

Salting is also a matter of taste, and the buttermaker must be guided by the wishes of his customers.

We hear a great deal nowadays about pasteurizing cream. It is said that a large proportion of the Danish butter is made from pasteurized cream. It has been tried in Canada, but chiefly in an experimental way. The pasteurization of cream is based on the theory that a temperature of 158 degrees Fah. destroys most of the bacteria which develop in milk or cream, and thus leaves a clean "soil" for the introduction of the proper "seed" in the shape of a starter.

In practice, however, it is somewhat difficult to heat a large body of cream to a temperature of 158 degrees without heating some part of it to a higher degree, and then there is trouble with the cooked or boiled flavor. In fact a "cooked" flavor will be noticed at 158 degrees, but it passes off after cooling. The cream must be cooled quickly after being heated, for 10 or 15 minutes. When the appliances for doing this work are brought nearer perfection than they are at present, the labor and attention required may be much lessened. In the meantime my advice to buttermakers is go a little slow and do not attempt this sort of thing unless you understand thoroughly what you are undertaking, and are sure you will be able to carry it out properly.

The use of a "starter" in butter-making is all but universal. If the cream is pasteurized a starter is an absolute necessity. A great deal has been claimed for the "pure culture" starters, so called, and I have no doubt very beneficial results have followed their use, but I am inclined to think that much of the improvement is due to greater care exercised in handling the cream. It is natural that if a man tries anything of the kind, he will take a little more pains and watch it more closely. I do not think that the flavor of butter made from good, pure milk can be much improved by the use of any starter, but in creamery work there is always some milk not quite up to the mark, if not positively bad. In such cases a starter prepared from some of the best milk is a decided advantage. Another point in favor of the starter is that it enables the maker to ripen the cream at a lower temperature. Bacteriologists tell us, and experience confirms it, that a temperature of about 60 degrees Fah. is favorable to the development of the best class of fermentation in ripening cream.

Before we touch upon the question of churning it may be well to refer briefly to the character and composition of butter fat. Everybody knows that the fat in milk, and in cream before churning begins, has the form of tiny globules, invisible to the naked eye. It does not consist of one single fat, but a mixture of several kinds, which may be divided into two classes, viz.: fixed fats and volatile fats. The latter form only a very small part of the whole, and probably have more to do with flavor than bulk. The fixed fats are divided by Mlyth as follows:

Stearin	50 per cent.
Palmitin	40 "
Olein	7 "
Butyrin	3 "
Other fats	100 "

Stearin is a hard, white fat, which melts at 157 degrees Fah. Beef and mutton tallow are largely composed of stearin. Palmitin is also a hard, white fat, with a melting point about twelve degrees below that of stearin. It is found in palm oil, etc. Olein is an oil at ordinary temperatures. These three fats are very common in nature, but the next, butyrin, is found only in butter, and is the characteristic fat of milk. Oleomargarine contains no butyrin.

When cows are on dry feed there is a larger proportion of the hard, white fats in the butter, while such food as grasses, silage, etc., produce more of the only fat. This explains why butter is usually harder and whiter in winter. For the same reason we have to use higher temperatures in churning in the winter time as a rule. It is thought that the fat is in a liquid condition in cream and solidifies as a result of the agitation in the churn, when the globules begin to adhere to each other. When churning proceeds too rapidly as a result of too high a temperature only part of the fat is solidified, and the balance, or part of it, is incorporated with it in an oily state, hence the reason why such butter is always soft and greasy.

It is obvious from the foregoing that no fixed temperature can be laid down for churning. It must be varied according to conditions, but should always be done at as low a temperature as possible without taking too long. Half an hour in summer, and a little longer in winter is about right. Washing the butter is an important part of the process. I do not believe in much washing if the butter is for immediate use. One water will usually be sufficient. Too much cold water will destroy the fine flavor, because the flavoring oils are largely soluble in water. If the butter is to be kept for some time it is better to wash until the water comes away quite clear. The temperature of the water used for washing has a great deal to do with the grain of the butter. If it is too cold the butter will come out too hard and dry, a very common fault in the winter time. If on the other hand the water is too warm the butter will, of course, be soft, and retain too much moisture. The proper temperature leaves the granules of butter in such a condition that they can be handled without gathering into a mass, and at the same time adhere readily when pressure is applied. The right temperature will vary considerably according to circumstances. So much depends upon the natural consistency of the butter, that no rule can be applied other than the condition in which the butter is found after washing is finished. If the cows are on dry feed the butter will be hard, owing to the large proportion of stearin present. Cotton-seed meal has a tendency to make hard butter, while linseed meal has the opposite effect. Experiments have shown that the melting point of butter was, on the average, six degrees higher with a ration of cotton-seed meal than it was when linseed meal was fed to the same cows. The temperature of the washing in such cases would have to be varied to about the same extent. Generally speaking, from fifty degrees to fifty-five degrees will be about the right temperature, except in hot weather, when a lower temperature will be required to counteract the influence of warm air during working.

