

dates might have been extended, had the plants been grown merely for honey, but, as they were at that time in the best of condition for hay, they were cut for that purpose. The yield of the first cutting was 2 tons 200 pounds of cured hay per acre. The second bloom was on July 27th, and lasted until August 17th. This is a very important point for beekeepers to note, as the bees worked as well on the second bloom as on the first, and from morning till night. The yield of the second cutting of cured hay was 2 tons 1,400 pounds per acre. A third crop will provide pasture, or it is better to allow it to remain on the ground for winter, or, in favorable seasons, it might be again cut, although this is not advisable. From what I have seen of sainfoin, I believe that farmers and beekeepers would find it profitable to grow it.

Sainfoin compared with alfalfa:

Starts to grow earlier in spring, and keeps green later in autumn.

Grows thicker in the bottom, making much better pasture.

The stems and branches are finer and softer; grows more bushy, not quite so high.

When a good stand is secured, it will equal in yield per acre, and is relished by all stock both green and dry.

It is the best honey-producing plant that I know of. The cost of securing a good catch is its greatest drawback. Requiring so much seed per acre makes it expensive. J. FIXTER.

Macdonald College.

THE DAIRY.

DAIRY EXPERIMENTAL WORK IN 1907.

The three chief lines of experimental work done in the Dairy Department of the Ontario Agricultural College, Guelph, as reported in the 23rd annual report of the institution, relate to "Methods of Determining Moisture in Dairy Products," "Experiments in Buttermaking," and "Experiments in Cheesemaking."

The steam-oven plan is the one which has given best all-round satisfaction with all kinds of dairy products, though the "Beaker" method gives good results in the hands of a careful person, for determining moisture in butter. The weakness of this latter test is the difficulty of knowing when to cease heating. The "Gray" and the "Improved Gray" methods were also tested, but were not altogether satisfactory. The tendency was for the results to be too low with both these. The expense for glassware and chemicals is also an objection, from the practical creameryman's viewpoint.

A short comparative test for moisture in curd is described. In this test, the amount of moisture in the curd at dipping is assumed to vary approximately with the variation in the weight of a given volume of curd. The standard taken is 17.5 c. c., which weighs, when the proper degree of moisture is in the curd, about 17.5 grains. Each decrease of .1 (one-tenth) of a grain in weight represents a decrease of about .6 (six-tenths) of one per cent. moisture in the curd.

EXPERIMENTS IN BUTTERMILKING.

Two main lines of experiments were conducted during the year. The first related to various methods of treating cream and butter, the latter of which was exported to London, Eng. The conclusions reached from the experiments are summarized as follows:

1. The results obtained from pasteurizing sour cream were not altogether satisfactory. The extra loss of fat in the buttermilk was not offset by an increased price obtained for the butter in London, although there were a few marked exceptions to these general results. Further experiments are needed to settle the point definitely.

2. The sweet-cream lots, pasteurized, and afterwards ripened, were scored highest in flavor by the Montreal experts, and sold for the highest prices in London. These experiments point strongly in favor of having the cream delivered sweet at creameries for the best results.

3. The saltless butter sold, on an average, at about two shillings per hundredweight more in London than did similar butter salted at the rate of one-half ounce of salt per pound of butter, and indicate the probable increased value of saltless butter over salt butter for export.

4. Preservative in the form of common borax, gave results practically equal to those obtained with the more expensive commercial preservatives. One-quarter of one per cent. is the amount recommended.

5. Two lots, out of 44 lots analyzed, contained over 16 per cent. moisture: The majority of the lots ranged from 14 to 15 per cent. moisture.

6. The financial returns were about three cents per pound of butter less for the butter exported than was received for similar butter on the local market. However, there is every prospect of much higher prices being received for Canadian butter exported during 1908.

The second series of butter experiments related to the much-discussed moisture question.

