

applies to all the cows or only to those of the Schuytz breed is uncertain. At the conclusion of the visit a hearty vote of thanks was conveyed by Professor Sheldon, on behalf of the Association, to Herr Lutz, who responded.

Returning to their numerous carriages, the visitors next proceeded to Dr. Gerber's dairy, in the city of Zurich, where butter, skim-milk cheese, and soft cheese are made, Gruyère and Emmenthaler being made by him in a country establishment. From his town dairy most of the milk is sent for town use, some of it, after being sterilised, in stoppered bottles. The arrangements of the dairy are good on the whole, but not remarkable. Laval separators are used in it. One of the best features is a large cistern in which all the milk is strained. On the other hand, it is not a good plan to make cheese in the same set of rooms (opening one into another) as that in which milk is dealt with and cream is separated. A notable thing in the dairy is a condensing machine, sent for experiment, its purpose being that of condensing separated milk for soap-making. Most remarkable of all, however, is Dr. Gerber's method of testing milk butter, and cheese, shown in operation in the laboratory. It is apparently superior to the Badock tester, for two reasons. In the first place, the revolving disc in which the tubes containing milk, &c., are placed is a covered one, so that nothing can fly out of it; and, secondly, instead of by turning a crank, the motion is obtained by winding a piece of string round the spindle and rapidly withdrawing it, causing the cylinder to spin like a top for about five minutes.

After luncheon a conference was held at the Hotel Bellevue, at which Herr Beachler, editor of the principal Swiss dairy paper, the *Schweizer (1) Molkereizeitung*, read a paper on "The Dairy Industry of Switzerland." He said that the climatic conditions and the soil of the country suited the breeding of cattle, so that in early times attention was paid to it, and to dairying with it. Even in the times of the Romans, cheese was carried from the Swiss Alps to Italy. After a time the making of cheese, chiefly Emmenthaler, became highly developed, and the green cheese Schabziger, now widely known, has been produced in the Canton of Glarus since the fifteenth century. The other cheeses made are the Gruyère, Ursoren, Glarner Ziger, Saanen, Welsh, and Bellelaye among hard cheese, and Limburgh, Romador, Vachorn, cream, and Sarassin among soft ones. The production of condensed milk has been an important industry in the country since 1866, when the first factory was established by the Anglo-Swiss Company in Cham, followed by the Nestlé factory at Vevey in 1868, and others later on. Dairying and breeding are now the most profitable branches of agriculture in Switzerland.

The cultivated area, including pasture, of Switzerland cover about 5,359,700 acres. The latest returns of live stock were those of the census of 1886, when there were 98,622 horses, 4,788 mules and asses, 1,212,538 cattle (or 223 per 1,000 acres of cultivated area), 341,804 sheep, 416,323 goats, and 394,917 pigs. The number of cows is put at 663,102, and that of heifer over one year at 186,983.

Except in the Alps, where they are out during the whole summer, the cattle are turned out only in the early

(1) "The Swiss Milk-Gazette."

spring and the late autumn. They get grass, clover, lucerne, green maize, rye, green oats, spurry, and other forage during the forage season, with rare addition of cake, &c. In winter they have hay, turnips, potatoes, beans, and cake, or other dry food. The speckled Fleckvieh cattle will yield 2,800 to 3,000 litres (622 to 666 gallons) per annum; but Herr Beachler puts the average yield of cows in Switzerland at 487 gallons. The estimated value of the cattle produce of Switzerland per annum is 285,242,000 francs, of which the share allowed for milk and its products is 174,263,200 francs. The net exports of cheese in 1893 were valued at 25,920,849 francs. Imports of butter exceed the exports. Last year 28,263 cows, 7,153 heifers, 5,730 young cattle, and 14,458 calves were exported, and 3,388 cows and heifers, and 17,188 young cattle and calves were exported.

The farmers combine to start and carry on cheese factories. In making fat or half fat cheese of the Emmenthal and Gruyère types the milk is warmed up to 35 deg. Centigrade with an extract produced by heating whey one or two days, and curdles in half an hour. After this the curds are well broken up and stirred until the particles are not larger than peas. These are left alone for about fifteen minutes, after which they are stirred again until they no longer shrivel up. Next they are warmed up to 55 to 60 deg. Centigrade, and stirred for half an hour to an hour, until they have the desired consistency, and no longer fall asunder, but they must not be hard, nor grate between the teeth when bitten. The right judgment as to the proper degree of maturity is said to be difficult, and only to be acquired by experience. In the handling of the curds they are carefully gathered in a cloth within the kettle and taken out of it; then they are put into a wooden ring, and with this under a press. Here the mass remains, the cloth being frequently changed, and the pressure heightened from 15 to 20 kilogrammes per kilo. of cheese for the next twenty-four hours. After this the cheese is taken out of the press and into the cellar (temperature, 10 to 12 deg. Centigrade,) and left in the wooden ring until it is hard enough and strown with dry salt. After three or four weeks the cheese is brought into the cellar, where it has to ferment. This cellar is mostly an apartment with a temperature of 18 to 22 deg. Centigrade, and very damp air. Here the holes are formed. The curing takes from six to eight weeks. Next the cheese is put into the store-cellar, where it must be every day, or every other day, strown with dry salt. It is also essential that it be regularly turned. The whey that is left yields whey butter. For that purpose it is either put into skimming vessels, or, with an addition of whey vinegar, warmed from 80 to 85 centigrades, until the butter-fat separates. This is taken off and cooled, and churned like common butter. If the remaining whey is heated from 90 to 95 centigrades, the albumen it contains curdles, which represents the Ziger cheese. Mostly the whey is, without extracting the Ziger, given to the pigs.

