

of cheese-making, by which we may be able to judge most accurately as to the amount of moisture to be retained in the curds, will be most successful, other things being equal. Another point needing attention is the shape of cheese. This undoubtedly has a considerable influence on flavor. Facts prove that when there is a good proportion of butter in the curds, thick shapes like the Cheddar and Stilton seem well adapted to secure mild, clear flavor, but skum milk cheese should always be made flat and thin. The saline taste sometimes complained of in old cheese is attributed by Dr. Voelcker to ammoniacal salts developed during the ripening process. These always have a pungent, saline taste. This is an evil that increases with age. It is caused by a portion of the casein or curd suffering decomposition in consequence of the ripening process not being properly conducted. Another thing which trade and our own interests imperatively demand, is the production of cheese that is slow of decay—that will retain its good qualities for a long period of time—one that can be kept either at home, on the factory shelves, or in the hands of purchasers, without fear of deterioration or loss. English shippers and dealers have always complained of the early decay of American cheese, and the fear of loss from this source has had a bad influence on the market. Haste to sell has resulted from the fear of deterioration, and prices have often been brought down in this way. There has been improvement in the keeping qualities of our cheese during the last few years, but there is room for improvement still, and no factory should make a pound of cheese the coming season, which cannot be kept without injury, at least for several months. There is not much doubt but stocks the coming season will have to be held to a greater extent than ever before, or low prices accepted. We must be prepared to meet the emergency. The desired result cannot be secured by manufacturers, without the earnest and hearty co-operation of patrons. The first requisite to success, is PURE, CLEAN, HEALTHY MILK. To obtain this, upland pastures should be used—uplands for pasture, lowlands for meadow. Then the herds must be driven very leisurely from the fields. Dogs are a great curse to dairy farming, by chasing the cows and causing them to come to the stables in a heated condition. Good milk cannot be had under such circumstances. It is cruel to let a poor dumb beast be chased violently over the pastures, painfully swinging a distended udder at every step. He who suffers this to be should be made to feel a loss by the rejection of his milk at the factory. The dirty practices of milkers must also be put a stop to. When such things are considered, it is no wonder that much of our cheese is condemned. If you Canadian dairymen would succeed, you must avoid these errors. One of the good things done at the recent

Convention of American Dairymen at Utica, was the resolution passed condemning the use of the wooden pail for milking. It is a great nuisance, and a fruitful source of ferment most injurious to the milk. So easily is milk tainted that even carrion in a field where dairy cows were pasturing, has given trouble in making cheese from the milk given by these cows. Ferment resulting from offensive matter in the milk, often occasions bad flavor in cheese. These are a fruitful cause of porosity and huffiness in cheese. Small particles of milk in the corners of pails or upon utensils exposed to the air, rapidly decompose, and operate upon the new milk with which they come in contact, in the same way as yeast, or in the same way as a small piece of putrifying meat in contact with sound meat imparts the influences of decomposition and decay. To kill these ferments requires a temperature of 212° . Nothing short of boiling heat will accomplish it. Hence in cleansing pails and dairy apparatus care should be taken that the water used be boiling hot. Half the dairymen do not understand this fact, but it is of very great practical importance. Another point demanding attention is the location of the pig-pens. I am to say that no modern built factory tolerates the pig-stye in its neighborhood. The greatest caution should be exercised in having all the surroundings clean, sweet and free from taints. In conveying milk to the factory, injury is often done by putting it when warm into cans with close fitting covers, and hauling it long distances in the heat. The milk ought to be spread out and cooled in some way before it is put in the cans. On arriving at the factory it is usually run into the vats at once, whereas it should be spread out in some way on a broad surface, and gradually flow into the vat from the opposite end of such broad surface. Even by such a crude process a large amount of impurity would be got rid of. The inventor who will get up a simple and practical machine for exposing newly drawn milk to the air, and freeing it from its animal odor, will at once make a fortune out of it. There is no doubt but the exceedingly fine aroma which is obtained in the best samples of Stilton, Cheddar, and Cheshire cheese is secured by manufacturing perfectly pure milk at low temperatures. In all the finest English cheeses that have come under my observation, the temperature in setting ranged at about 78° to 82° , never above 84° .

At this point in the address, Mr. Willard described at some length the Cheddar system of cheese making, and showed that it did not differ materially from the system in vogue at our cheese factories. Summing up he pointed out the following as the main principles applicable to our own practice.

1. Studying the condition of the milk.
2. Setting at a temperature from 78° to 82° .

3. Drawing the whey early.

4. Exposing the curd longer to the atmosphere, and allowing it to perfect its acidity, after the whey is drawn.

5. Putting in press before salting, at a temperature of 60° to 65° .

6. Grinding in the curd milk, and then salting.

These last two items are important, because you cannot regulate the salt accurately by guess, and can only get the right proportions by a uniformity in the condition of the curd.

The application of salt at a higher temperature than 65° is claimed to be prejudicial. I am firmly of opinion that the exposure of the curd in small particles to the atmosphere is beneficial and helps to secure good flavor and mellowness of texture. The philosophy of this is easily explained since it consists of the process known by the name of oxidation and by which the earth, air, and sea are purified from contamination. Dairymen and manufacturers will do well to study the philosophy of their business, to get hold of principles, and not follow rules in a blind, mechanical way. We, in the old dairy districts of New York, are just beginning to discover some of the errors which I have pointed out. You will do well to profit by the lessons we have been sixty years in learning.

Mr. Willard next proceeded to discuss the subject of butter making, which he said, has of late become one of great importance. The cheese factory system had so far cut off the production of this article that prices have advanced in the fine qualities to a pitch rendering this branch of the dairy business exceedingly profitable. Indeed, there is a prospect of its being made more remunerative than cheese. In Orange County, N. Y., long famous for its excellent butter, there has been recently introduced a system of jointly manufacturing cheese and butter. The system has proved a great success, and is being rapidly introduced into other parts of the country. It is a decided advance on all previous methods, and produces an article of a quality equal to that obtained from the most noted butter districts of Europe. No people on the face of the earth are more fastidious as to their food than the better classes in London England. Possessed of immense wealth, they pay liberally for extra qualities of food, particularly the products of the dairy. Good butter they will have at any cost. Their finest grades come from the continent: Normandy, Holstein, and the Channel Islands. It is worth to-day 140s stg. per cwt., or about 30 cents gold per lb. wholesale, while Canadian sells from 64s to 90s per cwt., and Irish extra brings 108c to 112s. I have seen and tested immense quantities of Normandy and Holstein butter in London. It is excellent in flavor and texture, very lightly salted, and of a rich, golden color. I saw them making