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**Hon. W. D. Hoard, Ex-Governor of Wisconsin.**

Mr. Hoard was a principal speaker at the late meetings of the Dairymen's Association of Eastern Ontario, the Creameries' Association of Ontario, and the Dairymen's Association of Western Ontario. Several of his addresses will be found in this month's number of *FARMING*.

# FARMING

Vol. XIV.

FEBRUARY, 1897.

No. 6.

## THE SECRETARY OF THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

We have pleasure in presenting to our readers, in connection with our special dairy number of *FARMING*, a portrait of MR. J. W. WHEATON, B.A., the popular and efficient secretary of the Dairymen's Association of Western Ontario. We think, also, that to give herewith a

short sketch of his life and work as a dairyman will be appropriate; especially so as we feel sure that from perusing it many of the younger readers of *FARMING* will be incited to emulate the indomitable energy and industry to which Mr. Wheaton's success and present prominence as a dairyman are undoubtedly due.

Mr. Wheaton was born in 1851, on a farm in the county of Middlesex, where his father Mr. Joseph Wheaton, is still living. His early life, till 1873, was spent on his father's farm, with the exception of a few very short intervals of winter schooling. This experience, deficient as it may seem to have been in educational advantages, has

been, however, of great use to Mr. Wheaton in his subsequent work, for it has given him a thorough knowledge of farm work, and, what is better, a thorough knowledge of the needs and possibilities of farm life, such as enables

him to act wisely when dealing with those dairy interests that affect farmers. In the summer of 1883 Mr. Wheaton went to Detroit to seek his fortune; but he soon returned home again, and in the spring of 1884 entered the service of Mr. J. W. Robertson (now Agricultural and Dairy Com-

missioner of Canada), for the purpose of learning the art of cheese-making. Mr. Robertson was then operating several factories in the Listowel district. Mr. Wheaton was employed by Mr. Robertson for one season in the Fordwich factory, and for another in the Drayton factory, in the latter of which he had full charge. From this out, until 1891, Mr. Wheaton followed cheese-making as a business, having the charge of several factories in succession, his change from one to another in every case being a promotion.

In the meantime, feeling the need of a better education than he had received, Mr. Wheaton had attended the Collegiate Institute at St.

Marys at times, as he found opportunity, for about eleven months in all, and in 1887 he entered the University of Toronto. As he was entirely dependent upon his own efforts for funds to put himself through his university



J. W. Wheaton, B.A.,

Secretary of the Dairymen's Association of Western Ontario.

course, he could not attend the University regularly for successive years, nor all of the time in any one year; but yet so diligently did he work at his studies when in attendance, and at cheese-making when not attending, that in the spring of 1892 he was graduated from our Provincial University with the degree of B.A. and Honors in the department of Natural Sciences. We conceive this record to be an admirable one, and one worthy the emulation of every young farmer's son who shall read this account who wishes to get on in life. As the cheese factories did not close their operations each season till the end of October, Mr. Wheaton was always a month late in entering upon his college studies for the winter, which of course was a great hindrance to him. Also in the winter time, instead of being able to devote himself entirely to his studies, he had to devote a considerable portion of time, especially in his holidays, to getting things in shape for the subsequent summer's work in cheese-making; as, for example, purchasing supplies, engaging help, etc.; for, inasmuch as the factories were run by him at so much per 100 lbs. of cheese made, he had all this business to attend to himself.

In the meantime his former employer, Professor Robertson, had become Dairy Commissioner for the Dominion, and in the spring of 1891 he asked Mr. Wheaton to go to Nova Scotia to look after the dairying interests of that province. Mr. Wheaton accepted this offer, and spent five months during the summer of that year in Nova Scotia, during which time he visited all the factories there, and gave help to the makers, testing the milk supplied, addressing meetings of patrons, and meetings of farmers who wished to have factories erected, etc., etc. A report of his work during this season was prepared by him and was included in the report of the Dominion Dairy Commissioner for 1892, and is the first detailed report published of dairy work in Nova Scotia. During this same summer he also visited some of the dairy districts of New Brunswick and Prince Edward Island, doing the same work as he was engaged at in Nova Scotia.

In 1892, immediately after completing his studies at the University, he again entered the service of the Dominion Dairy Commissioner, and for some time had charge of the Dairy Station at Perth, in the absence of Mr. Ruddick.

In the autumn of 1892 the Directors of the Dairymen's Association of Western Ontario determined to appoint as their Secretary a permanent officer, who should have charge of all the office work of the Association, and at the same time make a specialty during the winter months of holding meetings of patrons of cheese factories and addressing the patrons on the care of milk and upon other matters that might be of benefit to them, and who should devote his whole time to furthering in every possible way the interests of the dairy industry of Western Ontario. In seeking for such an officer, the Directors of the Association consulted Professor Robertson, who at once recommended Mr. Wheaton. Mr. Wheaton was accordingly offered the position, and, having accepted the offer, he entered upon his duties in October, 1892.

The wisdom of the Directors of the Western Association in establishing this office, and appointing Mr. Wheaton to it, has, as everyone knows, been most amply justified by the results. The Western Dairymen's Association is a thoroughly alive one. Under its influence the work of instructing makers in the art of making good cheese, and of educating patrons to a due sense of their responsibilities to the factories, has been pushed on so well that there has been a vast improvement in the quality of the cheese manufactured within the limits of the Association, and no small part of this improvement is due to the organizing and business talent of its Secretary.

FARMING has nothing but good wishes for an executive officer so efficient as Mr. Wheaton has everywhere shown himself to be, and joins with his many other friends in wishing him a long continuance of the confidence now reposed in him by the cheese-making interests of the country. And we are glad to be able to say that there is probability of even greater public responsibilities being entrusted to him.

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## WHAT THE FARMER OF TO-DAY MUST DO TO SECURE MORE PROFIT IN DAIRYING.

By HON. W. D. HOARD, Ex-Governor of Wisconsin, and Editor of *Hoard's Dairyman*

We are much pleased to be able to present to the readers of FARMING this month a series of articles on most timely dairy topics by the Hon. W. D. Hoard, ex-Governor of Wisconsin, editor of *Hoard's Dairyman*, and one of the best known, most popular, and most influential men of the day in all matters connected with the great agricultural interests of this continent.

These articles have been furnished us by Mr. Hoard with the kind consent and through the courtesy of the respective secretaries of the Dairymen's Association of Eastern Ontario, the Dairymen's Association of Western Ontario, and the Creameries' Association of Ontario, being either addresses given or papers read by Mr. Hoard at the recent annual meetings of these associations. We herewith, on behalf both of our readers and ourselves, express to these gentlemen our thanks for their courtesy and kindness.

We have pleasure, also, in presenting to our readers a portrait of ex-Governor Hoard, the very latest and, as he himself says, the very best he has ever had taken. This portrait, as is fitting, constitutes our front-piece for this number.

Mr. Hoard was born in Stockbridge, Madison County, New York, on October 10th, 1836, and therefore has just passed his sixtieth year. His father was the Rev. W. F. Hoard, a Methodist minister. He was reared on a farm, and educated at a public school, and from his earliest years was trained in the art of butter and cheesemaking. This was not an education of a very striking character, but it was one of which Mr. Hoard has always been proud. It fitted him for his life's work, and has thoroughly identified him with the great agricultural classes for whose material improvement he has for many years been most earnestly laboring. At eighteen years of age he was a professional cheesemaker and manager of a 45-cow dairy.

In 1857, when twenty-one years of age, Mr. Hoard emigrated to Wisconsin, and there for some years worked as a farm hand during the summer, and taught school during winter. In 1860 he married.

In 1861, the great American rebellion having broken out, he enlisted as a private soldier in the 4th Wisconsin Infantry. He was with the army of the Potomac until February, 1862, when he went with his regiment to join the expedition against New Orleans, under General Butler and

Admiral Faragut. He remained in active service in the South-west until nearly the end of that year, when, owing to disability due to disease, he returned to his old home in New York. However, just as soon as he recovered his health, he enlisted again, this time in the First New York Light Artillery, and he remained in active service in this regiment till the close of the war, when he again took up his residence in his adopted state, Wisconsin.

He at once engaged in farming, and continued at this business till 1870, when he entered upon the newspaper business and became editor and proprietor of a country weekly in Jefferson county.

It was in his journalistic capacity that Mr. Hoard first made a name for himself in the work of dairy improvement. Through his paper he at once began a vigorous agitation of dairy questions of great timely interest. In 1872 he organized the Jefferson County Dairymen's Association, and in the same year he organized the Wisconsin Dairymen's Association. Of the latter association he was the first secretary, and he served the association in that office for several years.

In 1885, the country weekly being too small for the discussion of dairy matters upon the scale and in the way he wished to discuss them, he started *Hoard's Dairyman*. This paper at once became both popular and successful, and it has now, and for some years past, has had, the largest circulation of all the dairy papers of the world.

In 1887 Mr. Hoard started at his home at Fort Atkin-

son the first "Hoard Creamery," the manager being his son, Mr. A. R. Hoard. This enterprise was also at once successful; and it has so continued to be, until now the Hoard Creameries are ten in number, and have a regular output of 1,000,000 lbs. of butter a year. This immense production is of such an excellent quality that the whole of it finds a special market among about 4,500 private families in the cities of Chicago, Milwaukee, Pittsburg, and St. Louis.

In 1889 Mr. Hoard was elected Governor of his State, and in this office he served two years. As is well known, he is a Republican in politics.

As a lecturer on dairy topics Ex-Governor Hoard is perhaps the most popular speaker that ever stood on a platform before an audience of farmers. In this respect his services have been repeatedly sought after in almost every State in the Union north of the Ohio river.

As might well be supposed, Mr. Hoard has been honored by his fellow dairymen with elections to many important offices. He has been President of the Wisconsin Dairymen's Association, President of the North-western Dairymen's Association, and President of the National Dairy Union.

An additional and still greater public honor is likely to be bestowed on Mr. Hoard—one which he is in every way well deserving to receive. There is great probability, indeed, of his being chosen for the position of Secretary of Agriculture in the incoming cabinet of President McKinley.

## PART I.

A wonderfully great and complex interest is this modern dairy industry.

It is a long line of intricate problems, from the cow in the stable on the humble farm home, up through the modern cheese factory or creamery, the modern refrigerator car, the modern railroad, the great army of middlemen, jobbers and dealers, the modern cold storage warehouse, the modern ocean steamship—a great floating refrigerator, another army of jobbers and dealers, to the mouth of the final consumer across the water.

Do you notice that every step of this wonderful food highway, after the milk leaves the cow, is lit up with the intense light of modern ideas, modern methods, modern economies? Nothing ancient anywhere on the line but old ocean.

Yet this great interest rests upon the cow, back there in the farm stable. She is in the hands of the farmer. Everything in this great procession must wait for him. Science, invention, capital, and enterprise have done about all they can do for the fate of his product.

Now what will he do for himself? We have come to a point where the future fate of American dairying (that is, the dairying of Canada and the United States) rests on the way the American farmer (that is, the farmer of Canada and the United States) will adapt himself to the necessities of the hour.

Believe me, this great dairy interest, both in Canada and the United States, is now in the

greatest peril of its whole history. Only one man can decide its fate. That is the farmer.

The oncoming march of competition from every side; the rapid development of the industry in Australia, New Zealand, South America; the progress of invention in the way of improved machinery, cold storage, cheap rail and ocean transportation; the prospective opening of dairy production in northern Europe and Asia—all point to a great increase of the supply of dairy food in one form or another.

In the meantime the foreign demand is still in old lines and channels, and mostly confined to England.

Now, most of this march of progress and improvement applies to the dairy product *after* it leaves the farm, not before.

It is this stubborn fact, so dimly seen by the farmer, which has caused me great solicitude. The chain is no stronger than its weakest link. Think of this: As a whole, the Canadian and United States dairy farmers are producing milk *as expensively as they ever did*.

Every investigation, every cow census taken, proves it.

Beyond the farmer, a wonderful reduction in expense has taken place in twenty-five years. But the majority of cow farmers are just where they were twenty-five years ago. A few "have heard the blessed sound," have seen the light, have put themselves into the current of economic thinking; but only a few, comparatively.

Unless these sleeping farmers wake up pretty soon they will be forced out of the business.

The merciless march of competition must apply to them as it does to every other man.

They will be ground to powder between two great millstones.

The progress and improvement in the cost of producing milk, and the consequent butter and cheese, in other countries, together with cheap, safe, and quick transportation therefrom to the consuming market—this is the upper millstone.

The nether is a steady and unyielding refusal, on the part of the farmer, to study how to reduce the cost of producing milk to a point that will defy foreign competition; how best to accommodate himself to this overmastering demand for cheaper dairy food; how to put *more and more* intelligent thought and calculation into the farm end of this great business.

I most earnestly believe that the actual cost in labor and capital per hundred pounds is just as great with ninety farmers out of every one hundred to-day as it was twenty-five years ago.

The farmer *feels* it; but, alas! he does not *see* it, and all that it means. He strikes blindly out for relief in every direction except the right one. He looks at every man in the procession of forces except himself.

There is only one avenue of escape. Will he see it before it is too late to save and maintain his old-time possession of this great interest?

Here is the first proposition: He must make up his mind and shape his methods to produce milk at a large per cent. less of cost per 100 pounds, or he will be forced to quit the business.

Well, if he quits, what else *can* he do?

Can he produce grain for the export market, and hope to escape foreign competition? No!

Can he produce meat and escape the same competition? No!

Can he keep on in the same old rut and produce milk at cost, and down to ten and even fifty per cent. *less than cost*, as thousands are doing, and make it up by reducing the comforts of modern civilization in his family?

I say to you that, in my belief, a large per cent. of the distress and complaint among our farmers is not alone because of hard times, but because they have not learned the great lesson of the age, which is "**cheaper production.**"

Every other link in this great chain is adjusting itself to this great lesson. That is the only way they keep up their profit. The moment the milk leaves the farm it goes out on a new road, where an intelligent, vigilant watch is kept over every cent of expense, to see that that cent does its largest work.

Is the farmer doing this with the milk before it leaves the farm?

Now these are three leading factors in this problem which the farmer must keep in constant consideration, as guide lines.

They are:

(1) *The cow.* What must she be? and how fed and handled?

(2) *The farm.* What must that be? How managed?

(3) *The result.* The cost of milk per hundred pounds.

Now these are the three points of the triangle that include the whole circle.

I am so confident of this that I would almost be willing to guarantee an increase of from 50 to 100 per cent. in the profits of every dairy farmer in Canada inside of five years if he would guide himself by the best modern thought on each of these three points.

There must be a radical change of ideas on all of these points. All three are tied together.

You may have the best cows in the world, but if you manage them badly you will fail. You may be the most skilful feeder, but if you have poor cows to consume your feed you will fail.

You may have both good cows and good skill as a feeder, yet if you are a poor soil-manager and do not grow the milk-food crops wisely, do not keep up the fertility and producing power of your farm, you will fail again.

Cross the border into New York, and I will show you the working of these mighty truths in the old dairy districts there. I will show you an absolute depreciation of the fertility of the soil in the last forty years, so that hundreds of farms cannot produce within thirty to fifty per cent. as much cow food as they formerly did. I will show you, as a consequence, farms that once sold at \$100 an acre offered to-day without a taker at \$30 to \$50 an acre.

Go to Wisconsin, where different ideas prevail as to cows and farm management, and I will show you a constant increase in the price of farm lands for the past thirty years.

The result stares every man in the face: How much does my milk cost me per 100 pounds? It is a ghost that will not down.

Every poor cow makes it cost more. Every per cent. in decline of productiveness in your soil makes it cost more.

The market for butter and cheese never asks what your milk costs you. It does not care. It supposes you are wise enough to ask it for yourself. Are you?

The market is only concerned about two things: The amount offered and the quality. *Nine out of*

ten farmers are looking at the *market end*, when they should be looking at the *cost end*.

The fate that has overtaken New York threatens Canada.

The natural tendency of cheese farming, nearly everywhere, as I see it, and as it has been conducted, is towards a reduction in the dairy quality of the cow, and a steady impoverishment of the soil.

It should not be so ; it does not need to be so. It comes from two causes :

(1) A wrong system of cheesemaking ; receiving milk by weight and not by quality. As a consequence the farmer is forced out of the channel of cow improvement, land improvement, brain and method improvement, into a condition of indifference as to these things.

(2) A wrong estimate by the farmer as to the true basis of the production of milk.

Just the minute he braces up and says to himself, "Henceforth I will produce milk by the cow," and "by the acre," then you will see him striding towards the great goal of true profit—a *low cost of milk per 100 pounds*.

Then you will see him wake up to the idea of producing a good cow for himself.

Then you will see him studying the deep problems of scientific feeding.

Then you will see him bending his mind to the study of soil enrichment and the production of the largest amount of the best food possible.

Then, too, you will see him snap his fingers in the face of all foreign competitors, for he can make milk cheaper than the cheapest.

I pay no attention to the cheese factory or creamery. They are not causes ; they are results.

The great problem that is upon us is not : What shall we pay for making cheese or butter ? nor is it, What we shall get a pound for the cheese or the butter ? For what man among us by taking thought unto himself can change the great market rate a penny ?

But it is : How can I as a farmer make as much profit at fifty cents a hundred as I once did at \$1 ? There is, however, light ahead on this question, if we will but seek it.

Let us saturate our mind and conviction with the three great principles I have stated, and there is not a farmer in all Canada but can make quick and encouraging progress towards securing "more profit in dairying."

## WHAT THE FARMER OF TO-DAY MUST DO TO SECURE MORE PROFIT IN DAIRYING.

By HON. W. D. HOARD, Ex-Governor of Wisconsin, and Editor of *Hoard's Dairyman*.

### PART II.

#### I. HE MUST CHANGE HIS METHODS IF NECESSARY.

It is the easiest thing in the world for men to go along for years with bad, wasteful methods. Somehow, we would rather stay by a method we are used to, be it ever so bad, than adopt one we are unacquainted with, even if it is a great deal better. But this sort of mutual inertia or lazy contentment is the worst foe to true progress.

It is every man's bounden duty to stop waste ; it is equally his duty to make all the business forces under him do their full share of work.

The farmer is a general. Acres, machinery, cows, hired men, are his infantry, artillery, cavalry, and engineer corps. He must train himself in the art of agricultural warfare. He must not let any of these forces go to waste ; and he must keep them up to their best effort, if he expects to win a victory in the shape of good profit.

All successful generals are quick to learn from their mistakes ; they are great students of the

methods of other generals. This is a great help to success. If they find their methods are wrong, they do not blindly adhere to them. They have learned that true rule for human guidance, "Never compare things that differ."

That means that every difficulty, every situation, is governed by its own law.

This applies wonderfully to the problems of cow farming.

Now one great source of waste and fruitless effort is a *refusal to change methods*. The farmer was brought up with cows, and thinks he knows all about them. He measures every new truth by an old error.

*Illustration* : A man had heard that Jerseys were good butter cows. He bought one that was fresh in milk. He took her from a kind master and a comfortable barn to a cold, uncomfortable stable, and turned her out to drink ice water on a very cold day. When she came into the stable she shivered, and in a week had shrunk her milk flow one-half.

He recounted to me all these circumstances, and said he did not think Jerseys were hardy. That man would have measured a diamond by what he knew of limestone.

When I undertook to show him that a highly organized dairy cow, one that would yield twice as much butter as any cow in his herd, should be treated according to the law of her own being, not according to his bad and ignorant methods, he replied by asking if I thought he was going to "change himself over to suit a cow."

*Another:* Two men in my county have been dairymen for twenty years. Each started with 160 acres of land, and they live only about a mile apart. One we will call A and the other B. When they started with cows, A was in debt for nearly the price of his farm. I was out of debt. A early saw that he needed the best cow he could get. He was a good judge, and he would pay a large price for a good animal. He became interested as a student in the physiology of the cow, and read everything he could find that would give him more light. B said it was all nonsense to read so much humbug. A bought the best registered Jersey sire he could find, and almost paralyzed the neighborhood by paying \$300 for him. Twelve years ago he built a silo. That enabled him to nearly double the size of his herd on the same land. Then he took up the study of the feeding problem. B calls A a crank. A is now worth ten times what B is. A has changed his methods for better ones, and is to-day wealthy, intelligent, and widely respected. B is worse off than he was twenty years ago. He knows but little, if any, more than he did then; his cows are of the same poor sort; he "don't believe in all this blamed humbug about breeding, feeding, silos, and such." His family have grown older and his expenses have increased, but his revenue has remained the same, and now he is in debt. He has rolled the spirit of non-progression under his tongue like "a sweet morsel," until he is ugly and sour at everybody.

What is the cause?

This—he would not change his methods. He would not imbibe knowledge enough to have a good judgment of methods. He would not use his intellect, train it, guide it, and refine it. He did not realize how deep this problem of successful dairy farming is, and that a man with a shallow, unfurnished mind cannot fathom it.

## II. HE MUST GET THE COST PRICE OF HIS MILK DOWN.

To do this depends on the cow and the way she is fed and managed. Here is a bit of practical experience for you:

A large milk producer in Ulster County, New York, writing on the subject, says:

"The poorest cow I ever owned gave 1,000 quarts a year, at a cost of over five cents a quart, while another cow produced over 7,000 quarts, at a cost of less than three-fourths of a cent a quart.

"A year ago my food-cost per cow per day was 26  $\frac{1}{100}$  cents. Of this the farm furnished 8 cents, and 18  $\frac{1}{100}$  cents was purchased. On this expense the herd averaged fourteen quarts a day, at a cost of 1  $\frac{3}{100}$  cents per quart. The ration was: Twelve pounds hay, eight pounds corn fodder, ten pounds wheat bran, six pounds hominy, and three pounds cotton-seed meal. An effort was made to reduce the cost by a better study of the feeding question, and the following ration was adopted; Twenty pounds hay, three pounds oat straw, three pounds oats, six pounds wheat bran, four pounds buckwheat middlings, and two pounds cotton-seed meal. This ration cost 21  $\frac{1}{4}$  cents a day. Of this 10 cents was raised on the farm and 11  $\frac{1}{4}$  cents purchased. The milk yield increased to 15  $\frac{1}{100}$  quarts a day, making the cost per quart 1  $\frac{1}{10}$  cents, a saving of nearly one-half of a cent per quart per day.

"In 1888 my cows averaged 1,000 quarts per cow, and the milk cost me 2  $\frac{3}{10}$  cents per quart. Last year the yield was 3,754 quarts per cow, and the cost per quart was only 1  $\frac{1}{10}$  cents, or a reduction of exactly one-half."

This result was brought about by weeding out the poor cows and putting good ones in their place. To know the good from the bad, the milk of each cow was weighed and tested at regular intervals.

"I guess so" was discharged, and "I know so" put in his place.

Now, think these facts over, and tell me candidly, is it not best to abandon our old wasteful ways of managing cows, and adopt some of these new ways? Let us always remember that cows cannot yield milk solids without suitable materials from which to make them; and that the cows capable of producing these solids in profitable quantities cannot do so on the coarse fare that is suitable to the lower grades of stock. Neither can they stand the exposure which common stock will endure without serious discomfort and injury.

## III. HE MUST AVOID WASTE.

The Experimental Farm of Ontario reports the amount of food consumed, bedding used, and manure produced, by a calf during the first three years of its life. The total weight, including six tons and thirty-eight one-hundredths of a ton of



straw used, was 29.64 tons. The manure produced was analyzed, and its value determined on the basis used for valuing commercial fertilizers. On this basis the value of the manure produced by the calf during his first three years was \$118.57.

This shows the enormous waste going on when the farmer does not look after the manure. The fertility or producing power of your land is your capital. Did you ever notice how much less a rich soil feels a bad drought than a poor one? The vicissitudes of farming are very much lessened by keeping the land rich. One of the chief reasons why I have been so persistent in advocating the use of land plaster in the stables is to save the waste of nitrogen.

#### IV. HE MUST STUDY THE FEED QUESTION.

Here is a fact clearly demonstrating this: Dr. Babcock found that the use of ensilage greatly increased the churnability of cream. It seemed to produce the same effect that is seen in the cream when the cows feed on June grass. Every farmer's wife knows how much more easily and thoroughly the cream comes at that time than later when the feed becomes drier and more woody. The same effect is produced by the feeding of roots.

Dr. Sturtevant at the Geneva Station found that milk from early mown hay, cornmeal, and bran yielded up 84 per cent. of its fat, while that from late-cut hay and gluten meal yielded up only 64 per cent. Here was a loss of 20 per cent. because of the kind and condition of the food.

Can farmers afford to shut their eyes to better study and knowledge on this question? There is money in it.

There are 800 patrons of the Hoard creameries. Among them, at each one of the ten creameries, are men who produce milk at 50 to 75 per cent. less cost than others. Every penny of reduced cost means that much of increased profit. Yet it is very hard to get those unsuccessful ones to study. In these times of low prices they are groaning with financial colic. Yet no man can get them to see where the waste is. Are there any such farmers in Canada?

#### V. HE MUST DEVELOP HIS HEIFERS PROPERLY.

In the development of the heifer to be a profitable dairy cow, a great deal depends on the sort of man that handles her from calfhood to her second or milking form. She must start with good dairy ancestry. That is the foundation, but not the superstructure. We have reason to believe that a large proportion of poor cows could have been made good ones if they had fallen into the hands of men who knew how to develop them

rightly. Here are the ways: (1) Prevent the growth of fat and the development of beefy tendencies. (2) Use constant gentleness, and frequently handle the udder. (3) Breed at fifteen months so as to start the development of the maternal functions while the body is easily moulded. (4) Feed liberally of milk-producing food so as to develop the growth of the udder all that is possible.

An Arkansas man asked my neighbor, C. P. Goodrich, the questions: "How are milk vessels developed in heifers? How is the milk flow stimulated?"

Mr. Goodrich has been a very successful producer of fine cows, and his answer was:

"Bring them up in the way they should go, and when they are old they will not depart from it"; that is to say, if they are well bred dairy heifers. By this I mean, bring up the heifers to consume large quantities of milk-producing food. There are some kinds of food that will induce growth, but not fat. Use such foods."

You can spoil the heifer for milk by feeding her gross fattening foods.

Prof. Roberts aptly says: If you ask such a heifer to turn all her food into milk she will say, "I can't do it; you taught me to make tallow."

There are lots of spoiled, wasted cows. Good cows are too scarce for even one to be spoiled in the making.

#### VI. HE MUST RAISE PROTEIN CHEAPLY.

Science and experience both agree that if we expect to produce milk cheaply and abundantly, not only must we have a good dairy cow, one that is fitted for the business, but we must also fit the feed to suit the cow.

She produces milk; and milk is the best balanced food in the world. Balanced how? By having in the best proportions the three ruling food elements, carbohydrates, fat, and protein. The cow cannot change her nature nor her milk. She depends upon her master for knowing enough to do the right thing by her. Poor cow; how fearfully and frequently she is deceived!

Said an old lady to me once: "Women and cows know how terribly lacking men are." Now if the cow yields a balanced milk abundantly—mind you, *abundantly*—she must have the right food to make it of. Into every pound of milk she is obliged, by a law she cannot escape, to put a certain per cent. of casein or curd. That is almost pure protein. Where will she get it? From her food. How can she get it from the food if the farmer does not furnish it?

All of the protein foods are somewhat expensive; more so at some times than at others. The

best among them is cotton-seed meal. That is the richest in protein. We must buy that; then comes oil meal, bran, gluten feed, and gluten meal, all of which we must buy. Can we help ourselves and produce this food cheaper than to buy it?

This is an intensely practical question. For years I have been striving to make the readers of "Hoard's Dairyman" understand this matter. My object is to keep up the yield of milk, and at the same time to leave more of the resulting money with the farm.

Professor Robertson conceived the idea of putting in the silo a balanced food that would do away with the necessity of buying it in another form. His plan was to grow corn, horse beans, and sunflower heads, and ensilo them together in a balanced ratio.

The corn for the carbohydrates or starch, the beans for the protein, and the sunflowers for the fat. The same object is striven for by those farmers who grow peas or vetches abundantly with corn or barley.

Thousands of farmers have been prevailed upon to include peas in their dairy farm management. They succeed or fail just in proportion, barring adverse seasons, as they understand how to grow peas.