The salt should always be applied while the butter is in the granular state. The maker is enabled then to distribute it well throughout the mass, and that being done very little working is required. I prefer salting in the churn if one knows how much butter there should be in order to get at the proper amount of salt. I cannot understand why some makers will persist in pressing the butter into a mass before adding the salt, and even applying it during the process of working. When that is done the butter must be worked more than it should be to prevent the mottled appearance due to uneven distribution of salt. I need not impress upon anyone the necessity for using the very best fine salt for buttermaking. That is well known. A fact perhaps not so well known is that salt will, if exposed to strong odors, absorb them to such an extent as to impart the same to the butter.

The butter should be worked at a temperature about 50° to 55°. If too cold, the grain is injured by the heavy pressure required and a certain amount of grinding which the butter will receive from the worker. The surfaces exposed to the rollers will be given a "lardy" appearance, which will show as white, thread-like streaks under the trier. When too warm the surplus moisture cannot be expelled without overworking the butter.

If the salt has been well distributed while the butter was in the granular condition very little working will be required. I prefer to have it stand three or four hours after the salt has been applied before final working. If the temperature is right I think a better texture or grain will be secured. Of course I do not dispute that fancy butter can be made by finishing at once after removal from the churn, but I think more uniform results will be obtained the other way.

Now in conclusion I have only a few words to say regarding packages. One must be guided in the choice of package according to the market he is catering to. If for immediate consumption in local markets, there is nothing better than the standard square print. We put up nearly all our butter at the Dairy School in this way, and I want to describe our style of doing it. The butter is first wrapped in parchment paper, and then each pound is placed in a thick paper box, which folds tightly and almost completely excludes the air. The paper box prevents the parchment from drying and curling up, and is a help in preserving the butter. It is very convenient for the merchant, and has a dainty appearance. Both parchment and box have the name of the school printed thereon. When this butter is shipped to Montreal or other markets it is packed in twenty pound cases, which are made the exact size to hold that many prints. They are made of thin lumber simply nailed together, and are not returned. The total cost of parchment wrapper, paper box, and shipping case is less than one cent per pound. I am satisfied that we double the cost in extra price received for the butter, besides always finding a ready sale for all we make.

The square box is fast replacing the tub for packed butter. In fact I may say it has replaced it on our side of the line, where we began using it in 1892. The idea is to have a box that

will hold 56 lbs. or half the English hundred weight. In order to do this it must measure one cubic foot inside. A solid cubic foot of butter weighs slightly more than 56 lbs., but butter is never packed perfectly solid, and something ought to be allowed for shrinkage. We always put 57 lbs. in each box. The best shape for the box is square, only slightly larger at the top than at the bottom in order that the butter may be turned out. The dove-tailed box is generally preferred to one that is nailed. Spruce is the favorite timber. White poplar is said to be suitable, but I have had no experience with it. No matter what kind of wood is used it must be that grown on high land and thoroughly seasoned and kiln dried. The inside of the box should be coated with paraffine wax. I would not use any other kind. If not waxed the box must be soaked and scalded in the same way as tubs are treated, and then they get out of shape. Of course they are lined with parchment, but that does not take the place of "soaking" or other treatment of an unwaxed package as many seem to suppose. It is merely an extra precaution. I believe the reason that we have been hearing so much about "mouldy butter" for some time past is because buttermakers have been depending entirely upon the parchment paper to protect the butter. There certainly can be no foundation for the claim heard in some quarters that butter moulds more readily in boxes than it does in tubs. When made of the same wood and treated in the same manner the box is calculated to preserve the butter better than the tub.

Boxes should be filled full of butter cut off level with the top, the parchment folded over and the cover, which should rest on the butter, firmly nailed. When I say firmly, I do not mean that three inch nails should be used so that it will be necessary to break the cover to get it off. A thin nail with a large head should be used. A number of patent covers are on the market and I think the best of these are likely to supersede the nail cover.

DEVELOPING GOOD HOGS.

First, choose the breed. Have an ideal animal and work for it. Breed from matured and well-bred sows. Don't sacrifice individuality to pedigree. Breed prolific sows only. Avoid cross-breeding and feeding too much corn and ice-water, as this lessens the vitality and tends to make too light a bone. Feed young stock and the breeding sows oats, shorts, bran, and oilmeal, with but little corn. Give plenty of exercise.

Give plenty of room in sleeping quarters, and teach young pigs to eat early. March and April litters are best. Keep salt and charcoal by them at all times. The growing of frame for the first six months and the keeping of equal-sized pigs together must be looked to. It requires intelligence of the highest order, after the ideal hog is secured, to keep it, and not allow it to degenerate.—*American Agriculturist*.

Mr. W. J. Black, Stanton, Ont., says "I cannot afford to lose a single copy of FARMING. It is a welcome visitor, especially since it became a weekly."