The conclusions reached from these experiments are:

1. The moisture in the butter and the overrun do not bear a constant relation to each other. This is somewhat difficult to explain, unless the "absorption theory," recently put forward by a bright young Canadian dairyman, be accepted. According to this theory, milk fats vary considerably in their power to absorb moisture when in the liquid condition. If this theory be correct, then we shall never have a constant relation between moisture in butter and overrun. The theory is of sufficient importance to warrant further investigation, and seems to bear on many practical problems in connection with creamery practice, more particularly in connection with testing cream.

2. Overchurning in the buttermilk, massing the butter in the wash water or in brine, and washing with the rollers in motion, especially when the butter is soft from using a wash water rather warm, tend to produce a butter with a high moisture content; but, in order to be effective, these abnormal methods have to be carried to a point where the tendency is to produce a greasy, gritty, mottled butter.

CHEESEMAKING EXPERIMENTS.

Pasteurization of Milk for Cheesemaking.—The report points out the difficulties in pasteurizing large quantities of milk, as handled in factories, and the writer says he does not think the plan is practicable under factory conditions, but the increased yield of cheese, equal to 14½ pounds per 1,000 pounds milk, as a result of pasteurization, is worth considering. This increased yield was caused, in part, at least, by increased albuminous material in the cheese, due to heating the milk. The quality of the cheese was not altogether satisfactory, but would suit local trade, because of its soft texture.

Recovering More of the Milk Solids.—The fact is pointed out that, in the ordinary process of cheesemaking, only about one-half of the milk solids are utilized, and one-half of the most valuable food material, prepared in any laboratory, or by nature, is practically wasted. The rapid development of the milk condenseries is a sign of the times, showing that something must be done to stop this great waste of human food.

The object of the experiments conducted was to see if a coagulating agent could not be obtained which would precipitate all or the greater part of these solids. It is pointed out that the results were not altogether satisfactory, except that the loss of solids in the whey was reduced about one per cent., but there was no increased yield of cheese, due to the fact that the cheese contained less moisture. The quality of the cheese made with the RA 2 coagulating agent was equal to that made by the use of rennet. So far as could be observed, the curds of cheese from using RA 2 were quite normal in character.

METHODS OF CUTTING CURD.

The use of a fine curd knife, made of fine wire, and having the wires one-quarter inch apart, is recommended, more particularly for what are known as fast-working curds. An increased yield of cheese, equal to about one pound of cheese per 1,000 pounds milk, was obtained by using the fine-wire, perpendicular curd knife, as compared with the regular-blade knife. The use of a fine wire (30-gauge) knife is strongly recommended in preference to the steel-blade form of curd knife.

MOISTURE IN CURDS AND CHEESE.

The principle of retaining as much moisture as possible in curds and cheese, consistent with making fine quality of goods, is recommended to the consideration of cheesemakers, because the water in curd and cheese contains dissolved in it some casein, all of the albumen and sugar, and the larger part of the ash or mineral constituents of milk. In this respect, the moisture or water of cheese differs materially from the water in butter, which latter is extraneous, and contains little or no food material in solution.

An increased yield of cheese, equal to from one-half to one pound of cheese, was obtained as the result of stirring curds very little or not at all at the time of dipping. A caution is given to makers, however, not to hastily change methods which have given good results in the past, but to try the new plan in a small way at first. Pope's advice is worth noting in this connection:

"Be not the first by whom the new is tried,
Nor yet the last to lay the old aside."

On the average, about 20 per cent. of the total moisture lost from curds occurs between dipping and milling, and about 10 or 12 per cent. is lost after adding the salt. From 3 to 4 per cent. is lost between milling and salting, and 1 to 3 per cent. during ripening or curing.

ACIDITY OF CURDS AT SALTING.

The object of these experiments was to ascertain the loss from holding curds four and five hours after dipping, compared with salting, on the average, about three hours after dipping. The results showed an increased yield of about 1½ pounds cheese per 1,000 pounds milk, as a result of salting at the earlier stage. There was little

or no difference in the quality of the cheese from the various methods of salting.