The old Indian said, "Know-a-heap is a big thing when you hunt otter." "Know-a-heap" will pay here, too. Some experiments in the way of growing flax with millet and oats, for hay, have been made, notably by Rev. Mr. Currie, of Euclid, Minnesota. He speaks very highly of this combination as a milk food, and says:

"My theory is that during the growth of the plant it has more protein without the excess of oil, so I sowed millet, flax, and oats together, and I cut it at a certain stage, and it is the best food I ever had."

The combination was cut when the millet was fairly headed out, and the flaxseed, say, half grown.

Concerning this combination, Professor Snyder, of the Minnesota Experiment Station, says:

"Mr. Currie's conclusion in regard to the use

of flax at a certain stage is borne out by the conditions of the plant during its period of growth. As the plant matures, the starch is used in the formation of the fats and oils, and he has cut the plant at the proper time when the nitrogenous (protein) property of the plant is most developed." Now these are hints. Take advantage of them, and see what you can do to solve this reduction of cost, and still keep up quality and quantity of product.

#### CONCLUSION.

Let me emphasize the matter once more.

The first factor in the problem of a cheaper production of milk is the cow—a dairy cow, a good cow. Take the first step first, and make a determined effort to do business only with a true dairy-bred cow. To this end the dairy farmer must become more of a breeder. This is the first step.

The next is the right sort of food, dairy food, food that will bring dairy results; the next, understanding and skill in feeding the right food; next, the production of the *right* food (*not* some other food) on our own farms, as far as possible; next, the right care and handling of the cow.

The nearer we come to perfection in all these points, the greater will be our profit. We must make milk for a less cost per 100 lbs. There is no help for it.

The inevitable growth of the business must bring that result. We must produce butter and cheese for *less money*.

We no longer control the output. Other countries are reaching for our markets. Our own production is increasing. Every line of human effort is in the same category.

We must make milk "by the acre," "by the cow," and "by the hundred pounds."

It is stupid for us to persist in using double the number of acres and cows to produce what one-half of these forces might just as well produce. We must learn to make just as much profit with milk at 65 cents a hundred as we once did with milk at \$1 a hundred. We can do it if we will address ourselves to a reformation of our cows and our ideas and methods.

PERTHURTON, Ont., Dec. 7, 1896. Dear Sirs,—I find FARMING a great help to me in my farm operations. I would not be without it. My boys are growing up, and I find such a paper helps to keep them in touch with farm life. Enclosed find \$2 for two years subscription. Hoping that this will be satisfactory, I remain yours sincerely, SAMUEL WATERS.

HOLLOWAY, Jan. 14, 1897. Please find enclosed \$3, being my own renewal and two new subscriptions. I am very well pleased with FARMING, and will do what I can towards its success. Yours, A. D. FOSTER.

HOULTON, Maine, Dec. 26, 1896. THE BRYANT PRESS, Dear Sirs,—I send you the name of a new subscriber and \$1 in compliance with the offer in October FARMING. I take some of the leading journals in the United States, as for instance, the *Breeders' Gazette*, and consider FARMING one of the *very best* that I have on my table. Respectfully yours, OSCAR SHRILEY.

PERTH, Jan. 14, 1897. Sirs,—Enclosed please find \$1 for new subscriber, whose name is below. We are all well pleased with FARMING, and will do what we can for it. Yours truly, R. E. WHITE.

# THE PRODUCTION OF MILK FOR CHEESE FACTORIES.

By J. W. ROBERTSON, Agricultural and Dairy Commissioner for the Dominion.

NOTE.—We purpose in an early number of FARMING to give our readers a somewhat full account of what Professor Robertson has done to develop and foster the dairy industry of Canada. In the meantime we are much

Indian corn, when grown under conditions favorable to its attainment of mature size and quality—in rows or hills 3 feet to 3½ feet apart, with from two to six seeds per foot in the row—yields a fodder by the use of which cows are enabled to produce the largest amount of milk, butter, or cheese per acre of land required for their support. Fodder corn is not a complete ration for the most economical production of the best milk. When it is supplemented by grass, bran, oil-cake, cotton-seed meal, or similar feeds, better returns for the feed consumed are realized than when it is made the exclusive diet.



Professor Robertson

pleased to be able to present to them the following very practical series of hints and suggestions relating to farm dairy work which he prepared for one of his earlier reports.

## FEED.

The milk of cows is a secretion or direct elaboration from their blood. Whatever interferes with the health and comfort of the animals will also affect the quality and quantity of their milk. Too much care cannot be exercised in providing feed that is cheap, succulent, easily digestible, wholesome, and nutritious. The grass of early summer is too watery and weak in feeding substance to be fed alone to the greatest advantage. A judicious allowance of bran, peas, and oats, oil-cake or cotton-seed meal, will increase the milk supply and fortify the cow's system for the production of a larger quantity of milk during midsummer, fall, and winter. Broadcast fodder-corn does not meet the needs of milking cows. A soiling crop of some sort or sorts should be grown to furnish plenty of green fodder at the time when pasture may be bare from prolonged dry weather.

## WATER.

Water is nature's vehicle for carrying about most of the matter which she requires to move from place to place. The great boulders were quietly clasped in its arms, and without apparent effort brought from the northern ridges to the southern parts of our Dominion. The tiniest specks of nourishing matter needed to replace the worn-out tissues of the body are likewise carried to their proper places in this wonderful omnibus. The identical water swallowed by a cow to serve as a carrying medium in her blood, for the equitable distribution of the elements of nutrition throughout her whole body, is made to serve a like function in the milk which she yields. If that water be impure in the first place it is likely to carry the impurity with it throughout its whole mission, from the drinking by the cow until after its consumption by the creature which consumes the cow's product. Water which has been contaminated by decaying animal matter is specially likely to retain its pollution. The milk from the cows which drink such water is a menace and danger to the public health, and interferes greatly with the commercial value of all dairy products. There should be an abundant supply of pure water, easily accessible to the cows during hot weather. It should be furnished at a comfortable temperature during the cold weather of winter. Cows which are denied access to abundance of water will not give as much milk, or milk of as good quality, as when plenty of water is provided them with wholesome satisfying feed.

## SALT.

Dairy cattle should have access to salt every day, and salt should be added to all their stable feed daily. The conclusions from a series of experiments carried on in 1886 indicate that when

cows are denied salt for a period of even one week they will yield from  $14\frac{1}{2}$  to  $17\frac{1}{2}$  per cent. less milk, and that of an inferior quality. Such milk will, on the average, turn sour in twenty-four hours less time than milk drawn from the same or similar cows which obtain a due allowance of salt, all other conditions of treatment being equal. This may apply with aptness to only the parts of the Dominion remote from the sea. From Quebec westward, as far as the Rocky Mountains, cows will consume an average of four ounces of salt per day while they are milking during the summer.

#### SHELTER.

Comfortable quarters are indispensable to the health and well-being of cows. Stables during the winter should have a temperature constantly within the range of from  $40^{\circ}$  to  $55^{\circ}$  Fahr. In summer time a shade should be provided in the pasture fields, or adjacent thereto, to protect against the exhausting influence of July and August suns. In all the management of cows such conditions should be provided and such care given as will insure excellent health and apparent contentment.

#### MILKING.

When practicable, the milking of each cow should be done by the same person, and with regularity as to time. He only that hath clean hands should be allowed to milk a cow. I say "he" because I think the men of the farm should do most of the milking, at least during the winter months. It is no more difficult to milk with dry hands than with wet. It is certainly more cleanly, and leaves the milk in a much more desirable condition for table use or manufacture. A pure atmosphere in the stables is indispensable to prevent contamination from that source. Immediate straining will remove impurities which otherwise might be dissolved in the milk to the permanent injury of the whole product.

#### AERATION.

After the straining is attended to the milk should be aerated. Too often it is poured into one large can and left there just as the cows have given it. That neglect implies three things that are very injurious to its quality for cheesemaking: (1) The peculiar odor which the cow imparts to the milk will be left in it until it becomes fixed in its flavor. (2) The germs of fermentation that come in the milk and from the air have the best conditions for growth and action when the milk is left undisturbed. (3) The milk will become in a degree unfit for per- coagulation by rennet. Hence it is needful and advantageous to aerate it for three reasons:

First, because by pouring, stirring, dipping, or by trickling it over an exposed surface, there is eliminated from the milk by evaporation any objectionable volatile element that may be in it.

Secondly, because, as has already been stated, the milk contains germs of fermentation. A strange peculiarity about some of these microbes is that they become active only in the absence of free oxygen. When warm new milk is left undisturbed carbonic acid gas is generated, and that furnishes the best condition for the commencement of action by these almost invisible creatures. After they get started they can keep up their decomposing work even in the presence of oxygen. It is impracticable to perfectly coagulate such milk so as to yield a fine quality of keeping cheese. Coagulation by the use of rennet of milk that is ripe can never be perfect unless it is thoroughly aerated immediately after it is taken from the cow. Neglect of aeration will increase the quantity of milk required to make a pound of fine cheese.

Thirdly, because the airing seems to give vigor to the germs of fermentation that will bring about an acid condition of the milk without producing the acid. So much is this so that it has been found impracticable to make strictly first-class Cheddar cheese from milk that has not been aerated.

#### COOLING.

The subsequent cooling of milk retards the process by which it becomes sour. Certain germs of fermentation exist in milk which, in the act of their multiplication, split molecules of sugar of milk each into four molecules of lactic acid. By delaying the operation of these germs the milk is kept sweet for a longer period. The cooling of the milk should never precede the aeration. A temperature of from  $60$  to  $70$  Fahr. will be found cold enough for the keeping of milk overnight: when it has been previously aired.

#### PROTECTION.

Milk is a liquid of absorbent proclivities. It should be protected against injury that would result from exposure to impure air. A general purpose milk stand is a device specially adapted for the spoiling of milk in that way. Such a stand serves as a milk stand and also a carriage stand, both of which are legitimate uses. Sometimes it is also occupied as a bivouac for swine, for the convenience of these animals, the end of whose whey trough furnishes one step for the stand. Both of these latter extensions of its uses and hospitalities are all wrong.

#### HONEST MILK.

The employment of inspectors promises to improve the quality of the milk furnished by some

patrons, whose highest moral aspiration is limited to an effort to keep the self-appointed commandment, "Thou shalt not be found out." The adulteration of milk by the addition of water, the removal of any portion of the cream, or the keeping back of any part of the strippings is forbidden by the Dominion statutes. Any person who is found out so doing will not escape lightly. The inspectors appointed by the Dairymen's Associations have been equipped with suitable and competent testing instruments, and have been instructed to render every assistance to cheesemakers, looking forward to the prevention of adulteration and the conviction and punishment of those who may be found guilty of the practice.

#### MATTERS MOST NEEDFUL OF CARE.

In the following short paragraphs I have ventured to gather helpful advice on the matters most needful of care:

- (1) Milk from cows in good health and apparent contentment only should be used.
- (2) Until after the eighth milking it should not be offered to a cheese factory.
- (3) An abundant supply of cheap, succulent, easily digestible, wholesome, nutritious feed should be provided.
- (4) Pure cold water should be allowed in quantities limited only by the cow's capacity and desire to drink.
- (5) A box or trough containing salt, to which the cows have access every day, is a requisite indispensable in the profitable keeping of cows.
- (6) Cows should be prohibited from drinking stagnant, impure water. The responsibility for the efficacy of that beneficial prohibition rests wholly with the individual farmer.

(7) Wild leeks and other weeds common in bush pastures give an offensive odor and flavor to the milk of animals which eat them.

(8) All the vessels used in the handling of milk should be cleaned thoroughly immediately after their use. A washing in tepid or cold water, to which has been added a little soda, and a subsequent scalding with boiling water, will prepare them for airing, that they may remain perfectly sweet.

(9) Cows should be milked with dry hands, and only after the udders have been washed or brushed clean.

(10) Tin pails only should be used.

(11) All milk should be strained *immediately* after it is drawn.

(12) Milking should be done, and milk should be kept, only in a place where the surrounding air is pure. Otherwise the presence of the tainting odors will not be neglected by the milk.

(13) All milk should be aired *immediately* after it has been strained. The treatment is equally beneficial to the evening and morning messes of milk.

(14) In warm weather all milk should be cooled to the temperature of the atmosphere after it has been aired, but not before.

(15) Milk is better for being kept over night in small quantities rather than in a large quantity in one vessel.

(16) Milk-stands should be constructed to shade from the sun the cans or vessels containing milk, as well as to shelter them from rains.

(17) Only pure, clean, honest milk should be offered. Any deviation from that will not always go unpunished.

## CREAM-GATHERING AND CHURNING IN THE PRIVATE DAIRY.

By JAMES STONEHOUSE, Instructor in Buttermaking, Ontario Agricultural College.

MR. JAMES STONEHOUSE was born in the county of Ontario. He was brought up on a farm and followed farming as a business in that county till 1882, when he went to seek his fortune in North Dakota. After some years of residence there, he decided to return to his native country. Having always had a strong inclination towards dairying, he attended the Dairy School at Guelph, and took the full course there.—Mr. Stonehouse is a strong believer in carefulness and cleanliness as the all-important factors in successful buttermaking. He attributes the success he has had as a dairyman, beyond what is due to the thorough instruction he received while attending the Dairy School, to the habits of carefulness and cleanliness which were fixed in him from his earliest years by the precepts and example of his mother in the farm dairy in his boyhood's home. And he says that his experience has

proven to him everywhere that the only successful buttermakers are those who believe (and, moreover, act upon their belief, and insist upon it in others) that too much care cannot be taken in the whole process of buttermaking, from the moment the milk leaves the cow's udder all the way to the final packing of the finished product for market.—The following very practical article by Mr. Stonehouse has been prepared from an article contributed by him to the Dairy Bulletin, issued by the Ontario Department of Agriculture about a year ago.

#### PURE MILK AND ABSOLUTE CLEANLINESS NECESSARY.

Whether the object is to make the cream into butter on the farm or to send it to a creamery to be churned and marketed, the first point to be

aimed at should be to get pure, wholesome milk, free from any bad taint or odor.

During the summer months, when cows are on grass, this is not difficult to do; but during fall and winter months, when the cows are housed, the conditions are very much changed, and it is during these months that we find it most difficult to get milk free from undesirable taints and flavors, which come most frequently either from the filthy surroundings of the cow or from food which imparts to the milk an objectionable flavor.



Mr. James Stonehouse.

Cleanliness must be enforced at every step of the process of buttermaking if we are to have an A1 product.

All pails and other utensils should be thoroughly washed, then scalded, after which they should be placed outside in a pure atmosphere to be well aired.

Always use a brush for washing milk utensils; and, after scalding, allow the heat to dry them.

The milk-room should be kept cool, clean, and sweet. Strain and set the milk as soon as possible after milking; and, if deep cans are used, set in water at a temperature of forty-five degrees or below in summer, and thirty-eight to forty degrees or below in fall and winter.

#### A THERMOMETER NECESSARY.

Every farmer who handles milk should use a thermometer, so that he will know when his milk is cooled to the above temperatures, as the loss of cream or butter-fat is much greater when the milk is cooled to only fifty degrees.

#### ICE IS NECESSARY.

To have profitable returns from the handling of milk, plenty of ice should be provided and

stored in a convenient place near the milk room. Milk set in deep cans with plenty of ice to keep the temperature at forty-five degrees or below can be skimmed in twelve hours in the summer; but in the fall and winter it should stand at least twenty-four hours. The longer milk can stand in covered cans and be kept perfectly sweet the thicker and richer the cream will be.

Thick, rich cream has many advantages over poor, thin cream, as we shall see later on.

#### SKIMMING.

Where the skim-milk is not drawn from the bottom of the can, a skimmer six inches in diameter across the top, without any wire around the edge, and tapering to a point six inches deep, with a handle ten to twelve inches long, will be found very convenient for skimming the cream from the top of the can. If the milk is drawn from the bottom of the can, we would suggest having a bottom with four or five inches of a slant, to carry off any sediment that may be on the bottom; and by having the bottom run down to a point, the skim milk can be drawn off much closer than can be done with a flat bottom.

#### EXPENSIVE CREAMERS NOT NECESSARY.

The per cent. of butter-fat in the cream depends upon the amount of skim-milk in the cream, as cream is simply tiny globules of butter-fat mixed with skim-milk. The amount of cream depends upon the per cent. of fat in the milk, the temperature to which the milk has been cooled, and the length of time it has been standing. There will be more cream on milk containing four per cent. of fat than on milk containing only three per cent. of fat, and there will be more cream on milk cooled to forty-two degrees than on milk cooled to only fifty degrees, other things being equal. No expensive creamer is necessary to get all the cream out of the milk, so long as the proper temperature is maintained, as it is the temperature of the water around the milk which does the work. Any ordinary box or barrel which will hold water will do the work just as well as the most expensive creamer made, if there is plenty of room for ice around the cans.

If the water in the tank becomes foul from milk spilled into it, or from any other cause, it should be changed immediately.

#### WHEN A SEPARATOR IS NECESSARY.

Where ice cannot be procured, not setting water as low as the temperatures indicated, we would recommend a separator for a herd of fifteen to twenty cows. These separators usually leave about one-tenth of one per cent. of fat in the milk, while milk from deep setting without ice,

and cooled to only fifty degrees, usually has about one per cent., or ten times as much loss as separator skim-milk, while if the same milk were cooled to forty-two degrees by the use of ice, the loss of fat would be but from one to three-tenths of one per cent.

#### WHEN THE SHALLOW PAN SHOULD BE USED.

If a separator cannot be had, we would prefer the shallow pan system to the deep setting without ice or cold spring water, as all our experiments go to show that the deep setting without ice, either in summer or winter, causes a large loss of butter-fat in the skim-milk. Many people have the idea that in cold weather ice is not needed, but it is a great mistake, as ice is just as important in winter as in summer.

#### HOW THE SHALLOW PAN SHOULD BE USED.

Where the shallow-pan system is followed, the milk should be set in a clean, cool room at a temperature of sixty degrees or lower for thirty-six hours, but no longer, as the cream is all up by that time, and will be of a better quality than if allowed to remain longer, since cream, if exposed to the air in warm weather, becomes thick and tough and will not run through the strainer into the churn; and such cream should never be accepted in a creamery, for it is hardly possible to make butter free from white specks from it. It is also difficult to make good flavored butter in a creamery from a mixed lot of shallow-pan cream, because there are so few milk rooms that are fit to set milk in; and if cream takes on a disagreeable flavor from its surroundings it is impossible to make first-class butter from it. Buyers always look for flavor first, and if that is not good, no other quality in the butter will compensate for its loss, and the price is gauged accordingly.

#### A BABCOCK TESTER ESSENTIAL.

No dairy farmer should be without a Babcock milk tester for testing the milk of each individual cow and also the skim-milk. Each cow should give at least 6,000 pounds of milk per year, which should make about 250 pounds of butter. Each cow's milk should be weighed and the milk tested to ascertain how much butter-fat the cow is giving. The cow which is giving the largest amount of milk, and is perhaps considered the most profitable cow in the herd, may be giving much less butter-fat than another cow which gives a much smaller quantity of milk.

The skim-milk should be tested, that the farmer may know whether he is getting all of the butter-fat out of the milk. We have frequently tested skim-milk from farmers which showed

from one to one and a half per cent. of butter fat, which means a loss of about twenty-five per cent. of all the butter-fat in the milk; or, in other words, the butter from every fourth cow was thrown away in the skim-milk.

#### CARE OF THE CREAM.

After the milk has been carefully skimmed, the cream should be kept in a covered can with the temperature somewhat below fifty degrees, and stirred well each time fresh cream is added.

If the temperature of the milk room or cellar is not down to fifty degrees, the cream should be set in ice water, if it is separator or shallow-pan cream; but if it is from deep setting cans raised with ice there should be no difficulty in keeping it perfectly sweet in an ordinary cellar, because the temperature is low when the cream is taken from the milk. If the cream is cared for in this way there will be no complaints about the cream souring before it is wanted; and if the farmer is a patron of a creamery, he will have done his duty in supplying the buttermaker with the raw material in prime condition for making gilt-edged butter. Cream should never be set in open crocks or pails in cellars, pantries, or any other place where the air is not pure, nor where the temperature is above sixty degrees, as it is sure to sour, and will often be in churning condition before it is wanted. When the cream can is emptied, it should be thoroughly washed and scalded and placed where it will get plenty of fresh, pure air before it is again needed.

#### CHURNING.

The preparation of the cream is the first thing to be thought of, and that should commence at least eighteen hours before churning, if the cream has been kept sweet up to this time.

The first thing to be done is to raise the temperature up to a point at which the acid will begin to develop; and, where no starter is used, this will usually be about sixty-five degrees. This is easily done by placing the cream can in a tub of warm water at ninety or a hundred degrees and stirring the cream constantly until sixty-five degrees is reached. Care should be taken in warm weather that it does not go much above this temperature. If it does, the cream is liable to become too sour or overripe before churning time.

If the cream has a slightly acid taste before bringing it from the cellar, it should not be raised above sixty degrees, and that not more than twelve or fourteen hours before churning time.

#### WHEN AND HOW TO USE A STARTER.

In cold weather it is advisable to use a starter, so that the cream may sour more rapidly and at a

lower temperature ; for cream when ripened at a high temperature and kept there till near churning time makes soft butter of a poor texture. A good plan to secure a starter is to take a quart or so of the ripened cream, if it is of a good flavor, and put it into the cream can which is to hold the cream for the next churning, care being taken to keep the temperature low enough (fifty degrees) to prevent the acid germs from developing until the cream is warmed up for ripening, when the acid will develop rapidly. In this case the temperature need not be over sixty degrees to secure sufficient acid or ripeness in eighteen hours. Repeat the starter as before.

#### WHAT TEMPERATURE SHOULD BE USED.

The temperature at which cream can be churned varies from fifty to seventy degrees. Where a separator is used and the cream-screw is gauged to give cream with twenty-five to thirty per cent. of fat in it, it can be churned at a temperature of forty-eight to fifty-two degrees, and the butter from such cream comes much firmer, while the loss in the buttermilk is less than from thin cream. The ordinary dairy cream usually has about sixteen to eighteen per cent. of fat in it, and must be churned at fifty-eight to sixty-two degrees in summer and from sixty-two to sixty-four degrees in winter. The cream should always be strained into the churn to break up any pieces of curd. The time occupied in churning will vary with the temperature of the cream, the breed of the cows, and the time they have been giving milk.

#### GRANULATION.

Cream with sixteen to twenty per cent. of fat in it, and at the right temperature, will churn and gather into granules without the addition of any water ; but cream with twenty-five to thirty per cent. of fat will thicken up in the churn, so that concussion will cease. At this stage about ten per cent. of water at the temperature of the cream should be added ; and, when it breaks, the same quantity of water, two or three degrees

lower, should be added, so as to prevent the granules from massing together, and to give the butter sufficient liquid to float in, so as to get a good separation from the buttermilk. When the granules are about the size of wheat kernels, draw off the buttermilk ; then wash with sufficient water to keep the granules apart and at a temperature a little lower than the churning temperature of the cream ; and, if the butter is to be packed or held for a market, repeat the washing until the water comes off clear.

#### SALTING.

Salting in the churn is coming largely into vogue, and we recommend it very strongly as the best method of salting butter, for the reason that we can have our butter free from specks and streaks with the least possible amount of working.

If this method is to be followed, a churn with out dashers should be used, and the water for the last washing should be cold enough to harden the butter granules, so that they will not easily mass together while the churn is being revolved after the salt has been added. This is the main point in salting in the churn, and must be carefully guarded to insure good results.

After the washing is done, let the butter drain for fifteen minutes ; then salt with one and one-eighth to one and one-quarter ounces to the pound, as considerable of the salt is carried off with the water left in the butter ; tip the churn backward and forward as the salt is being added ; then revolve the churn very slowly a few times and let it stand for fifteen minutes, after which revolve till the butter masses into a lump. (It should be hard enough to stand revolving four or five minutes before massing.) Now let it stand in the churn or put it away in the butter tray for about three hours, when it will be ready to make up for market with a very slight amount of working, as the salt has been thoroughly mixed with the butter in the granular state, and most of it is already dissolved.

CHEAPSIDE, Jan. 5, 1897.—The publishers of FARMING, Dear Sirs,—Enclosed you will find my subscription for 1896-7 inclusive. I am much pleased with FARMING. I like the change very much. I have been a subscriber since 1884, and I think it is better now than ever it was. May you have success in your work. Yours truly, F. D. AWDE.

FORT FRANCIS, Ont., January 9, 1897.—Enclosed you will find my subscription to FARMING. I am very well pleased with the numbers. I have received and the valuable information they contain. Wishing you every success. Respectfully yours, JOHN O. STEWART.

FOX CREEK, MONCTON, N.B., Jan. 12, 1897. Editor of FARMING.—As it is the rule for a man, when he has a dollar to set aside to place it in the bank which pays the most interest, and gives the best security, so it is with me. I desire to put my dollar into the bank of FARMING, which I consider pays to its depositors and readers fully 100 per cent. interest. Being a farmer, I cannot get on without FARMING, therefore please find enclosed my subscription for 1897. Yours, etc., DENNIS D. LEGGE, Fox Creek, Moncton, N.B.

PARIS, January 18, 1897.—I have received the January number of FARMING, and must say that I consider it a valuable farm number. RICHARD McDONALD.



# CHEDDAR CHEESEMAKING: WITH SOME REMARKS ON THE CARE OF CHEESE IN THE CURING ROOM.\*

By J. A. RUDDICK, Superintendent of the Kingston Dairy School.

NOTE.—This practical and instructive paper was read by Mr. Ruddick at the late meeting of the Eastern Dairymen's Association at Brockville. Although it is somewhat out of the line of subjects generally taken up by FARMING, being intended for the professional cheesemaker rather than for farmers, yet as the cheesemaking industry is so important to the Canadian farmer in every way, we



Mr. J. A. Ruddick.

believe that the paper will be read with great interest and profit by many farmers, simply because of their desire to keep abreast with the latest development of that industry, knowing as they do that what benefits it will benefit them also. For a sketch of Mr. Ruddick's life and work as a practical dairyman and dairy instructor, see FARMING for December, page 255.

What constitutes a Cheddar cheese, and why is it so called? These are questions frequently asked, and not always correctly answered.

As far as my information goes, this particular kind of cheese takes its name from the village of Cheddar, in the county of Somerset, England. It is said to have been made there for as much as two hundred and fifty years past. Professor Sheldon, writing on the subject, says that "Cheddar cheese resembles the British people in so far as it is cosmopolitan alike in its presence and its adaptability."

Certainly no other kind of cheese is made in so

many countries and to such an extent as it is. It well deserves the title "king of cheese."

It is made in various parts of England and Scotland, in Australia and New Zealand, in Canada and the United States, and even in Germany and Russia.

Some of the English makers do not admit that ours is a true Cheddar, but I cannot see any essential difference in the process as followed in either country.

The one feature which distinguishes the process of Cheddar cheesemaking from that of the hundred or so other varieties of cheese is the direct and intentional employment of acidity before the whey is removed. All the other important kinds of cheese are made from sweet curd.

The principles underlying the making of Cheddar cheese are better defined and more thoroughly understood scientifically than those of any other kind.

Canadians are not behind in this respect; in fact, I believe that as a whole our makers are the best trained and best educated makers in the world.

Certainly we have reached a point where we are able to produce cheese of remarkable uniformity over a very wide range of country; for it is a fact that you might make a collection of cheese from every province in this broad Dominion, from Prince Edward Island to British Columbia, and find them so uniform in style, appearance, and quality that they could be sold as one lot. No better proof is needed to show that our makers are working intelligently and along well-defined lines. We have here also evidence of the value of the work of instruction, in which Canadians were pioneers, and have ever since been a model for other countries.

But my main subject is the "Process of Cheddar Cheesemaking," and I must confine myself to that. It is not my purpose to deal with the whole process in detail, but rather to take up a few important features and discuss them separately.

## FERMENTATION STARTERS.

First, then, let us consider the use of fermentation starters.

The use of a "starter" in cheesemaking is not

\*It will be interesting to our readers to know that practically all the cheese manufactured in Canada is what is known as "Cheddar cheese."

a new thing, for years ago it was a common practice to use sour whey to hasten the ripening of the milk; and milk was even held over for the same purpose. This milk was usually taken from the vat after the temperature had been raised to the setting point; but careful makers soon found out that, although the development of acidity was hurried, it was usually accompanied by injurious flavors, and the practice was condemned. Since that time, however, we have learned how to use the "starter" intelligently and with beneficial results.

It will not do to take milk for a starter simply because it is sour, but due regard must be paid to the flavor as well; and in order to have it right great care must be exercised in preparing it.

