

The Dairy.

A CO-OPERATIVE DAIRY IN BELGIUM

Co operation and success go hand in hand in these days of division of labor. Baron L. Peers, who has a charming country seat a few miles from Bruges, Belgium, owns an extensive farm and co-operative dairy, which was visited by F. O. Loder-Symonds, and a description of which he gives in the journal of the Royal Agricultural Society of England.

The milk from the different contributors is hauled in churns to the dairy in carts by dogs. Every churn at its arrival is weighed and a sample for quality is taken in a small graduated and numbered glass tube. It is then emptied into a large vat which feeds the separators. The cream, which is separated by "Alexandra" separators, passes into a metal bucket in a recess in the floor. The skim-milk is raised by a centrifugal pump to a sterilizer, where it is heated to 185° Fahr., and from thence its flows over a "refrigerator" into a measuring apparatus, by which the churns of the contributors are refilled, each man getting skim-milk to the measure of 90 per cent. of the quantity of new milk sent in. The cream is kept in a cool cellar, with large windows open to the north, to ripen for 24 hours. Baron Peers lays great stress upon the ripening process being carried on in full light, as being favorable to the activity of the right kind of microbes and fatal to those which produce bad flavor. The cream is then churned in Dutch fixed churns, the operation taking 45 minutes, the proper temperature being maintained with warm water or ice, as the case may be. The fixed churn is preferred to any of the revolving English patterns, because the cream is always in free communication with the air, and is, therefore, not contaminated by the evolution of gas which has to be let off from time to time from close churns. The butter is removed in the granular stage, and at once made up on a circular butter-worker driven by steam, packed and sent off to London, Paris, or elsewhere.

Great importance is attached to the heating or "pasteurisation" of the skim milk, as this enables the contributors to receive it in a state fit for food. The buttermilk is also returned. A careful account of the quality and quantity of milk sent in is kept. The quantity multiplied by the factor of quality, obtained by the method described hereafter, is the "effective" of each contributor. The total cash received, divided by the sum of the "effective," gives the "factor" of profit. The "effective" of each contributor, multiplied by the "factor," gives the gross money value of the butter derived from his milk. From this is deducted about one-quarter of a cent as the cost of separating. The balance is then divided equally between the contributors and the Baron. Each farmer thus gets the whole of his by-products back and a trifle less than one-half the selling price of the butter. The butter, however, is quite 25 per cent. more in quantity and 25 per cent. higher in price than it would be if made up in the old-fashioned way by the peasant himself. He thus gets about the same pecuniary return and is saved the trouble of making and marketing.

The cows of an improved breed are being kept, the first cross between the Jersey bull and the common country

cow being the most valued. To assist this process two or three Jersey bulls are kept by Baron Peers. A "home herd" of some sixty pedigree Jerseys is maintained; these having replaced a former herd of Shorthorns, which gained many prizes in their day, but which have now been supplanted by the Jersey as a more profitable butter cow. The Baron lays great stress upon the "escutcheon" of a cow, and said he never knew it to fail as an indication. He finds the best daily winter ration to be:—

4½ pounds maize meal—boiled.
2½ pounds rye meal—boiled.
67½ pounds turnips.
11½ pounds hay.

That such a large amount of turnips can be fed without rendering the butter unsalable will be a source of wonder to many of our readers. Baron Peers explained that this could be avoided by proper methods of conducting the fermentation. To get rid of the turnip flavor it is advisable in the first place to separate the milk as completely as possible from the cream; hence, the cream produced in the winter, when the cows are eating turnips, is much thicker than that separated in the summer months, and the operation of separation takes longer. After separation the cream is "pasteurised" by being heated to 185° Fahr.; then cooled and passed into the ripening room, when a small quantity of the ripened milk of a cow which has been fed exclusively on hay is added. The effect of this is to start a healthy ripening; the bacteria associated with the flavor having been either killed or rendered inert by the "pasteurisation." This process is said to be so effected that no trace of turnip flavor can be detected in the butter, and the factory butter therefore sells during the winter months at a price proportionately much higher than that of ordinary butter.

TURNIPS AND BUTTER FLAVOR.

Turnips, if unwisely fed, will give butter a slightly acid flavor. But the best judges claim that if fed say at or near to one milking they will leave no nip, and will in fact help the quality of the butter made from them. This question was recently put to three expert butter-makers, with the following results:—

No. 1 replied:—"We have always fed turnips in the autumn and winter when making butter, and have sent our butter to the best markets and have always obtained the best prices for it, with the statement, 'butter, first-class.' I have had the opinion of an expert on our butter, and he says if I want a certificate he will give me one stating that he could detect no turnip taint, that it was very fine in make, and of first class quality. The manner of making is this: We are very careful to have the milking attended to so that the milk shall be clean, and from anything that could in any way taint the milk, as this would be retained in the cream. As soon as possible after milking, we pour boiling hot water into the can until it attains about 125 deg. Fahr., then we set in the common creamers or pans. The creamers we run off every 36 hours, and the pans every 48 hours; and as soon as the cream is ripe or turned a little sour, we temper it to 60 deg., and about ten minutes before churning we dissolve a teaspoonful of prepared salt-petre in warm water and stir into the cream, and

then churn. When the butter is in granules, we let it stand a few minutes, and then run off the buttermilk and wash the butter in the churn, until the water is clear, and then salt with fine salt, one ounce to the pound of butter."

