

off injury by the fly. A method that is frequently recommended but not very often practiced, is to sow "decoy" strips of wheat late in August. Many of the flies will be induced to lay their eggs on these strips, which may then be plowed under and the eggs destroyed. Do not let the strips stand more than four weeks, or but a few days after sowing the main crop.

In combating Hessian fly, great stress is laid by entomologists on cultural practice. Anything which tends to increase the vigor of the crop helps to ward off the fly, or, at least, to minimize its effects. A noted authority, Prof. Webster, of Ohio, who has studied the Hessian fly for many years, believes that four-fifths of its ravages may be prevented by a better system of agriculture.

THE DAIRY.

A Day in a Cheese Factory.

Though cheese has for years been Canada's leading dairy product; though the factories where it is made may be counted by the dozen in nearly every county of Ontario and Quebec, while some are also operated in the Maritime Provinces; though it is with us a more or less common article of diet, and though many thousands of our farmers rely chiefly on their monthly cheese-factory checks as a source of income, there are millions of Canadians, and among them, no doubt, a number of "The Farmer's Advocate" readers, who lack even a general idea of the processes by which this staple food is manufactured. For such, a description of a day's work in a cheese factory, as witnessed by a member of our editorial staff, may be of interest.

Typical of the better class of factories is the North Oxford factory, in the famous Western Ontario dairying County of Oxford. This is the district where one of the first cow-testing associations in Canada was organized last winter. The factory, which is situated about two and one-half miles north of Ingersoll, is a neat brick structure, surrounded with maple trees. A row of them line the driveway which passes the weighstand of the factory, and here a whole string of milk wagons may stand in the shade waiting their turn to unload. This is far better for the milk than keeping the cans in a blazing hot sun. It does not sour so quickly, it makes better cheese, besides which is the comfort of the men and horses, and here a whole string of milk wagons may stand in the shade waiting their turn to unload. This is far better for the milk than keeping the cans in a blazing hot sun. It does not sour so quickly, it makes better cheese, besides which is the comfort of the men and horses, and here a whole string of milk wagons may stand in the shade waiting their turn to unload.

The history of this factory is like that of many others. Built originally as a private enterprise, it was afterwards taken over by a joint-stock company, but has now passed back again into private control. Mr. G. M. McKenzie is the modest but capable proprietor and maker, being assisted by his two sons and a hired hand. There are 76 patrons on the books, and the make has annually increased to last year's respectable output of 215 tons of cheese. June, 1906, was the record month, \$8,000 worth of cheese being made. From this, one patron's net proceeds, deducting the cost of making, figured out a check for \$262, besides which he received pay for a portion of his milk which he sold in town. Last year the cows in the herd of Peter Dunne, who used to be a cheesemaker, but is now farming, averaged 7,000 pounds of milk apiece during the cheese season, April 1st to December 1st. Holsteins and their grades are the favorite breed in this district.

FROM FARM TO FACTORY.

We need not pause to describe a dairy farm. The sight is familiar to all our readers. The rising at 4.30 or 5 a.m. to get the milking done, the arrival of the milk hauler at any time from 6 to 7, according to the distance of the farm from his starting point; the trip of the flat-topped milk wagon along the road, with its one to two dozen milk cans, hauled by a usually rather rakish-looking team; the arrival of the hauler at the factory weighstand, after having waited in a procession, perhaps, for half an hour behind other haulers who got in ahead of him; the lifting, weighing and emptying of each can, with the cheesemaker there to sniff as the lid is pulled off the can, to see if there is evidence of sourness, dirt or bad flavor of any kind that might cause trouble afterwards in the vat of milk; the driving a few yards away to the elevated whey tank, where the recently-empty milk cans are filled with whey from the previous day's make of cheese; the return trip in the blazing forenoon sun, and the delivery of the cans at the milk stands along the route, whence they had been picked up a few hours earlier—all these things are common-place sights in the dairy sections. One of our illustrations shows the last driver of the day just ready to start back with his load of whey. His team, though not one of the best in this particular section, is stouter looking and better fed than a good many that may be seen elsewhere. Milk hauling is a sort of dog's life for man and beast, and it is rather the exception to find a really thrifty farmer undertaking it.