There are several ways of preparing a starter. In the first place there is the "pure culture of lactic ferment," so called, which may be procured from any dealer in dairy supplies. To use this a quantity of milk or skimmed milk is pasteurized, that is, heated to 158° Fah., and then cooled to about 80°, after which the pure culture is added, and the whole then protected in a tightly-closed vessel.

Another plan is to use any good sour milk in place of the pure culture for adding to the pasteurized milk, keeping over each day a small quantity for that purpose, as long as the flavor remains good.

A third plan is to select every day some of the very best milk which comes to the factory, warm it to 80° or 90°, and then allow it to sour spontaneously. The latter plan is much the simplest, and will, I believe, give the best results in practice. It is necessary that great care should be exercised in selecting the milk, taking nothing but what is perfectly clean in flavor, and then protecting it from contamination by keeping it in a thoroughly clean and air-tight vessel. After the milk has turned sour, but before it is thick, about 50 per cent. of pure cold water may be added, which will prevent it from becoming too thick and cheesy.

If colored cheese are being made, the starter should be colored before it turns sour. From 2 to 5 per cent. of this may be used, according to the needs of the case.

The primary use of a starter is to hasten the ripening of the milk; or, in other words, aid in the development of acidity. Judiciously used, it has a good effect also in overcoming the bad effects of tainted or gassy milk.

It is well to remember in this connection that when milk is cold, say below 60°, the bacteria which it contains do not multiply rapidly, and are in a more or less dormant condition. It

even takes some time for them to revive after the temperature is raised. In order, then, to derive full benefit from the use of a starter, it should be held at a temperature of 80° or 90° for about an hour before using, thus giving the organisms time to become vigorous and quick in their action. Every cheesemaker present must have noticed in ripening milk that the changes at first after heating take place slowly, but when the milk stands some time the development is much more rapid.

#### THE USE OF RENNET.

Our next point for consideration is the use of rennet.

Rennet is the only known agent which is suitable for the coagulation of milk in cheese-making. It forms a tough, elastic curd, and helps to expel the moisture. When milk is coagulated by the addition of acids, the curd is soft and flocculent, and does not hold the fat the same as rennet curd does. The strong acid reaction is not favorable to the growth of the particular kinds of organisms which are instrumental in curing the cheese, while the rennet curd presents a condition which is very favorable.

It is now admitted that rennet has nothing to do directly with the curing of the cheese. The French and German investigators to whom we are indebted for almost all our knowledge of this subject do not recognize rennet as a curing agent at all, but attribute the changes which occur during the ripening process to the action of bacteria. But, you say, how do we account for the fact, observed by all makers and taught everywhere, that the more rennet one uses the quicker will the cheese cure? Generally speaking, it is true that a cheese made with a large quantity of rennet cures or ripens earlier than one made with a smaller quantity, but it is not necessarily so. I think the explanation is as follows: If a large quantity of rennet is used, the curd formed is firmer and tougher on that account, and is not broken up as much in cutting and stirring during the early stages; and as a consequence it contains more moisture; and it is this moisture which causes the cheese to cure quicker, by making the conditions more favorable for bacterial development. The difference in the amount of moisture may be slight, but it only takes a slight difference to affect the curing.

The effect of temperature on the action of rennet is very interesting. At 60° F. the curd formed is very loose and flocculent, and below that point there is very little action. Experience teaches that the freezing of the rennet extract weakens it somewhat, but does not destroy it. Between 80° and 105° the curd is more or less

firm, reaching the maximum at the latter point. As the temperature is raised above 105° the power of the rennet is gradually diminished. At 122° the curd is again soft and spongy, while at 140° the rennet becomes permanently inactive, subsequent cooling having no effect in restoring it to a normal condition.

Thus we have additional proof that rennet is not the active agent in the cheese-ripening process, because we know that the famous Gruyère cheese is "cooked" to a temperature of 135°—a temperature high enough to destroy the action of rennet—yet this cheese cures naturally.

The practical lesson which we may draw from the foregoing facts in relation to temperatures is that it is always best to use cold water for diluting the rennet extract before adding it to the milk. The low temperature delays the action of the rennet for a few seconds, giving time to stir it into the milk. Never use warm water.

Before we leave this matter of the use of rennet, I wish to say that I hope no one will think that I would consider the quantity of rennet used to be unimportant. There is a medium in all things. If we use too small a quantity of rennet, or set at too low a temperature, the curd is tender, it is easily broken, and there is an unnecessary loss of milk constituents. We are using too large a quantity when the curd forms quickly and becomes so firm that we cannot cut it properly. If for no other reason, it is a waste of material to use too much. I would say that, under ordinary circumstances, enough rennet should be used to make the curd fit for cutting in not more than thirty minutes.

#### CUTTING THE CURD.

Next in order comes the cutting of the curd.

This is one of the most important parts of the process. A knowledge of the proper condition for cutting can be acquired only by actual observation and experience. If it is cut too soft there is too much loss, because the curd is easily broken; while, on the other hand, if it is allowed to stand too long it becomes tough, and hard to cut evenly.

Whenever the cutting has been started it should be finished without delay, unless it is found that it has been started rather too soon. I know from observation that many makers are careless about the cutting, doing it in a very rough manner, smashing and bruising the curd with their knives. The cutting should always be very carefully done, and every effort be made to cut the curd as uniform in size as possible.

Never use a knife from which there are any blades missing any longer than can be helped.

Remember that if you have a curd made up of uneven-sized particles you have, at the same

time, one in which all the parts are not changing alike; for it is well known that a coarse curd will change much more rapidly than a finer one, for the simple reason that the coarse particles contain the most moisture.

We make use of this knowledge in handling overripe milk by cutting the curd very much finer and stirring it harder during the early stages; in fact, it is of the utmost importance to do so.

In connection with the cutting of the curd, let me point out something which I have noticed in going from one factory to another, something which has quite an important bearing on the working of curds.

I refer to the curd knives and the differences there are in knives at different factories. We find that at one factory the knives are so made that the blades are a full half-inch apart. Some are even more than that, while in other factories the blades in the knives are only three-eighths of an inch apart. Now this seems a small matter, but I am satisfied that this very thing has been the means of causing a good many inferior cheese to be made; not necessarily, of course, but because makers, when changing from one factory to another, have not fully understood the different effects of cutting the curd thus coarse or fine, or else have not been observant enough to notice that there is a difference in the knives.

We often hear makers say that the milk works either faster or slower in one particular factory than it does in some other that they have worked in, and the difference is generally attributed to locality, but I think it might very often be traced to the causes I have enumerated.

I am not prepared to say that the milk does not work differently in different sections of the country. There may be more in that theory than we are aware of. The English makers lay considerable stress on the point, and they claim that where there is abundance of lime present in the soil it is not necessary to heat the curd as high as in other places where the soil is deficient in lime. But then they used to think that good Cheddar cheese could not be made outside of the county of Somerset, and we know how mistaken they were on this point.

I think, however, that the question of the effect of soils upon cheesemaking is one which is worth investigating.

In my own experience, making cheese over a very wide range of country, I have noticed some differences which might be due to the influence of soils. For instance, last summer, when I made cheese one day high up in the mountains of British Columbia, where the soil has been formed by

the disintegration of those mighty masses of limestone that compose the Rocky Mountains in that locality, I found that a temperature of 98° gave me a very hard, firm cheese.

I am told by those making cheese in Prince Edward Island that the tendency is the other way, and geology shows us that the soil there is what is known as the Triassic formation, and is deficient in lime.

In Ontario we usually have such a variety of soils within the territory served by any one factory that these effects are not likely to be noticed readily.

#### THE COOKING OF THE CURD.

Passing on to the heating or the "cooking of the curd," as it is called, I wish to draw attention only to one point, viz., the variation in temperature required for milks containing different percentages of fat. We find that when the milk is comparatively rich in fat, say, over 4.0 per cent., rather better results are arrived at by raising the temperature of the curd as high as 100°. It helps to make the curd firm and lessens the tendency towards "pastiness."

#### THE CARE OF CHEESE IN THE CURING ROOM.

I will conclude this paper with a few suggestions relative to the care of cheese in the curing room.

Makers are sometimes bothered by their cheese moulding. This is a sure sign of too much moisture in the atmosphere. Cheese usually mould a little in a new curing room on account of the moisture in the new lumber. Good ventilation and plenty of light will help to keep down the mould, and when it is necessary a quantity of stone lime placed in the room will absorb a great deal of moisture.

Mould will not hurt the cheese except in appearance, unless there are cracks or broken surfaces where it can penetrate.

On the other hand, cheese frequently crack, not only on the ends, but in extreme cases under the bandages as well. This cracking of the cheese

indicates that the air in the room is too dry; the cheese are cracking simply because they are losing too much moisture, just the same as a piece of green timber will check and crack if dried out too quickly. Some batches of cheese develop cracks quicker than others because they are naturally drier.

Sour press boards and cap cloths also have a tendency to cause the ends of cheese to crack.

Moisture may be added to the air in a room, and the temperature lowered several degrees at the same time, by sprinkling water on the floor.

Another plan is to suspend a sheet of canvas in the room, and keep it saturated with water until the desired amount of moisture is secured. In Australia this plan has been adopted, and by placing the canvas in the window it is claimed that the temperature may be reduced as much as 10°. I fancy there would not be as much effect in this country, because it is not as warm nor as dry here as it is in Australia; consequently there would not be the same amount of evaporation.

Our cheese suffer a great loss in weight as well as injury in quality on account of the high temperature to which they are subjected in poorly constructed curing rooms during the hot weather. Thousands of dollars are lost annually, all of which might be saved by a little improvement in buildings. I am satisfied that every dollar spent in improving many of our curing rooms would be saved in one or two seasons at the most. Suppose, for example, that we have a curing room with an average of 300 cheese in it. If we can save a shrinkage of half a pound per cheese per week it would amount to 1,800 lbs. of cheese in twelve weeks, and this, at 8c. per lb., is worth \$144. I believe it is quite possible to effect this saving in a majority of the factories by fitting up the curing rooms so that the temperature can be better controlled.

Besides the saving in shrinkage, we must also take into account that the quality of the cheese will be better preserved, and cheesemakers will not be called upon so often to pay "reclaims."

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WILLOW BANK, Chatham, Ont., Jan. 15, 1897.—Editor of FARMING. Dear Sir,—Please find enclosed my subscription for 1897. I have taken FARMING under all its different names since it was first published, and think its present form is the best. Yours, etc., ARTHUR FISHER.

WHITECHURCH, Dec. 30, 1896.—I like FARMING very much and would like to see it in the hands of more of our farmers. I always make it a point to show it to every one who comes in, and they all admire it. Yours truly, J. L. HOLMES.

WAVEKLEY, Dec., 28, 1896.—THE BRYANT PRESS, Gentlemen,—I wish to say that FARMING is a well-got-up publication and ought to have a large circulation, because it is worthy of our support. Yours truly, JOSEPH BELL.

MELANCTHON, Jan. 11, 1897.—Gentlemen,—Please send your journal (FARMING) to the address below, as I am going to present it to our library, where it will come under the observation of a large number of readers. I think it is the best of our Canadian journals. I remain, yours truly, J. F. BREEN, President Public Library, Melancthon.

# RAISING CALVES TO BE DAIRY COWS.

By GEORGE HARCOURT, B.S.A., Stock and Farm Editor of FARMING.

The low price which has ruled for dairy products during the last two years has had the effect of discouraging many farmers, so much so indeed that some have given up dairying. This is a mistake. There will be poor years as well as good ones in any business; but it is the man who continues at his chosen line of work year after year, in spite of discouragement, that will reap the greatest benefit.

These discouraging prices, together with the dry seasons that have prevailed, should lead the dairy farmer to make a very close study of his business. One thing is quite evident: he must get his cows to produce more milk, and thus get his milk produced for him at a lower cost.

One step in this direction is to be more careful in the breeding, feeding, and developing of the young heifer calf. Many a cow that should have been a profitable milk producer has been ruined by having her digestive powers impaired through improper handling while she was a young calf. Such an animal will ever be a wasteful user of food.

## THE FIRST CARE OF THE CALF.

It has been said that to raise a successful calf you need to begin ten months before it is born. The first step, then, for any farmer to take in the care of a calf intended for the dairy is to select and use the right bull. The bull should be a good representative of one of the dairy breeds. This, however, is not enough. His dam and granddam should be noted for their ability as profitable milk producers, and they should, if possible, be cows superior in ability to those the farmer owns.

The second thing to be attended to in the care of a calf is also one that must be looked after before the calf is born. The cow should be well fed and kept in "good heart," so as to develop the embryo calf and bring it to perfection of vigor and strength. The practice of dropping off the supply of her food when the cow goes dry should not be followed. During the last two months of pregnancy the fœtus makes a great demand upon the mother's system, and this should be met with a liberal supply of proper food. A calf that has been well nourished as a fœtus will, as a cow, possess greater vitality, greater power of endurance, and greater ability to bear up under the strain of heavy milk production, and will thus make a more profitable animal than one that has not been so well nourished.

## THE BEST TIME FOR COWS TO COME IN.

The best time for cows to begin their milking season is from September to March. With the aid of corn ensilage milk can be produced more cheaply in winter than in summer; and with the butter factory for the winter, and the cheese factory for the summer, the greatest profits are to be realized. The winter season also presents the very best conditions for raising calves successfully. The summer months are very busy ones, and the conditions then present for raising calves are by no means so favorable. On account of press of work the calves are neglected; oftentimes they are ill-fed; and frequently they are turned out in the hot sun to obtain their own living before they are old enough to do so properly. The fact is that in summer it takes too much trouble to look after young calves as they should be looked after. So true is this that every farmer knows by his own experience that a fall calf will invariably catch up to its summer mate by the time it is two years old, and oftentimes be the larger, stronger, and more profitable animal of the two. One reason for this is that the digestive functions of the fall calf have not been injured, and thus the fall calf is capable of making a better use of its food than the summer or spring calf. It has not been hurt by the sun and the heat of summer, and worried by tormenting flies. A stunted calf is but a sink hole for feed.

## THE KIND OF CALVES TO RAISE.

Only heifer calves from the most profitable cows should be raised. It does not pay to keep a heifer until she is four or five years old to find out whether she will make a profitable milk-producing animal or not.

## FIRST TREATMENT OF THE CALF.

The whole treatment of the calf should be with the object of preserving unimpaired the digestive powers of the calf. The first step in this direction should be to see that the dam licks her calf for at least half an hour as soon as it is born; if she does not do so naturally, induce her to do so by sprinkling a little bran or salt over the calf. This licking by the dam seems to have an effect on the thrift of the calf that is beneficial. It starts the vital organs of the calf into activity, and seems to give them strength and vigor. This start continues with the animal throughout life. Hence the importance of it. The opposite is equally true. If the digestive system of the calf is impaired, more food is required to produce the

same results than if the system were healthy. This impairment also is continued through life.

#### REMOVING THE CALF.

Practice differs on this point ; but the best plan is to remove the calf as soon as it is licked dry by the dam and before it has had a chance to suck. The task of teaching the calf to drink will then be less, and the cow will fret less for the calf. The best calf undoubtedly can be raised on the cow ; but in ordinary dairy practice this plan does not pay, for the milk which the calf would use is worth more than the calf itself ; and the butter-fat needed by the calf can be supplied to it in a cheaper form.

Moreover, the calf will not take to eating dry feed so quickly or so early in life if it is allowed to suck the cow.

It must be borne in mind, however, that starving the calf into drinking milk is not a good plan, for its delicate stomach is very likely to be injured if force is resorted to in order to teach it to drink. Such mismanagement often gives the calf a setback that stays with her through the following summer, if not throughout her whole life.

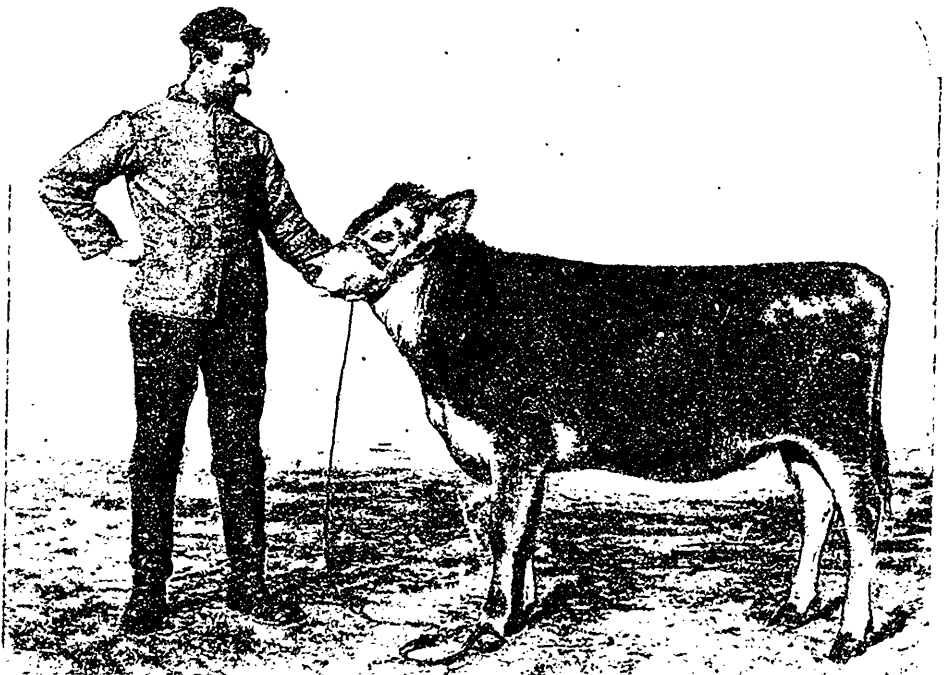
#### THE FIRST FEED.

The first milk, or colostrum, or "beastings," has somewhat of a purgative quality, and is par-

ticularly adapted by nature for starting the organs of the young calf into active operation. It is, therefore, the first thing that should be fed to the calf. It should be given after the calf is dry and has been removed, and as soon as it seems ready for it. The mother's milk of the first six or eight milkings should be fed. After that, other cows' milk may be substituted for the mother's milk if it is desirable to do so, but the best results will follow from the use of the mother's milk only.

#### THE QUANTITY OF MILK TO FEED.

The "paunch" or "rumen" is not developed in the calf at first, and is not brought into use until the animal begins to eat bulky foods, such as grain and hay. It is only the true stomach of the calf that is used at first. This is a small organ, and is not yet accustomed to food ; therefore the first feeding should be done carefully, and in such a way as not to injure the stomach in any way. Large quantities of food at first are to be avoided. Two quarts should be the limit for the first feed, and even less would often be safer. Then as the stomach becomes stronger the quantity may be increased. It should not be increased to over three quarts at a feed for the first two weeks, and this should be fed three times a day. After that the quantity can be gradually increased.



Daisy Belle, Jersey Heifer Calf.

Eight months old. Winner of four first prizes at leading local shows. Bred and owned by F. J. Macklin, Fenella, Ont. (Mr. Macklin himself holds the calf.)

## THE TEMPERATURE OF THE MILK.

The new milk should, if possible, be fed warm from the cow. If this cannot be done, it should be warmed to or near 98° Fahr. as can be got. This rule applies to all kinds of milk and until the calf is several months old. Never feed the milk cold to young calves. Milk from creamers, set in ice water, is very apt to be too cold. When fed, it makes the calves feel uncomfortable, and thus cannot be good for their digestive organs. Skim-milk from the cream separator gives good results, because if fed at once it has still its natural warmth.

## HOW OFTEN TO FEED.

In nature the calf has frequent access to her dam, and I believe we should follow nature more closely than we do. The young calf should be fed at least three times a day for the first two weeks. The first day or two I believe good results will follow from the feeding of small quantities of milk four or five times a day. After the calf is two weeks old the quantity should be increased; and then feeding twice a day will be sufficient. The whole object in the treatment should be to prevent the calf from becoming so hungry that she gulps the milk down in her eagerness to get it. This gulping is not good for the digestive organs; it induces bloating, and is not according to nature. In nature the calf takes her milk slowly, so that it is mixed with the saliva of the mouth. I think more frequent feeding during the first few weeks would do away with a great deal of this greedy drinking and consequent indigestion and scouring which impairs the ability of the calf to make the best possible use of the food fed to it, and induces a permanent indigestion, which, when the calf becomes a cow, prevents her from doing all she ought to do for her owner.

## THE CHANGE TO SKIM-MILK.

The calf should have new milk for two weeks. Many good feeders do not feed it so long, but nevertheless the calf will be the better for it. The change then to skim-milk should be made gradually. Don't give all skim-milk the first feed, but take a week to make the change. Add a little skim-milk the first feed, and a little more at each feed until all skim-milk is fed.

A rapid change from new milk to skim-milk might be injurious to the delicate stomach of the calf.

To supply the fat or cream removed from the skim-milk, there is nothing better than flaxseed jelly. To make this jelly take for each calf two tablespoonfuls of flaxseed per day with six times its bulk of water, and boil to a jelly. Feed it warm

in the milk. Two tablespoonfuls of oil-meal per day dissolved in hot water will make a very good substitute for the flaxseed. Either should be slowly increased as the calf grows older. Another good substitute for the butter-fat of the natural milk is a gruel made by boiling a pint of flaxseed and a pint of oil-meal in ten to twelve quarts of water. This gruel should be given so that it is from one-fourth to one-fifth of the quantity of milk fed. Another good gruel, and one used by one of the most successful breeders of dairy stock, is made from two pints of oatmeal (such as we use for making our own porridge) and one-half pint of linseed meal boiled with sufficient water to make a good porridge. It must be well boiled. The quantity given above constitutes a day's feed for one calf. It should be stirred in with the milk.

*All skim-milk should be fed sweet.*

## REGULARITY IN FEEDING.

We like our cows sharp on time; if we have to wait for them, we want to know the reason why. If the calf could speak, she, too, would ask why. So she does by bawling! She is uneasy and restless when feeding time comes and there is no feed for her. A calf that is fed regularly will look better bred, and will be a stronger, larger, and better calf at six months old than one fed in an irregular way.

## FEEDING GRAIN.

When the calf is about four weeks old, begin to teach her to lick meal. Put a little meal in the bottom of the pail when she is through drinking her milk. Chopped oats or bran will make a good meal for her at this time. As soon as she learns to eat it, a little linseed meal may be mixed with it, and soon the gruel in the milk can be discontinued. The quantity of meal may be gradually increased as the animal grows older. However, only as much meal should be fed as is sufficient to promote good growth. The heifer calf that is intended for dairy work should not be taught to convert her food into fat and lay it on her back; hence the foods fed to her should be those that tend to produce growth rather than fat. This principle is important, and should be kept in mind during all her feeding until she comes in as a milker. It is possible to spoil—that is, as a *profitable milker*—a heifer born of the best cow in the country, by feeding her fat-producing foods, and thereby teaching her to make her food into fat and lay it on her back. Don't spoil your heifers in that way.

Another "don't." Don't feed, mixed in the milk, chopped oats, bran, middlings, shorts, or any other meal that has not been *well boiled*.

These foods produce irritation in the digestive tract, and cause indigestion and scouring. Feed them dry, so that the calf can chew them and mix with them the saliva of the mouth. If they must be fed in the milk, *boil them first*.

#### FEEDING HAY.

As soon as the calf begins to lick meal, hang a bunch of nice sweet clover hay over the side of the pen so that she can nibble at it. As soon as she learns to eat hay, keep her well supplied with it. Teach her to eat it *very freely*, and thus develop in her a capacity for using bulky food, so that when she has to produce milk she will have the ability to convert into milk large quantities of food. This is important. If a heifer is fed concentrated food while young, and is not then taught or trained to consume large quantities of bulky food, she will not have the ability to do so when she is required to convert food into milk.

“Train up a calf in the way she should go, and when she is old she will not depart from it,” is as sound a maxim in raising calves for the dairy as in training children.

#### IMPORTANCE OF KEEPING THE FEEDING PAIL CLEAN.

During the summer, particularly during the hot weather, the feeding pail will need frequent cleansing. The milk left around the inside of the pail by the calf furnishes a very fertile breeding ground for bacteria, and the pail soon becomes sour and unfit for use. A prominent breeder remarked not long ago that dirty pails spoil and kill more calves than people are aware of.

#### CALF-FEEDING DEVICES.

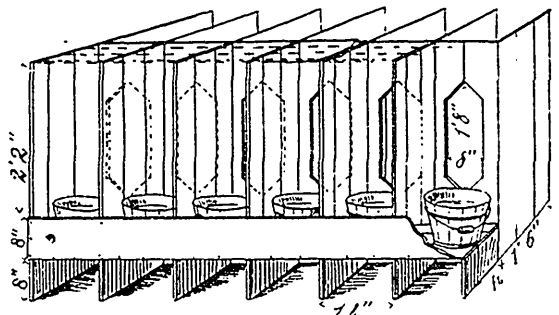
Neglect in the early training of the calf leads to trouble in after days. Not feeding her frequently enough in her early days makes the calf greedy and inclined to gulp down the milk fed to her faster than she should. This leads calves to the nasty practice of sucking each other. The glands that secrete the saliva are excited to action by the food, and the flow of saliva continues after the milk supplied her is all drunk up. This makes her feel uncomfortable, and she starts sucking the other calves and swallows her saliva.

Feeding devices of various kinds have been planned whereby the calves may obtain their supply of milk in a more natural way, and thus prevent the evil effects that follow rapid drinking.

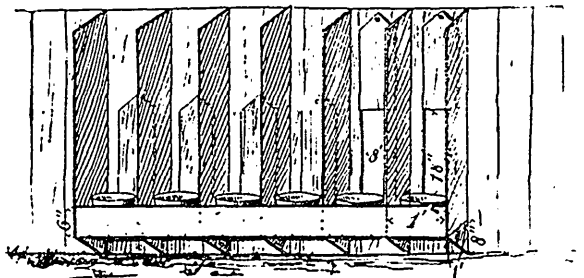
One of these devices is simply a round piece of plank the size of the bottom of the pail, which is placed so as to float on top of the milk in the pail, and thus prevent the calf from getting its milk too rapidly. A similar float with a hole in the centre, in which a large rubber teat is fastened, has been found a successful contrivance. Certain patent calf-feeders are for sale which fill the bill fairly well.

For a very greedy calf and one inclined to bloat, the following plan has been found to stop its bad habit altogether. Just above the regular feeding pail, and out of the reach of the calf, another pail is fastened. Leading from a hole in the bottom of the upper pail is a tube which conducts the milk into the lower one. The flow is regulated by the size of the hole or by a tap, so that only a very small quantity at a time is in the bottom of the feeding pail. Where it can be arranged the upper pail can rest with one edge just over the edge of the lower pail, then no tube will be needed.

The accompanying cut illustrates a feeding manger that has been found very serviceable for feeding calves. The manger is especially designed for feeding calves that suck each other. The partitions run right across it; then if tie-chains or ropes are fastened in front and the calves tied, it will be impossible for them to reach one another so as to suck. Each calf can have her own time to clean out the pail. The plan



Feeding Manger for Calves.



Feeding Shelf for Calves.



also affords excellent conditions for teaching the calf to lick meal, and each calf can be fed a suitable quantity. Half an hour after they have had their milk they may be loosed, and there will be no sucking.

The manger can be made with any number of compartments. It can be built solid in the side of a box-stall for calves, or built by itself, so that it can be moved wherever it is needed.

Another good contrivance is simply a shelf built on the outside of the partition wall of the

calf-pen. Openings are made so that the calves may put their heads through them. Slides can be made for the openings so that the calves can be kept back until the pails are put in place. Divisions also may be built on this shelf, and a narrow board along the front will keep the pails in place.

CONCLUSION

If a little more care were taken with the dairy calf, a little more brain power used all along the line of her breeding, feeding, and training, we should have more profitable cows as the result.

THE FOOD COST OF A POUND OF BUTTER.\*

By H. H. DEAN, B.S.A., Professor of Dairying, Ontario Agricultural College.

The food cost of a pound of butter depends upon :

- (1) The man who is doing the feeding.
- (2) The kind of food fed--whether suited for milk production or not.
- (3) The cow to which the food is given.
- (4) The care and treatment given to the cow while the food is being used.
- (5) The milker. Poor milkers may easily decrease the flow of milk and thereby increase the food cost of butter.
- (6) The man who handles the milk. An ignorant, unskilful person, who wastes or spoils a portion of the milk given by the cow, thereby adds to the food cost of the milk that is saved and of the butter that is well made.
- (7) The man who markets the finished product.