The weak point about the foregoing experiments is the lack of chemical and bacteriological data. Most of the work would be more complete if this data were added. The authorities at the College may very well consider whether or not the time has not come when there should be at least one man devoting all his time to dairy problems in chemistry and bacteriology. It is no reflection on the excellent work done now in these two departments of the College to say that they would be materially strengthened, and the Dairy Department of the College would be very much helped if such a man were available for dairy work. These problems come up, not only in connection with the dairy work at the College, but also in connection with the work of the instructors during the summer. Such a man would be of inestimable value to the man in the factory and to the instructor on the road. It cannot be altogether a question of finance, because we note, from the financial statement, that the net expenditure in the Dairy Department during the year was but the paltry sum of \$158.32. Surely a larger sum than this may be profitably spent on investigational dairy work. Our neighbors in the United States are spending large sums of money on purely investigational problems in connection with dairying. How much money is being spent to-day in Canada upon scientific dairy investigation? Practically nothing. How shall we hope to maintain the lead in dairying if we allow this branch of the work to be neglected? It is verily true, "Unless science makes progress, practice marks time," in dairying. H. H. D.

INSTRUCTORS IN TOUCH WITH PATRONS.

During the months of December, January, February and March, 132 special and annual meetings of cheese-factory and creamery patrons were attended by the Chief Dairy Instructor for Western Ontario or one of the staff of Instructors, with a total attendance of 5,341, or an average of 42 patrons at each meeting. The subjects taken up and discussed by the speakers and patrons were: "Paying for Milk by the Babcock Test," "Co-operation Between Patron and Maker," "Producing and Caring for Milk and Cream," "Storing Ice for Cooling Milk and Cream," "Green Crops and Silage as a Substitute for Dry Pastures," "The Advantages of Keeping Records of Individual Cows," "Advantages of Building Cooling Rooms for Cheese," "General Outline of the Work of Dairy Instruction and Inspection, as Carried on in Ontario, What it Had Accomplished and Was Expected to Accomplish in the Future"; "The Advantages of Sending Home Sweet, Clean Whey From Clean Whey Tanks, and the Pasteurizing of the Whey as a Means of Helping to Control Acidity and Bad Flavors."

A great deal of interest was shown by the patrons at these meetings, and the subjects taken up by the speakers were freely discussed, and suggestions offered for the improvement of the industry were readily adopted. A general feeling of satisfaction with the high prices of dairy products during the past year prevailed, and confidence in the future was strong. The outlook for the coming season appears bright. The writer noted quite a number of patrons who had been giving particular attention to fat cattle in past years, expressing their intention of going more extensively into milk production. A number of factories voted to try the heating of the whey this year, while quite a large percentage freely gave the makers a raise in price for manufacturing, believing that they deserved it on account of the rise in cost of supplies and general expenses. A few more factories adopted the system of paying for milk by test, though a few others voted it out, leaving the number about the same as last year.

Attending these annual meetings will, it is believed, give good results, for at no other time can the instructors meet so many patrons of a factory in one place, and talk over subjects of interest to them and methods of improvement, which, when carried out by the patrons, will certainly have a wide influence in keeping up the price of dairy products, for there is no doubt that fine quality has a great deal to do with the high prices, as well as the law of supply and demand. The efforts of the Department of Agriculture of Ontario and the Dairymen's Association of Western Ontario, in sending out these speakers to annual meetings, are certainly appreciated by the factory men and milk producers in general, and it is to be hoped that a prosperous and productive season will be our record for 1908.

FRANK HERNES,
Chief Dairy Instructor, Western Ontario.

Appearance does not tell much as to milking capacity, and hence the necessity for milking trials and butter tests, and their inclusion in records of pedigree. But appearance does tell a good deal as to the commercial merits of either a beef animal or an animal designed for draft or speed.—[Scottish Farmer.]