Some patrons prefer to haul their own milk. These get their cheese made for \$1.00 a cwt., whereas the others pay \$1.50. It is hard to get haulers nowadays, and the maker at North Oxford has to pay them more than he makes out of the extra 50 cents a hundred pounds of cheese that he charges patrons for the service. From the standpoint of the patron, however, there can

be no question of the economy of having his milk hauled on the above terms, excepting, perhaps, a few large patrons, who are situated near the factory, or who have an old man or a boy to make the daily trip.

MAKING THE CHEESE.

Perhaps it will conduce to a clearer idea of the process of manufacture to preface the description with a brief outline of cheddar cheesemaking. [Cheddar cheese is practically the only kind made commercially in

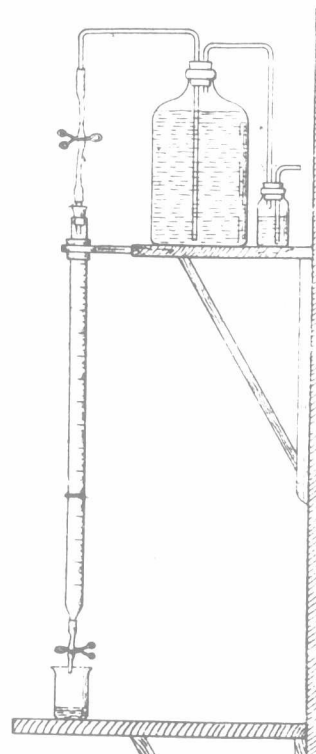
lactic acid. The object is to produce a uniform quality of cheese. It is accomplished by adding to each vat a pailful of "starter," which is milk of the previous day soured by inoculation with a pure commercial lactic-acid culture. Either of two tests may be used to determine the proper degree of ripeness. The old test was what is known as the rennet test, and this is still used in many cases. Of late years an apparatus called the acidimeter has been used for this purpose, as well as to determine the percentage of acid at various successive stages of the process of manufacture.

The acidimeter is an apparatus for measuring the percentage of acid, or, that is to say, the degree of sourness in milk. Its principle is very simple. It is a well-known fact in chemistry that acids and alkalis have the power to neutralize each other's properties. Moreover, it is known that the act of neutralization is a definite one; that is, for a certain quantity of an acid a certain quantity of an alkali (also called a "base") is required to effect neutralization. The acidimeter is a means of measuring the amount of a standard alkaline solution required to exactly neutralize the acid in a given quantity—say 10 cubic centimeters—of milk or whey. The liquid to be tested is measured into a beaker, and the neutralizer slowly added from a graduated burette, with a pinch cock at the lower end. To indicate when the point of neutralization has been reached, a "color indicator" is put into the milk before adding the alkaline solution. The indicator consists of three or four drops of phenolphthalein, a substance which shows no color when the liquid is acid, but changes promptly to a pink when the neutral point is reached. Just enough alkali is added to the milk to produce a permanent color. Note is then taken of the amount of the alkaline solution that has been used, and the percentage of acid in the milk is methodically calculated.

After the starter has been added the coloring matter is put in, unless it is desired to make white or uncolored cheese, as is done in the North Oxford factory. Cheese coloring is made from annatto seed dissolved in an alkali; also from coal tar and from saphron. Coloring matter adds no food value; it is rank-smelling stuff, and an educated consumer's taste will ultimately cease to demand it. A large quantity of uncolored cheese is now manufactured. The usual amount of coloring added is one to one and a half ounces per 1,000 lbs. of milk.