THE MAN IS THE IMPORTANT FACTOR.

The most important factor in the problem of milk production (and consequently of butter production) is *the man*. It will be noticed that in the foregoing statement "the man" enters into the conditions *five times*, "the cow" once, and "the food" once. "The man" has charge of the feeding and of the care and treatment of the cow. It is he who milks her, handles the milk, and sells the product. It is he, also, who breeds the cow, and produces the food that is fed. The cow is only the machine that produces the milk, and the food is but the raw material that is supplied to the machine.



H. H. Dean, B.S.A.,  
Professor of Dairying, Ontario Agricultural College.

BY-PRODUCTS.

There is another factor entering into this problem that is not enumerated above ; that is to say, "*an economical*

\* From an address given by Professor Dean, at the recent annual meeting of the Ontario Creameries' Association at St. Marys.

use of the by-products of the dairy—the skim-milk and the buttermilk.

By using these by-products to the very best advantage, in feeding them to calves and to hogs, the food cost of a pound of butter may be very considerably lessened, because every item of expense saved, or of extra revenue gained, lessens the cost of producing the butter.

#### DAIRYMEN ARE TOO INDIFFERENT TO FOOD COSTS AND BUTTER YIELDS.

Very few, if any, of our dairymen know what it costs to feed their cows, or what is the value during the year of the product which their cows produce in the form of butter. When butter was bringing a high price it did not seem necessary to know what it cost to produce a pound of butter; but when butter comes down to twenty and even fifteen cents *we have got to know it*.

I make the following estimate as to the cost of producing a pound of butter at the present prices of labor and feeding stuffs: Two cents a pound for labor and supplies; fourteen cents a pound for food; and one cent a pound for freight and commission in selling.

Thus when butter is selling at twenty cents, *seventy per cent.* of this price must go to pay for the food cost. How very important, then, is it to know what the food cost of a pound of butter is.

#### THE FOOD COST OF A POUND OF BUTTER AT THE O.A.C.

During the past season the dairy department of the Ontario Agricultural College has been weighing the feed, weighing the milk, and testing the milk of each cow in the dairy herd, with the object of getting exact information as to the food cost of the butter produced by the herd.

The highest yield of butter produced by any one cow in the season was 424 pounds; the lowest was 120 pounds. The average yield was 244 pounds per cow.

The highest average food cost of the butter produced by any one cow was  $22\frac{2}{5}$  cents per pound; the lowest was  $8\frac{1}{5}$  cents per pound; the average was  $13\frac{1}{5}$  cents per pound.

It was found that, estimating the selling price of the butter at twenty cents per pound, the cow whose butter cost  $22\frac{2}{5}$  cents per pound to produce made a loss of \$2.69 on the food fed her during the season.

While the cow whose butter cost  $8\frac{1}{5}$  cents per pound to produce made a profit of \$47.30 on the food fed her during the season, estimating the selling price of the butter at the same rate of twenty cents a pound.

We are aiming to make all the cows in our

herd give a profit of, at least, \$35 per cow upon the food fed.

The food cost per cow during the year ran from \$24 to \$39. The average cost was \$31.

The value of the by-products and of the manure is reckoned to be sufficient to balance the labor bill.

#### THE FOOD COST PER POUND BY MONTHS.

The average food cost per pound of the butter by months is shown in the following table:

Month.	Number of cows milking.	Average food cost per lb. for the month.
December, 1895	16	18.8c.
January, 1896	16	14.0c.
February, "	15	12.3c.
March "	17	13.6c.
April "	18	10.4c.
May "	17	6.7c.
June "	21	4.2c.
July "	22	8.3c.
August "	24	12.6c.
September "	21	17.3c.
October "	22	15.3c.
November "	20	12.5c.

Average number of cows for year - 19

Average food cost per lb. for year -  $12\frac{1}{10}$ c.

It will be seen that the most economical period for the production of butter was during the months of May, June, and July. During the last half of May, and in the months of June and July, each cow was charged with pasture at the rate of \$1 per month. While the pasture was good little else was fed them.

#### NO MONEY IN BUTTER AT TWELVE CENTS.

These results go to show that the man who is making butter and taking the price of it out at a country store at twelve to fifteen cents per pound is not obtaining very much profit from his cows.

#### FARMERS CAN FEED CHEAPER THAN WE AT THE COLLEGE CAN DO.

I believe that farmers can feed more cheaply than we can do at the college, because everything we feed is bought or charged for at market prices.

From the table it will be seen that our average food cost per pound for the year, taking into consideration all the cows that were giving milk, was  $12\frac{1}{10}$  cents. But when we include the cost of the food *during the time that the cows were dry*, the average food cost per pound ran up to  $13\frac{7}{10}$  cents; that is, practically 14 cents, as said above.

#### THE KEY TO SUCCESS IN FEEDING.

When the result of the first month (December, 1895) was figured out, and I found it to be 18.8 cents (see table), I said that something was

wrong. But in reality there was nothing wrong with our figures. We were at that time feeding 40 lbs. ensilage, 10 lbs. clover hay, 20 lbs. mangolds, and 8 lbs. grain (equal parts, bran, oats, peas, and oil cake).

In the hope of increasing the milk produced, and thus decreasing the food cost per pound, we increased the grain to 9 lbs., but only one cow responded by giving a larger flow. This showed that we were feeding up to the cows' limits of production.

The key to success is to find the limit of production for each individual cow, and then by carefully feeding neither too much nor too little to keep each cow up to her full capacity of production.

#### SUPPLEMENTARY NOTE BY PROFESSOR DEAN.

During six years of institute work I have not found a single farmer who could tell me what it cost him to feed a cow for a year; nor, therefore, what profit he made on his individual cows in a year.

Below is given a tabular statement of what the herd of fourteen cows kept at the experimental dairy of the Ontario Agricultural College individually cost during the past year, and what profits were individually made by them.

Notice the variation in the values of the food consumed by the different cows, and also in the amounts of milk they produced; also notice the want of correspondence between the productions of the cows as compared with the food they severally consumed.

Look at Jennie's record: 4,028 pounds of milk, making only 120 pounds of butter, costing 22.2 cents a pound, which, when sold at twenty cents a pound, made a loss of \$2.69 on her year's production. This shows that because a cow gives a fair amount of milk it does not follow that she will be a profitable cow to keep.

Patience produced milk at the cheapest rate, four cents a gallon. She was the most economical producer in the herd; but still she was beaten, when it came to the production of butter and cheese, by Belle, because her milk contained less butter-fat.

If the production of these two cows had been sold as milk, Patience would have made the greater profit. If, however, their milk had been made up into butter and cheese, Belle would have shown the greater profit.

This table shows the necessity of every farmer obtaining definite knowledge of what his cows are doing, not only in milk, but in the production of butter and cheese.

#### IMPROVEMENT HOPED FOR.

We hope to improve upon our results for 1896 during 1897.

Improvement can be effected, however, only by getting better cows, and by paying more attention to the food and care given to them.

In the meantime I would like to impress this advice upon all dairymen: Endeavor to ascertain exactly (1) what it costs to feed each cow in your herd; (2) what each cow is doing in her milk pail; (3) how many pounds of butter each cow makes. If you find that for any particular cow the milk and butter you get from her do not pay for her feed and the labor you give her, then the quicker you and that cow dissolve partnership the better.

How could a farmer hope to make money from his cows if all his herd were like Jennie, even supposing he could sell his butter for twenty cents a pound the year round?

In this herd of fourteen cows, one-half of them show a very small profit, even when the butter is estimated as being sold for twenty cents a pound, or when the cheese is estimated at 8.7 cents a pound. What would have been the profit if the butter had been traded out at a country store for twelve or fifteen cents a pound, or if the cheese had netted only five or six cents a pound, which was a common price during a great portion of the year?

Now, for the encouragement of those who have good cows and of those who would like to have good cows, I want to call attention to the record of Ontario Belle, a daughter of Belle.

Ontario Belle had her first calf about April 1st, 1896, and was not two years old until June. Her record is given from the time she came in until the 2nd of December, when the year ended. It will be seen that she has inherited from her mother the faculty of economical production. This law of inheritance is very constant in its action in purebred animals. Hence those who have good cows may expect to have their good qualities perpetuated in their offspring, and those who have not good cows may gather the assurance that if they would but invest in good purebred cows the good qualities of these animals would be transmitted with almost unerring certainty to their offspring.

In estimating the profits as given in the table no account has been taken of the labor bestowed upon the cows, or of the labor necessary to convert the milk into butter or cheese. The former may be considered as compensated for by the value of the manure produced and of the by-

products obtained in the making of the butter or cheese. The latter may be taken as costing three cents a pound for butter and about one and one-half cents a pound for cheese. When the cost of making the cheese and butter is taken into consideration, it will be seen that a still smaller num-

ber of cows in the above herd are profitable animals to keep.

The obvious lesson is that none but good cows should be kept. To find out which are the profitable animals in his herd every farmer must test his own cows for himself.

#### RECORD OF THE O.A.C. DAIRY HERD FOR 1896.

NOTE. - The yield of milk is that which was actually given in each case. The yield in butter and cheese was found by estimating what the milk yield of each cow would produce in butter and cheese, according to the butter-fat contained by the milk.

Names of the cows.	Total cost of the food.	Total yield			Average cost of food consumed to produce			Profit		
		In milk actually produced.	Estimated in butter.	Estimated in cheese.	1 gallon of milk.	1 lb. of butter.	1 lb. of cheese.	On milk if sold at 4c. a gallon.	On butter if sold at 20c. a lb.	On cheese if sold at 8.7c. a lb.
	\$ c.	lbs.	lbs.	lbs.	cts.	cts.	cts.	\$ c.	\$ c.	\$ c.
Margaret.....	39 89	7944	312	702	5.0	12.7	5.6	87 15	22 51	21 18
Belle.....	37 50	6702	424	954	5.6	8.8	3.9	60 70	47 30	45 57
Birdie.....	38 85	7787	365	821	4.9	10.6	4.7	85 63	34 15	32 57
Poesy.....	28 45	5771	27	511	4.9	12.5	5.5	63 87	16 95	16 09
Annie.....	23 20	5341	239	537	5.2	11.8	5.5	57 21	19 57	18 4
Jennie.....	26 69	4028	120	360	6.6	22.2	7.4	37 69	-2 69	4 63
Jessie.....	29 48	3780	161	362	7.8	18.3	8.1	31 00	2 72	2 04
Filpail.....	29 60	5906	199	448	5.9	14.9	6.6	56 40	10 00	9 57
Carrie.....	29 64	3979	169	360	7.4	17.5	7.8	34 04	4 16	3 45
Minnie.....	24 36	2380	133	300	10.1	18.2	8.1	13 88	2 32	2 41
Rose.....	30 96	5865	325	731	5.2	9.5	4.2	63 68	34 06	32 63
Patience.....	30 66	7473	329	740	4.9	9.0	4.9	89 46	35 74	34 2
Maud.....	27 14	4147	180	495	6.5	15.1	6.7	39 10	8 86	8 0
Mabel.....	32 55	5683	235	528	5.7	13.8	6.1	58 33	14 45	13 37
Ontario Belle (April 1 to December 2).....	17 43	3195	194	436	5.4	9.0	4.0	23 61	21 37	20 50

## PRACTICAL BUTTERMILKING IN THE CREAMERY.

By J. B. MUIR, Avonbank, Instructor in charge of the Cheese Factory Syndicate of the Dairy Association of Western Ontario.

MR. JAMES B. MUIR, of Avonbank, Ontario, is one of the best cheese and butter makers in Canada. He was born in Ingersoll in 1861. He began his cheesemaking career at the age of fifteen by engaging in the service of Mr. J. W.

Robertson, now Dairy Commissioner for the Dominion. He was employed by Mr. Robertson two years in his North Branch Factory, London township. Mr. Muir then (1879) took charge of the Proof Line Factory. He was a successful maker from the beginning. His cheese always secured the highest market prices, and often price higher than these. After spending nine years at the Proof Line Factory he went to Avonbank (spring of 1888) and has been there ever since. In this factory he has been remarkably successful in always turning out cheese of the highest quality. At the World's Fair of Chicago his cheese scored 99 points. In 1895 he was successful at all leading exhibitions, taking two firsts at Toronto; one first, two seconds, and a third at London; and the sweepstakes and one first and one third at Gananoque. All these prizes have been taken on white cheese; and no colored cheese is made at the Avonbank factory.—Mr. Muir has the honor also of being the first person in Ontario to introduce winter buttermaking into a cheese factory without Government assistance.—In the spring of 1896 Mr. Muir was engaged by the directors of the Dairymen's Association of Western Ontario to take charge of the work of instruction and inspection in their first syndicate. In this work he was very successful; and almost every maker

and owner of the factories in the syndicate have requested the directors of the association to continue the syndicate system with Mr. Muir in charge.—The following paper by Mr. Muir was read at the meeting of the Creameries' Association

The work of practical buttermaking commences when the milk has been received at the creamery, although the condition of the cows, the care of the utensils, the cleanliness observed in milking, and the care which the milk has or has not received, have to a great extent determined the results before the milk arrives at the creamery.

#### TEMPERING THE MILK.

Tempering the milk for separating is the first step to be attended to after the milk has been received. During the winter season the skimming will be done most thoroughly by separating at a temperature of about 90°. This can be best accomplished by heating the milk in the receiving vat



to 65° or 70°, and finishing in a channel tempering vat.

#### STARTING THE SEPARATORS.

When the first milk has been received I would turn the steam on the receiving vat, start the separators (having previously had them oiled and the bowls filled with water), and start also the pump that elevates the milk to the tempering vat; then by the time the separators come to full speed the tempering vat is filled, and the milk in it is raised to the desired temperature, ready to let flow into the separators. Give the separators close attention, and see that full speed is maintained until the separating is finished, so that there will be no loss of butter-fat. After the milk is all through, flush out the bowl two or three times with warm water, in order to remove all the cream.

#### TESTING THE SKIM-MILK.

I would recommend every buttermaker to test the skim-milk every day. Have a bottle, and catch a sample every fifteen or twenty minutes during the run; then take a sample from this for the tester. It will not pay any creamery to run a separator that will not skim to a trace every day.

#### USING THE STARTER.

I would always recommend the use of a good, clean-flavored starter for ripening cream, and would put it in early, so that the flavor will become fixed in the cream before any undesirable bacteria develop.

The best and safest starter to use is made from fresh, sweet skim-milk. The objection to using buttermilk or sour cream is that if you get "off" in flavor you will be sure to propagate the bad flavor from day to day.

#### RIPENING THE CREAM.

Ripening the cream is the most important part in the manufacture of fine butter, yet this point is often neglected, and left to be done in a "happy-go-lucky" manner. If cream is left alone to ripen spontaneously, a chance is given to all kinds of bacteria to develop, so that the result depends upon "the survival of the strongest." I am satisfied that more uniform results may be obtained in all cases by the use of a properly prepared starter.

I would recommend using plenty of starter and ripening at a temperature high enough to ensure the cream becoming sour before evening; then cool to 65° or below as quickly as possible, and, by leaving cold water or ice around the cream, it will be down to about right churning temperature in the morning.

#### THE PROPER CHURNING TEMPERATURE.

This I consider to be about 50 to 53°. Some may think this a very low temperature, but there are many advantages in churning at a low temperature. A low temperature not only secures a more exhaustive churning, but gives better butter, with less foreign elements in it, and with much better keeping qualities than a higher temperature gives. It is necessary to have rich cream, that is, cream containing from 30 to 35 per cent. of butter-fat, to enable us to churn at this low temperature. The cream cannot be churned below 60° without consuming a great deal of time and patience. Thin cream also develops acid much faster than rich cream. Another point in favor of rich cream is that with it we are better able to control the flavor and ripening process by using a good pure starter.



Carmen Sylvia, Holstein Cow.

Property of C. J. Gilroy & Son, Glen Buell, Ont. Winner of milk test at Toronto Industrial, 1895. From August 15, 1896, to January 7, 1897, she gave 2,000 lbs. of milk, testing 3.4 per cent. butter-fat.

Cream ripened at a high temperature should be cooled to 52° or 54° about two hours before churning, so as to solidify or harden the fat. The practice I have recommended of ripening and cooling the night before will be found very convenient, for thereby the cream is ready for the churn the first thing in the morning.

#### COLORING.

Cream should always be strained into the churn so as to remove any lumps of cream or coagulated casein. If coloring is to be added it should be done after the cream is in the churn and before the churn is started. About half an ounce to 1,000 lbs. of milk will give about the right color in the winter. This amount will have to be varied according to the season of the year and the market for which the butter is intended.

## CHURNING.

The churn should never be filled over half full ; one-third full is better. This is especially so with thick cream at a low temperature, as such cream is liable to foam and fill the churn so that concussion ceases. When the butter begins to come it is a good precaution to stop and take the temperature. If the temperature is too high add a little ice cold water ; if the temperature is not too high it is only necessary to add sufficient cool water to keep the butter in granular form until the butter is gathered in granules about the size of wheat grains or a little larger. The churning should never be done in less than forty-five minutes ; from that time to an hour will be found about right.

Every buttermaker should test his buttermilk daily, and if he is losing more than a trace of fat there is something wrong, which should be looked after at once.

## WASHING.

Washing butter is for the purpose of removing the buttermilk ; and the least washing possible that will accomplish this purpose is to be recommended, since too much washing does not give as high flavored butter as once washing does. Herein lies another advantage of churning at a low temperature ; it requires less washing to remove the buttermilk.

The quantity of water used should be equal to the quantity of cream churned ; and in the winter season this water should be at a temperature of about 55° to 57°. The best way to heat the water to this temperature is to have a small steam pipe connected with the water pipe near the churn. The steam can be turned on and the water quickly heated to the desired temperature. After the water is added revolve the churn for about two minutes ; then draw off the water immediately ; for if left on it will affect the flavor of the butter.

## SALTING.

When the butter has drained for fifteen or twenty minutes it may be salted, either in the churn or on the worker. The former method I believe to be the better one, inasmuch as there is no better place to incorporate the salt with the butter granules than in the churn. Also, when this plan is followed, an even color is more easily obtained, and the texture of the butter is better preserved because of the less working that is necessary.

When salting in the churn, first put on about one-half the salt ; then tilt the churn one way, and put on about one-half the salt you have left ; then tilt the churn back the other way, and put on the remainder of the salt. When all the salt has been added the churn may be turned over by hand a few times.



Dandy, Prize-Winning Ayrshire Cow.

Winner of first prize for Ayrshire cow "36 months old and over" at the Ontario Provincial Winter Show, held at Guelph, December, 1896. The property of Naaman Dymont, Clappison, Ont.

The best way, however, is to have a large wooden fork, and with it mix the salt evenly through the butter. The butter may be left in the churn, or taken out and put into tubs and let stand for about two hours to allow the salt to dissolve.

When salting in the churn, it is best to estimate the quantity of salt required from the number of pounds of milk needed to make a pound of butter. The quantity of salt will have to be varied to suit the market for which it is intended. The export market requires only about one-half to five-eighths of an ounce to the pound. Our local markets require one ounce.

#### THE SALT.

Salt for butter should have a fine, even grain, and be kept in a clean, dry room, free from any impure surroundings, for salt absorbs bad odors very quickly.

#### WORKING THE BUTTER.

The object in working butter is to rid it of surplus moisture, to distribute the salt, and to unite the granules so as to give the butter consistency. The butter should not have any more working than what is sufficient to accomplish this. One of the advantages of salting in the churn and allowing the butter to stand until the salt is all dissolved is that much less working is required.

The butter requires to be worked only until the color is uniform; that is, until the streaks caused by the salt disappear. About twelve to fifteen turns of the worker will be found sufficient.

When butter is salted on the worker, and is intended to be salted only once, the worker should be allowed to go round twenty-five times, so as to thoroughly mix the salt. If there is an excess of moisture in the butter a few more turns will be required.

The working should never be done when the butter is at too low a temperature, as too low a temperature injures the grain. A temperature of about 55° will be found about right.

#### PACKING.

The butter may now be put up in pound prints, or packed in boxes for market. Care should be exercised in packing, and it is very important that the sides be packed firmly, so that they will present a solid appearance when the butter is stripped and placed on the counter for sale.

#### FINALLY.

A few words in conclusion. Keep yourself and everything in and about your creamery clean and tidy; and always do your best to make a uniformly fine article.

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## PLAIN TALKS ON CREAMERY MATTERS.\*

By the HON. W. D. HOARD, Ex-Governor of Wisconsin.

### I. THE CARE OF MILK FOR THE CREAMERY.

A great deal might be said on this very important question, for 75 per cent. of the success of the creamery depends on it. But where too much is said too little is remembered and assimilated.

The following brief set of rules comprehend in the main all the principles involved:

(1) As soon as the milk begins to sour the cream stops rising, and it cannot be thoroughly separated in the centrifugal; therefore keep it cool and sweet, lest you lose your own butter-fat.

(2) If you cannot keep your milk cool and sweet in hot weather don't try to patronize the creamery.

(3) You can keep it cool and sweet, however, by thoroughly aerating the milk; keeping it in a cool, airy place; throwing over the cans a wet woollen blanket, and frequently wetting the blanket; or by keeping it in cold running water.

(4) You can further help to keep it sweet by a thorough cleansing of the milk vessels, and not allowing the milk to stand in the barn or stable a moment after it is drawn from the cow. Be scrupulously clean in the habit of milking.

Thorough effort in these two directions, keeping milk cool and keeping it sweet, will make a gain during hot weather of from 10 to 40 per cent. in your butter yield.

Whatever you gain is rescued from waste. You must stop this waste; for here is where and why the farmer does not get larger dividends. Depend upon it, this is a true statement, whether you see it clearly or not.

### II. THE EDUCATIONAL EFFECT OF THE BABCOCK TEST.

The Hoard Creameries were first started in 1887. Test was taken of the average quality of milk for four years, first by the Curtis oil test,

\*These "Plain Talks" were given by Mr. Hoard before the Creameries' Association of Ontario at the recent annual meeting of the association held in St. Marys.



Artis Peer's Poem, Holstein Year Old Heifer.

The property of G. W. Clemons, of St. George, Ont., Secretary of the Holstein-Friesian Association of Canada. First in her class and winner of sweepstakes at Toronto, 1896.

next by the Short test. It was found to be 3.97 (percentage of butter-fat). On April 1st, 1891, we commenced to pay by the Babcock test, and we have paid by it ever since.

The old system demoralized the patron; educated him in wrong ideas; prevented him from studying the breeding and feeding problem, except for the production of the cow that would yield the largest quantity of milk, no matter whether it was poor or not.

Under the education of the Babcock test, in six months the milk came up to 4.41 (percentage of butter-fat), and the average increase of the butter output for the following year was nearly *one-third of a pound of butter more per 100 pounds of milk.*

Where do you suppose that butter came from? I will tell you. It came partly from the stopping of dishonesty, but more from the improved care and handling of the cows that were induced simply because every patron stood on his own responsibility.

If a patron neglected his cows, ill-treated or ill-fed them, he could not make it up by watering the milk. He must be measured by whatever measure he meted *out* to the cow. That was the

educational effect produced on the farmer by placing him under a logical and just system. Every man who has the power to reason, expand, and grow into a knowledge of dairy truth, ought to welcome such an educational force. Many there be who do not, but who oppose it. Let us hope they will see the expensive error of their way.

I have been amazed beyond measure many times at the fact of how few men there were in a factory community who would reason their way to a broad, just conclusion.

A large majority would seem to be led by narrow suspicions and prejudices. So they would turn their back on the light.

The farmer suffers greatly in pocket and progress if he does this. The cows suffer also.

Standing in the barnyard of a Norwegian farmer one day, the owner said to me in a simple yet forceful way, "I t'ink all my cows peen in a pad way." "Why?" we asked. "O, because I not understand 'em better."

What the mariner's compass is to the sailor on the trackless ocean the Babcock tester is to the dairyman who would know the truth of cow life. Yet there are so many who had rather sail by "dead reckoning" in either case.



## III. THE COST OF BUTTER IN CANADA.

If I go among the patrons of almost any creamery in the land I shall not find more than one in fifty (and I doubt if I shall find even that number) who will show me that they have taken any systematic pains to know what a pound of butter has cost them. The question might as well be one respecting "Darkest Africa," and yet there is not a patron among you but could easily work it out, if you would. The creamery books would aid you greatly if you would but apply to them, for they give the total yield of milk and the resultant yield of butter. You know the number of cows you have; you can closely estimate the tons of hay and other fodder, together with the value of the pasturage they have consumed, and the total amount of grain fed.

From this you can estimate the cash value of the food, and add the labor cost, and divide the total by the number of cows employed, and the result will be the average cost of each cow on the farm. To this add the expense of taking the milk to the creamery and the cost per pound of making the butter. Divide this sum by the total number of pounds of butter to your credit as reported by the creamery, and you have the cost to you of a pound of butter.

Now deduct from the total milk weight the weight of butter made, making a fair allowance for waste, and you have the weight of the skim-milk. Estimate this at what you think it is worth to you. Where creameries take good care of the skim-milk, and prevent dishonest patrons from robbing the rest, it is worth all the way from ten cents to twenty-five cents a hundred pounds, depending on the price of pork and veal somewhat, and very much on the skill of the farmer who feeds it. Make your own estimate, and add it to the cash value of the butter. Here you have the total earnings of your herd of cows. Divide it by the number of cows, and study long and reflectively on the difference between the sum earned by each cow and what she cost.

*The amount of that difference per cow represents your ability as a dairy farmer. Try it once, and get a fair, square estimate of what you are as a manager of your own fortunes.*

Let me say right here that if your creamery does not furnish you a monthly report, with its dividend, which will give you the figures on which to make the above calculation, make an effort to have it done. Men, plants, and animals do not thrive well by being kept in the dark.

What we all need is light. But we must not let cowardly and refuse to profit by the light.

A very close calculation was made by a writer, "F. J. S.," in the *Farmer's Advocate* last year

on the cost of butter in Eastern Canada. He divided the question into three parts: "Grass butter," "fall butter," and "winter butter"; and worked it out on the basis that a cow gives 5,000 pounds of milk, yielding 200 pounds of butter, and that she milks nine months.

Labor is charged at ten cents an hour, board included. The strictly grass butter season he puts at two months, May 20th to July 20th. The total cost for feed, labor, milking, caring for milk, churning, and marketing he puts at \$5.80 per cow for sixty days. He then charges up to this "grass butter" the proportion of cost of keeping the cow three months in idleness, which is \$1.33, making a total of \$7.13, which brings the cost of the ninety pounds of butter which was produced on grass by a two-hundred-pound cow to be eight cents a pound.

The fall period he placed at ninety days. For this period the cost per pound of butter was found to be fifteen cents.

The cost of winter production for a period of 120 days, with ensilage used, is placed at 20½ cents a pound.

*The Cost of the Year's Butter.*

It was also found that the 200 pounds of butter cost, to produce, \$30.62. Hence the average cost for the year per pound was 15⅓c. But the cost of feed of each cow per annum was found to be \$25.37. Hence the cost of one pound of butter for food alone was nearly 12½c., while the cost of milk per 100 pounds was found to be 58c.

Now comes a very interesting conclusion which I wish every cow-owner here to think upon, take home with him, and make a subject of frequent reflection for the next year. If he will, I will guarantee it will make a successful dairyman of him.

Here it is:

Understand that the cost of butter was 15⅓ cents, *when the cow gave 200 pounds a year*. The writer says, "Cows giving but 175 pounds of butter — only twenty-five pounds less — would make the butter cost *nearly three cents a pound* in excess of the above estimate."

Here is the secret of the great cost of butter. *It is the poor cow.*

What are the questions that every man of us should ask right now?

They should be:

- (1) How many of my cows give even 175 pounds of butter a year?
- (2) What have I done to know what they give or what they cost?
- (3) Can I afford any longer to be a mere guess-work dairyman?

My friends, go to any creamery or cheese factory on the continent, and you will see twenty men haggling over the cost of making per pound where you will see one man who is studying the cost of a poor cow. "What would you think of a man," said an old Yankee woman, "who would deliberately put his nose on a grindstone, and bear down at that?" The man who deliberately keeps two cows to do the work of one cow is that kind of a man.

