THE STORY OF SWITZERLAND CHEESE

SWITZERLAND CHEESE ASSOCIATION
105 HUDSON STREET
NEW YORK, N.Y.
A ASSAN, the shepherd boy, tending his father's flocks on the hills overlooking his native village, found himself at high noon far from the cooling spring where he usually ate his frugal repast of black bread, dates and honey. All morning, while the flocks had wandered hither and thither, he had sat in the shadow of a rock patiently moulding with his hands a new water bottle he was making from the stomach of a goat. In a few days it would be shaped and cured so that it might be used to bring his daily supply of water from the spring under the great rock in the valley. Busy with his task he had noted not the sun's march up the heavens, but now the hot sun was overhead and Sassan was grievously athirst. The spring was far distant, but a milk ewe was at hand furnishing not only a cure for the thirst, but a supply of milk to be stored in the partly cured water bottle and carefully hidden behind a stone. The flocks wandered over the hills, the sun fell, and Sassan tossing the water bag over his shoulder wended his way to his father's house. At the house he started to pour out the milk, but it would not flow. Turning the skin outside in he found to his surprise a firm white curd which, when salted, added a new delight to the table of his father.

—OLD PERSIAN LEGEND.

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The art of cheese making is one of the oldest of the technical processes. Records indicate that it was known during the reign of King David, one thousand years before Christ. Mention of it may be found in the writings of the Greeks, and later Roman writers refer to "caseus Helvetius," which was imported from the North, Helvetia (now better known as Switzerland). Cheese, therefore, may be regarded as one of the oldest of the foods prepared by man. Furthermore, it is worthy of note that cheese is a true food and not an artificial food, i.e., it is prepared from material which is itself a food, milk.
Types of Cheese

Cheese may be divided into two main types, (1) the hard cheeses such as Emmental (Switzerland), Edam, Roquefort, and Cheddar, and (2) the soft cheeses such as Camembert, Limburger and Brie. A compilation by Doane and Lawson lists over 350 varieties of cheese. Of all these varieties the Switzerland cheese has, probably, the oldest history, and today forms an industry surrounded by picturesque customs. Scattered over the Alps, the Swiss farms have for centuries been the bases of an industry of utmost importance to the country. Green pastures, rich in aromatic grass and Alpine flowers, yield forage to thousands of cattle which supply the rich milk to some 3000 "cheese factories," or Kaesereien, as they are known in Switzerland. The character and quality of cheese depends upon the character of the milk from which it is made, as well as the process by which it is made. Although it may be possible to exactly duplicate the process of making any type of cheese in any country, it is impossible to reproduce the environment. Because of this difference in environment the character of the milk from which cheese is made varies from one country to another, and as a result the quality and taste will vary. This explains why the imitation Swiss cheeses produced in any country do not have the same characteristics which make the true Switzerland cheese so palatable.

The Cattle

Four breeds of cattle are predominant in Switzerland. The most commonly known is the so-called "Simmenthaler," taking its name from a beautiful valley in the Southern part of Canton of Berne. It is red and white in color and well known as excellent stock in various parts of the world to which a great number of animals have been exported in past years. Another breed has its origin in the mountains of the Canton of Fribourg in the Western part of Switzerland. It is somewhat similar in appearance to the Holstein breed, black and white, although slightly smaller in size. In the Southern and Eastern parts of the country two other breeds, all black and all brown respectively, are more generally kept.

The Pastures

Realizing the important part played by the character of the milk used in making cheese, the Swiss farmer takes his young cattle to the pastures of high altitude for the summer months. The advent of Spring in the Alps is always a long looked-for event in the beautiful villages. From the lowlands, the herds of young cattle are brought by train to the railroad stations nearest to the respective pasturages, and the remaining part of the journey is completed on foot. After the unloading from the train, bells are hung about the throats of the cattle, the largest bells with the deepest tones being reserved for the leader cows. Then the picturesque procession forms and, after leaving the station, proceeds through the village. These processions, with men and women dressed in their picturesque
costumes, are one of the many interesting customs of the Swiss people. Leaving the village behind, the procession slowly takes the trail for the pastures high above. Having passed beyond the village into the open country beyond, the villagers leave the procession, and the men who will remain with the herd all during the summer continue on with the cows into the hills.

