After the inspection of the various departments the people congregated in a very large tent to listen to notable speakers and the College Cadet Band. Supt. of Public Instruction Barrett was the first speaker, who impressed upon his hearers the claims of and necessity of an agricultural college, stating he invariably recommended the agricultural college to his teachers and their pupils, and expressed the opinion that the townward tide of our young people would be stemmed by the education imparted by the agricultural college. Judge Leeds followed and in a humorous speech prescribed the Domestic Economy course as a remedy for the townward trend of the young people of the farm. Editor Wallace, of *Wallace's Farmer*, appealed to the audience to give their boys and girls a chance by giving them a course of training at the Agricultural College. Professor Henry, of the Wisconsin Agricultural College, placed the matter of agricultural colleges and schools before the farmers, telling them they should not begrudge liberal help to such institutions, as they would be more than repaid for any such expenditure, and stated that true economy in governments consisted in a judicious expenditure of money by that government. Speaking with Professor Henry at another time, the writer elicited the fact that students were directly benefited by a course in agriculture, the Professor citing case after case of his own students who were financially benefited, either as farmers on their own account or as employees of others. Such evidence effectually disposes of any cavilling on the subject from farmers or their would-be advisers. The Professor distinctly stated that none of the cases cited were teachers or professors in agriculture, but went right to work on the farm. The advantages accruing from having an agricultural college or school within reach of the farming community are evident to anyone who comes in contact with the people of this country and the professors of such institutions. As the land is continually cropped year after year, and as competition in the markets of the world gets keener and keener, scientific practical work will have to be done by Canadians, and especially Manitobans, if they wish to hold the best positions, either as agriculturists, dairymen or stockmen. Such being the case, an agricultural college or school is indispensable to Manitoba.

Iowa Agricultural College. A. G. HOPKINS.

Removing Large Stones from the Ground.

On many farms there are to be found large bowlders whose tops are either just visible above the ground or have a slight covering of soil, not quite deep enough to keep the plow point from striking them every time the field is plowed. These rocks are a nuisance to cultivation and are often responsible for injuries to implements, and yet they are left because the farmer does not wish to spend much time in their removal. Many of them are too large for a team to move, even supposing that they were on the top of the ground, but they can be split and made small enough for easy removal without any great expense except the loss of time taken in digging round them.

Some people get rid of these big bowlders temporarily by digging a hole to one side of them somewhat deeper than the bottom of the rocks, then, digging around them sufficiently to get a chain around, a team is hitched on and the stones rolled into the newly-dug holes. This, however, is only deferring the evil day, as in time they will once more work up to the surface. Another way is to dig all round the stone, drill a hole in it, insert a charge of powder and blow it to pieces; or dynamite could be used for the same purpose.

The simplest and cheapest way, however, is to dig all round the stone and just as far in depth as is sufficient to show that the bottom is not far off. Then fill in all round and on top with old rails, stumps, trash, etc.,—anything, in fact, that wants burning up and that will make a hot fire. Set fire to the pile, and when it has pretty well burned down have half a dozen pails of water ready and pour them on the stone from all quarters. You will be surprised to see how the stone will chip and crack across into pieces which can be easily handled by a team. A crowbar to pry the pieces apart is generally all that is necessary to prepare the stone for the team to draw out, but sometimes, if the fire has not been hot enough, a beetle and a couple of iron wedges will be found useful to extend the cracks so that the chain can be put round the sections.

DAIRY.

Moisture and Temperature in Cheese Curing.

Following is a synopsis of the results of experimental work conducted under the direction of Mr. J. A. Ruddick at the Eastern Dairy School, Kingston, Ont., during the past season:—

1. THE EFFECT OF DIFFERENT DEGREES OF MOISTURE ON THE SHRINKAGE OF CHEESE.

During the month of May this year (when the test was undertaken) the average relative humidity was 82 per cent. in the curing room, while the records show that it frequently goes as low as 66 to 70, being the lowest of any month in the year. We have been unable, then, to give the results of a low percentage of moisture and are confined to a comparison between what is about normal and a very high per cent. of moisture or relative humidity. Cheese from the same batches were placed in Room A, with an average humidity of 95 per cent. on the one hand, and in Room B, with an average of 82 per cent. of relative humidity. Cheese in Room A lost 1.73 per cent. in weight in three weeks, while those in Room B lost 2.57 per cent. The temperature was the same in both rooms. Moisture was artificially supplied to Room A (see sec. 6). Cheese moulded badly in Room A, but did not in Room B.

