

matic principles sought for in butter are produced by lactic fermentation, by a simultaneous general fermentation, or by several fermentations combined, I do not know."

Prof. Segelecke then asks the question: "What is the chemical composition of the aromatic principle so much admired in butter?" He suggests that to solve this interesting question, elaborate experiments would be required, and in conclusion he sums up the matter by saying that this, at least, is certain, "that without decomposition there is no aroma — at least no aroma in the ordinary sense of the word."

The question here raised is an important one in its relation to dairy manufactures, especially in cheese-making, where it has been found that the flavor so much admired, which cheese-mongers express by the word "nutty," or "clean, sweet, nutty flavor," is, in its best estate, the result of developing lactic acid in the curd.

Before the inauguration of the cheese factory system, when cheese was made up on the farm, the general opinion prevailed among the best and most experienced cheese-makers that a better-flavored cheese came from milk having some age — at least 12 hours' old — and that in the then method of manufacture (a kind of sweet process), a finely-flavored cheese of the best sort could not be made from milk drawn directly from the cow. This principle has been very clearly demonstrated by the Cheddar dairymen of England, who develop lactic acid in their curds, and whose cheese has long been sought after as the best sort made in England, commanding the highest prices. Of course this development of lactic acid must not be carried too far, since it is then more or less destructive to the aromatic principles producing fine flavor, and it is on account of developing acidity *too far* that many cheese makers fail to accomplish the highest results both as to flavor and mellow texture of their cheese. It is a curious fact in science that some of the most delightful flavors and perfumes are brought about from chemical changes or partial decomposition in products not particularly pleasing to the taste or smell.

It is well known that the development of lactic acid in cheese-making is a means of covering up and keeping down disagreeable taints; but the manner of its action, whether it be in developing with more force aromatic principles, or in killing the disagreeable taints in some way, has not as yet been fully explained.

I give these facts to show that good cheese does not result simply in separating a certain percentage of water from sweet milk, as some have supposed, but that certain changes must be brought about in the union of the different constituents of milk, and that the proper development of lactic acid in the curd is among the first and most important of these.

The effort to disguise the operation of acid in the curds under the name of "a cheesy smell" or "cheesing" is only a mystification of the art of cheese-making, likely to lead many astray. Cheese-makers should have a knowledge of lactic acid, and be taught how to use it properly and not to misuse it; for when rightly used it becomes an important aid in the hands of the cheese-maker for producing a highly flavored, rich, long-keeping and highly appetizing product. This the Cheddar dairymen of England have proved over and over again during an experience of more than 200 years.

Prof. Sheldon in his book on "Dairy Farming," now going through the press, gives the following sensible comments on this question:

"It is obvious that incipient decomposition, which is but another term for ripening, develops the flavors which we so much admire; and it is equally obvious that these pleasant flavors become unpleasant after a time as decomposition proceeds. Thus it follows that a given degree of acidity is useful in both cheese and butter-making, developing as it does the flavor and aroma; but if it is allowed to go too far it

destroys both of them, or rather carries them into a stage in which they are no longer attractive to the palate. The introduction of extraneous matter also may easily induce a sort of fermentation or decomposition which will develop an aroma which is foreign, or may prevent the development of that which we should naturally expect to find in a well-ordered article."

In conclusion, the importance of cleanliness in all the details of dairy practice cannot be too strongly urged. Milk a compound body, and the dairyman has enough to tax his powers in treating a substance composed of so many constituents differing from each other in character. If filth or any other foreign decomposing matter be added as another element, the substance becomes still more complicated, and it is not easy to tell what new compounds will result from a union with this extraneous matter, to depreciate or spoil the product; and there are other considerations of a sanitary nature involved in this question of cleanliness. Filth and its products of decomposition, may result in poisons more or less virulent; for it is from this source, it is believed, comes that subtle poison sometimes developed in cheese, the nature of which is so difficult to fix by chemical analysis.

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How young may heifers breed?

YOUNG DAIRYMAN, *New York*.—I have a heifer that took the bull at twelve months old; she will, therefore, come in at twenty-one months. I want to know if it is proper for a heifer to breed so early—whether it is not likely to injure her constitution and her milking capacity?

REPLY.—We should not advise allowing a heifer to be served under the age of 15 months, so that she may come in at the end of her second year; but we have known many heifers to come in as young as the one mentioned, and do well, developing into very fine milkers; yet it must be remembered that some heifers are as well developed at 12 months as others at 18 months. Much must depend upon the breed, whether usually bred to early maturity, or the slow development of three and four years. It may, however, be stated as a general rule, that heifers must be well fed in order to develop the system properly for breeding so early as two years. But this question has been thoroughly settled by the best dairymen in nearly all countries in favor of heifers coming into milk at two years old. It has been found that a well developed heifer coming into milk at two years old is usually a better cow at four years than one coming in at three years; and besides this important fact, the breeder will have received 4,000 lbs. of milk the third year, instead of having kept her that year simply for her growth. It appears that an early development of the milk secretions tends to increase their power or flow, just as the exercise of the muscles increases their power. The breeders of the Island of Jersey are very particular to have their heifers come into milk at two years. The most expert Short-horn breeders usually have the first calf dropped at 24 to 30 months. — *National Live-Stock Journal*.

Jerseys or Guernseys.

Mr. W. L. RUTHERFORD, of St. Lawrence Co., read a paper upon these breeds. He gave a short sketch of the Jerseys, and then the yield in butter of many noted cows of this breed. He gave it as his experience, that cows which gave the most milk yielded the smallest proportion of cream. That a cow, when yielding 28 to 30 lbs. of milk, requires 18 or 19 lbs. for a pound of butter; but when she gave 12 to 14 lbs. she made a pound of butter from 12 to 14 lbs. of milk. In two heifers, the past summer, the one yielding 28 lbs. per day required 4 lbs. of milk more for a pound of butter than another yielding 22 lbs. of milk per day. He attributed the larger proportion of fat