#### IV. CREAMERY ECONOMIES.

There are a great many ways in which economy and efficiency in creamery management can be promoted. One very important one is bringing the daily supply of milk up to the maximum working capacity of the creamery. To take a creamery with a capacity of handling 10,000 pounds of milk a day and give it only 5,000 pounds not only is bad economy, but it results in an increase of the cost of making the butter. The law of economic proportion holds good in the creamery as it does in the cow. It costs as much to support the body of a 150-pound cow as it does a 300-pound cow. It costs as much in labor, room, machinery, and nearly as much in fuel, for the running of 5,000 pounds of milk as it does for 10,000 pounds.

Then, again, there is a great waste, and consequent increased cost per pound of butter, in having a large number of patrons and not a corresponding increase of milk.

Here is a case in point with three creameries, two in Iowa and one in Minnesota. The Luana creamery, Iowa, has received as high as 48,000 pounds of milk a day. They use five separators, employ twenty milk haulers, have four men in the creamery and two coopers, and have three hundred patrons.

In the same State the Strawberry Point creamery has taken in as high as 48,657 pounds of milk a day. There are 268 patrons, and four men are employed in the creamery.

The Alden, Minnesota, creamery has also reached the 48,000 pound mark a day. It has 155 patrons, and three men are employed in the creamery.

It is very evident that the Alden creamery is doing its work at the least cost, and, if the butter is equally good, at a larger profit, when the expense of hauling the milk and the cost of factory work is considered. It receives from 155 patrons about the same amount of milk that is received from 300 at Luana, or 268 at Strawberry Point.

A part of this economy the patron is responsible for; that is the amount of milk delivered daily.

This important fact should always be considered when starting new creameries or cheese factories. Every community of farmers should con-

sider that it takes about so many thousand pounds of milk daily to pay the running expenses; then an additional number to pay interest on capital, and maintain repairs. A well-appointed creamery and ice house, the whole built as good as it ought to be, will cost not far from \$2,500. The debit yearly account against this property will stand as follows:

Interest at 6 per cent.....	\$ 150 00
Annual depreciation and repairs, 10 per cent....	250 00
Labor of a good buttermaker and assistant.....	800 00
Fuel.....	275 00
Oil, lights, incidentals, etc.....	50 00
Total.....	\$1,525 00

In ordinary practice it requires one pound of good coal to separate fifteen pounds of milk, but the cost of firing up is as great for a small amount of milk as for a larger. It costs the Hoard Co. \$390 a year for fuel in a creamery that averages 8,000 pounds of milk a day, and we pay more for help than I have allowed here.

I think the above figures are conservative. Now, to meet the bare expense of existence, the creamery must make 105 pounds of butter a day at four cents a pound, as it will be seen from the above statement that the daily expense is within a slight fraction of \$4.17 a day. To make this amount of butter (105 pounds) will require at least 2,500 pounds of average Canadian milk. If the price charged for making is less than four cents a pound the patronage must be greater.

Now this general outline of calculation will serve to show all concerned in establishing creameries that there is such a thing as an economic limit, below which it is not safe to go.

The history of the creamery business in the United States is marked by numerous instances of failure. There are thousands of idle creameries to-day because the farmers among whom they were planted did not understand the application of economic principles, and that the success of the undertaking rested upon them. The creamery sharper would come among them, tell wonderful stories of the profits that would accrue from such an institution in their midst, get them to subscribe stock to the amount of double what a good creamery should cost, take a thousand dollars of the stock himself, and leave with his ill-gotten booty.

These farmers were not dairymen, even in any sense of the word. The whole enterprise from beginning to end was built on what they did not know.

Whether the creamery is co-operative or proprietary, the principles of economic management hold true just the same.

Here, again, we see that this dairy business is one which requires close discriminating intelligence. *What a lot of men there are in it who are afraid they will know too much!*

# THE CARE OF MILK WHICH IS TO BE SENT TO CHEESE FACTORIES.\*

By T. B. MILLAR, Inspector, The Dairymen's Association of Western Ontario.

MR. T. B. MILLAR, of Kincardine, the Inspector of the Dairymen's Association of Western Ontario, was born in the county of Bruce. His father died when he was five years old, and at the early age of ten years he had practically to earn his own living. He worked on a farm till he was twenty-two years of age, and had the advantage only of such education as he could get during a few short winters at a common school. At twenty-two he made up his mind to learn cheesemaking. At the end of a year he was placed in charge of the Burgoyne factory,



and he remained in that position until May, 1891, when the Western Dairymen's Association appointed him their instructor. He has been in their employ as instructor and inspector ever since. When the Dairy School was opened at Guelph in 1893 Mr. Millar was appointed assistant cheesemaker. He held that position two years, and was then placed in charge of the milk-testing department. In 1896 he was appointed chief instructor in cheesemaking at the dairy school connected with the Ontario Agricultural College, and he still holds that position.

On this subject a great deal may be said, but I will try to make this paper as short and as practical as possible.

In the first place I would like to give a slight idea of how I find the milk as it is delivered at the factories.

## BAD FLAVORS IN MILK.

In the summer months, when the milk is being poured into the weighing-can, you will quite

often find it off-flavor; as, for example, "gassy," sour, or "cowy." These three flavors are very common, and are due to careless handling of the milk, such as lack of cleanliness in milking, or by neglect of straining and airing immediately after milking. But there are innumerable other flavors, due to bad feeding. In the fall months such flavors as rape and turnip are frequently met with.

The first sort of flavors can be avoided by carefulness in the handling of the milk. The only remedy for the last sort of flavors is not feeding to milch cows rape, turnips, or any other kind of food that will produce bad-flavored milk.

Amongst the weeds that will give bad flavors I would mention the leek, the ragweed, and the wild camilla. It is, therefore, the duty of every patron to see that these weeds do not exist in his pasture field.

Then, again, tainted milk may be caused by the cows drinking dirty or stagnant water.

But the chief cause of bad milk is *dirt*; dirty milk pails and cans, dirty milking yards, and dirty hog-pens situated near the milk-stand, or the place where the milk is kept over night.

A number of patrons do not strain their milk; and if you take a look at the strainer in the factory, while the milk is being delivered, you will see a sight that for *variety* of ingredients would be hard to equal, and harder to enumerate. All these things tend to give a *highly-flavored* sort of butter.

## CAREFULNESS AND CLEANLINESS NEEDED.

The milk for delivery to a factory is to be manufactured into food for human consumption, and therefore it should receive the most careful attention. Only milk from healthy cows, that have a plentiful supply of pure food and water, and free access to salt daily, should be used.

The milkers, too, should be clean and tidy, and use only tin pails, and they should immediately after milking strain and thoroughly air the milk, and handle it always in as cleanly a manner as possible until it is delivered to the factory.

Milk that is sent to the factory without being strained should be returned to the patron at once, because from such milk a first-class quality of cheese cannot be made.

\*A paper read at the annual meeting of the Dairymen's Association of Western Ontario, held at Brantford, January 22nd and 23rd, 1897.

## AERATION.

All milk should be *aerated*, the sooner after milking the better. By aeration is meant the thorough exposure of the milk to the air. This may be done by dipping it out and pouring it back into the can with a dipper; or by allowing the milk to run slowly through small holes in a vessel, the milk falling in fine streams through the air into the milk can; or it may be run through one of the many aerators offered for sale by the dairy supply dealers. When the milk is thus aerated, the animal odors and bad flavors which it may contain pass off; but to accomplish this result the aeration must be performed in a pure atmosphere.

Milk that has been aerated will keep sweet longer, other conditions being equal, than milk that has not been aerated; but the chief advantage gained by aeration is that the milk, when so treated, is of a much better flavor than it would be if not so treated.

Where patrons of factories have practised aeration they find that it is not necessary to cool milk with water, even during the hottest weather.

Thoroughly *air* the milk until it is *cooled*.

## OTHER DETAILS TO BE ATTENDED TO.

Milk keeps better in small quantities, and, when

two cans are used, the evening and the morning milkings should not be mixed.

The milk-stands should be constructed so as to protect the milk from sun and rain, and should be in a clean place away from anything that is likely to give the milk a bad flavor.

When the whey is returned in the milk cans, it should at once be taken to the hog-pen and emptied. It should not be emptied into a barrel by the milk-stand, to be used as needed, this being positively a filthy practice, which should not be followed by any patron.

After the pails and cans have been used they should be washed with tepid water and scalded thoroughly, and then placed where they will get plenty of sunlight. In the dairy a cloth should never be used on a vessel after the vessel has been scalded; for, if the water is as hot as it should be (that is, boiling hot), the vessel will soon dry of itself.

Never use soap on dairy tinware, as it is apt to leave a soapy flavor, but occasionally use salt instead, which is much better, and will leave your tinware in a clean, sweet condition.

In conclusion, I would say that pure milk can be obtained only from healthy cows and the use of pure food and pure water, with pure air and cleanly handling.

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## CHEESEMAKING IN WESTERN ONTARIO IN 1896.\*

By T. B. MILLAR, Inspector, The Dairymen's Association of Western Ontario.

### THE POOR MILK OF JUNE AND JULY RESULTED IN POOR CHEESE.

In the months of June and July a great many very inferior cheese were made. There were different causes for this. One which I may mention, namely, the low price of cheese (6¾ cents per pound), resulted in the patrons being very indifferent as to the production and care of the milk, a great many of them not even straining it; and as to aerating it, that was the exception rather than the rule. The consequence was that a lot of bad-flavored, dirty, "gassy" milk was delivered to the factories.

The cheesemakers made one mistake in accepting such milk, and they made a second in maturing the milk too far before setting, or by using a large quantity of starter. What was the result? A lot of stiff, coarse-textured, and badly-flavored cheese.

I do not mean to say that this state of affairs prevailed among the best factories, but in the course

of attending to my duties the majority of the cheese I saw in June and July were of the description I have given.

I would ask dairymen, both patrons and makers, to bear in mind that the *lower* the price of the product is the *greater* should be the care given to the manufacture of the product. We should do our best at all times to create a demand above all others for *Canadian cheese*, but especially should we do so when prices are low. We shall succeed in this only when patrons and makers work together for the advancement of their industry.

### THE BUTTER-FAT PERCENTAGE OF THE MILK SUPPLY VERY VARIED.

During the season I tested 572 samples of milk, as supplied by individual patrons, with the Quevenne lactometer, and 462 samples with the Babcock milk-tester. Of these samples one tested 1 per cent. of butter-fat; fourteen between 1 and 2 per cent.; fifty-five between 2 and 3 per cent.; three hundred and three between 3 and 4 per

\*Prepared from Mr. Millar's Report for 1896 to The Dairymen's Association of Western Ontario.

cent. ; eighty-two between 4 and 5 per cent. ; four between 5 and 6 per cent. ; two between 6 and 7 per cent. ; and one 7 per cent. of butter-fat.

Samples of milk taken from the vats during the months of April and May tested from 3 to 3.5 per cent. of butter-fat ; during June and July they tested from 3.2 to 3.6 per cent. ; during September, from 3.4 to 3.5 per cent. ; and during October and November from 3.7 to 4.2 per cent. of butter-fat.

#### TAMPERING WITH THE MILK-SUPPLY DECREASING.

I am glad to say that the patrons who tamper with the milk supplied by them to the factories are growing less in number. During the season I visited the farms of fifteen patrons to get from them samples of milk as it came from their cows. Thirteen of these patrons were requested to meet me before a justice of the peace. Twelve pleaded guilty to the charges preferred against them, and were fined from \$5 to \$20 and costs. The remaining one, who pleaded not guilty, was convicted and fined \$5 with costs, amounting to \$17.07.

#### PAYMENT ACCORDING TO QUALITY NOT BECOMING MORE COMMON.

I am sorry to note that the system of paying for milk according to quality does not seem to be gaining much ground, but holds about the same position that it did two years ago.

#### RETURNING THE WHEY IN THE MILK CANS NOT BECOMING LESS COMMON.

I regret, too, that the system of returning the whey in the milk cans is as prevalent as it ever was, although this system means a loss of many thousands of dollars to the dairymen of this province every year. During the past season I have been summoned to several factories where the cheese had been rejected. After examining everything closely I concluded, in most instances, that the condition of the milk as it was received at the factory was at fault, and, on conferring with the president or salesman of the company, he would admit that some of the patrons were in the habit of leaving the whey in their cans till evening.

As long as the whey is returned to the patrons in their milk cans we shall have this difficulty to contend with.

#### CLEANLINESS STILL VERY MUCH NEEDED.

Of the factories that I have visited during the year I have classed two as "very clean" ; seventy-four as "clean" ; twenty-nine as "fair" ; and twelve as "dirty." This classification

shows that far too large a number of our factories were not as clean as they should have been, or as they *must* be if they are to succeed.

One reason for this bad condition of things is that factorymen have been *cutting down the prices* which they pay for making ; and as a natural result the makers are trying to get along with less help, so that some part of their work has to be neglected. Another reason is that many makers are by nature and habit careless and dirty, and do not mind how things are so long as they can get through the *dirt* without sticking in it.

Last July I was called to a factory where the cheese had been rejected and the proprietors wanted to know what was the cause. I could tell them almost as soon as I saw the inside of the making room. The secret of the whole trouble was *dirt, dirt*, and I said to the maker, "The first thing you have to do is to clean your factory and everything in it, vats, sinks, sink-covers, strainers, presses, and everything else."

This is rather a hard thing to say, and I often think it hurts me more to say it than it does those lazy fellows I have to say it to ; but I would assert right here that if a man is not *clean* in himself and *clean* about his work he has no place in a cheese or butter factory ; and no matter how long he remains in one he will never be a success.

To be successful dairymen we must not only use all the skill at our command, but we must exercise the greatest cleanliness all through the process, from the feeding of the cow until the cheese is placed on the consumer's table.

I would urge the managers of cheese and butter factories to pay the maker in every case a fair equivalent for his services, and then demand of him good work and a well-kept, clean factory, for unless a maker can give you this he is dear at any price.

#### THE WHEY TANKS TOO OFTEN VERY DIRTY.

The whey tanks at a great many factories are positively dirty. Some of them have not been thoroughly cleaned since the tanks were built, and all they are good for in their present condition is to destroy whatever feeding value there is in the whey, and to furnish an excellent breeding place for all the worst sorts of bacteria. The tanks should be thoroughly cleaned at least once a week.

#### THE SANITARY CONDITION OF THE FACTORIES OFTEN VERY DEPLORABLE.

Only a small percentage of factorymen pay due attention to the sanitary condition of their factories and surroundings. Very often you will find the floors and gutters leaking, with a pool of

rotten whey under the factory; or probably that the waste water drain has been choked so that in the yard within a few feet of the factory a cess-pool is formed.

If you go to the president of the company and urge him to attend to this matter, he will very likely say that it must be attended to at once; but if you go back in a month you will quite often find things just as you left them.

I would ask this association to endeavor to bring about some means by which this evil may be remedied.

#### BAD FLAVORS TOO COMMON.

During the latter part of the season, in almost

every factory I visited the cheese were showing bad flavors, such as apple, rape, turnips, etc., by which the value of the cheese would be reduced from one to two cents per pound. The patrons are responsible for this. If they will persist in feeding such strong-flavored food as apples, rape, and turnips to their milch cows, they must expect to find corresponding flavors in the finished product, and therefore they must be prepared to accept a low price for the same. How much better it would be all round if the patrons would feed corn and mangels to their cows, especially as these foods produce just as much milk as those just mentioned, and also milk of a much better quality and of a finer flavor.

## PRACTICAL ADVICE TO CHEESEMAKERS AND CHEESE-FACTORY PATRONS.\*

By A. F. MACLAREN, Esq., M.P., Stratford, President of The Dairymen's Association of Western Ontario.

MR. A. F. MACLAREN, of Stratford, President of the newly organized Butter and Cheese Association of Western Ontario, is one of the best known dairymen in Canada. He is the manufacturer of the justly celebrated "Imperial Cheese," which at the World's Fair, at Chicago, in 1893, was the only cheese that scored "perfection," or the



full standard of 100 points. Mr. MacLaren was born in 1854, in Perth, in Lanark county. But when he was very young his father moved to the township of Hibbert, county of Perth. When a child he had the advantage of a year or two of schooling at a rural public school; but he had to begin to earn his own living at the early age of nine years. He worked on a farm till he was seventeen years of age,

and then he entered the Fullarton cheese factory to learn cheesemaking. He followed this business for several years, and then he began to buy cheese. He first bought for Thomas Ballantyne & Co., of Stratford; then for J. L. Grant & Co., of Ingersoll; and then for the Ingersoll Packing Company. In 1892 he began to manufacture his Imperial cheese at Stratford. Not long ago he moved his factory to Toronto, and he has now also a branch office in Detroit.—Mr. MacLaren is considered one of the best judges of cheese on the continent. At the World's Fair, at Chicago, when no Canadian cheese were competing, he was the sole judge of the cheese exhibits. When Canadian cheese were competing he was joint judge with Mr. A. H. Barber, of Chicago, and Mr. G. E. Perlee, of New York. He has frequently acted as sole judge at all our leading Canadian fairs.—Mr. MacLaren was one of the most able and energetic executive officers the Western Association ever had. He was on its board of directors for many years. He has also been vice-president; and he was its last president. He is, as said above, the president of the succeeding association, the Butter and Cheese Association of Western Ontario.—Mr. MacLaren was at the last federal election elected M.P. for North Perth. In politics he is a Conservative.

I propose, in this paper, to give, as briefly as possible, a slight idea of the work accomplished by The Dairymen's Association of Western Ontario during the past year.

The purpose of this association has always been to advance and promote the great cheese industry of Canada, and I think all will agree with me when I state that this association has done a great deal towards the placing of our cheese in a prominent position in the markets of the world, but that there is still great room for improvement and advancement, and that a large amount of

\* Being a part of the address delivered by Mr. MacLaren as President of The Dairymen's Association of Western Ontario, at the annual meeting of the association, held at Brantford, January 19th, 1897.

work is yet to be done before we reach the point of perfection.

During the past year an extra effort was made by the directors of the association in the inspecting of milk and in the giving of instruction in making and curing cheese. Good work was done by our inspector, Mr. Millar, who visited a great many factories in the fall, and instructed the makers and advised with them as to the manner in which they should cure and store their cheese.

#### THE SYNDICATE SYSTEM.

The "syndicate system" which we inaugurated last spring has proved to be a step in the right direction, and, I believe, has furnished us with a means of improving and bringing about a greater uniformity in our cheese. The necessity of some definite system of instruction is recognized by everyone connected with the cheesemaking industry, and I hope that in another year the number of syndicates will be largely increased; and, as our secretary, Mr. Wheaton, has received some very satisfactory reports from those in charge of the syndicate factories regarding the benefits of the scheme, I have no doubt that we shall have little difficulty in increasing the number of syndicates, and that, instead of the association looking up syndicates, new syndicates will be looking for the association to take charge of them.

#### IMPROVEMENT STILL NEEDED.

It is gratifying to know that prices have been better this year than for some time past; at the same time it is to be regretted that the quality of a large portion of the cheese which is made in Ontario has not improved to the extent that it should have done, considering the instruction and advice that for some years past have been given to patrons and cheesemakers and all interested in the industry. It is my opinion that with the means which are now available for the acquiring of a knowledge of the latest and best methods of carrying on the dairy business, those practically interested in dairying being provided with dairy schools, dairy commissioners, government assistance, travelling instructors, etc., we should have made more advancement than we have made.

#### MORE ATTENTION TO THE MILK NEEDED.

In my own experience with the past season's trade, I have seen many wrong things; and I do not hesitate to say that never before was there a greater need for patrons to give attention to the care of the milk intended for cheesemaking, or for makers to understand that they should not attempt to make good-flavored cheese from poor-flavored milk, and to realize that when they have a lot of good and well-made cheese they should

give their best attention to the curing of it, a matter that, I am again sorry to say, has been very sadly neglected during the last fall and winter by many cheesemakers and factorymen, sometimes the one class being in fault and sometimes the other. The greatest faults to be found with the past season's make are the bad flavors, due to the carelessness of patrons in feeding turnips, rye, apples, etc., etc., to their cows.

#### DANGER IN THE USE OF A "STARTER."

I also found that in many factories a great number of cheese were almost ruined because they used a "starter." I may here state that I never was in favor of a starter being used at all, although perhaps it may be used to advantage late in the fall. I think it much better to heat the milk, so that thereby it will develop acid the more rapidly; and even if this process does take longer than when a starter is used, it is much safer. To me, using a starter to hasten the development of acid is like using coal oil to start a fire, *dangerous*. The starter business has been the cause of a lot of bad cheese being made in some factories during the past season, for I have actually found some cheesemakers using it in June, July, and August.

#### BAD CURING-ROOMS A CAUSE OF LOSS.

I have also found a great many very poorly cured cheese, due, undoubtedly, to bad and improperly equipped curing-rooms and to carelessness or ignorance on the part of cheesemakers as to the temperature required for curing, and as to the conditions to be maintained in properly curing cheese for export.

#### TURNIPS, RYE, RAPE, AND APPLES A CAUSE OF LOSS.

I now want to draw attention to some important features of our business in regard to which I think a great many improvements may be made upon our last season's work. I cannot for my life understand why patrons who are supplying milk to cheese factories and butter factories will persist in feeding improper food to milch cows, knowing at the time they are doing so that the flavor of the butter or cheese made in the factories will be impaired thereby; and that with such food as turnips, rye, rape, apples, etc., etc., cheese will depreciate in value all the way from a  $\frac{1}{2}$  cent to  $2\frac{1}{2}$  cents per pound. If our farmers must grow food such as turnips, rye, apples, or anything which will injure the flavor in milk, butter, or cheese, why not feed it to the other stock on the farm and not to the milch cows? I think I am within the limit when I state that I know of at least *forty* factories at which cheese

have been rejected and then resold at a reduced price of all the way from  $\frac{1}{2}$  cent to  $2\frac{1}{2}$  cents per pound because the patrons of those factories would persist in sending to the factory milk from cows which had been fed some of the above-named foods. All patrons of cheese factories are manufacturers, inasmuch as our factories are co-operative; and it should be to their interest to stop such practices, which injure our good reputation for fine cheese and reduce or lessen their profits.

#### IMPROPER CURING A CAUSE OF LOSS.

Another great difficulty, and one for which there is no excuse, that we have had to contend with is the careless and improper manner in which cheese have been cured. This was of very frequent occurrence in the early and late made cheese. Many curing-rooms are totally unfit for curing cheese during cold or hot weather. And in a great many factories where there are good curing-rooms there are not proper heating arrangements. It is high time that cheese-factory directors were doing away with the small box stove in the corner, and replacing it by a good coal stove with a tin jacket, or by a furnace. Then there would be no chance of buyers coming round and rejecting cheese simply because they were improperly cured. Then, again, many buildings are totally unfit for either making or curing cheese. How can you expect cheese to be well cured in a curing-room so poorly built that the wind blows through the floor, the windows, and the cracks in the walls? Unless many of our factories improve their buildings and furnish better facilities for manufacturing cheese it will be necessary for them to drop out of the business altogether; at any rate during the early and later portions of the cheese-making season. In fact, I would like to see the day when all cheese factories would not open until May 1st and when they would close October 31st; we should then have better quality, better prices, and a better reputation.

#### BETTER CURING-ROOMS A NECESSITY.

Just one word with regard to curing-rooms in hot weather. I have frequently examined cheese at two or three weeks old which were then all right in flavor and texture; but when I have examined the same cheese a week or two later,

after a severe hot spell, I have found them all off flavor, open in texture, greasy, and in every way an inferior lot. This injury to the cheese could have been prevented by some system of cold storage at the factory. I would suggest that an ice house be built in connection with all cheese factories, and that by some system the ice or cold air could be conveyed to the curing-room during the hot spells. In this way we could prevent the cheese from becoming overheated; at any rate, I think the factory is the place where the cold storage system should begin; for what is the use of shipping injured, overheated goods in refrigerator cars and refrigerator steamships? First of all, manufacture good goods; then protect them from injury by heat in the factory, on the railway, on the sea, and when they arrive in England. The same principle applies to our butter factories; and as we are now converting many of our cheese factories into butter factories for winter butter-making, I would urge upon those who are doing so the necessity of fitting up their factories in the latest improved manner, so as to make a quality of butter which will be suitable for export. We shall have to compete with Denmark, New Zealand, and other countries; and if we wish to occupy a position with our butter similar to that which we now hold in connection with our cheese we must leave no stone unturned that we may manufacture a first-class article; and I trust that all our patrons will aid their buttermakers by supplying to them an unexceptionable quality of milk.

#### BOARDS OF ARBITRATION.

Another suggestion I wish to make is one which I think will meet with the approval of both buyers and sellers. It is well known that during the past year a great many disputes arose between buyers and sellers. I think it would be a good thing for a "board of arbitrators" to be appointed in connection with each cheese board, for the purpose of settling disputes, for the reason that, as things now are, many times the fault is placed on the wrong man; but if a board of good men were appointed as arbitrators the blame would be placed where it belonged, and the reputations of innocent men would not be injured; for now cheesemakers, cheese-salesmen, and cheese-buyers are all often blamed when they should not be.

MR. T. A. DUFF, of Toronto, writes: "I congratulate you on the excellence of your January number. I was very much pleased, indeed, with it."

SHEPPARDTON, Jan. 22nd, 1879.—Gentlemen: I have taken your journal for a number of years, and have found it a valuable paper. W. J. HAYDEN.

MENIE, Ont., Oct. 16th, 1896.—The Bryant Press, Gentlemen: I send you my advertisement for November, and would say that I have had a great many enquiries and made a great many sales through FARMING. Hoping you may have continued success, I am, yours truly, JAMES A. STEWART, JR.



# PRACTICAL CHEESEMAKING.

By GEORGE H. BARR, Maker-in-Charge of the Black Creek Cheese Factory.



MR. GEORGE H. BARR was born in the township of Hibbert, county of Perth. He remained working on his father's farm till he was twenty-one years of age, but had the benefit of a good common school education. He obtained his first knowledge of cheesemaking by serving in the Brownsville factory under Mr. J. E. Hopkins, now Dominion Dairy Superintendent for the Province of Nova Scotia. He spent two years with Mr. Hopkins. For nine years Mr. Barr has been in charge of a factory himself. For the last two years he has had charge of the Black Creek factory. This factory is owned by the Hon. Thomas Ballantyne, M.P.P., and has a well-deserved reputation as being one of the very best and most completely equipped cheese and butter factories in the Dominion. During the season just ended they made at this factory 146 tons of cheese and 5,200 pounds of butter. The paper printed below was read by Mr. Barr at the recent annual meeting of The Dairymen's Association of Western Ontario, and was exceedingly well received by the association, being justly esteemed by the members present as one of the very best papers on cheesemaking ever read before an audience of cheesemakers in Canada.

In order to produce first-class cheese during our Canadian cheese season, it is necessary to have suitable buildings in which to make and cure the cheese. These, I am sorry to say, are not provided for all cheesemakers.

In respect to a great many of our factories, I am sorry to say that it is almost impossible to keep them warm enough in spring and fall, nor the curing-room cool enough in summer. And although a cheesemaker may do his best to make first-class cheese in a making-room, such as those I speak of, it is very difficult to reach that mark. If he does reach it, his cheese are liable to be spoiled in a curing-room in which the temperature cannot be controlled.

## A MODEL CHEESE FACTORY.

At the Black Creek factory, where I am at present, and where I have been for several years past, the maker does not suffer from lack of proper buildings, or from lack of proper equipment; for I believe this factory is the finest in Canada; and I will here give a description of some of the special features connected with it.

The Black Creek factory is built and equipped for both butter and cheesemaking. The creamery is a room 35x40 at the south end of the building; immediately adjoining the creamery on the north comes the vat room, which is 35x52; then comes the press room to the north of the vat room, this room being 35x30. The milk is taken in at the two windows on the west side of the building, and opposite the vat room, of course. The boiler room is on the east side of the building, and so situated that one door opens out of the vat room and another out of the creamery into it; and adjoining the boiler room on the south, with a door leading into it from the creamery, there is a very comfortable office, properly furnished, where the maker may do the necessary

work in the factory books in comfort and free from disturbing surroundings.

The ceilings are twelve feet high and are finished in black ash, oiled; the walls are hollow, built of red brick, and finished outside with red mortar; on the inside there is a wainscoting of cement four feet high; and above the cement is white plaster, both the cement and the plaster being put directly on the bricks. The high ceilings, the large windows, and the white walls make an airy and well-lighted building.