2. THE EFFECT OF DIFFERENT DEGREES OF MOISTURE AND TEMPERATURE IN CURING ROOM ON SHRINKAGE AND QUALITY OF CHEESE.

	ROOM A.	ROOM B.	ROOM C.
Size of room in cub. ft.	780	780	780
Method of controlling temperature.........	Ice	Sub-earth duct	No control
Lbs. of ice used per day	100-150		
Method of controlling moisture	Wet sheet suspended	Sub-earth duct	Lime.
Average temperature.	65	68	80
Av. relative humidity	86	81	68
Av. shrinkage of cheese	2.59	2.59	3.53
Quality cheese, points scored................	98	97	90
Duration of test......	18 days	18 days	18 days

A glace at the above table will show that the shrinkage was the same in Rooms A and B, but much more in Room C. The cheese moulded freely in Room A, very slightly in Room B, and not at all in Room C. The difference in quality was very marked. The cheese in Rooms A and B were practically the same and showed a clean, cool flavor, but those in Room C were decidedly off flavor.

3. SUB-EARTH DUCT VS. ICE FOR CONTROLLING TEMPERATURE.

Table 1 shows that Room A, with 100 to 150 lbs. of ice per day, was a little cooler than Room B with the sub-earth duct. The shrinkage of the cheese was just the same, and there was no appreciable difference in quality. It would seem probable that the sub-earth duct, if properly constructed and used in connection with a well-built curing room having proper circulation of air, would be quite as effective as a considerable quantity of ice. It must not be forgotten that these rooms are small (see table). If a larger room were used more ice would be required in proportion to the size.

4. NOTES ON SUB-EARTH DUCT.

There are three curing rooms at the Kingston Dairy School. The sub-earth duct is connected only with one, which is called Room B. As all the rooms are exactly alike, it is easy to make comparisons. The duct is 150 feet long and consists of an 8-inch unglazed tile, same as used for draining land. The intake is 12 feet high, with a wind cowl which always faces the wind. Above ground it is made of galvanized iron. There is a tight connection where it joins the building, and it enters the room through an ordinary hot-air register with a valve. It is placed 6 feet below the surface, and beneath the duct is a 2-inch tile to carry off the water. It was not possible to place the duct any deeper in the earth because the sewer into which it was drained was at that level. The duct kept the temperature in Room B 6 to 8 degrees lower than the other rooms on the hottest days, and as much as 14 degrees lower than a room where there was no insulation and similar to a poorly-constructed curing room. The cheese moulded very slightly. Contrary to the experience of others, I found that the air, after coming through the duct, was often drier than it was outside or in the other rooms. This occurred on very warm, damp days when the air was almost saturated. Passing through the duct it was cooled to the dew point, consequently it lost some of the moisture. On being warmed somewhat after coming into the room the relative humidity was less than at first. The circulation of air was most rapid when a strong wind was blowing. It did not cease entirely even in a dead calm. When the circulation was slow the temperature of the air passing through the duct was lowered more, so that it was nearly as effective as when the wind was blowing. For a larger room I would recommend a larger duct. It might be constructed with several small tiles placed together.

5. PREVENTION OF MOULD ON CHEESE.

We have continued the use of formalin as an agent in preventing the growth of mould on cheese. The results are quite satisfactory. Spraying the cheese with a 25 per cent. solution of the formalin prevented any mould from growing for three weeks, while those not sprayed were covered with mould. After three weeks it was necessary to apply it again. [NOTE.—It must not be supposed that one application will be sufficient for an indefinite period.] One objection to the method is the labor and time involved in making the application. I think it is likely that some method will be devised whereby the effect will be secured by means of evaporation of the formalin, so that the air of the room will be charged to such an extent as to suppress the growth of the mould. Experiments have already demonstrated the practicability of such a method, but the work is not far enough advanced to warrant publication. We found the best time to spray was just after the cheese were placed on the shelves.

6. METHODS OF PROVIDING MOISTURE IN CURING ROOMS.

After trying several plans, we have adopted the one of suspending a linen sheet over a perforated water-pipe, regulating the flow of water by means of a valve. There must be a trough beneath the sheet to catch the drippings. The perforations will work best if very small—mere pin points. Have the sheet double for a few inches at the end attached to the pipe, bring one piece up each side and fasten at the top. In this way the water must pass through the cloth, which facilitates saturation.