Leaving the village, a journey of from five to ten hours may be ahead of the herd. The kitchen utensils, bedding and the like, for the few men accompanying the herd and who will remain in charge during the summer, have to be carried along, as the mountain trails leading to these pasturages are not usually accessible to vehicles of any kind. Each one carries his own supply of equipment, strapped to his back. The nourishment of these herdsmen, while in the mountains with the cattle, consists chiefly of cheese, milk and bread, and their life, with the exception of occasional visits from tourists who happen to pass through the region, is one of seclusion.

At the pastures in the mountains, long low sheds are provided as a shelter for the herd and one end of these buildings is constructed in such a way as to serve as quarters for the men. A few men, or a family of four or five persons may be in charge of several hundred heads of cattle. The cattle are usually rounded up for the night and driven out again in the early hours of the morning. This, however, is not a strict rule; weather conditions and temperature permitting, the herd is left to pass the night in the open. A danger menacing the cattle are the thunderstorms often raging thru the mountains in the hot months of July and August. Here and there, scattered over the pastures stand old firs, and the cases are numerous where as many as twenty animals were killed by lightning while taking shelter from the rain under these trees. For this reason the herd is always driven to the sheds upon approach of a storm if time permits. The pastures owned by the various communities are usually fenced in, as are also the dangerous places where the cattle might come to grief through slipping over rocks and falling down the cliffs.

While the making of hay for winter forage constitutes an all-important task for the farmer in all parts of the country, this work is particularly interesting, though tiresome, in certain villages of high altitude. Almost inaccessible spots or very steep slopes, interspersed with rocks and cliffs, yield excellent grass but cannot be reached with either machinery or carts. All the work has to be done by hand. The mowing is done by hand; the hay is gathered in large nets and the heavy bales thus formed are carried down to the little farms for storage until winter. It is difficult to picture the
reaction of an American farmer if he were asked to gather hay in this manner for the benefit of his cattle.

In the Fall, when days get shorter and the nights very cool, preparations are made to return to the valley, and a procession similar to the one in Spring proceeds on its way down to return the cattle to their respective owners.

**Cheese-Making**

The buildings in which cheese is made are usually owned by the corporation of farmers of a locality. These buildings are specially constructed for the purpose and are equipped with heating plants as well as warm and cold storage cellars for the manufacture and the curing of the product. The cheese maker rents this building from the corporation and contracts to take the whole output of their milk over a period of usually six months, i.e., May 1st to October 31st, or November 1st to April 30th, called summer or winter milk respectively. The cheese maker pays the farmers for their milk and in turn sells the finished product to the dealer through whom the cheese then passes on into the channels of the trade.

At the farms the cows are milked regularly, morning and evening, and the milk is brought to the cheese factory without delay between the hours of 6-7 o'clock A. M. and P. M. Part of it is carried by men in flat containers on their back, but most of it is brought in large round cans, containing about 12 gallons, on dog carts. This bringing of milk to the cheese factory twice a day is a matter of daily routine with the smaller boys of the farms. The distance they have to cover is rarely over one mile, and the number of farms so delivering their milk to one cheese factory is usually 20 to 30, in many cases 40 to 50 or more.