The boiler room has a brick smoke stack forty feet high, which is an ornament to the building. It is, besides, a good investment, for it will last much longer than an iron smoke stack, and the insurance is by it reduced 25c per annum. Both the cold and the hot water tanks are elevated above the ceiling of the boiler room, the cold water tank being high enough to empty into the hot water tank. Pipes connect with each tank so as to convey hot or cold water to the parts of the building where it is wanted. A pipe also leads from the cold water tank to the south end of the creamery, and a piece of hose is attached to it there, for the purpose of putting cold water into the cans before the milk-hauler leaves the factory; and nothing else is more appreciated by the patrons; the water keeps the milk that is left in the cans from drying on them, and so makes them easy to wash.

The whey runs from the vats to a large tank in the ground, from which it is forced by an ejector 100 yards through pump logs to the hog-pens. Beside this large whey tank there is a smaller tank into which all the washings and waste water of the factory run; and the same ejector forces this waste water through the same pump logs past the hog-pens to a large open trench with a gravel bottom, through which it filters into a

neighboring stream. By this method of disposing of the washings and waste water, the factory and surroundings are free from the smell, so terribly offensive, that is usually looked upon as a necessary accompaniment to every cheese factory.

The curing-room is sixty feet north of the making-room, and is placed that distance away for the purpose of reducing the insurance on it and upon the cheese contained in it, the rate charged upon the curing-room and upon the cheese in it being 70 cents per \$100 per annum, which is the ordinary storehouse rate, and very considerably lower than the rate usually charged upon cheese factories.

The walls of the curing-room are built of brick, the same as the making-room, and the building is divided into two rooms; in each room there are two ice racks, suspended about four feet from the ceiling, into which we can put ice during a hot spell, and thereby prevent the temperature getting so high as to do any damage to the cheese. These racks are supported on cross pieces fastened to the upright posts, and to them shelving is attached, and galvanized iron is placed underneath the racks to convey the drip from the melting ice to a gutter, which leads to a small conductor pipe that carries the water out of the room.

In cold weather heat is supplied by a hot air furnace, which is much better than an ordinary coal stove or wood stove. It is much more easily regulated, is more economical of fuel, and with it the circulation of air in the room is more perfect. The furnace stands on the floor near the centre of the room. It takes the cold air off the floor, warms it, and delivers the heated air high enough to prevent injury to the cheese surrounding the furnace. The top of the galvanized iron casing is taken off the furnace; but the sides of the casing remain, and are continued about a foot higher than in the ordinary furnace.

You will see from this description that there are several new and special features about the Black Creek factory, that all go towards improvement, and might be copied by others with benefit.

#### MAKING THE CHEESE.

The first and most important matter in connection with making the cheese is securing nice, sweet, clean-flavored milk. This is possible only by getting the patrons to be careful as to the food and water which their cows receive, to observe perfect cleanliness in all their milking operations, to air their milk in a pure atmosphere, and to deliver it at the factory in nice clean cans. If a cheesemaker gets milk such as this his day's work will not be a very difficult one. So be

careful in taking in the milk, weigh it correctly, and put the weights down in a book made especially for this purpose. We use one in which the patrons' names are written only once a month. It is well bound, and will hold the records of three or four years' milk supply.

Let the milk in the vat be heating slowly as it is being weighed in, and stir it gently as it heats. During the summer months it is well to test the milk by the rennet test as soon as it is 80° or 82°. By doing this you will find out the condition of the milk, and you are not so apt to be caught with overripe milk.

#### SETTING THE MILK.

The rennet test has been so often explained that I need not do it here. I will only say, Be very careful in using it, and, if possible, let the same person always do the testing.

To my mind setting the milk is the most critical point in the making of cheese. If you get this done right, with good milk, the curd will come along all right. If you set the milk when it is too sweet, or let it get overripe, there is trouble all the way along. So be very careful in setting the milk.

As a rule, I set at 22 or 24 seconds, using one dram of extract to 8 ozs. milk, at 86°. I would not say that everyone should set at the same number of seconds; but by all means set the milk so that the curd will remain in the whey 2¾ or 3 hours from the time of setting to the time of dipping, the dipping to be done when the curd will not show more than ¼ inch of acid on the hot iron.

For spring cheese (April, or first week in May), use enough extract so that the curd will cut in from fifteen to twenty minutes, say from 3½ to 4½ ozs. to 1,000 lbs. milk. In summer use 2¾ to 3 ozs. of extract, cutting in from twenty-five to thirty minutes. In the fall use 3 ozs., cutting in from thirty-five to forty minutes. Have the rennet measured out and diluted in one-half pail of cold water before the milk is quite ready to set, then you will be able to catch it right on the dot. Have the milk in motion before pouring in the rennet, and stir it constantly about four minutes; then take a thin stick, made for the purpose, and pass it slowly from one end of the vat to the other, pushing any froth which may be on top ahead; this helps to steady the milk and keep the cream from rising.

#### CUTTING THE CURD.

Begin to cut the curd as soon as it will break nice and clean when the finger is inserted and pushed along under the surface, the splitting being done with the thumb. Use the horizontal

knife first; hold it plumb and cut slowly; do not rush it through the curd so as to cause a wave in front of the knife, for this wave produces a great amount of waste. Then, with the perpendicular knife, cut crosswise of the vat; then lengthwise. This will be sufficient cutting, except for a fast-working curd, which should be cut finer. In cutting across the vat with the perpendicular knife, I find I can make a better cut by always drawing the knife towards me when cutting than by cutting both ways.

#### HEATING OR COOKING THE CURD.

If you use agitators, start them slowly immediately after cutting. If you stir by hand, I would have the curd stand about five minutes before commencing to stir. Stir for ten minutes before applying steam, being careful to have all the curd free from the sides and bottom of the vat before starting the steam. At this point it is quite easy to cause a very great waste in the curd by stirring too fast or too roughly; so handle the curd as carefully as you would eggs; for if you break eggs you make a bad mess, and if you break the curd now you make a bad mess too.

Heat to 98°, getting it to that temperature in about one and a half hours from time of setting. Try the curd on the hot iron as soon as the heating is completed, to be sure that it is not coming too fast, and I would advise drawing off a part of the whey now. If you use agitators, take them out and use the rake just as soon as the curd shows any acid on the hot iron, raking occasionally, until ready to dip.

#### DIPPING THE CURD.

The drawing off of all the whey and the dipping of the curd should be done when the curd shows from one-eighth to one-quarter inch of acid by the hot-iron test. I prefer the curd sink, with rack and cloth, to any other method of handling the curd at this stage.

Use a board to put between the curd sink and the vat when dipping, to keep any curd from falling on the floor. The amount of stirring a curd requires at this stage must be left to the good judgment of the cheesemaker. I would only say, Do not stir too dry, as it is easier to get the moisture out than to put it in again after the curd is stirred too dry.

When the curd is sufficiently stirred, spread it evenly on the racks, and cover it with a cloth made for this purpose. In about ten minutes break it into small pieces, setting them on edge, one deep. Ten to fifteen minutes after doing this turn them flatwise, putting them two deep; next time put them three deep, and keep turning

them often enough so that no whey' is allowed to stand on the curd until it is ready to mill.

#### MILLING THE CURD.

The time to mill will be when the curd shows a little butter when pressed in the hand, feels smooth, and is flaky when pulled apart; this is usually about one and a half or two hours after dipping. Use a knife mill, and one that will bruise the curd the least.

From milling to salting stir just enough to keep the curd from matting, and do not rub and smash the curd in stirring.

In summer I very seldom cover the curd after milling, and for about half an hour before salting I give it all the fresh air I can.

#### SALTING.

During the past season we did a good deal of piling or stacking the curd before salting, piling it as deep as we could, leaving it five or ten minutes, and then spreading it out; then stirring a few times and piling again. This seemed to give the curd that nice, mellow, silky feel we like to get when it is ready to salt. And do not salt the curd at all until you get it that way. Have the curd at a temperature of from 84° to 86° when it is ready to salt.

Use nothing but the best salt, breaking all lumps and taking out any specks which may be in it. Spread the curd evenly on the rack, and spread about half of the salt over the curd and rub it well in on the surface, and then mix thoroughly. Spread the curd evenly again, and put on the remainder of the salt and rub it in well. Then leave the curd for five or ten minutes, after which stir it thoroughly. Then leave it again for a few minutes, and then turn it again before putting it into the hoops.

#### PRESSING.

Now put the curd into the hoops, being careful to put the same weight into each hoop. Shake the sink cloth after filling each hoop, so that you will not have all the small pieces of curd in the last cheese.

Put the pressure on slowly at first, increasing it gradually for forty-five minutes, when the cheese will be ready to bandage.

When bandaging, use clean warm water for rinsing the press cloths, and hot water for rinsing the cap cloths.

Do not be in a hurry in doing the bandaging. I have no use for a man who bandages one cheese per minute; that is too fast. Be careful to have the bandages lap over each end three-quarters of an inch, and pulled evenly all round, and the cap cloth large enough to cover the lap of the bandage.

After bandaging put the pressure on gradually, as before, putting full pressure on the last thing at night.

Turn the cheese in the hoops the first thing in the morning, and press them till after dinner if possible.

#### CURING THE CHEESE.

When taking cheese out to remove to the curing room, wipe off all marks and grease from them, and see that each cheese is square and neatly finished.

Put the number of the vat and the day of the month on each cheese; then place them on the shelves in the curing-room carefully. Do not roll green cheese along the shelves or bruise them, for this usage produces marks and cracks. Place the cheese of each vat together, and have them look straight and trim on the shelves. Turn them every day except Sunday.

In spring-cure the cheese at a temperature of about 70°; in summer use every means possible to keep the curing-room cool. The ice racks I have spoken of are an excellent help in this respect.

I cured my fall cheese this season at 62 degrees and found them cured nicely. Of course this temperature was maintained day and night, which can be done in a good building, and with a coal furnace such as I have mentioned.

#### A FEW POINTERS.

I would like to mention a few things which I have learned from the past season's work, namely:

(1) The curds which were three hours or three and a quarter hours from setting to dipping made finer cheese than curds which were two and a quarter or two and a half hours from setting to dipping.

(2) The curds which were dipped when show-

ing less than one fourth inch of acid on the hot-iron test made nicer and more silky cheese than those dipped when showing more than one-fourth inch acid.

(3) The curds which were three hours from setting to dipping and were dipped when showing one-eighth inch acid worked better between dipping and salting than those which showed one-fourth inch or more.

#### A FEW "DON'TS."

I will close my paper by mentioning a few "don'ts" for factorymen and cheesemakers.

#### To Factorymen:

Don't cut your cheesemaker's wages down any lower.

Don't buy a gang press with a *tin trough* under the hoops. Let the trough be wooden.

Don't buy a cheese truck with four wheels on it; get one with three, invented by R. M. Balantyne (not patented).

Don't expect a man to make good fall cheese in a building as cold as a skating rink, and that, too, without a stove.

#### To Cheesemakers:

Don't go and tender for a factory so low that you cannot live, just for the fun of making cheese.

Don't take in bad milk.

Don't overripen your milk to hasten your work; by doing so you will retard your work and make poor cheese.

Don't allow your curd to show more than one-fourth inch acid when dipping.

Don't think that your curd sinks need washing only once a week; wash them every day.

Don't wear the same pair of trousers from April to November without washing them; keep yourself and your factory scrupulously clean.

Don't go with your bare feet in the factory. It is an uncleanly habit.

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MR. THOMAS A. BROWNE, secretary of the Western Fair Association, London writes: "Allow me to express my appreciation of your successful effort to make the January number of FARMING an attractive poultry number. If you had been present and seen the eagerness with which they were sought at Guelph, you would be proud of yourselves. The articles are good and the arrangement first-class."

ORCHARD, Ont., Jan. 22nd, 1897.—Dear Sirs: The January number of FARMING is received, and we assure you we are very much pleased with it. We have taken your Journal since 1884, and have never liked it as well as we do now. The book form we think a great improvement, and consider that a farmer cannot invest a dollar to better advantage than in a year's subscription to FARMING. Wishing you continued success. Yours truly, CALDWELL BROS.

ANGUS, Jan. 19th, 1897.—Gentlemen: Please find enclosed \$1, being amount of my subscription for 1897. Kindly allow me to complement you on the success you have made of the January issue—the special poultry number. I heard it very favorably commented upon by every exhibitor at the Ontario Poultry Association's show held in Guelph last week. Yours truly, W. J. BELL.

MR. F. W. WELLS, proprietor of the "Reliable Poultry Yards," Rochester, N. Y., is one of the leading breeders of White Wyandottes in the State of New York, and his opinion regarding everything pertaining to poultry is pretty generally accepted as of value. We are pleased, therefore, to add his testimony, which is entirely independent and disinterested, to that of others regarding our January poultry number. This is what he says: "I consider the January issue of FARMING the best of any poultry paper that I ever saw."

# WINTER BUTTERMAKING.

By J. H. MONRAD, Winnetka, Ill., Secretary Illinois State Dairymen's Association.



MR. J. H. MONRAD was one of the most interesting personages at the late Dairymen's Convention at Brantford. He is a Dane, and, while his excellent knowledge of English permits him to express himself with grace and fluency, his slightly foreign accent and his somewhat "bookish" phraseology lent a quaintness to his remarks which perhaps made them all the more impressive to his auditors. His knowledge of the history and technique of the art of modern dairying is, perhaps, as complete as that of any man on the continent. He has had dairying experience and opportunities for the observation of dairy methods in many quarters of the world; he has had a very considerable experience as a dairyman on his own account, not only in the United States, but also in his native country, Denmark; and he has also had the inestimable advantage of a thorough course of instruction in the science of dairying under Professor Fjord, in Denmark. Moreover, as a business representative he has been connected with dairy supply companies of world-wide reputation, as, for example, the Hansen Laboratory, the well-known manufacturers of lactic ferment and butter-color. In the work of dairy development in the Northwestern States Mr. Monrad is an influence of recognized power, and as a writer and speaker on dairy topics his words are everywhere read or listened to with interest and profit. It was a happy thought on the part of the directors of the Western Association to secure Mr. Monrad for their annual meeting, and we are sure the readers of *FARMING* will be glad that we are able to give them in full one of the addresses which he gave there.

That a cow bred so as to calve in the fall will produce more milk during the year than if she were bred to calve in the spring is an easily explained fact, inasmuch as the fresh pastures of the springtime will stimulate her to a greater yield at a period in her life when otherwise nature would let the yield decrease.

The cost of food is sometimes considered as higher during the winter than during the summer; but this is certainly counterbalanced by the cheaper price at which the labor for milking the cows and caring for them can be obtained at a time when outside work is scarce.

However, many experienced dairymen dispute the fact that winter feed is more expensive than summer pasture. If we can grow twice or three times the amount of fodder per acre, in the shape of silage, oats, hay, or roots, that we can get from summer pastures, it may well be questioned whether the labor saved by the cows doing their own harvesting is not more than counterbalanced by the increased return got per acre from the growing of feed-stuffs that are to be used in winter.

That it is better to have the cows dry during the hottest two months of summer, when flies are plenty and grass scarce, rather than at any other time no practical man will deny.

However, I am a believer in winter butter-making only to a certain extent. It is as absurd to feed cows for twelve months in the year, and then look to them for returns only during five or six, or even seven, months, as it would be to hire a man for a year and let him loaf five months.

Give the man his vacation of a month or so, and give the cow hers for six weeks or two months; but there the line should be drawn.

As long as there is a considerable difference in the price of winter and summer butter, it would seem to be the more profitable plan to have all the cows to come in during the fall; but I am old foggy enough to believe in the flavor-producing quality of the milk obtained from fresh cows as something of considerable commercial value; and hence it is not my desire to persuade you to have all your cows to calve in the fall, nor need I fear your succeeding in doing so. And if your wish is to continue to make cheese in summer, and to keep up the reputation for its quality which as Canadians you have already gained, it would be well to let half of your cows calve in the spring and the other half in the fall.

We live in an age that cries out for uniformity of product; but if we have the milking periods of our cows distributed equally through the year, our chances for uniformity are certainly better than if our cows all came in at the same season of the year.

If the same conditions obtain among your patrons as among those of our Western States, I must warn you against the treacherous system of "every-other-day" delivery to creameries. This system has been introduced on the supposition that in the cool weather of winter the milk will not be injured by being kept two days in the farmers' cans at home.

Though the milk does not get as sour in winter as during the warm weather of summer, nevertheless detrimental bacteria have nearly as good a chance to develop at that season as at any other, and the fault of bitter milk is often due to this cause.

"But," says the creamery owner, "it does not pay to haul the milk every day; in fact, the farmers would not do it." In that case, all I

have to say is that we must go back to the "gathered cream" system, using separators on the farm or in small skimming stations. To leave the milk for twenty-four or thirty-six hours to the vicissitudes of the average farm is absurd, and the system should at once be abandoned if in use.

But though the time during which the cow gives her milk, and the feed fed to her, have each something to do with the flavor of the resulting butter, the main stress should be laid on the proper ripening of the cream; and when we go into winter buttermaking this must be the centre pivot on which everything else turns.

And now we come to the climatic conditions. Fifteen or twenty years ago people spoke glibly about "dairy belts," believing that good butter could be made only in certain degrees of latitude; but who dare now, in face of centrifugal skimming and artificial refrigeration, draw the line anywhere, and say where successful buttermaking cannot be carried on?

But though the separator and the ice-house help us to overcome the loss of butter-fat during the hot weather, we must create artificially the needed temperature for ripening our cream when making butter in winter. Here again simple justice to the maker demands that we construct our creameries so as to give him complete control of temperature in winter as well as summer.

Temperature is the Alpha and the Omega both in cheesemaking and buttermaking.

In speaking about ripening cream, and our ability to secure the uniformity so much needed for export butter, I cannot but take issue with the experiments which have been made here and in the States with regard to commercial starters, at least to a certain extent.

The stations have proved that quite as good a starter may be prepared from selected milk as any artificial starter that can be bought; and to this I say "yes" and "amen."

But because certain manufacturers of commercial pure cultures have made ridiculously exaggerated claims as to their effect, this regrettable fact should not blind us to the truth that a reliable

commercial ferment or starter will help us to uniformity in developing a good flavor in our butter, just as surely as commercial color has helped us to greater uniformity in the color of both cheese and butter, or just as surely as commercial rennet extracts have helped us to more uniform work in cheesemaking.

There is scarcely a creamery in the country that has facilities for getting perfect milk. Therefore the average creamery cannot obtain as uniform results by the ordinary methods of ripening cream as it could obtain by pasteurization and the use of reliable commercial starters.

If your creameries do not now pasteurize their cream in making export butter, it is to be hoped that your Professor Robertson will at once inaugurate extensive comparative experiments to show the value of pasteurization, experiments which I had hoped to see carried out in the United States a year ago.

Of course with perfect milk it is admitted that you can make better butter from unpasteurized cream than from pasteurized cream; but, alas! even with the very best of good-will I dare not flatter you by expressing the belief that you (any more than your cousins across the lakes) can succeed in getting such milk at your creameries.

Need I call your attention to the fact that the shutting up of your cows in stables that are not properly ventilated, and in an atmosphere filled with germ-laden dust from the fodder and the excrement of the animals, is not conducive to the production of perfect milk?

The general neglect of carding and brushing the cows that are kept for the production of milk that is used as human food is a neglect that is all the more astonishing when we consider the time that people spend in grooming the horses that they keep for doing all sorts of heavy dirty work.

While pasteurizing the cream is not a panacea for all evils which arise from imperfect milk, it is certainly a great promoter of uniformity.

Provided you have the same quality of milk and complete control of temperatures, it will be as easy to make good butter in winter as in summer.

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ST. IVES, Jan. 4th, 1897.—FARMING, Toronto, Dear Sirs: Enclosed find two new subscriptions. I would like you to send me a few copies of your most valuable paper, FARMING, to distribute amongst the neighbors, as I feel sure that several of them will subscribe. I value my own copy too highly to let it out of my sight. Wishing you a happy and prosperous year. Yours truly, E. DUNN.

DEC. 30th, 1896.—THE BRYANT PRESS, Publishers of FARMING, Gentlemen: Enclosed please find one dollar for a new subscriber to FARMING. I am well pleased with it.

This country would be much better if every farmer had it in his home. Wishing you a happy and prosperous new year, yours respectfully, GEORGE THOMPSON, Hepworth Station, Township of Amabel.

CHILLIWACK, B.C., Dec. 17th, 1896.—THE BRYANT PRESS, Toronto, Ont., Dear Sirs: Please find enclosed money order for \$3.00. One dollar for a new subscriber and \$2.00 for my own for two years. I am very pleased with the progress that FARMING has made in the last year. I think it is the best agricultural paper I know of. Yours truly, JOSEPH ARNOLD.

## A MODEL AND INEXPENSIVE DAIRY.

EXPENSIVE BUILDINGS AND APPLIANCES NOT NECESSARY TO SUCCESSFUL DAIRYING. THE GREAT SUCCESS OF MRS. E. M. JONES, OF BROCKVILLE, AS A BUTTERMAKER AND DAIRYWOMAN PROVES THIS.

By GEORGE HARCOURT, B.S.A., Stock and Farm Editor, FARMING.

MRS. E. M. JONES, of Brockville, is undoubtedly the best known dairywoman on the continent. Her book "Dairying for Profit" has had a circulation of hundreds of thousands, and is still selling constantly. Some time ago the Hon. John Dryden, Minister of Agriculture for Ontario, obtained 50,000 copies of it for free distribution among the farmers of Ontario. So impressed was he with its merits that he gave it the following very emphatic endorsement: "This work has done more to arouse and educate our farmers in successful dairying than any other publication issued in this country. My department purchased 50,000 copies of it for free distribution, and everywhere the same emphatic statements have been made as to the good accomplished through its circulation. The book is so readable, and contains as well so much valuable information that it is very highly valued by everyone interested in better dairy products." The Hon. Mr. Greenway purchased several thousand copies for distribution among the farmers of Manitoba and was equally emphatic in his endorsement of it. The Quebec Government not only distributed it among the farmers of Quebec in English, but also had it translated, and distributed it in French. It is safe to say that perhaps no work more useful to farmers has ever been printed or sold in Canada. Mrs. Jones is also well known to stockmen for the excellence of her famous "Belvedere" herd of Jersey cattle.

As a Jersey breeder she was for many years in the very front rank, not only among Canadian breeders, but among American breeders as well. Of course she is an emphatic believer in the merits of the Jerseys as butter producers. As to the objection often urged against Jerseys that they are delicate and soon wear out, she says: "I can offer no better refutation than to submit the test of my grand old cow, Massena. In her sixteenth year Massena yielded, in six months only, 5,413½ pounds of milk, from which was actually churned 416 lbs. 10 oz. of splendid butter." As to the merits of Jerseys in general she says: "I don't say that no other breed will make the same quantity of

butter on the same quantity of feed, but I do say that I could never get them to do it, or nearly to do it and I think I understand the matter pretty well."

If there is any drawback to the influence exerted by the "home dairy" of the Ontario Agricultural College upon the many farmers and farmers' wives who visit it every summer, it is that the building is so complete in every way, and everything connected with it so well fitted up, that the effect upon the visitor is sometimes

discouraging rather than encouraging. A visitor may very reasonably express himself thus: "It is all very well for the Government to fit up such an affair as this and call it a 'home dairy'; they have lots of money to do it with; but we cannot do it, we cannot afford the expense." The result is oftentimes that visitors who very much admire what they see of the dairy work and the dairy equipment of the college, instead of trying to benefit from what they have seen, and to im-



Mrs. E. M. Jones, Brockville.

prove their own dairy work and equipment correspondingly, lose heart, and do not try to make any improvement at all.

It is, therefore, very encouraging and refreshing to find anywhere a modest, simple home dairy, inexpensively fitted up, and such as any farmer might easily establish for himself if he would; but one, too, where butter is made in considerable quantities, and butter, too, that commands the highest prices—prices indeed that may properly be called "fancy prices."

Such a dairy is that of Mrs. E. M. Jones, of Brockville, whose reputation as a dairywoman is of the highest character both for the quality of the butter she makes, the prices she realizes, and the excellence of the stock which she breeds and keeps for dairy purposes.

A visit to her dairy can inspire even the humblest farmer with nothing but encouragement. He cannot fail but be impressed with the magnitude of what has been accomplished, and that, too, in an inexpensive building and with inexpensive appliances; and he will invariably return to his own home with a determination to try to do as well himself; for he sees nothing in her establishment but what he can easily duplicate in his own.

As said above, Mrs. Jones' dairy is a very simple one; the appliances in it are almost identical with those which almost every farmer now possesses. The same may be said of her stables and outbuildings, for they are only ordinary buildings fitted up merely to make comfortable quarters for her cattle, and nothing more. Every farmer in the country, with scarcely an exception, could make equally comfortable quarters for his cattle in his own stables, with but a small expenditure of lumber and labor, if he went about it in the right way.

Mrs. Jones' dairy is a room about twenty feet square in the cellar of her house. In this primitive affair she has made as much as 7,000 pounds of butter in a year, butter that has brought her an average price of thirty-five cents a pound at her own door.

She stores her cream in a "creamer cabinet," but this cabinet does not present any better conditions for raising the cream than those any farmer can secure by a careful use of deep pails set in ice water. She churns her cream in a "Ballard rocking churn," but this churn does not possess any points of advantage over the

ordinary barrel churn which is used in many farm dairies.

Her butter-worker is an American worker, but a worker that will work the butter just as well as it does can be bought for a small sum.

Mrs. Jones, however, is careful to secure perfect ventilation and perfect cleanliness. The floor of her dairy room is cemented, and its walls always kept well whitewashed. The ventilation is regulated entirely by the windows.

Thus there are no appliances in Mrs. Jones' dairy, with perhaps the exception of the butter-worker, that a great many farmers do not now already possess. Yet with these simple appliances, in this simple room in the cellar of her house, she has for years made butter of the finest quality, that has sold for the highest fancy prices in the New York market, sometimes as high as 72 cents and even \$1 a pound.

What Mrs. Jones euphemistically calls her "office" is nothing more than the wide sill of a window in her dairy-room. Yet on this window sill she has made out accounts for butter that she has sold amounting to over \$50,000.

Thus it is evident that it is not to the conveniences or appliances that she possesses that Mrs. Jones' success as a buttermaker is due. Her success is due wholly to her skill, to her carefulness, to the perfect purity of her dairy atmosphere, and the perfect cleanliness of all her dairy operations.

So while it might be true that a visitor will be incited on seeing what Mrs. Jones has done in her small and inexpensively fitted dairy-room to endeavor to do likewise himself, still the fact remains that his own success must depend upon himself alone, and upon the care and the intelligence which he bestows upon his work. Equal care and equal intelligence will bring about similar results; but the question remains, Will the visitor bestow on his buttermaking the care and intelligence required?

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## PRACTICAL THOUGHTS SUGGESTED BY THE PAST SEASON'S WORK IN THE ONTARIO EXPERIMENTAL DAIRY.\*

By H. H. DEAN, B.S.A., Professor of Dairying, Ontario Agricultural College.

### I. LOSS OF BUTTER-FAT IN SKIMMING.

Closely connected with the feeding problem is the problem of making up the milk product of the cow into butter or cheese with as little waste as possible. Just to see how closely farmers were skimming their milk, I went to thirty-two dairy

farmers in the neighborhood around Guelph, and got a sample of skim-milk from each of them. To produce this skim-milk the cream had been raised in various ways: in deep pails set in ice water and in the well; in crocks; and in shallow pans. I found that in these thirty-two samples

\* Being part of an address given by Professor Dean at the late Creameries' Convention at St. Marys.



the average loss of butter-fat amounted to one pound of butter for every hundred pounds of milk. The actual loss varied from one-half of one per cent. to two per cent. of butter-fat. I believe that this showing is but a true index of what is taking place all over the province, wherever milk is skimmed. This waste is so great that it would of itself more than pay the cost of having the butter made up in a creamery. The way to correct this waste is for every farmer to test his skim-milk for himself. He can do this if he has a Babcock tester. I thoroughly believe that every farmer in the country who has a herd of ten or twelve cows should have a Babcock tester of his own. He will find it useful not only in the way here suggested, but in testing what his cows are doing at the pail. Without such a test I do not see how he can get on at all.

