

doubt that this is the best mode of making butter, both with respect to economy of labor and to the quantity and quality of the butter; but if it is determined to churn cream instead of milk, several precautions are absolutely necessary, in order to have it good.

1st. The milk in the pans should be very shallow. The cream rises with rapidity proportionate to the shallowness of the pans. Experiments show that when milk is 12 inches deep, less than half the cream will rise to the surface; you will always find the cream thicker over the flaring edges than over the centre of the pan. Since the flavor of the butter depends in some degree upon the rapidity with which cream rises, the milk in the pan should never be over three inches deep, and it is better when it does not exceed two inches.

2d. Cream should be secluded from all foreign odors. Cream has a remarkable affinity for all kinds of odors; it absorbs them with the greatest avidity, and when the slight protion of them are incorporated with it, the flavor of the butter is sensibly impaired. A smoked ham, a codfish, a piece of cheese or an onion kept in a milk-room over night, will degrade the flavor of the butter. The dairy therefore should be so located that no draft of air from drains, cesspools, hog-pens or barn-yards can at any time pass through it; it should be well ventilated; no particle of decaying substances, either animal or vegetable, should be admitted into it; the most scrupulous neatness should be observed in the walls, the shelves and the utensils; if the milk is spilled it should not be allowed to dry, but should be washed up immediately. The casein of the milk is a nitrogenized body, and is therefore in a state of very unstable union. When it is brought into contact with bodies in the act of change, its affinities are broken up, and it is resolved into new compounds. To prevent this the churns, pans and strainers should be thoroughly washed, scalded and dried, and every possible precaution taken against bringing the milk into contact with decaying substances. The rays of the sun should enter the milk-room at least an hour every day. Cellars, where the direct rays of the sun cannot enter, are often used as milk rooms, but there is always a cellary odor in them which impairs the flavor of the butter. Much of the butter offered in the market is deprived of its sweetness, and diminished in price, from a neglect of some or all of the particulars enumerated.

3d. The vessel in which cream is kept should be tightly covered. This precaution will not only prevent the absorption of noxious odors, but exclusion of light and air appears to favor an occult ripening of the cream which improves the flavor of the butter. Those who have neglected this rule will find that a strict adherence to it will not only improve their butter, but its keeping properties also.

4th. The proper time to skim milk is when it begins to thicken in the centre of the pan, and before it becomes loppered. Every moment it remains after this, its quality is impaired. This is denied by many dairy-men, but I think a majority of the best butter-makers will subscribe to the rule. I am myself fully satisfied of its importance. Those dairies where this rule is observed, will in the long run, stand much higher in the market than those that neglect it.

5th. The temperature of the milk at the time of churning is of great importance. Good butter-makers usually have their milk when churning at a temperature ranging from 54 to 64 deg. F. It is impossible to make butter below 40 deg. If it exceeds 70 deg. it is so oily as to be disgusting. Pure butter contains 68 per cent. of a solid fat known as *margarine*, and 30 per cent. of a fluid fat or oil called *olein*. At 60 deg. F. the *margarine* of milk undergoes very little change; but at 70 deg. it absorbs oxygen from the atmosphere and is converted into *olein*, which gives the butter an oily consistency and a rank flavor. When the sugar of milk absorbs oxygen in the churning process, and forms lactic acid, the transformation is always attended with an elevation of temperature—the thermometer always stands 5 or 6 degrees higher at the close of the churning than it did at the beginning. Since, therefore, butter is much better when the temperature at the close of churning is 60 deg. F. than it is at any other, it follows that the temperature at the beginning of the process should be as near 54 or 55 deg. as possible.

6th. The milk of different cows varies very much in the time required for creaming. The milk of some cows will cream in 12 hours, while others require 36 hours; the milk of all the cows should therefore be mingled together before it is poured into the pans, in order to secure uniformity in this respect. When cream from a previous skimming is poured into a vessel containing a previous one, the two skimmings should be well stirred together.