In the course of the discussion, which chiefly consisted in answers to questions. Herr Mettler said 95 per cent. of the farmers owned their farms. He also stated that all taxes were practically levied in one tax, in proportion to income, no distinction between realty and personalty being made.

After the conference the Local Committee conducted the party on a pleasure excursion up the Uetliberg Mountain, (1) the summit of which is reached by a winding railway.

#### LUCERNE TUESDAY.

This morning a start was made at 6.45 for Cham, Lake Zug, where the Farmers' Co-operative Cheese Factory was first inspected. This is owned by twenty farmers, who supply the milk of about 300 cows. The temperature of the milk in cheese-making is varied by means of a movable grate under them. Emmenthaler is the variety of cheeses made, 12 lb. of milk making a pound of cheese. As soon as the cheese have been pressed they are soaked in brine strong enough to make them float for two or three days. Afterwards the cheese is kept in a cool chamber for a month; next in a warm room from two to four months—long enough to cause the holes found in this cheese to form by means of the fermentation set up by the high temperature. Salt has to be rubbed upon the cheese daily when in the cold and warm rooms alike. The usual price at the factory is 10d. a pound. Whey butter is made, and some cream-butter from milk set in shallow pans.

The most important business of the day was the inspection of the Anglo-Swiss Condensed Milk Company's factory at Cham, after the visitors had been hospitably entertained at luncheon.

This is a great building, and in it about 250 men and women are employed, working usually ten hours a day, the wages of men being four to five francs a day, and those of women two to three francs. The Company have three factories in Switzerland, two in England, and two in America. The three Swiss factories take the milk of 10,000 cows. The arrangements and appliances are in a high state of perfection. First the visitors were shown into the milk-receiving room, where the milk is weighed, next to the evaporating room, where it is condensed in five great condensers, holding a thousand gallons each. The boiling-room was next seen. There, the sugar is added before the condensing takes place. Here, the milk is cooled after being condensed to as low a temperature as possible, with the use of water, in which the cans of milk are stood. Next it is put into tins and rapidly soldered down. The box-making and tin-making rooms attracted most attention, particularly the latter, where wonderful machinery is in use. In another building butter and skim-milk cheese are made. At this factory alone the milk of 6,000 cows is taken, it being much bigger than the others in Switzerland.

The model farm at Langrüttli, now owned by Herr Lustenberger, was last visited to day. It is about 210 acres, nearly all grass, and seventy two cows are kept. They are kept tied up all the summer, and fed on grass and other green stuff. In winter they have corn as well as hay. There are two breeds here, the Schuytz and the Simmenthal. The manager says the former is the better for milk; but this is the home of that breed, and in other districts the verdict is in favour of the rival breed.

#### BERNE, WEDNESDAY NIGHT.

This has been a red-letter day for the members of the British Dairy Farmers' Association and their friends, not only because some places of dairy interest have been visited, but also,

(1) Berg means a mountain.—Ed.

and mainly, because it has given the visitors an opportunity of seeing more of Swiss life and character and social condition than either of the preceding days. The goodness of Colonel von Wattonwyl is referred to in our leading columns, and we need not here repeat the brief description of the very remarkable entertainment at Konolfingen-Stalden. The rail ride from Lucerne to that place was a charming one, not only in relation to scenery in the ordinary sense of the word, but also for the great show of their farms and farmhouses which it afforded. Land in small patches was seen to be cultivated up to nearly the tops of high hills, and the sizes of the houses belonging to very small farms were very striking. Men, women, and children were busy hay-making all along the route up to the evening, when rain fell heavily—the first experienced here since Saturday. Splendid crops of hay were seen wherever good land was passed.

Arrived at Konolfingen-Stalden, the first proceeding was a short walk along a fertile valley to the village dairy, in front of which some excellent bulls and cows of the Simmenthal breed were exhibited. They were collected from the animals bred by four local syndicates of cattle-breeders' associations formed to improve the breed by the selection and purchase of first-class bulls, and recording the pedigrees of cows and bulls. In the dairy first-class Emmenthaler cheese was being made. The members of the village association—27 in number—divide the proceeds of the sale of cheese and of the butter which they also make. They are not paid for their milk, but wait till they have realised the value of its products before getting their respective shares of the money. The plan of steeping the cheese in brine, noticed at Cham, is not pursued here. It appears, too, that there must be some mistake about the price undertood to be realised for cheese at Cham, namely, a franc a pound, as that is the retail price for the best cheese in towns. About 8d. a pound is obtained at this village dairy. Visitors were much struck with the size and excellence of the farm buildings on Adolf Stuecki's farm of 40 acres. He has twenty capital cows of the Simmenthal breed. The cows are kept tied up (as elsewhere throughout the districts visited) in summer as well as in winter, and are only let out in the autumn, after the second (or third in some cases) cut of grass has been cleared off the pasture. They are fed exclusively upon green forage, cut and brought into the cowhouse for them in summer, and on hay and oatmeal mixed with water in winter.

(To be continued.)

**Butter not coming.**—There are various causes why butter sometimes does not come, or is very reluctant to come, in churning, but the following recorded in the German periodical, the *Milk Zeitung*, or as we should say, the Dairy Journal, is quite new to us.

"The cream was found to contain bacteria, which caused a soapy consistency and an unpleasant odour and flavour, and the microbes were traced to mouldy hay with which the cows had been fed, or mouldy straw with which they were littered. Even the pasturage of cows upon grass land upon which manure made from mouldy straw has been spread has been known to produce the trouble referred to according to the authority named."

Are we not going rather too deeply into this style of argument?