co-operative testing shall be adopted by employing a skillful, disinterested person to do the work, either under the supervision of the factories interested, or by the Government, such person to be paid out of a general fund raised by said factories as a tax on the cheese manufactured; or, indirectly, by the Provincial Government, similar to the present system of employing and paying travelling instructors.

4. That a campaign of education on the importance of testing milk and paying for it upon a cheese-producing basis, be instituted during the coming winter among all our cheese-factory sections, in order to arouse interest in the question.

The dairyman's New-year resolution: "I will weigh and record every cow's milk every milking from now to December. Labor is dear. The more expensive it is, the greater the necessity of making the most out of it. The way to do this is to keep milk records. It will not only help me to develop a better herd, but it will make me a better dairyman."



Idaline Pauline De Kol 10083.

Holstein cow. First in class over 48 months, in milking competition, Ontario Winter Fair, 1910. Yield of milk in three days, 232.3 pounds; yield of milk in official test, 90.5 pounds in one day; butter in seven days, 24.798 lbs. on 80-per-cent. basis. Owned by R. J. Kelly, Tillsonburg, Ont.

about two pounds more of cheese per 100 pounds milk in favor of milk testing 4.5 per cent. fat. We thus see the absurdity and injustice of basing cheese values upon weight of milk only.

The second system, in use among, perhaps, less than 25 per cent. of the cheese factories of Canada, is that known as the "test" plan, or of basing values upon one milk constituent, viz., the fat. This system was advocated about the time the Babcock test for fat was brought to the attention of dairymen in 1890. This test was hailed with delight by Canadian factorymen, and it has undoubtedly been of great assistance in developing the dairy industry of Canada.

Referring to our table, we see that, as the percentage of fat in the milk increased, the yield of cheese per pound of fat in the milk decreased. On this point science and practice agreed. Science says that, as cheese is made from two milk constituents, fat and casein, one of these alone cannot be used as a basis for determining cheese production from milk with varying percentages of that constituent. In practice, we found this to be the case, hence we could not accept the "fat" theory and practice as a basis of settlement among patrons of cheeseries. We have maintained our position on this question during the past eighteen years.

The third system takes into account both fat and casein, but, as there was no short method of determining casein previous to 1907, we suggested the factor 2 as an addend to the fat percentage



"Jersey Jewels" in Their Island Home