

fluctuations almost disappear, and we obtain a nearly constant acidity for each month, equal to 0.19% of lactic acid. It seldom rises above 0.22, nor should it fall below 0.17 without inquiry into the cause, as will be explained hereafter. It was not until 1897 that any abnormal condition of the milk as regards acidity arose. Then the acidity of the milk was so low that it became necessary to investigate the cause.

Milk of Abnormal Acidity.—The cause of the abnormal acidity of the milk in 1897 was discovered in 1898. As previously pointed out on p. 72, certain cows were discovered at Long Ashton yielding abnormal milk. Upon testing the acidity of this milk, the results obtained were for Cherry, .14 per cent., and for Ayrshire Horns .13 per cent. These results, it will be seen, are quite exceptional—the average of the herd being .19—and were equally unexpected. It was, therefore, determined to follow up this line of inquiry, and, side by side with the complete analyses of the milk, estimations were subsequently made of the acidity of each cow's milk. It was then discovered that the acidity of the milk varied generally in proportion to the casein in the milk. This is well shown by the following table, which gives not only the average acidity of the milk of the four exceptional cows, but also the acidity of the other milks, taking the averages according to the proportion of casein they contain.

Milk containing.—	Average acidity
Under 2 per cent. casein14
Over 2 and under 2.5 per cent. casein....	.20
Over 2.5 and under 3 per cent. casein....	.21
Over 3 per cent. casein23

As it is generally found that the proportion of solids in the milk is in direct relation to the proportion of casein, we may roughly express these results by saying that the greater the proportion of solids in the milk, the higher is the natural acidity of that milk. This probably accounts for the fact that the acidity of the milk is generally higher in the later part of the year, when the milk is richer, than in the spring. It appears to me that these results justify the conclusion that the estimation of the acidity of each cow's milk would give the cheese-maker a rough (though not absolutely accurate) guide to the proportion of casein and solids in the milk, and as to its suitability for cheese-making. Any cow yielding milk of very low acidity should be regarded with suspicion by the cheese-maker.

The Effect of Milk of Abnormal Acidity.—The influence of the abnormal milk of the four cows upon the whole of the milk and the cheese produced therefrom was remarkable; but it can only be appreciated when studied in conjunction with the effect of keeping it out of the mixed milk.

In the first place, this milk, owing to its low acidity and small proportion of casein, diminished the percentage of both acid and casein in the mixed milk.

The Effect of the Low Acidity.—Diminishing the percentage of acid in the milk necessitates a lower percentage of acid being obtained in the curd before grinding, for the lower the percentage of acid in the milk as drawn from the cows the lower must be the acidity obtained in the liquid from press. It will subsequently be shown that the acidity of the liquid from press, for a fairly quick ripening cheese, should be five times that of the evening's milk when brought into the dairy, and with ordinary milk this can easily be obtained. But when dealing with abnormal milk a difficulty arises due to the want of casein.

The Effect of the Low Casein.—Owing to the deficiency of the milk in casein, the curd will be wanting in contractile power, so that by the time sufficient acid has been produced in the curd for it to be ground, it will not be sufficiently dry—in other words, it will not have expressed sufficient whey. The practical difficulty which the cheese-maker has to meet is to decide whether to put away the curd when sufficient acidity is developed, although it would not be properly dry, and the cheese would consequently ripen rapidly—for a wet curd always ripens more rapidly than a dry curd—or to obtain the requisite dryness with an excess of acidity, which would also make the cheeses ripen rapidly and further introduce the risk of producing an acid cheese. Miss Cannon decided to adopt the former system, and in my opinion was justified in doing so. Yet it necessarily resulted in certain peculiarities which will be referred to subsequently. (See *Moisture in Curd.*)

(To be continued).