## II. EFFECT OF THE LENGTH OF TIME OF MILKING SINCE CALVING.

In order to test the effect on the flavor of butter of the time at which the milking is done, as compared with the time of calving, our herd was divided into three groups: fresh calved cows, cows in milk under six months, and cows in milk over six months. The milk from these three groups was kept separate, and the cream churned separately. It was found that the length of time the cows had been in lactation did not materially affect the flavor, grain, or quality of the butter. The score for flavor was: Fresh calved cows, 41.8 points; cows under six months, 40.9 points; cows over six months, 41.7 points; out of a possible 45.

## III. TEMPERATURE FOR SEPARATING CREAM.

The usual temperature for separating cream is about 85°. We have found better results to follow when the temperature is raised to 95°, or to 100°, or even to 130°. The higher temperature gives closer separation, and improves the flavor and quality of the butter; also it has a tendency to drive off any bad odors there may be in the milk. About ninety-five per cent. of the creameries in Denmark pasteurize the cream after it comes from the separator. I think a great deal of the success of the Danish butter-makers is due to this fact, and so long as we are troubled with turnip taints, stable odors, etc., I believe we shall have to heat our milk in the manner I have described if we want to produce the best-flavored butter.

## IV. TEMPERATURE FOR RIPENING CREAM,

In order to obtain some data as to the proper temperature for ripening cream, we took a large lot of cream and divided it into three smaller lots. One lot was ripened at a temperature of 60°, and another at 75°, and a third lot was first cooled down to 48°, and held there one hour, and then was raised to 60° and ripened. The scores for flavor were 42.9, 42.2, and 42.8 points respectively, out of a possible 45. This shows that there is nothing to be gained from lowering the temperature and raising it again, and that about 60° is the best temperature at which to ripen cream.

## V. PURE CULTURES.

A great deal has been written about pure cultures lately, and every person has heard about "B. 41," Professor Conn's culture for giving the desired flavor to butter. We have tried B. 41, also Hansen's Lactic Ferment, and a starter made by ourselves from pasteurized skim-milk. The butter made from different lots of the same kind of cream, treated with these three ferments, was tested. The score for flavor stood 41.8 for B. 41 and Hansen's Lactic Ferment, and 42.8 for our own starter. In a factory where there is difficulty in getting a good flavor pure cultures may be of use; otherwise it seems evident that every butter-maker can make his own starter.

## VI. BEST PER CENT OF FAT IN THE CREAM.

Our experiments show that butter made from cream containing about 18 per cent. of butter-fat will score higher for flavor than butter made from cream containing about 28 per cent. of butter-fat; but that this better flavor lasts only for about a week, after which time it deteriorates. The good flavor of butter made from cream containing about 28 per cent. of butter-fat is decidedly the more permanent. It would seem that the deterioration in flavor in the first case is due to the fact that in the 18 per cent. cream there is an undue proportion of skim-milk, and that, therefore, in the butter made from it there will be an undue proportion of buttermilk. Hence the butter made from this cream will be washed free from its buttermilk with considerable difficulty; and hence will be likely to contain more buttermilk than it ought, and so will be liable to go off flavor easily. Washing the butter is an important matter in any case. For a quick market butter may be washed slightly; but butter that has to be kept any length of time must always be washed well.

# AN EASY WAY TO HANDLE GRAVEL.

By ISAAC USHER, Thorold.

MR. ISAAC USHER, of Isaac Usher & Sons, of Thorold, Ont., is a native of the English Lake District. His education, like that of so many other Englishmen who have made their way in the world and acquired reputation



and competency by their own unaided efforts, was practical rather than scholastic. At the early age of thirteen he began active life by helping his father, who was a stonemason and contractor, and he learned the trade of stonemason himself. When still a young man he came to Canada, and worked at his trade in Woodstock. Later he went to Southern Illinois; and when the American civil war broke out he enlisted, and he served as a soldier all through the war. After the war was over he followed his trade again, but gradually he worked his way into contracting. In 1873 he had a number of contracts on the Welland canal. The firm to which he belonged was a very successful one. They built some of the largest bridges and tunnels on the continent. Among their great engineering works may be mentioned the Susquehanna bridge at Havre de Grace for the B. & O. R.R.; the Schuylkill bridge in Philadelphia; a half-mile double-tracked tunnel under the city of Philadelphia; and a bridge across the Misuri river for the C.B. & Q.R.R. About nine years ago Mr. Usher bought the Queenston Cement Works. His family had been settled in Thorold since 1873, and Mr. Usher then determined to make Canada his permanent home. He finds the Queenston cement superior to any other cement he has ever used, and he is now spending his whole time in promoting its use, especially among farmers, for foundation walls, cement floors, silo and pig-pen walls, etc., etc. He also advocates its use for concrete arches, bridge abutments, etc. He claims that this cement makes more durable structures and cheaper ones for the purposes named than those that can be made out of stone and mortar. As Mr. Usher has had a large experience in all sorts of contract work, we feel sure that the labor-saving device which

he recommends in the following paper will be found a thoroughly practical one. Mr. Usher is an enthusiastic promoter of the good roads movement, and has done good service among the people of our province in advocating good roads.

I appreciate the growing interest throughout the province in the good roads movement, and wish it every success. As a railroad contractor, I have had experience handling gravel in many different ways, and in this article I wish to give the farmers the benefit of my experience by explaining how they can build a simple contrivance, a trap, whereby they can load gravel into their wagons with scrapers. I have used it to advantage in handling both earth and gravel, and I know that when the trap is properly placed twice the amount of material can be handled in a given time with the same force as when ordinary means are used; hence I believe it has some relation to good roads. Farmers find digging and shovelling gravel hard work, largely because they are not used to it, and very often because they do not have the proper shovels and picks to work with.

## A GRAVEL TRAP.

The trap is a platform supported on posts, about seven feet high, eight feet wide, and twelve feet long. It should be set in the lowest central portion of the pit. Earth is banked against the sides, so that the teams can draw the gravel in scrapers up on the platform. From there it is dumped through an opening into the wagon, which stands underneath.

## HOW TO BUILD THE TRAP.

The accompanying cut gives a good idea of how the trap is built. Two rows of posts are placed in position to form the sides of the trap. They should be set about two feet in the ground to give solidity, four feet apart in the row, and four posts should be in each row. The distance between the two rows should be about eight feet. The backs of the posts should be flattened a little so that planks can be nailed on to keep back the embankment. A good tenon should be made on the top of each post. Select four good stringers, flatten them on one side for the top, and make a mortise in each end of them to correspond with the tenons on the tops of the posts. Put the stringers on the posts, but do not spike them fast; they may be pinned, but leave them so that the trap can easily be taken down and removed, if necessary. Now put on the planks, which should be at least twelve feet long, and spike them down well. In the centre of the platform make an opening about two feet four inches square; this is to dump the gravel through. On each side of this opening bolt a piece of two-inch hardwood scantling; this is to form a catch to dump the scrapers. As the scraper comes up on the platform, it may have to be eased a little so that it

will not catch the edge of the plank, but the handles should then be lifted a little so that the edge of the scraper will catch the scantling at the edge of the opening, and dump it.

#### PREPARING THE GRAVEL PIT.

Where every farmer gets out his own load of gravel, it seems impossible to keep the pit in anything like proper shape for rapid work. Generally the gravel is dug out from the sides, so that from "cave-ins" a lot of the best gravel is covered up with surface earth, and in opening new places the same thing occurs, so that the best gravel, which is usually in the bottom, is covered over. Where a gravel pit is in such a shape, the farmers should turn in and strip off the surface soil some distance back from the edge, because in working with a trap the gravel must be worked from the surface, and a larger surface must be uncovered than otherwise would be necessary.

#### PLACING THE TRAP.

Now make a place for the trap. If a large quantity of gravel is to be handled, it would be well to place the trap so that the scrapers can be loaded from both sides, and also so that the wagons can be driven through the trap. If the quantity of gravel to be handled is not very large, the trap can be made lower, say six feet high, and then the wagons are simply backed up into it under the opening at the top. The trap should be long

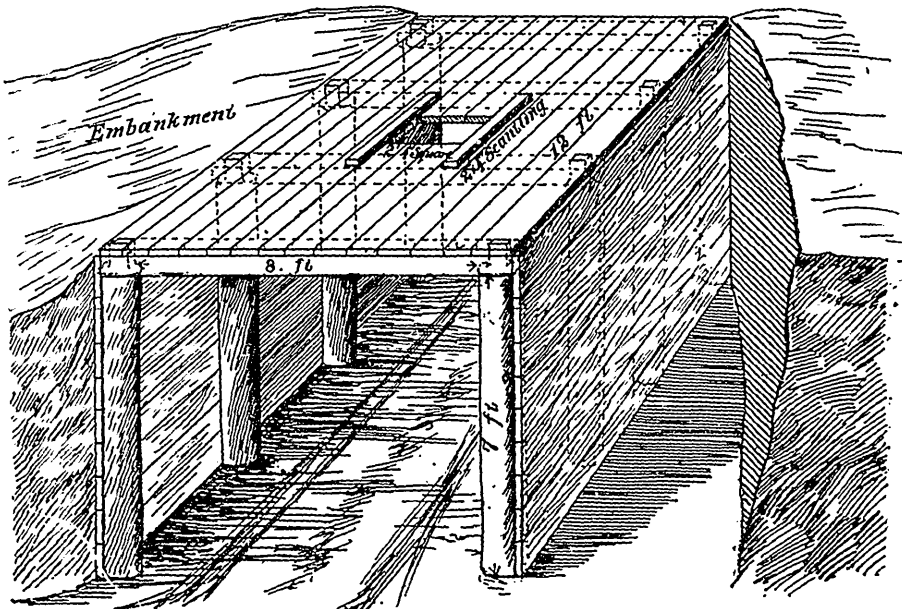
enough that the front part of the wagons can be filled first.

The trap should be placed in the lowest place in the pit, so that the top of it will be as little above the general level as possible. Where a trap to back under is made, a place for it can be dug out of the side of the pit, and the gravel be brought in upon it on the level. Keep the gravel well plowed, so that the scrapers will fill more easily. When filling, one team should be kept at the pit, so as to move the wagon forward as the box is filled, and to put the wagon in place when it is needed.

#### THE SPREADER.

For some time it is a good plan to use a "spreader" on the teams working the scrapers. The spreader is a light stick about four feet in length, with a hole in each end, through which a light strap passes to fasten it to the inside rings of the horses' bits. This spreader will keep the horses apart, and its use serves to cause the teams to soon learn to pass the opening in the platform, which at first they may be reluctant to do.

I spend most of my time in the summer among the farmers of Ontario, and I shall be very glad to assist in building a trap, or to help in any way I can. In a future number I will contribute a few practical hints on roadmaking.



Mr. Usher's Trap for Loading Gravel.

# THE DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO—ANNUAL MEETING.

(Specially reported for FARMING.)

## GRASSES.

The twentieth annual convention of the Dairymen's Association of Eastern Ontario was held at Brockville, January 6th, 7th, and 8th. The attendance was good, and keen interest was taken in all the proceedings.

### THE PRESIDENT'S ADDRESS.

The President, Mr. Henry Wade, of Toronto, occupied the chair, and in his annual address called attention to the fact that the returns from the port of Montreal for 1896 showed that Canada exported 16,000 boxes of cheese more than during 1895, the total number being over 1,726,000 boxes. This means an increase of about one and one half million dollars.

The export of butter has also been very encouraging. In 1894 we sent to Great Britain 32,000 packages; in 1895, 69,000; in 1896, 157,321 packages. This means an increase in the value of our butter export of over \$1,000,000, as compared with 1895. There is no reason why we cannot double our export of butter again next year.

### MR. DERBYSHIRE'S ADDRESS.

Mr. D. Derbyshire, the well-known dairyman, chairman of the local committee, welcomed the members of the association to Brockville. In his address he pointed out that it was beyond the power of the association to raise the price of cheese or butter, because prices are controlled by the markets of the world. It is possible, however, so to educate the producer that the desired profit may yet be obtained; but the only way to accomplish this is for the farmer to reduce the cost of producing milk, and for the maker to improve the quality of his product.

### EX-GOVERNOR HOARD'S ADDRESS.

In the afternoon session of the first day the Hon. W. D. Hoard, of Wisconsin, was the first speaker. His subject was, "What the Farmer of To-day must do to Secure More Profit in Dairying." His address was a magnificent one, and we are very glad to be able to present it in full to the readers of FARMING. It forms our leading article for this month.

Professor Fletcher, of the Central Experimental Farm, Ottawa, was the next speaker. He gave a very practical address on grasses. While he recognized corn as the sheet anchor of American dairying, he thought it should not be grown to the exclusion of the grasses. He gave an interesting account of his experimental grass plots, undertaken for the purpose of determining the relative value of the different grasses grown in Canada. He thought farmers should experiment a little with mixtures of grasses.

A great deal has been heard about "saccaline," and its remarkable yields of fodder, but Professor Fletcher thought the best way to express its worth was by calling it a *gigantic humbug*. A plot at the Experimental Farm was frozen to the ground by a slight frost on the 28th of June last. Cattle did not like it. It is worthless.

Wagner's Wood Pea (*Lathyrus Sylvestris Wagneri*) promises well; it grows a thick, tangled bunch of vine, rich in protein. The plant is said by some to be poisonous, but no ill effects have followed the feeding of it at Ottawa or in Manitoba. One case of poisoning, however, has been reported from British Columbia, so that it apparently requires further testing. The seed is expensive, but once it has caught the plant is a persistent grower.

The professor, in closing, spoke about quack grass and maintained that it could be killed out by thorough cultivation. This aroused a lively discussion, which lasted until the meeting closed.

### PUBLIC MEETING.

On the evening of the first day a public meeting was held in the Opera House, which was addressed by Ex-Governor Hoard, Hon. John Dryden, Professor Fletcher, of Ottawa, Professor Robertson, of Ottawa, and others.

### CHEESEMAKING.

On Thursday morning Mr. J. A. Ruddick, superintendent of the Kingston Dairy School, gave a very valuable paper on "Cheddar Cheesemaking." This paper will be found in full on page 405 of the present issue.



Henry Wade, Toronto,  
Late President of The Dairymen's Association of Eastern Ontario

## "RUST" SPOTS IN CHEESE.

At the close of his address Mr. Ruddick called the attention of the association to a new trouble, "rust" spots in cheese. He first noticed these spots some years ago, and this summer he had met with a bad case of the rust. He got Professor Connell, of Queen's University, an experienced bacteriologist, to investigate his rust. Professor Connell found the rust was caused by a germ, and a bad one. It was separated out and cultivated, then Mr. Ruddick placed some of the cultivated germs in a vat of milk and found that they caused "rust" spots in the cheese manufactured from it. He was not in a position to name a remedy, but advised thorough cleanliness in everything about the factory. A thorough cleansing of all the gutters, drains, pipes, etc., in one factory had stopped the trouble there. He recommended disinfecting all gutters, drains, etc., with a solution made by dissolving one pound of copperas in ten gallons of water. This solution should not be used on the woodwork inside the factory, because it would stain it.

## TEMPERATURE FOR THE CURING ROOM.

In answer to a question, Mr. Ruddick said that the proper temperature for a curing room was between 60° and 70° Fah. Every germ seems to develop best in a temperature peculiar to itself. There are good and bad germs. With respect to cheesemaking the bad germs produce disagreeable flavors in the cheese, the good ones the flavors we desire. A temperature below 60° develops those germs that cause bitter flavors. A temperature of between 60° and 70° seems to develop those germs that we need. A splendid discussion then followed. Many questions were asked of Mr. Ruddick by the cheesemakers present, and were ably answered by him.

## THE GERM TROUBLE.

At the close of the discussion Professor J. W. Robertson, Dominion Dairy Commissioner, in a very able address, emphasized the necessity for absolute cleanliness in the cheese factory. Cheesemakers wonder why there are so many more of these mischief-making germs nowadays than there used to be. These germs have always existed, but the conditions for their best development were not presented until the cheese factories came into existence. Just as the Colorado beetle did not develop in its native home to the same degree that it has done since it worked east and found in the potato leaf the right conditions for its rapid development, so the building of cheese factories and the making of cheese have presented the conditions that favor the rapid growth of germs deleterious to cheesemaking. Year by year, as the grounds around the factories, the factories themselves, the whey tanks, etc., become more thoroughly occupied by these germs it will become more difficult to make first-class cheese. So, too, the farm dairy, the milking yard, the milk stands, etc., will more and more become favorable breeding grounds for mischievous bacteria the longer they are in use; and it will be more and more difficult for the patron to send untainted milk to the cheese factory. Proof of the foregoing statements is seen in the fact that it has been known in the Northwest for cream to be brought into a factory a distance of twenty miles only once every five days, all summer long, and yet be in a perfectly sweet condition. The reason for this is that there are none, or few, of these mischievous germs there as yet. So terribly real is this germ trouble that it has been asserted that cheese factories will have to put in perfect systems of drainage, or else move to new sites every four or five years, if the good quality of our cheese is to be maintained.

## COLD STORAGE.

In the afternoon session of this day Professor Robertson took up the question of cold storage. He first showed how cold storage could be made of value to the Canadian producer, then from plans he showed how a cold storage room should be built. He then explained the conditions upon which the bonuses could be obtained which the Government had offered to induce creamery men and others to provide cold storage buildings for handling perishable products.

## HON. MR. FISHER'S ADDRESS.

The Dominion Minister of Agriculture, Hon. Sydney Fisher, was the next speaker. He could testify that, as a farmer, he had frequently been benefited by the interchange of thought which took place at such meetings as these, and he thought that no farmer should miss attending them who could possibly be present. He said that as



R. G. Murphy, Elgin,

Late Secretary of the Dairymen's Association of Eastern Ontario; Secretary of the Butter and Cheese Association of Eastern Ontario.

Dominion Minister of Agriculture he conceived it to be his duty to work out the problem of the proper conveyance of Canadian produce to the English market, and he hoped to see next summer a perfect chain of cold storage facilities established, reaching from the producer to the consumer. This could not be accomplished without some expenditure of money, but the whole country was dependent on the success of the farmer; hence it was of interest to all that the expenditure should be made.

## HON. W. D. HOARD'S ADDRESS.

Following the Minister of Agriculture came Hon. W. D. Hoard, who continued his address on "More Profit in Dairying," which he had begun the day before. This address will be found in full on page 395 of FARMING for this issue.

## BRANDING CHEESE.

At the invitation of the Dominion Minister of Agriculture, the propriety of branding cheese was brought up for

discussion. The discussion waxed hot, and at one time things were very lively. Great objection was taken to the clause in the proposed bill compelling the dating of the making of the cheese. Finally, a resolution objecting to the dating of the cheese, but approving of the remainder of the bill, was carried.

#### REPORTS OF INSTRUCTORS.

The instructors of the association, Messrs. Bensley, Purvis, Howey, and Publow, made their annual reports at the meeting on Friday morning. The reports showed that 21,436 samples of milk had been tested by them in their capacity of inspectors. In ninety-five cases they had found that the milk had been tampered with. These cases had all been dealt with rigorously; many delinquents had been brought before a magistrate and fined; others had settled with the managers of the factories, and some with the inspectors direct.

A statement in the report of Instructor Publow, to the effect that in his opinion the cheesemaker should not be held responsible for bad-flavored cheese, because the bad

flavor was generally due to the patrons supplying bad-flavored milk, aroused a very spirited discussion. Some who were present thought that a portion of the blame should be placed upon the owners of the factories for not furnishing proper cooling-rooms.

Mr. W. Eager, of Morrisburg, recommended paying for milk at the cheese factory according to the Babcock test.

#### ELECTION OF OFFICERS.

According to the "amalgamation" agreement the association is to be known henceforth as the "Butter and Cheese Association of Eastern Ontario." The officers for the new association are: President, D. Derbyshire, Brockville; vice-president, E. J. Madden, Newburg; 2nd vice-president, Wm. Eager, Morrisburg; 3rd vice-president, R. J. Graham, Belleville; treasurer, P. R. Daley, Foxboro. Directors—J. MacTavish, Vancamp; E. Kidd, North Gower; J. R. Dargavel, Elgin; James Whitton, Wellman's Corners; T. B. Carlaw, Warkworth; Henry Wade, Toronto. Auditors—Morden Bird, Stirling, and F. W. Brenton, Belleville. Secretary, R. G. Murphy, Elgin.

## THE CREAMERIES' ASSOCIATION OF ONTARIO— ANNUAL MEETING.

(Specially reported for FARMING.)

The twelfth annual convention of the Creameries' Association of Ontario was held in St. Marys, January 13th, 14th, and 15th, 1897. The President, Mr. D. Derbyshire, of Brockville, occupied the chair. In his annual address the president briefly reviewed the work of the association during the past year, and in closing called attention to the proposed amalgamation of the three dairy associations of the province into two "butter and cheese associations," one for the east and one for the west, and asked for the hearty support of the members for the new organizations.

#### PROFESSOR DEAN'S ADDRESSES.

The afternoon session was well attended by dairymen and farmers. The first speaker was Professor H. H. Dean, of the Ontario Agricultural College. His subjects were the "Food Cost of a Pound of Butter" and "Practical Thoughts in Dairying." His addresses will be found in full in this month's issue of FARMING.

#### EX-GOVERNOR HOARD'S ADDRESS.

The next speaker was Hon. W. D. Hoard, who gave an intensely interesting talk, enlivened with much humor, on "Dairy Ideas." We trust to be able to give a full report of this address in an early number of FARMING. At the close of the address questions were showered in upon the speaker from all parts of the room, and were answered with point and effectiveness.

#### THE BANQUET.

On Wednesday evening the buttermakers did justice to the banquet tendered them by the citizens of St. Marys. The toast list provided was complete and the speeches were excellent.

#### MR. A. A. WRIGHT'S ADDRESS.

On Thursday morning the first speaker was Mr. A. A. Wright, of Renfrew. Mr. Wright advocated the making of butter in cheese factories after the close of the cheese season. He suggested a grouping of factories for winter work, with a separator in each factory of a group, and the

sending of the cream to one central factory, where it could be made into butter.

He also advocated a longer milking period for cows, and went so far as to say that cows of his that had been kept milking until they came in again had given an increase.



D. Derbyshire, Brockville,

Late President of the Creameries' Association of Ontario  
President of the Butter and Cheese Association  
of Eastern Ontario.

milk yield year by year for three years. This statement raised a spirited discussion. Objection was taken to milking the cows so long, the contention being that the offspring would be weak. Mr. Wright said that the offspring of the cows he had referred to were not weaklings. The secret of his success seems to be that he is a good feeder, and supplies his young stock with plenty of bone-and-muscle-producing food.

PROFESSOR ROBERTSON'S ADDRESS.

Professor Robertson, Dominion Dairy Commissioner, then took up the subject of cold storage. Cold storage, he said, will be valuable to the Canadian farmer only as it will enable him to obtain larger profits for his produce. He pointed out that perishable goods were valued more for their *daintiness of flavor* than for their actual value as food. Thus a basketful of stale peaches contain very largely the same ingredients that they do when they are in the blush of ripeness, but they do not command as much money in an open market. The condition in which perishable products reach the English market is an important matter. Now, if the condition in which our fruit, butter, cheese, eggs, poultry, fresh meat, etc., reach the English market can be improved by establishing a chain of cold storage, extending from the producer to the consumer, it will be a great thing for the farmer.

Professor Robertson then called attention to a chart containing the following figures:

IMPORTS MADE BY GREAT BRITAIN IN 1805.

Totals.	Imports from Canada.
Values.	Values.
Wheat, barley, oats, flour. \$241,986,692	\$ 7,335,599
Animals (living) for food.. 43,635,739	8,052,294
Dressed meats..... 114,109,534	4,608,904
Cheese..... 22,752,299	14,220,505
Butter..... 69,326,786	536,797
Eggs..... 19,483,437	574,577
Fish..... 14,495,226	2,974,850
Fruit (raw)..... 23,680,290	1,711,769
Milk (condensed and preserved)..... 5,273,320	.....
Potatoes..... 5,692,120	556
Poultry and game..... 2,945,112	6,845
Total..... \$563,382,055	\$39,972,696

He showed from this chart that our largest exports are made up of those products that do not spoil in transit. He then went over each class of exports represented in the chart, and showed the possibilities in it for the Canadian farmer when aided by cold storage. He then explained, by the aid of charts, the most modern plans of constructing cold storage rooms in connection with creameries. He announced that the Department of Agriculture at Ottawa would examine any plan for a cold storage room that a creamery manager would send to Ottawa. Moreover, that plans of cold storage rooms, etc., would be sent on application to any one interested in the subject.

THE HON. MR. FISHER'S ADDRESS.

The first speaker of the afternoon was the Dominion Minister of Agriculture. Dairying is the highest branch of agriculture, because in following it the farmer sends away from his farm the least amount of fertility possible. The dairy farmer makes a concentrated product, and in doing so there is greater opportunity for the exercise of skill than in any other line of farming. He dwelt on the rapid advance, through co-operative work in creameries,

which had been made in the value of butter manufactured by the Canadian farmer, and believed that with the aid of cold storage there would be a still greater advance than ever. Butter put in cold storage at Prince Albert, N.W.T., the day after it was made and kept in cold storage until it reached the Liverpool market brought 114 shillings for 112 pounds, a price only slightly exceeded by the finest Danish butter. He was anxious to establish a system of cold storage that would benefit every creamery in Ontario, and in order to stimulate the creameries to do their part in the matter the Government proposed to give a bonus of \$50 the first year to every creamery that would construct a cold storage room, and an additional grant of \$25 a year for the two following years if the cold storage room so constructed continued to be used. The Government had already made arrangements with the G.T.R. and C.P.R. for a weekly cold storage service, and he hoped that they would be able to make similar arrangements with the



Mark Sprague, Ameliasburg, Secretary of the Creameries' Association of Ontario.

smaller railways. They had already nearly completed arrangements with the steamship lines for cold storage services. All these services will be sufficiently under the control of the Government that no extortionate rates will be charged. It was a national undertaking, and one that would be available to all classes of producers that need cold storage for the better preservation of their products in transit.

Mr. Fisher then touched upon the necessity of greater care being taken in the looking after the cows. Better feed was required and more thought and intelligence needed all along the line.

EX-GOVERNOR HOARD'S SECOND ADDRESS.

The Hon. W. D. Hoard then gave the meeting a series of practical talks on creamery matters, which every creamery man in the country would be the better for having heard, if that were possible. We are glad to be able to say

that we are giving to the readers of FARMING in this month's issue a full report of these talks.

## GRASSES.

Professor Fletcher, of the Experimental Farm at Ottawa, then gave the address on "Grasses" which he had given at the dairy meeting at Brockville the week before.

## BUTTER FOR THE BRITISH MARKET.

In the Friday morning session Professor Robertson gave another of his characteristically instructive and practical addresses. It was entitled "Butter for the British Market." It simply bristled with valuable pointers to creamery men.

## THE AMALGAMATION SCHEME REJECTED.

Some time ago representatives from each of the three dairy associations of the province met in Toronto and agreed to the scheme of amalgamation which had been proposed by the Ontario Minister of Agriculture. The action of the representatives of the creameries association does not receive the endorsement of the association. At the close of Professor Robertson's address, as reported above, Mr. Aaron Wenger, of Ayton, took the platform and stated that at a meeting of the directors of the Ontario Association, held the night before, the following resolution had been adopted:

"Moved by Mr. J. H. Croil, seconded by Mr. A. A. Wright, that we, the representatives of the Ontario Creameries' Association, now in committee assembled, do hereby express our disapproval of the action of the joint committee at Toronto in amalgamating the three dairy associations into two butter and cheese associations, and do hereby protest against the same, and strongly advise the election of a board of officers for the Creameries' Association for 1897, as heretofore. We at the same time believe that if amalgamation be desirable it would be advisable to form one association only, and put the dairy business of the province into the hands of a dairy commissioner who will be directly under the control of the Minister of Agriculture."

Mr. R. J. Graham, Belleville, then stated that, in view of the work which the association had done, was doing, and had before it still to do, they should elect a new set of

officers and keep the association alive; and if the Government decided to withdraw the grant, possibly they could continue the work with private money. He accordingly moved that the following officers be elected for 1897:

President, A. Wenger, Ayton; vice-presidents, J. Croil, Montreal, and T. J. Miller, Spencerville. Directors—Messrs. W. D. McCrimmon, Glenroy; A. Campbell, Ormond; C. R. Tousaw, Iroquois; John Sprague, Ameliasburg; A. A. Wright, Renfrew; F. L. Green, Greenwood; James Carmichael, Arva; W. G. Walton, Farnilton, A. L. Bobier, Exeter; D. N. Eckstein, Neustadt; James Struthers, Owen Sound; Wm. Halliday, Chesley; Wm. Snider, St. Jacobs.