The milk brought in is immediately weighed in a hanging scale and record of the weight is kept on a blackboard by the cheese maker and also entered in a little booklet which remains in the hands of the farmer for future record. Approximately four-fifths of the milk coming in at one time is poured into the large copper vat or boiler in which the actual first process of making of the cheese is to take place within the next three hours. The remaining one-fifth is stored away for 12 hours in flat pans in an adjoining cool room and will be used together with the fresh milk that comes in next morning (or evening), part of which will again be put aside for the same period, and so on.
When the vat contains between 800 and 1200 quarts of milk it is necessary to bring its contents to the proper temperature. The milk is kept at this temperature, between 90 and 95 degrees (F), until the desired amount of lactic acid is formed in the milk. Care must be taken, however, that there is not too much lactic acid in the milk. Milk that has the proper amount of lactic acid and is ready for the cheese-making process is termed "ripe." The first step in the process is coagulating the milk. This is accomplished by the addition of rennet to the milk. Rennet is the secretion of the stomach of various animals, that of the calf being most highly prized for cheese-making. In Switzerland only rennet obtained from calves is used. This aqueous extract contains a ferment which has the property of coagulating casein in a very high degree. From one-half to one part of rennet will coagulate 1000 parts of milk. The rennet is diluted with from 20 to 40 times its volume of water at a temperature of 85 to 90 degrees (F). This dilution of the rennet permits it to act uniformly on the milk and prevents the production of a lumpy curd. Before adding the rennet the milk is stirred thoroughly in order to distribute the fat evenly throughout the milk. The rennet is added evenly and slowly, the milk being stirred constantly for several minutes in order to distribute the rennet solution uniformly through the milk. The mass is then allowed to rest for about one-half hour during which time the rennet added to it causes it to coagulate. After this curdling process has taken place, the white thick mass is in appearance and consistency somewhat like jelly and is cut into smaller and smaller pieces by means of various instruments such as a wooden shovel and an instrument which looks somewhat like a harp. This cutting of the curd into pieces permits the whey to escape and the smaller the pieces of curd the more rapidly will the whey escape. The curd, tending to contract as it is formed, forces out a portion of the whey and this cutting of the curd increases the surface from which the whey can exude with the result that the separation of the whey from the curd goes on more rapidly. If the curd is cut too soon, when very soft, there may be a large loss of fat and a decrease in the quantity and quality of the cheese. If the curd is too hard when cut, greater difficulty is encountered in removing the whey and the quality of the cheese is decreased. Because of this critical nature of cutting the curd it is possible only for a skilled and experienced cheese maker to produce continually a uniform product of a desired quality. As the curd is cut and the whey begins to separate from it the curd settles to the bottom. For two hours the curd is stirred, mostly with a mechanical stirring device, and the temperature raised during this period to 128-131 degrees (F).

At the end of this period the curd, having obtained the necessary consistency, is taken out of the vat by passing a cloth, mounted on a frame, along the bottom of the vat, tying the ends of the cloth together, lifting the mass high with a tackle and hauling it out of the vat, along a rail suspended from the ceiling, over on to a solid table.
The whey left in the vat after the curd has been taken out still contains some butter fat, milk sugar and a considerable portion of the soluble mineral matter originally present in the milk. By means of separators the butter fat in the whey is extracted and the remaining liquid as a rule goes back to the farmer. It is returned to the farm in the containers in which the milk was brought to the factory and is used by the Swiss farmer as one of the important ingredients in the food for hogs.

The curd, after being taken from the vat to the table, is pressed into a mould for 24 hours and the wheel of cheese, as it is later found in the trade, takes shape. The main object of pressing the curd in this mould—besides giving it the desired shape—is to squeeze all the whey out of it and to retain nothing but the dry mass of curd. It is turned over several times a day, packed in dry cloth and the mould is tightened. Gradually, during this process, the mass becomes more and more compact, although it is not yet sufficiently hard to support its own weight without falling out of its cylindrical shape, which at this stage can best be compared with a thick slice of sausage cut off at a perfect right angle and magnified many times.

The loaf is then taken to a cool cellar where it will swim for several days in a large concrete or wooden container filled with salt water. The ripening of the cheese depends upon bacterial activity. The changes which take place in the chemical and physical properties of the cheese and the flavor developed are the results of different organisms. These bacteria are sensitive to environment so that results obtained with the same species of bacteria in changed environments are not the same. This explains why a cheese made in one locality cannot be exactly imitated in a different locality. After having gone through this salt water bath, the loaf is placed on a shelf in the cool cellar for a number of days. This prevents too rapid fermentation which would lower the quality of the cheese. From the cool cellar the loaf is transferred to the warm cellar. Much labor is necessary to take care of the cheese all during these weeks. Each loaf or wheel is taken out of the shelf every other day, turned over, washed off and rubbed thoroughly with a dry cloth, and salt sprinkled over it. The grains of salt melt in the moist atmosphere of the cellar and the drops of pure salt water penetrate through the rind into the curd, thus contributing to its tasty flavor.