No. 2 wrote:—"As you request me to furnish your readers information as to the quantity of turnips fed, I would say that I give each cow about half a bushel twice a day, fed after milking. I have an underground stone milk-house with stone floor. The milk keeps sweet for three days in the hottest time in summer. We use mostly shallow pans; skim every twenty-four hours; pans kept well scalded and clean; churn in the autumn from 60 deg. to 64 deg. If I were giving each cow two bushels a day I would dissolve some salt-petre and put some in the cream."

No. 3 said:—"Beautiful butter can be made if the cows are given only a small allowance of turnips after they are milked, at first, gradually increasing the quantity. The milk was set in pans, and two or three quarts of ice-cold pure water put in the pan and the milk strained into it. The butter was beautiful; not the least unpleasant smell or taste of turnips was noticeable."

Nor'-West Farmer.

CHEESE, BUTTER AND MILK

VII

The Principles of Butter-Making

EDS COUNTRY GENTLEMAN—Pure butter should contain no more than 10 to 15 per cent. of moisture, a good sample averaging about 12 per cent., and unless heavily salted, an almost infinitesimal proportion of casein and sugar. Theoretically, butter should contain nothing more than the fat of milk, the salt which is added during manufacture, and the moisture, which up to a certain point is inseparable from butter. Those who understand the manufacture of butter are well aware that both by the exercise of skill and carelessness a much larger amount of moisture can be added to the bulk than is essential, and it follows that the larger the amount of water, the greater the weight of the butter produced. To manufacture butter with excessive moisture is fraudulent for the consumer pays the price of butter for moisture; but it should be remembered that the perpetrators of a fraud of this character often defeat their own object, inasmuch as butter of high quality cannot be produced, nor will it keep, if the moisture is excessive. Excessive salting is equally deleterious to the quality—a minute proportion of salt improves the flavor, but a large quantity masks it, at the same time adding to the weight.

We have remarked that there should be no other material in butter than fat, moisture and salt. In practice, however, it is next to impossible to remove either the whole of the sugar or the casein or curdy matter, and this being the case, in the course of time—and it depends entirely upon the proportion of caseous matter left in the butter—a sample becomes rancid and unfit either for sale or consumption. The prime object, therefore, is to produce as large a quantity of butter as possible with the finest flavor, reducing the moisture and the extraneous curdy matter and sugar to the lowest possible proportion.

In the first place then, in order to produce quantity, it is necessary to use the cream separator, which extracts

more fat from the milk than is obtainable by any other process. If this is followed by treatment which has for its object the conversion of as much of this fat as possible into butter, a maximum quantity will be obtained.

As regards quality, it is first of all important that the milk should be obtained from carefully fed, clean cows which are milked by clean hands into clean vessels, the milk being subsequently strained before manipulation. The apartment in which the various operations take place should be perfectly pure. In this case the cream from the separator will in due course ripen properly, and the correct flavor will in consequence develop.

Having obtained quantity and flavor, we have next to deal with the conversion of the butter fat obtained in the churn into made-up butter. As we shall see, the grains of fat as they are first produced are floating in buttermilk, the particular constituent of which is casein. This casein is one of the most important foods of the lactic ferment; hence its removal is essential. Careful washing, therefore is the first process, and if the tiny grains are washed at a given stage, which is shown in every dairy school, the greater portion of the curd will be removed and almost pure butter fat left behind.

Bacteria, Good and Bad

Let us first of all assume that inferior butter is produced in a dairy and that the accipier is unable to improve the quality. The thing is easy if the work is carried out with intelligence and thoroughness. The manufacturer must condescend to recognize a scientific fact. The alteration which takes place in cream—that is to say, its change from perfect sweetness to a condition of sourness, acidity, or ripeness—is owing to the presence of an organism of bacterium which can only be seen by those who are skilled in the use of the microscope. This organism rapidly increases in number when milk is warm and exposed to the atmosphere. It converts the sugar of milk into lactic acid, and hence the sourness of milk. If this change is allowed to continue unchecked, the curd of the milk will coagulate, and it is for this reason that cream when allowed to ripen in churning becomes thicker. If cream is churned while it is still sweet, it is frequently longer before it is converted into butter, it produces less butter, and the flavor is less full and nutty. The object, therefore, of ripening cream is to increase the quantity of butter and improve the flavor. In every dairy the lactic ferment is present either upon the utensils or in the atmosphere itself, but in some cases there are other organisms which have a very contrary influence, destroying the fine flavor and replacing it by a disagreeable one which reduces the value of the butter. The object of the dairyman, therefore, should be to maintain the apartment in which the milk or cream is placed, as well as the utensils employed, in as cleanly a condition as possible. There need be no fear about boiling water or lime destroying the lactic ferment. If it is removed from the utensils, it is present in the air and present, too, in a clean apartment in much larger numbers than any other organism is likely to be; it is, in a word, essential to the production of good butter. On the other hand, in a dirty apartment and on dirty utensils dangerous ferments are common, and if by conditions which suit them—and dirt is the chief of those conditions—they are induced to increase in number, they are able to grapple, as it