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DAIRY FACTORIES.

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PHILADELPHIA:
J. B. LIPPINCOTT COMPANY.
1889.



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*By Henry
Stewart*



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DAIRY FACTORIES.

Dairy Factories. Dairying, as a special business, has been extensively developed during the latter half of the 19th century in America, the United States and Canada included, mainly through the introduction of the peculiarly American factory system, or associated dairying. The first factory was organized in the state of New York, by Jesse Williams, in 1860, and the result being exceedingly favourable in regard to the quality and increased market value of the product (which was then cheese only), many other factories were organized, until in 1866 there were nearly 500 of them in operation in the state mentioned, the cost of these being about \$1,000,000 (£200,000), with a stock of cows worth at the then low valuation, at least \$10,000,000. The farms thus associated were then worth, for the million acres covered by them, not more than \$40,000,000 (£8,000,000), or an average of \$40 per acre. Five years later there were factories in several of the states and also in Canada; the list comprising 946 in the state of New York, 103 in Ohio, 46 in Illinois, 5 in Kentucky, 4 in Minnesota, 34 in Wisconsin, 26 in Massachusetts, 32 in Vermont, 14 in Pennsylvania, 7 in Iowa, 2 in Indiana, and 1 each in Virginia, North Carolina, Tennessee, Kansas, and Connecticut. This associated industry became known in foreign countries as the 'American system of

dairying,' and was quickly introduced into England, Sweden, Denmark, Switzerland, Holland, and other countries where the dairy business was carried on extensively, but it has not increased to anything like the extent it has in America. Very soon the manufacture of butter was introduced into the factories, as well as into special establishments for butter-making alone, the latter being called creameries, in contradistinction to the factories where cheese only was made, or where butter and skim-milk cheese were made, or where the skim-milk was adulterated with fats and oils of various kinds, as substitutes for cream. It was about this time (1872) that the French oleo-margarine (a preparation of beef-fat) was introduced into the American dairy as a substitute for pure butter fat in the manufacture of cheese. It is a disagreeable truth to confess that this fraudulent '*dairy* (?) product,' as it is called, still maintains a firm hold upon American dairying, and largely as a distinct fraud, made use of for the purpose of making and selling adulterated cheese, and butter as well, for a pure product. And in addition to the fat of beeves, lard and cotton-seed oil are extensively used. Laws recently passed in several of the states and in the United States congress forbid the sale of butter so adulterated under heavy penalties, but no legislation as yet protects cheese from the fraudulent mixture. This stigma upon the American dairy (Canada, it may be said, is happily free from it) remains to this time a reproach and severe pecuniary damage to the dairy business.

American dairy cheese is made under the well-known Cheddar system, so called, which is prevalent

in parts of England, and in Ayrshire and other localities in Scotland. This is *the* American cheese which is so well known and highly regarded in Great Britain, when purely made under the best system of management. But a considerable variety of cheese is now made in imitation of foreign kinds, and is used by the foreign-born citizens, who have not forgotten their acquired taste for the old home-made cheese.

Creameries, or butter-factories, came into use with the cheese-factories, but were not numerous until a way was found to utilise the skim-milk by adding artificial fats to it. Then the combined butter and cheese factory turned out its butter and its full-milk cheese together. This questionable method of business, however, became unpopular, and actual creameries came into vogue, and have rapidly increased during the past few years. In 1880 there were 3932 cheese and butter factories in the United States; in 1888 there were at least 5000, the largest numerical increase having been in creameries. In the creamery, the cream gathered from 600 or 800 cows is worked up by one skilled butter-maker, and the product is a good article of even quality all through; it is made in sufficient quantity for shipment and sale under the best conditions, and hence it commands a higher price than the best ordinary farm-dairy butter. It is made with the best apparatus, is packed and shipped in cold-storage or refrigerator cars, and reaches the domestic consumer within a week after it is made; and the foreign purchaser may have it upon his table within two weeks of the churning in the creamery, more than 4000 miles distant. These are advantages which the

solitary butter-maker cannot secure; hence he can only get the creamery price by securing special customers near his dairy. A few so-called fancy dairies are able to secure 40, 50, or even 75 cents (1s. 8d. to 3s.) per pound for their butter, but even the best ordinary farm-dairy butter sells at a lower price than creamery butter, and fully three-fourths of it sells for less than half the price of the other.

American creamery butter is made by the deep setting system, borrowed from the Swedish method, and improved by American ingenuity. The milk is strained from the pail into cans 9 inches in diameter and 20 inches deep. These are set in tanks of water cooled by ice to 45°. At the end of twelve to twenty-four hours the cream has separated, and the milk is drawn off by a tap in the bottom of the can, view being given by a strip of glass let into the side of the can. The cream is then drawn off by itself. For the use of the creamery the quantity of cream is measured by the inch, and is paid for on the basis of so many inches to the pound of butter. One hundred and thirteen cubic inches of cream is taken as the standard in this respect. The creamery gathers the cream once a day, and secures it perfectly sweet, while the skim-milk is also left sweet for the feeding of calves, for sale for consumption, or for the making of pork. The cream is kept until it is slightly acid before it is churned, making thus a quality of butter which keeps better and longer than that made from sweet cream. The churns most popular are those without any dash, being a cubical box turning on an axis passing through diagonal corners; or a barrel turning on an axis passing

through its centre sidewise; or an oblong square box oscillating endwise in swinging supports. The action of churning thus consists of a dashing of the cream violently against the sides or ends of the churn, and, by concussion, causing the globules of fat in the cream to adhere together, and gradually coalesce and form small grains of butter. When these grains are as large as wheat-grains, or peas at the largest, the buttermilk is drawn off, cold water or weak brine is poured into the churn, and the churn is moved gently, to agitate and wash the butter. When the butter has been completely freed from milk, and no longer clouds the water, it is drained, and salted with finely-ground pure salt, at the rate of from $\frac{1}{2}$ oz. to 1 oz. to the pound of butter. The salt is easily incorporated with the small grains of butter, and after a rest of a few hours for the salt to absorb the excess of moisture from the butter and become completely dissolved, a butter-worker is used to press the butter, make it solid and even in texture, and as dry as possible. It is then packed in new spruce or oak tubs, or pails, of 20 to 50 lb., for domestic sale, or in 100-lb. firkins for export.

