altogether. So that the roots and stubble of clover, with the assistance of nature, will supply as much nitrogen as two crops of wheat of 30 bushels. The same crop of wheat will carry off in the grain and straw, 22.7 lbs. phosphoric acid, and almost 28 lbs. of potash.

The point which I wish to make plain is the advantage of growing a green crop as a manure. A crop of clover which will yield in its dry state two tons per acre, will yield 102 lbs. of nitrogen, 25 1 lbs. of phosphoric acid, and 87.4 lbs. of potash, or enough with the natural supply to produce a wheat crop of 30 bushels per acre for five years, and which is equal to twenty-five tons of manure. A farmer could easily sow a crop of rye on the land in the fall after the harvest was taken off, and plow it under in the early part of the season for his root crop; or he could sow and plow in two crops of buckwheat or rape on his summer-fallow, both of which are rich in the fertilizers mentioned. By these judicious means the land need not become exhausted, but, on the contrary, be built up.

(TO BE CONTINUED.)

DAIRY.

Mistakes in Cheesemaking.

BY T. B. MILLAR, INSTRUCTOR FOR THE WESTERN ONTARIO DAIRYMEN'S ASSOCIATION.

At this season of the year it would be well for cheesemakers to devote part of their leisure hours to considering some of the mistakes made in the manufacturing of cheese during the past season. True, every cheesemaker does not make many mistakes. Yet almost every one makes a few. It may be that the one who buys the cheese doesn't find fault with them. He inspects and passes them as all right, and although there is nothing said about the quality, yet the maker feels that there is something about certain lots that should be better, and he will set about learning the cause and applying the remedy. That is, he will if he has his own interests and the interests of the industry at heart, and unless a maker has *something* of this spirit he should quit the business *at once*, and try some other line of work that does not require the untiring watchfulness and attention that cheesemaking does.

In pointing out a few of the mistakes that have been made during the past season, and in fact I may say every season, I do so with a view of throwing out a few hints on cheesemaking that I trust will be helpful to makers, more especially to those who have made these mistakes. In this article I will confine my remarks to summer cheesemaking.

USING RENNET.

I take it for granted that all cheesemakers are familiar with and use the rennet test. If not, they should, as it is very essential that every cheesemaker should know just when the milk is in the proper condition for the application of the rennet. To determine this, the rennet test is a very simple and accurate method. All makers admit that adopting the rennet test has been a great stride in the right direction, and the maturing or ripening of milk before setting is of untold value to cheesemakers. Yet all good things may be overdone, and I must say that this practice of maturing milk has been overdone in a great many instances. A certain class of makers persist in maturing the milk too far before adding the rennet. By doing so they think it will enable them to get out of the factory an hour or two earlier in the evening. This is a great mistake. After maturing milk past a certain point it develops forms of fermentation and bad flavors that otherwise might be escaped. The results are that it requires more time to get the curd in proper condition before going to press. During the past four seasons I have made cheese in almost every cheesemaking district in Western Ontario, and in all my experience the best results were obtained from milk set about 18 seconds by the rennet test, using one drachm Hansen's pure extract and 8 ozs. of milk at 86° Of course, there are exceptions to all rules, and local circumstances must always be taken into consideration. It is a well-known fact if milk is allowed to become over-ripe, or develop too much lactic acid before it is set, it has a detrimental effect upon the quality of the cheese. There is a coarseness in the grain or texture. It lacks that silky texture and quality so *very* desirable in all cheese.

COLORING.

In coloring, some add the annatto immediately before adding the rennet, and stir both in together. The coloring matter is not evenly distributed in the milk, and the result is mottled cheese. Then the maker wonders what is the matter with his annatto. Add the coloring as soon as possible after you get the weight of milk in the vat, and be sure that it is thoroughly mixed before the rennet is put in.

COAGULATION AND CUTTING.

Right here the question arises: How much rennet should be used for 1,000 lbs. of milk? I find makers using all the way from 1½ ozs. to 4 ozs. Still, the quantity is not a safe guide to go by, as a great deal depends upon its strength or quality. Yet I find vats of milk coagulating and ready for cutting, varying all the way from 20 to 45 minutes. This is another mistake. We should have a more systematic way of doing our work. Enough rennet should be used to cause perfect coagulation, fit for cutting, in from 30 to 35 minutes. Commence cutting with the horizontal knife, then follow at once with the perpendicular. Begin cutting while the curd is tender, and handle it very carefully, as rough or careless handling at this stage means a decided loss both in quantity and quality.

