

do not become crisp and get broken off. If hay lies in the swath in the hot sun for five or six hours, the intense heat kills the cells in the delicate leaves of the clover or alfalfa, so that they wilt at once and become crisp. This is most detrimental. The leaves are the greater factor in removing the moisture from the hay, and in the cured hay from the feeding standpoint. It is, then, of the greatest importance to prevent their too-rapid drying.

In raking, after such a drying in the sun, almost all the leaves are lost, and the stems not fully dry, while the under side of a heavy swath is still green as when cut.

In light crops, or where timothy is the chief grass in the field, one tedding is sufficient. This may be followed by the side-delivery rake and the loader, housing the hay before nightfall. Some prefer to use the loader without the rake, thinking it saves time. The use of the rake, however, makes for a better curing of the hay.

In alfalfa haymaking, or even in clover hay-making, the use of canvas caps may well be considered. Alfalfa and clover are both such highly valuable feeds for all kinds of stock, and, if well saved, can be used to displace so much mill stuffs that the greatest effort should be made to grow and save them.

A little extraneous moisture on the hay does great harm. All dew or light rains should be completely off the hay before it goes to the barn, otherwise mould is very likely to develop. A little excess of moisture within the hay, as cell sap, is not nearly so likely to cause damage.

In the barn, the sprinkling of salt over the hay after every two or three loads helps to preserve the hay, prevents mould, and adds to its palatability. Some think, however, that the hay is rendered less digestible.

In the Maritime Provinces, where the middle of the day does not become so warm, haste is not characteristic of the best methods. There is not so much tendency to over-rapid drying and its consequent losses. Where, in these Provinces, other than leguminous hays are made, on account of the slow drying, due to climate, and the less prevalent leaves on the grasses, much more time must be given the hay, both in the cock and before it is put in the cock.

Not only "make hay while the sun shines," but keep making it all the time, if you would have good hay.

The first point to accentuate as we approach the subject of harvesting is the pre-eminent value of the leaves. These contain from seventy-five to eighty per cent. of the protein of the whole plant, that valuable compound that goes to produce milk and meat. It has been estimated that a ton of properly-cured alfalfa leaves is equal in protein to 2,800 pounds of wheat bran; and when it is also estimated by careful observers that the loss of leaves in harvesting, even under favoring circumstances, ranges from fifteen to thirty or more per cent., it is readily seen that the harvesting is an important part in alfalfa haymaking.—[From Coburn's "The Book of Alfalfa."

"Alfalfa hay," says Coburn, "taken from the mow in February, green, appetizing and nutritious, falls little, if any, short of serving the purposes of silage."



A Third Cutting of Alfalfa Under Hay Caps in Minnesota.

Hay caps, while not generally favored, but only because of the labor entailed, are considered by some discerning farmers as very commendable. They may easily pay for themselves by saving one crop from damage by rain and sun. They are made of canvas, brush, burlap, cotton sheeting into squares, and attaching a few ropes to each corner.

THE DAIRY.

New Methods of Cream Treatment II.

To continue this subject, which I commenced in a former issue (May 12th), there are a couple of points yet which I would like to refer to in connection with pasteurization. When cream is heated in a continuous-flow machine, like the Reid or Jensen pasteurizer, it remains at the maximum temperature for a very short period of time, varying from a few seconds to a minute, at most, depending upon the speed of the machine and the rate of feed. The bacterial efficiency varies with the temperature and time of exposure; the higher the temperature, and the longer the time of exposure, the greater is the percentage of germs destroyed.

To obviate the use of the excessively high temperatures which are necessary to do the work with short-exposure machines, there is coming into use a piece of apparatus known as a "retarder," which is somewhat similar to a large channel heater, familiar to most of us in the old whole-milk days. This is connected up with the outlet of the pasteurizer, and through it the cream flows slowly, maintaining its temperature for several minutes (according to its size) before running over the cooler in the usual manner. The efficiency of the machine is thus considerably improved, and excessively high temperatures are no longer required. This is a simple piece of apparatus, which is meeting with much success in a number of creameries, and is one which can be easily and cheaply installed.

The second point brings us back to the old method of intermittent pasteurization, and refers to pasteurization in bulk in a modern cream-ripening vat, such as the Wizard, for example. The method is, briefly, as follows: The vat being preferably half-full, at least, the disks are set in motion, several pails of hot water are introduced into the ice-box at the end, and circulated continuously through the disks by means of the small rotary pump on the front end. The steam valve is opened wide, and the circulating water is gradually heated to any temperature required. In from 20 to 30 minutes the cream will have reached a temperature of 150 degrees F., when the steam is turned off, the pump stopped, and cold water now run through till the cream has been cooled to the desired ripening temperature, circulating iced water by means of the pump again in case the ordinary water supply does not bring it low enough.