7. LIME AS AN ABSORBENT OF MOISTURE IN CURING ROOMS.

Although we used as much as one and a half bushels of fresh stone lime in one room (see size of room) it had no appreciable effect in reducing the moisture.

8. NOTES ON THE USE OF HYGROMETERS.

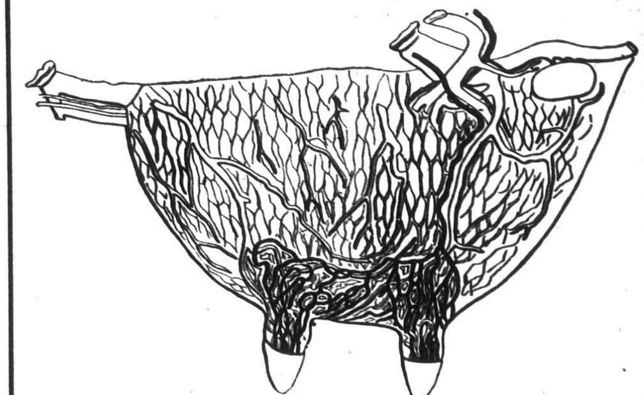
For determining the relative humidity in the curing rooms we use Mason's Standard Hygrometer, which is simply a "wet and dry bulb" thermometer. There is a so-called hygrometer on the market which consists of a small coil of some kind of fiber which is supposed to wind or unwind as the moisture in the room varies. The coil actuates an indicator which moves along a scale, thus showing the degrees of moisture. A comparison of these instruments with the "wet and dry bulb," which is accurate, if properly managed, shows them to be utterly unreliable. For example, at the present writing the relative humidity is 86 per cent. One of these patent instruments placed in the same room gives it as 91, while another makes it 64.

The Secretion of Milk.

The properties of milk, when once it has been drawn from the udder, are well known to us, thanks to the work of the analyst, its chief constituents being water, fat, casein, albumen, milk sugar, and mineral salts. This being so, very few persons, except those who are engaged in experimental work on the subject, trouble their heads as to how milk is formed in the udder of the female. Probably the difficulties in the way are the reason for this, inasmuch as this question has been a stumbling-block to investigators for years, and very little is even now really known about it. Many theories have been started regarding the origin of milk, which have been accepted more or less fully for a time, only to be upset a few years later by some more plausible theory, which, in its turn, succumbed to something more ingenious.

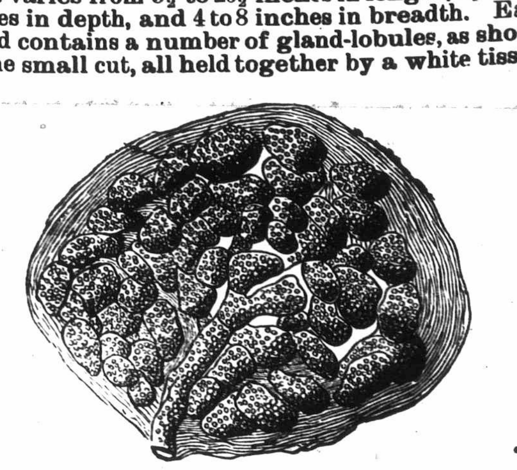
For instance, in the first half of this century it was believed that the milk-glands acted as a filter for certain constituents of the blood, and that the resulting filtered material changed into milk, the amount and quality of which was determined solely by the amount and quality of the food. Chemical research, however, showed that not one of the organic constituents of milk could be found ready formed in the blood, their source being in the milk-glands, and so this theory went the way of others which succeeded it.

But, although so little is known about the secretion of milk in the udder, nevertheless investigation has demonstrated several important points. The milk-glands, in which the milk originates, are the most important part of the udder as regards milk formation. The accompanying large cut,



Left side of udder with skin removed, showing superficial arteries and veins, and the lymphatic vessels and nerves.

taken from Aikman & Wright's Book of the Dairy, to which work we are also indebted for the other illustrations of parts of the udder, shows the position of the milk-glands at the back part of the udder, together with the superficial arteries and veins and the lymphatic vessels and nerves. The udder of the cow has a strong fibrous partition, running lengthways, which divides it in half. In each half there is a milk gland of a reddish-gray color, which in full-grown cows varies from 9½ to 20½ inches in length, 6¼ to 12¼ inches in depth, and 4 to 8 inches in breadth. Each gland contains a number of gland-lobules, as shown in the small cut, all held together by a white tissue.



Gland-lobules, with outlet tube.