STIRRING.

Some make a mistake by turning the steam on the vat as soon as the cutting is completed, and commence stirring at once with a rake, and the way they go at it would give one the impression that they were raking hay, or something that did not require careful handling. After cutting, the curd should be stirred gently by hand (where agitators are not used) for 10 or 15 minutes before any steam is turned on, unless in the case of a fast-working curd, raise the temperature gradually, taking about 35 or 40 minutes to raise from 86° to 98°. Continue stirring for 15 or 20 minutes after the temperature has been raised to the desired point, and occasionally afterwards, to keep from matting, until the curd is dipped.

ACID DEVELOPMENT.

With regard to the amount of acid that should be developed in the whey before the curd is ready to dip, ideas are varied and numerous. Some dip with 1-16 inch acid, or as soon as they can see those fine, silky threads on applying curd to the hot iron, while others would not dip with less than a ¼ inch, and often develop ⅜ inch, but they do so at the expense of quality. It is a mistake to go to the extreme, either one way or the other. The best results are obtained with from ⅛ to ¼ inch acid, and I would not advise using more than ¼ inch acid at any time. Some claim that in case of a bad-flavored curd it is an advantage to develop more acid before dipping; pile it up in the sink as deep as they can get it, and leave it there for hours before milling. At this stage it has developed anywhere from 2½ to 3½ inches acid, according to the hot iron test. After milling, they will turn it over a few times, then cover it again, and keep covered until salted. This is a decided mistake. The longer the curd remains in the whey the stronger the flavor becomes. When a bad flavor is developed in the vat, draw off the bulk of the whey early, dip curd with little acid, and keep it warm up till the time it is ready for milling. If you haven't proper means for keeping curd warm in the sink, it is advisable to raise the temperature 2° higher just before dipping. This will help to maintain the heat at the desired point, about 94° or 96°. Turn the curd frequently, and mill when it becomes velvety or flakey and will show about 1½ inch acid. Give a good deal of stirring. *Air* and mature well before salting.

SALTING.

Use from 2½ to 3½ lbs. of salt per 1,000 lbs. of milk, varying the quantity in proportion to the percentage of moisture in the curd, and by all means use some brand of dairy salt. Don't use common barrel salt on any account, as some of it contains ingredients which are anything but beneficial to the cheese. Allow the salt to dissolve before putting curd to press, and see that the temperature is not above 85° at this stage.

HOOPING AND PRESSING.

After putting the curd in the hoops, don't be in a hurry to apply the pressure. Some practice putting the full pressure on as quickly as possible, using a lever three or four feet long for that purpose, keeping them at high pressure mark for 10 or 15 minutes, then take them out and bandage in a haphazard way, and into the press again, paying very little attention to the style or finish of the cheese. They do not turn the cheese in the hoops in the morning, but have them taken to the curing room at once and placed on the shelves. There you may find them, all shapes and sizes—medium, little and big, straight, crooked, shoulders, bandages pulled down off the corners and wrinkled on the sides—yet hardly any two of them alike. From their appearance one might easily be led to believe that they had been specially prepared for a variety show. In the first place, it is a mistake to apply the pressure so quickly. This should be done very slowly at first, and gradually increased until the full force or pressure is applied.

A PACIFIC COAST VEGETABLE DISPLAY.

BANDAGING.

It is a mistake to try to bandage cheese in 15 or 20 minutes after they have been put in the press. They should be left in the press at least 45 minutes before bandaging. Pull the bandages up neatly, and try to have about an inch of the bandage to lap over each end of the cheese. Use a double set of cap or end cloths, so that one will be left on the cheese until a perfect rind is formed. Turn the cheese in the hoops every morning, and trim off any shoulders that may have been formed during the night, then put back to press for some hours before removing to the curing room.

CLEANLINESS AND NEATNESS.

I would like to impress upon every maker the necessity of keeping his factory clean and tidy. No matter what the quality of his cheese may be, unless he is *clean* and *neat*, he cannot be rated as a first-class maker.

British Columbia Vegetables.

The accompanying illustration, from a photograph, will afford our readers an idea of the extent and excellence of the vegetable display at the last exhibition held at New Westminster.