In case of sour cream in summer time, when no ripening is required, a good starter is added when the temperature reaches 70 degrees, or less; cooling continued to churning temperature or lower, and the churning made a few hours later the same day the cream is received.

The exposure of the cream to the temperatures of 110 to 150 degrees F. for at least ten minutes insures efficient pasteurization, and the aeration of the hot cream on the immersed portion of the disks is also beneficial, especially in the case of tainted cream. In the writer's experience with this method, compared with the common one of heating to 180 to 185 degrees F. in a continuous-flow machine, the former is immeasurably superior, judging from results obtained in experiments during the summer months of a couple of seasons.

Combined with this, the ease of manipulation, minimum of attention required, economy of machinery and space, and the certainty of having every drop of cream exposed to the maximum temperature for any desired length of time, is rapidly bringing advance buttermakers to realize that the modern cream-ripener, so-called, is an efficient and economical pasteurizer as well.

Two other modern methods of cream treatment remain yet to be discussed, and they, as Prof. Hastings remarks, in a recent issue of Hoard's Dairyman, savor very strongly of the methods of the renovated plant, with the exception that the butter-fat is never melted, as it is with the renovator.

The first is the process of diluting and re-separating the cream delivered by the patrons. The diluting material is fresh, sweet whole or skim milk, if obtainable in sufficient bulk; otherwise, water. A large-size, hollow-bowl, Danish-Weston separator (no small skim-milk tubes to plug up) can do the separating. The badness of old, sour cream is chiefly limited to one constituent, the casein, which undergoes putrefactive changes, rather than to any change taking place in the fat itself. Undoubtedly, the fat will absorb to some extent bad flavors from this change, but, compared with the casein, it is much more stable, and less easily spoiled. The process of re-separation removes the bulk of this undesirable curd, which is taken from the bowl at intervals as a heavy separator slime. A rich cream is skimmed, a heavy starter added, and a much-improved quality of butter churned. Cost of separating and fat losses in skim milk and curd are considerable, but by making an otherwise unmerchantable product merchantable, the manufacturer comes out ahead.

The second process consists of blowing purified air through the heated cream in considerable quantities. This, as naturally would be supposed, removes, to a large extent, the abnormal taint and objectionable odors commonly found in poor cream, and has found a field on this account. Neither of these two latter processes is recommended to, or likely to be used by Canadian dairymen, but the advantages of pasteurization in one form or another are so generally proved, and conceded that no creameryman can afford to get along without its aid. T. H. L.

Pasteurization Problems.

Editor "The Farmer's Advocate":

Your correspondent, H. H. D., in the May 26th number of your journal, criticises, somewhat arbitrarily, to my mind, the method of double pasteurization as a remedy for metallic flavor in butter made from pasteurized cream.

You admit that this defect is rare in Canada; therefore, your experience with it must be limited.

In several of the Western States it has been common during recent years, especially in the spring and early summer, causing considerable financial loss to many creameries. It has also been investigated closely by one of the leading experiment stations in this country. The solution of the problem evaded them all for some time.

Do you suppose that all this trouble and financial loss was due to lack of proper cleaning of pipes and pasteurizer? If so, it is a tremendous slam on our buttermakers, investigators and creamery managers.

Then the method of "double pasteurization" was hit on, and proved to be a successful remedy for the trouble.

Even if "we cannot see where any advantage is gained by such a system," the fact remains that it is gained, as the trouble has been overcome by it. As to its practicality, there is no question as to that, for it has been successfully adopted by a number of large creameries on this side.

Again, if cream is heated to 125 degrees F., and held at that temperature for 20 minutes, it will not cool to 100 degrees, as your correspondent suggests.

I merely write to have the facts put before your readers as they are, rather than have conclusions drawn from my article by your correspondent, who is undoubtedly unfamiliar with the trouble to which I referred, although I do not doubt that he may have experienced a somewhat similar trouble from the cause he names. T. H. L.

The Commissioner of the Cold-storage Branch at Ottawa reports that the demand for cows is unprecedented this year. As high as \$100 has been paid for well-graded cows. The shipment of cream to the United States continues from southern Quebec, along the St. Lawrence River, and from Western Ontario. Practically all factories within driving distance of the border, east of Richelieu River, are skimming the milk and selling the cream.

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