When the acidimeter indicates that there is .19 per cent. of acid in the milk, it is "set" (temperature, 84 degrees Fahr.), by the addition of three to five ounces of rennet per 1,000 pounds of milk. Rennet is an extract from a calf's stomach, but it is now also obtained from plants, such as figwort, mallowwort, etc. It is sold in two forms, liquid and powder. The powdered form is seldom used in Ontario. Rennet acts on the casein of milk, splitting it up into two compounds, soluble and insoluble. It will not work properly on milk which has been boiled, or which is alkaline. Its visible effect is to thicken the milk into a smooth, white, jelly-like consistency, like the familiar thick milk which everyone knows.

The coagulation is normally complete in about half an hour from the time of adding the rennet. At this stage the "cutting" begins. The first is horizontal cutting. A curd knife is used, with a number of horizontal blades, spaced about $\frac{1}{2}$ of an inch in a steel frame. Running this through the vat lengthwise cuts the curd into layers. A similar knife, with the blades vertical, used to be employed for the vertical cuttings, but now a vertical knife is made with wires instead of blades. The new style is handier to use, and disturbs the curd less, resulting in a more evenly cut curd. Curd is cut so that the whey may be readily expelled while heating or cooking is being done. Careless cutting and rough handling of the curd causes loss of fat and injures the texture of the cheese. Unless agitated soon after cutting, the curd tends to mat together again. Agitation or stirring used to be done by hand, but nowadays automatic agitators (run by an engine) are used, several being in one vat. It is better than hand



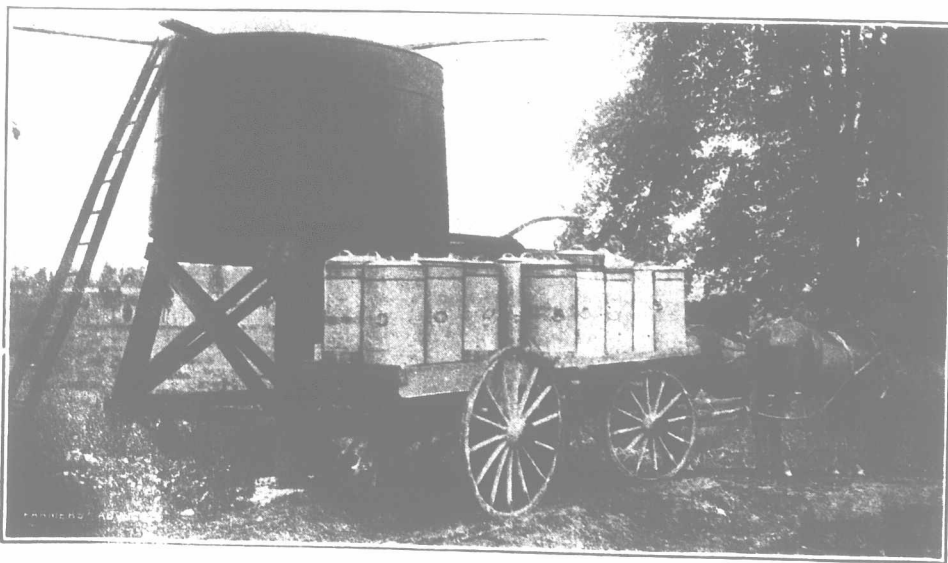
Diagrammatic sketch of an acidimeter.

Canada.] After being received at the stand the milk was run into five long vats, holding 5,000 or 6,000 pounds of milk each, one being filled after another. Here operations begin. To enumerate, they are: Ripening the milk, coloring (optional), renneting, cutting (once horizontally and twice perpendicularly, as a rule), cooking, dipping, matting, milling, salting, hooping, pressing (lightly at first, about one hour), dressing, pressing again, putting the cheese into the curing room, turning them on the shelves, boxing and shipping.

Ripening the milk consists in the development of



The North Oxford Cheese Factory, near Ingersoll, Ont.



Starting Back with a Load of Whey.