The dairy interest has reached vast proportions in America and Canada. At least 1,500,000 farms, with 10,000,000 cows and 100,000,000 acres of land, are devoted more or less closely to the various branches of the industry. In the most populous of the states, where the dairy is the principal agricultural employment, good dairy farms are valued at \$100 (£20) per acre and upwards, as the buildings may be more valuable than the average. The land held to be most

suitable for the dairy is a rich limestone loam or gravel, that is productive of the best variety of grasses, especially the so-called blue grass (*Poa pratensis*), which affords the best pasturage. The best dairy districts are in the states of Vermont, New York, Pennsylvania, Ohio, Iowa, Wisconsin, Illinois, and the province of Ontario, in Canada.

The cows mostly kept upon dairy farms are the Dutch or North Holland, commonly called Holstein or Holstein-Friesian, Shorthorns, Ayrshire, the half or higher bred grades of these, and the common 'native' cows, the descendants of the promiscuous mixture of the various races of cattle brought into America. The most popular of these is the grade shorthorn, which may be purchased when in fresh milk; the Dutch cow is next in popular estimation, but it is scarce and high-priced, and is much less used. The average yield of these cows varies from 6000 to 8000 lb. of milk per year, or between calves, where calves are bred; the largest yield of the shorthorn and its grades averages 50 lb. daily, that of the Dutch cows is somewhat greater, and a few of the best have a record of more than 24,000 lb. of milk between calves and within a year. These cows can be kept with profit only upon high feeding and the best of pasture. For the butter-dairy the Jersey breed and its grades are the most profitable, and American pastures are now quite thickly sprinkled with the Jersey colours. Ayrshires come next, and the Devon follows in favour; but of necessity the common native and much cheaper cow forms the rank and file of the dairy herds.

In America the whole of the work of caring for the cows, feeding and milking them, is done by men. The feeding consists of pasturing wholly; pasturing with partial soiling, or full soiling in the summer; and feeding upon hay and meals of various kinds with pulped roots or silage in the winter. A large number of dairies are devoted to making butter in the winter, by which a higher price is obtained for the product, and leisure is secured in the summer for the growth of the feeding crops for use in the winter. With the rapid rise in the value of farms suited to the dairy, pasturing is found to be too costly for the largest profit, and partial soiling is almost universally resorted to. Complete soiling, by which one cow may be kept on the product of one acre of land all the year, is practised in some of the best of the fine-butter dairies, where land is worth \$200 per acre or more, and where pure-bred Jersey, Guernsey, or Ayrshire cows of high value are kept, a yield of 12 to 14 lb. of butter per week being obtained by the high feeding of these cows. One of these cows, a Jersey, recently produced 49 lb. of butter in a week, under a forced test, while from 14 lb. to 24 lb. of butter weekly has been given by more than 100 Jersey cows now living. This, however, is an example of what is known as fancy dairying, which is closely connected with breeding cows for sale at high prices. In a good working dairy a cow is required to yield 7 to 10 lb. of butter weekly in the height of the season, and at least 200 to 250 lb. in the season.

The average feeding of a dairy cow in the summer consists of the best pasture that can be afforded, with

some fresh green fodder as soon as the great heat of the summer hardens the grass, and from 2 to 12 quarts of ground feed—ground corn and oats, bran, cotton-seed meal, or linseed meal. A very common method of feeding is to give 2 or 3 quarts of mixed corn meal and bran, with a quart of cotton-seed meal at each milking time, the cows generally being brought to the barn to be milked. In winter, hay of clover and timothy grass mixed, with the same quantity above mentioned of meal and a peck of brewers' grains, is a common ration for cows kept in milk-dairies; brewers' grains are not thought favourably of in cheese or butter dairies, where any food that readily becomes sour or tainted is scrupulously avoided, and is wholly prohibited by the owners of factories or creameries, and by condensers of milk. Roots of various kinds are rarely used in America, the hot, dry summer climate and the greater ease of growing the equally valuable feeding crop, maize (commonly called corn), combining to make root-crops unpopular. When roots are grown, the long red or the yellow globe mangels are preferred.

The use of ensilage has been found very convenient in the dairy, and this practice is rapidly extending. In the dairy districts of Wisconsin at least 2000 silos were built in 1888, the serious damage to the feeding crops by the dry season of the previous year having induced dairymen to secure ample feed by growing corn—which suffers little from drought, and to some extent enjoys dry, hot weather—and preserving it green in silos. It is quite certain that the cheapness and ease of production of this grand fodder crop has

given a greater stimulus to the American dairy than any other favourable circumstance. The abundance and cheapness of the grain (corn), and also of bran, enable American dairymen to produce cheap milk, cheese, and butter; and there is no other class of American farmers who enjoy equal comfort, and even wealth.

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