In the warm cellar the fermentation in the cheese increases, the lactic acid bacteria produce lactates which are attacked by organisms of a different type which results in the production of carbon dioxide to which the characteristic "eyes" or holes are due. The rind forms and takes on a yellowish brown color. The eyes are normally about the size of a 5c or 25c piece and are evenly distributed throughout the whole mass of the curd which has become of a rich creamy color. In the winter, when the cows are fed on hay, the color of the cheese is rather white, while in summer, when green fodder is available, the shade is richer, a creamy yellow. After the necessary stage of eye formation has been reached, which requires three to five weeks, the cheese is again transferred to a storage place with a low temperature. This cooling off causes the fermentation to stop. The eye formation remains at the point where it is at the time of transfer from the moist atmosphere and higher temperature to the cooler storage. Through years of experience, the cheese maker is able to tell, by tapping on the surface of the loaf, just when the fermentation, in other words, the formation of the "holes" inside, has progressed far enough; this is his way of determining the day when the transfer from the warm to the cold cellar is to take place.

Marketing the Cheese

The product is then ready to pass into the hands of the trade. At intervals of from two to three months, the dealer to whom the cheese maker has sold his output of cheese, comes to the factory, examines a number of wheels, weighs them and takes them away. The

Some Swiss Costumes.
weight of single loaves of cheese varies from 160 to 220 pounds.

In selecting and classifying a particular loaf of cheese the commercial qualities of importance are the flavor, texture, body, color and appearance. The requirements of the different world markets vary considerably, some markets demanding very ripe cheese, others less ripe and some demand other characteristics. The dealer must therefore examine each loaf and classify it so that through his knowledge of the market demands, he can send it to the proper market for sale.

Although large motor trucks are rapidly coming into use in transferring the loaves of cheese from the factory to the dealer’s warehouse, this was done formerly by loading the wheels into long carts padded with straw and drawn by horses. The dealer’s storage cellar is the place in which the cheese is kept before being shipped to the markets. Where a very “ripe” cheese is needed, the dealer will keep the cheese in his warehouse for several weeks where it will be regularly washed and salted in order to bring its flavor to the desired point.

As previously stated, the commercial qualities of any cheese depend upon the environment in which the cheese is made, first, because of the effect of environment upon the character of the milk used and, second, because of the effect of environment on the bacterial activity in the cheese-making process. In order to protect the user from imitations the exporters of Switzerland cheese stamp the name SWITZERLAND on the rind of every loaf of their shipments. In packing these loaves for shipment, three to four loaves are placed in round wooden tubs. The weight of one of these tubs when filled averages 700 pounds. After the cover has been placed on the tub and the usual labors and formalities connected with shipping have been completed, the tubs are handed over to the railroad and sent on their way to all parts of the world.

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Cheese as a Food

The approximate average composition of Switzerland Cheese is as follows:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Water</td>
<td>34%</td>
</tr>
<tr>
<td>Fat</td>
<td>31%</td>
</tr>
<tr>
<td>Protein</td>
<td>30%</td>
</tr>
<tr>
<td>Salt, Milk Sugar, Lactic Acid and Ash</td>
<td>5%</td>
</tr>
</tbody>
</table>

Cheese is very rich in protein and fat as well as in calcium and phosphorus, which latter elements are largely in combination with the casein and are concentrated with the casein in the process of cheese making. A pound of cheese represents, approximately, the casein and fat of a gallon of milk. In most localities cheese gives a greater return in food values for money expended than meats or other foods of animal origin.

Cheese, eaten raw or thoroughly cooked, is as thoroughly digested as other staple foods. This has been ascertained by scientific tests. Artificial digestion experiments have shown that the pancreatic fermentive enzymes have much more effect upon the digestion of cheese than the gastric fermentives. This indicates that the digestion of cheese takes place chiefly in the small intestine rather than in the stomach. Langworthy, following tests of the effect of eating cheese as compared with meat, concludes, “It seems fair to believe that there was practically no difference between the cheese and the meat with respect to ease of digestion at least in such quantities as are commonly eaten.”

Cheese, containing neither starch nor cellulose, probably should be eaten in combination with bread, potatoes and other starchy foods as well as with vegetables and sweets. Due to the high percentage of fat in cheese the accompanying dishes do not need any appreciable quantity of fats. The harder breads should be eaten with cheese to balance the soft texture of the cheese.

Although cheese is generally used in some way in most families, little thought has been given by the majority of housekeepers to making menus with cheese as a central dish, until the last few years. A great deal of this lack has been due to inexperience. Cheese, if used in quantity, should be used to replace foods of similar composition rather than to supplement them. Thus cheese, meat, fish and eggs may be used interchangeably for the main dishes of a meal.