After some discussion the motion was submitted to the convention and unanimously carried.

Mr. T. J. Dillon, Superintendent of the Dominion Dairy Station in Prince Edward Island, then gave a brief but instructive address on "New Ideas in Creamery Work."

## THE BABCOCK TEST.

The afternoon proceedings were opened by an address from the President in favor of the Babcock test as a means for determining the proper division of the proceeds of both cheese and butter factories.

## INJURIOUS INSECTS.

Professor Fletcher then spoke on "Injurious Insects." The potato beetle, the horn fly, the pea bug, and other insects injurious to the work of the dairy farmer were discussed by him. Many questions respecting these pests were asked by the members and ably answered by the lecturer.

The convention then closed.

## A GOVERNMENT BONUS FOR BUTTER ASKED FOR.

At a meeting of the new directors of the association a resolution was passed suggesting that the Provincial Government should give the farmer producing the milk a bonus of one cent a pound on all creamery butter exported to England; also that a bonus of more than one cent a pound be given for winter butter; and that this bonus be continued for three years. A copy of the resolution was ordered to be sent to the members of the Provincial Government.

## THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO—ANNUAL MEETING,

(Specially reported for FARMING.)

The twentieth annual convention of this association was held in the city of Brantford, January 19th, 20th, and 21st, 1897. There was a large number of cheesemakers present; the papers and discussions were practical; and the interest taken in them was well sustained throughout the convention.

The president's address, the report of the directors, and the report of Inspector Millar, were among the first items on the programme.

A discussion arose on Mr. Millar's report about the advisability of publishing the names of all cheesemakers whose factories he visits, and the condition in which he finds their factory and cheese. It certainly would be a step in advance.

## THE REPORT OF THE SECRETARY.

Mr. J. W. Wheaton, the secretary, reported that a larger number of local conventions had been held than

during previous years; that the gathering of cheesemakers, held at the Dairy School, Guelph, had been productive of much good; that the correspondence of the secretary's office had been much larger during the year than in former years; that the membership of the year was 450, not as many as there should be; and that the revenue from fines imposed for tampering with milk sent to the factory had decreased by about 30 per cent.

A more thorough system of instruction should be carried out. There are over 350 cheese factories in Western Ontario, and to properly bring the work of inspection and instruction to all of these factories would require eight inspectors. At present the inspector only goes to these factories that ask and are willing to pay for his services. Constant instruction is needed if we are to hold our own. If the factories would each pay an annual fee of \$10 there would be sufficient funds to carry on the work of instruction.



tion in each factory. There is another plan; if each patron would pay the small sum of fifteen cents for this purpose sufficient money would be raised for purposes of instruction.

The sanitary condition of many of the factories is not what it ought to be. It has been suggested that the inspector appointed by the association should be made a health officer by the Provincial Board of Health, and as such have power to compel makers and owners to keep all factories and their surroundings in proper sanitary condition.

Some little difficulty was experienced in finding a group of factories that would work together for a trial of the syndicate scheme which the directors had determined to carry out, but a group of seventeen factories, partly in the London district and partly in the Ingersoll district, was finally obtained that were willing to form a syndicate for purposes of instruction. One factory dropped out before the season was over; the remainder continued in the syndicate until the close of the season. The beneficial results of the instruction so obtained were so obvious that it is the hope of the directors that there will be more of these groups next season.

#### DISCUSSION ON THE SECRETARY'S REPORT.

A question was asked of the convention whether a cheesemaker could not tell at all times if the milk brought to him was fit to be received. The opinion of the meeting was *no*; for when milk is cold neither the cheesemaker nor anyone else can tell what taints there may be in it.

The president advised the use of a spirit lamp for heating samples of suspected milk; any bad odor contained in it would then be given off and would be detected.

Mr. Maynard, of Drumbo, approved of the proposed plan of taxing each patron 15 cents a year for instruction; he was sure the patron would be saved a good deal more than that sum in the better quality of the product.

Mr. John Marshall, of Bruce county, said the patrons of Elderslie cheese factory had lost \$500 on their cheese this year; that would have been saved had a fee of 15 cents a patron or even a fee of \$20 for the factory been paid for instruction. He approved of the plan.

Mr. Pattullo, M. P. P., of Woodstock, asked if the association should ask the Legislature for authority to collect a fee from each factory or patron. The board of directors of a cheese factory were often to blame for the uncleanly condition of the factory. He thought the inspector should be a health officer; then the names of the delinquent factories could be made public.

Mr. Blayney, of Lynnvillle, agreed with Mr. Pattullo. He could see that he had lost \$28 last year through want of proper instruction and inspection at the factory to which he sent his milk. He was going to lose \$18 this year through the same cause, and he would have been glad to have saved it by paying 15 cents a year.

Hon. Thos. Ballantyne, of Stratford, thought too much importance could not be laid upon the question of instruction. Milk is very different from the usual run of raw products used by manufacturers, and no rule of thumb can be followed in making it up into cheese. For this reason the best as well as the poorest cheesemaker can often profit by the visits of an instructor.

He had been in England at the close of the past season and had found there several bad lots of Canadian cheese whose inferior quality was wholly traceable to the practice of sending whey home in milk cans. This should not be done. He deplored the practice of keeping the culled cheese for home consumption; we should keep the very choicest cheese for this purpose, so as to teach our people to eat more

cheese. He thought every factory should be brought under inspection and instruction, because we are going back in the quality of the cheese we make rather than advancing.

Mr. J. W. Steinhoff, of Stratford, said the makers were responsible for dirty factories, but the patrons were responsible for the condition of the milk. Poor makers would not come out to the meetings; hence inspectors and instructors should be sent to them.

#### THE SYNDICATE FACTORIES.

Mr. J. B. Muir, of Avonbank, the instructor for the syndicate factories, said that he had commenced work on the 2nd of June. He first paid a hurried visit to each factory; afterwards he spent a day at each one. At the seventeen factories he found only three cheesemakers that were making first-class cheese; eight cheesemakers were making harsh, gritty cheese; and five were making some fine cheese, but also a lot of open, weak-bodied cheese. Only three of the cheesemakers were turning the cheese in the hoops in the morning; but before the season was over all but four of them turned their cheese. There was a steady improvement in the quality, finish, and uniformity of the cheese as made during the season. At first a number of the cheesemakers did not care to receive instruction; but all acknowledged before the season was over that if they had followed the instructions at the beginning of the season their results would have been more satisfactory. He thought the factory owners and makers in a syndicate group should meet and agree on the method of making, the weight of each cheese, etc., so that the output of the group should be uniform in size, quality, and finish. This would mean a better price for the cheese which they made when they came to sell it.

#### DISCUSSION ON MR. MUIR'S REPORT.

In the discussion on this paper Mr. Hoard raised a question as to the best method of heating a curing-room. He advocated for this purpose the use of steam from the boiler. Pipes could be put around the walls of the curing-room and connected with the boiler; then by using a regulator between the boiler and the pipes in the curing-room an even temperature could be maintained. If the fire was banked at night there would be sufficient steam in the boiler to hold an even temperature all night.

Mr. R. M. Ballantyne advocated a hot air furnace similar to the one used in the Black Creek cheese factory, and described in Mr. Barr's article on cheesemaking. Since using that one they had ordered another from the maker in Hamilton, who had put a better jacket on it. This jacket was a double one; the inside lining was corrugated, and a layer of asbestos paper was placed between it and the outer layer. Cheese could stand quite close to this jacket, because no heat came through it. The price was \$32 at Hamilton.

Mr. R. G. Murphy, the secretary of the Butter and Cheese Association of Eastern Ontario, said that in his association there were two factories heated with steam from the boiler, and no trouble was experienced in keeping an even temperature over night. They banked the fires and used a regulator.

In regard to instructors, he said the Eastern Association employed six instructors. A charge of \$5 was made for one visit, or \$10 for three visits. This fee was taken from the general dividend of a factory before any division was made.

#### THE EVENING MEETING.

At the meeting in the evening Mayor Elliott, on behalf of the council, welcomed the members of the association to Brantford, and Mr. A. Pattullo, M. P. P., responded on

behalf of the members. Mr. D. Derbyshire, President of the new Butter and Cheese Association of Eastern Ontario, brought greetings from the members of his association to their fellow-workers in the west. Mr. McDonald, M.P., President of the Quebec Dairymen's Association, brought greetings from his association, and wished to tell dairymen of Ontario that the Province of Quebec now had 1,440 cheese factories and 400 butter factories. The most of their cheese factories were members of syndicate groups.

Mr. J. H. Monrad, of Winnetka, Ill., in his address stated that in a test of a herd of 200 cows on a farm in Denmark the cost of producing a pound of butter ranged from 15 cents in the case of the most economical cow to 78½ cents in the case of the most expensive one. In one herd of 40 cows, 17 cows produced butter at a cost which exceeded the price received for it. He believed it was the same in this country, and that it would be a good thing if lightning would kill off one-quarter of our cows, if it would only kill the right ones.

The Hon. W. D. Hoard then gave one of his characteristic addresses, and closed it with one of his well-told stories.

#### THE CARE OF MILK.

On Wednesday morning Mr. T. B. Millar's paper on "The Care of Milk" was the first item on the programme. This paper is given in full in this month's FARMING. In the discussion which followed, Mr. A. T. Bell, of Tavistock, asked Mr. Millar if he would advise the patrons to cool their milk after milking. Mr. Millar said it was not a safe thing to advise the patrons to cool their milk, because they would then cool the milk and not aerate it. He would rather have them aerate the milk than cool it.

Mr. Monrad believed in cooling the milk as well as in aerating it. He would give aeration the first place, but cooling was almost equally important. To get the best results, the cooling should be done in conjunction with the aeration. The cooling retarded the development of lactic acid.

In answer to the question, "Will turnips spoil the flavor of the cheese?" Mr. R. M. Ballantyne, of Stratford, said that turnips would spoil the cheese, and that his firm would not give as high a price for cheese made from "turnipy" milk as for cheese made from good milk. If the farmers wanted to feed their cows turnips they might do so, but his firm would have to continue to give them a lower price for their product.

In answer to the question, "Will green rye produce any bad flavor?" Inspector Millar said that if the cows were pastured on the rye for only an hour or so after milking, and if the rye were young and tender, there would then be no taint. He thought, however, that we had other feeds, such as clover, that could be grown to greater advantage than either rye or turnips.

"Would you exclude all kinds of turnips?" asked a delegate. "I would," answered Mr. Millar.

Mr. T. J. Dillon, Dairy Superintendent of Prince Edward Island, stated that he had lost one of his best customers in St. John's, Newfoundland, a man who took 3,000 pounds of butter at a shipment, because he had sent him one lot of butter with the flavor of turnips in it. He gave several other instances of how turnips had lost him good customers. The people will not have turnipy-flavored butter. The buyers say, "Why don't these farmers feed their turnips to something else than their cows? Can't they see that they are going to spoil the reputation of their butter?" This is a fact; and if we are going to hold our own as cheese and butter producers we must stop feeding turnips to cows.

He advised patrons to use salt and a good brush for cleaning milk cans, and to do away with dish-cloths. He recommended cheesemakers to set up a leach-tub, and to extract the lye from the ashes got from the boiler, and use a little lye in the water for washing the floor of the factory and for washing cloths and brushes.

#### "PRACTICAL CHEESEMAKING."

The next paper was on "Practical Cheesemaking," and was given by Mr. George H. Barr, maker in the Black Creek factory. This paper, in full, will also be found in this month's issue of FARMING.

Mr. Robert Robertson, of London, a cheese-buyer, gave strong testimony in favor of a furnace in the curing-room. He denounced the practice of feeding turnips to milk cows. The farmers, by feeding them, lost more than they gained.

#### CURING-ROOMS AND CURING.

Mr. J. H. Monrad, Secretary of the Illinois Dairymen's Association, then gave an address on "Curing-rooms and Curing." In his opening remarks Mr. Monrad said that there must be true co-operation between the patrons and the directors of any factory if good cheese are to be made. He thought that the whole trouble about tainted milk arose from the fact that farmers did not realize their responsibility in the matter. The farmer thinks his responsibility ceases as soon as his milk is delivered at the factory. It does not. He (the speaker) believed that the farmer was responsible for the quality of the product until the cheese was eaten.

He was surprised to find the instructor of the association testing milk. He thought his report on the condition of each factory he visited should be published.

He advocated the adoption of the Swiss fermentation test in the cheese factories. A sample of each patron's milk is taken every day, placed in warm water, and held at a temperature of 110° for six or eight hours. Accurate records are kept of the condition of the samples of milk. If there is any loss on the cheese, when cold, due to tainted milk, these samples show whose milk is tainted, and the loss is placed accordingly. But if the loss is due to defective making, then the cheesemaker has to stand the loss.

In his paper Mr. Monrad called attention to the failure of the German chemists to find out by chemical means the changes that take place in cheese during the curing or ripening process. Our knowledge at present of the changes that do take place is still very limited. What we do know about it points to the action of bacteria. It is to the bacteriologist, therefore, that we must now look for definite information concerning these changes. The curing of cheese, if due to the action of certain bacteria, will resolve itself into a question of moisture and temperature, because only under certain conditions of moisture and temperature will these bacteria develop and attain their best growth.

It is a well-known fact that the best Swiss cheese is made on the Alps, and that the best Cheddar cheese is made in hilly, if not mountainous, countries. Is this owing to the climate of these cheesemaking districts or to the character of their pastures? He suggested for next season the use of a moisture metre and a thermometer in every cheese factory, and that a daily record be kept of the readings of these two instruments. Then if these records were compared with the quality of the cheese manufactured on corresponding dates valuable information might be obtained.

The curing-room should be so constructed that the cheesemaker will have perfect control of the moisture and

temperature at all times. He would like to gather information on the following questions:

"Why do cheesemakers prefer two curing-rooms with different temperatures and amounts of moisture, the one warm and dry to start with, and the other cooler, with more moisture, to finish the curing? Is it because it is their desire to start in the second room a different kind of fermentation? or is it to regulate the same fermentation in another temperature?"

"What are the necessary climatic conditions of a successful cheesemaking country?"

#### THE FOOD COST OF A POUND OF BUTTER.

Prof. Dean then gave his address on "The Food Cost of a Pound of Butter." It was practically the same address that he gave at the Creameries' Convention in St. Marys. It will be found in full in this month's issue of FARMING.

#### THE WAYS OF WASTEFULNESS.

The Hon. W. D. Hoard, in opening his address on the above topic, said that people should appreciate Professor Dean's address. It was a very rare thing to find such a clear statement of important facts as the professor has presented in his address. The certainty of the transmission of the good qualities of mother to daughter constituted the great value of purebred animals.

To convince the patrons of his creameries that skim-milk had some feeding value, Mr. Hoard had bought thirty-six pigs at four and one-half cents a pound. He fed them fifty-six days on skim-milk alone, and then sold them at four and one-half cents. The gain the pigs had made showed the feeding value of skim-milk alone to be twenty two and one-half cents per hundred pounds. He bought another lot of thirty-six pigs at four and one-half cents a pound, fed them on middlings and skim-milk for fifty-six days, and sold them at the same price. After deducting the cost of the middlings the feeding value of the skim-milk was then found to be twenty-seven and one-half cents per one hundred pounds. This showed that there is an increase in the feeding value of the skim-milk when it is properly fed with other food.

Mr. Hoard stated that a friend of his, Mr. C. P. Goodrich, had made a similar experiment. Mr. Goodrich found that one hundred pounds of skim-milk would make five pounds of pork, and that one bushel of corn would make ten pounds of pork, but that if the two were fed together they would together make eighteen pounds of pork. In feeding pigs he had found that the most profitable gain was made while the pig was making its first weight of fifty pounds; after that it required more food to make a pound of gain the older the pig became. It required an amount of food, daily, equal to two per cent. of the live weight of an animal simply to support life before any gain could be made in the animal's weight. Thus, a hog weighing 300 pounds would require six pounds of feed to support life before any gain could be made in his weight. If that amount of food was not fed the hog would lose a little. It thus paid best to market pigs while they were young.

The returns of the cheese factories in Western Ontario in 1894 showed that the patrons received from \$9.96 to \$36 per cow. The \$9.96, which the poor cows returned, Mr. Hoard characterized as the wages of ignorance and shiftlessness.

He thought there should be a meeting of the patrons of every cheese and butter factory every week all winter. This would mean a dairy school in every district, constituted to study the values of all cows which contributed milk for dairy purposes.

He believed competition would get still keener, and therefore advised the keeping of fewer cows, but better

ones. He thought every farmer should: (1) Test his cows; (2) weed out the poor ones; (3) get the service of a first-class dairy sire from a long line of serviceable cows; (4) not be afraid to pay a high price for a good cow; (5) begin to study the feeding question; (6) study dairy life in the stable, not steer life, but mother life. Good stables cost no more than poor ones. Many animals are suffering from poor stabling; the farmer consequently is paying for this, and paying roundly, but, nevertheless, he won't spend a cent to remedy the trouble. Ignorance is a thousand times more expensive than good knowledge.

The idea that no food is so cheap as pasture was a delusion. It is not true. At the Wisconsin Experiment Station three cows were pastured on a dense blue-grass pasture (100 per cent. better than is generally found), and three cows were stabled and fed soiling crops. It required three and seven-tenths acres of the pasture to support the first three cows; they produced 6582.8 lbs. of milk, which made 303¾ lbs. of butter; while the three cows that were stabled required only one and a half acres to supply their feed, while they produced 7,173 lbs. of milk, which made 294¾ lbs. of butter. The product of one acre used for growing soiling crops therefore gave as good returns as two and one-quarter acres when used as pasture.

Mr. Hoard said that they paid by the Bahcock test for all milk delivered at the Hoard creameries. The price ranged from 89 cents to \$1.36 per hundred pounds, and varied according to the amount of butter-fat the milk contained.

He advised dairymen to keep their minds and judgment bright by reading and studying dairy literature.

#### SOME PROFITABLE COWS.

Mr. E. D. Tillson, of Tilsonburg, gave some very interesting facts about his cows. He has one cow which last year gave 15,000 lbs. of milk. This was an exceptional case. His averages, however, were also very good. Ten cows averaged 11,600 lbs.; 40 cows averaged 9,000 lbs.; and 60 cows averaged 7,500 lbs.

#### DISCUSSION ON THE PAPERS OF MR. MONRAD AND MR. BARR.

Mr. Monrad's questions as to the climatic conditions necessary for cheesemaking came up for discussion at the evening meeting of the second day.

Inspector Millar thought we had many of the necessary conditions here in Western Ontario, and that those we did not have could easily be supplied artificially. Mr. Monrad then wanted to know how much moisture was needed in the curing-room during hot weather.

Mr. Millar said he had found cheese cracking under the bandages when there was only 15 per cent. of moisture. He thought there should be 60 per cent. of moisture.

Mr. Monrad—"If the air is too dry, will it not cause the rind to be heavier; and, if the air is moist, will not the rind be thinner?"

Mr. Millar—"If the air is very dry it might cause the rind to be thicker, because the moisture would evaporate from the cheese too rapidly. Very often when scale boards are left on the ends of the cheese in the curing-room the rind is not heavy enough, because the boards retain too much moisture. The cheese will crack if the air is too dry."

Mr. G. H. Barr—"I use a hygrometer in the curing-room, and I think the amount of moisture is about right when the instrument shows 60 per cent. of moisture. When over 60 per cent. of moisture is present mould will appear on the cheese. I think from 50 to 60 per cent. of moisture is about right for a temperature of from 60 to 70 degrees. If ice is used, and I certainly would recommend its use dur-

ing hot weather, the air will contain more moisture than when it is not used."

Mr. Robert Robertson, London, asked if there was any way of preventing black mould on cheese in the summer time. It got so bad in some districts that some factories had their cheese rejected on account of it.

Mr. Monrad said that he thought this black mould is caused by the presence of too much moisture, and that the factory where it occurs should be ventilated at night instead of during the day.

Professor Dean had experienced some trouble with black mould. He recommended a cooler room for the cheese. He believed a lot of cheese become mouldy in cold storage from the presence of too much moisture. He had found that a little air-slacked lime in a box in the curing-room would absorb a large amount of moisture. He also advised washing the shelves in the curing-room with lye water, and keeping them perfectly dry whenever troubled with black mould.

Mr. J. E. Hopkins, Superintendent of Dairy Work in Nova Scotia, said that he remembered one case of mouldy cheese that came under his notice when he was an inspector for the Western Association. The cause of this mould had been damp dead air under the curing-room floor. The mould disappeared when openings were made in the foundation walls so as to permit a perfect circulation of air.

Mr. Monrad advised washing the shelves in the curing-room with lime water.

"When would Mr. Barr recommend to begin using the ice racks in the curing-room?" asked a delegate.

Mr. Barr—"Just as soon as the temperature is over 65 degrees. One reason why so many stiff cheeses are made is that the makers are afraid of the hot spells during summer, and so make their cheese with a view to standing the hot weather. They wish to be sure that they will come through all right." Although he had used the racks he could not keep the temperature below 70 degrees. Some of the August cheese that he had made moulded on account of the presence of too much moisture.

Mr. Maclaren—"How do rust stains get on the cheese?"

Mr. Barr—"It is generally the maker's fault if there are rust stains on the cheese. The directors of some factories will not supply proper utensils for making good cheese. Sometimes the hoops will make rust stains in spite of the watchfulness of the most vigilant maker. The directors should get new hoops when this is the case."

Mr. Monrad—"Has anyone had any experience with underground ventilating shafts for the curing-room?"

Mr. T. J. Dillon, Superintendent of Dairy Work in Prince Edward Island—"I have had some experience with an underground ventilating shaft. The shaft was only some three feet underground, and did not have the cooling effect upon the temperature that was expected. I believe that if the shaft had been down some ten or twelve feet in the ground, it might have had some cooling influence on the temperature of the room. In Prince Edward Island we have a great deal more moisture than you have here; consequently we have a great many more mouldy cheeses. I wash the mouldy cheese with whey; then with clean water. This makes them as bright and clean as when they came out of the press."

A. McNeill, Windsor—"Would not cement walls and floors be a good thing in a curing-room?"

Mr. Monrad—"I would strongly advocate a cement floor for the curing-room, and especially for the making-room. Such a floor is easily kept clean. The men, however, who work on cement floors complain that they are hard on the feet. The men tire more quickly, and the

floors wear out boots quicker. Wooden floors can be kept clean and bright for about two years; after that it is difficult to keep them in proper condition."

The chairman closed the discussion and introduced Mr. A. Pattullo, M. P. P., of Woodstock, who gave an interesting address on "Agricultural Education."

#### THE BRANDING BILL.

The Hon. Sydney Fisher then gave an excellent address, in which, among other things, he mentioned the proposed Branding Bill. He was followed by the Hon. Thomas Ballantyne, who also spoke on the Branding Bill.

Professor Robertson then said that he had a few points respecting the Branding Bill that he wished to lay before the convention.

The branding or marking of any article of commerce was valuable (1) as a record; (2) as a means of identification; and (3) as descriptive of the quality of the article. The brand on any article in time constitutes a market name. In this way branding our cheese with the word "Canadian" would be of advantage to us.

In regard to the branding of the date of making on cheese, he would say that the quality of cheese follows the weather, and the pasture and water conditions, and not the calendar.

He thought the legislation that was wanted was such as would prevent any fraud being perpetrated that would cause the good reputation of Canadian cheese to suffer.

He then gave a capital address entitled "Bread and Butter."

The Hon. W. D. Hoard followed with one of his characteristically pleasing and instructive addresses.

#### PRACTICAL BUTTERMAKING.

At the morning session of the third day of the convention Mr. J. B. Muir gave an excellent paper on "Practical Buttermaking." This paper will be found in full in FARMING, on a previous page.

#### DISCUSSION ON MR. MUIR'S PAPER.

Mr. Millar, a brother of Inspector Millar, said he ripened his cream at a temperature of between 60 and 70 degrees. He had obtained the best results by ripening at a temperature of 70 degrees. He would like to know how Mr. Muir cooled his cream.

Mr. Muir—"I cool the cream with ice, and keep it cooling during the night, so that by morning it will be at a temperature somewhere between 52 and 54 degrees."

Mr. F. J. Sleightholm—"I cannot see the necessity of separating at such a high temperature. I am separating now with an Alpha Delaval at a temperature of 65 to 70 degrees, and have only a trace of butter-fat left in the skim-milk. I think it is lost time and labor heating the milk to a high temperature and then cooling it again. In regard to salting in the churn, I understand that the object is to save working the butter. I think ten or twelve revolutions of the worker are sufficient after the salt is dissolved. Do you approve of a trunk lid churn?"

Mr. Muir—"Yes, I do. Mine does not leak. There is a great difference in separators. I can get my separator to do better and more rapid work if I heat my milk."

Mr. Monrad—"I once got a buttermaker to divide a quantity of cream into two lots. One lot was heated to a temperature of 155 degrees and then cooled. Otherwise there was no difference in the treatment of the two lots. I took a sample of butter from each lot with me to Chicago and got an expert to examine them. He pronounced the butter from the cream that had been heated equal in flavor and grain to that from the cream that had not been heated. I wish to emphasize the fact that the higher the tempera-

ture to which your cream is raised the lower must be the temperature to which it is cooled, and the longer the time it must be held at that temperature. The reason of this is that the lower temperature is necessary in order that crystallization of the fat globules may take place again.

MR. MONRAD'S ADDRESS.

Mr. Monrad then followed with an address on "Winter Buttermaking." It was a most thoughtful address, and was well received. It will be found in full in this month's FARMING.

Professor Robertson began the discussion which followed Mr. Monrad's address. He said that in Denmark a large amount of butter was made in the winter. The Danish stables were models of neatness and cleanliness. If the farmers of Ontario are to succeed in winter dairying they must pay more attention to their stables. The stables must be made comfortable. The temperature should never go below 40 degrees. *The stables must be clean*; and it will pay to curry the cows every day. Plenty of succulent food should be supplied the cows. In closing he referred to the Government's cold storage scheme, and said he would be pleased to furnish plans of cold storage rooms to those who contemplated putting them into their factories or creameries.

A delegate asked the professor if it would be safe to give a cow whey to drink.

Professor Robertson replied that he thought such a practice would be dangerous and he would not favor it.

The Hon. Sydney Fisher then made a short address, and emphasized a few points which he thought were essential for the success of winter dairying. The first one was to give the cows all the food they could profitably make use of and no more. The second point was to provide good, warm, comfortable, and well-ventilated buildings for the cows. The third point was to see that the cows had plenty of sunshine supplied them while confined in the stables. A fourth point was to see that the inside of all parts of the stable was thoroughly whitewashed. A spray pump was the best instrument for putting on the whitewash. Carefulness in all the details necessary to produce the milk was the key to success.

THE BRANDING BILL AGAIN.

At the afternoon meeting of the third day a number of resolutions were passed. The last one of these resolutions was that the convention recommend "that the word *Canadian* only be branded upon our cheese." An interesting discussion followed the introduction of this resolution, but the resolution was finally carried.

Mr. Derbyshire made a short speech, asking the cheesemakers to pay more attention to the little details of their work.

MODERN FEEDING PROBLEMS.

In his address on "Modern Feeding Problems," which Ex-Governor Hoard then gave, he said that there were some new terms the farmer would have to learn to under-

stand and to use. Just as the farmer had learned to understand and use the word "telephone," so he would have to learn to understand and use the words "carbohydrates," "protein," and "nutritive ratio." One of the essentials to success in dairy work was to have the right cow. He believed that the proportion of solids in the milk which a cow will give is born with her. Therefore it is important to get the right cow to begin with. If it is *butter-fat* that is wanted, breed from a *butter-bred cow*. She possesses a specialized function, namely, the production of butter-fat, and will, therefore, give a greater return in butter-fat from the food fed her than a cow bred to show proficiency in some other specialized function.

Having secured such a cow, the next thing is to see that she has the right kind of food. It has been found that the production of butter-fat is governed largely by the nervous system of the cow, and consequently the production of large amounts of butter-fat is a drain upon the cow's nervous energies. To meet this drain a certain kind of food is needed, viz., protein. A cow cannot yield butter-fat on a diet of carbohydrates; she must have a liberal supply of protein in her food, and, therefore, farmers will have to study the feeding problem and know what foods contain much protein and what foods contain but little of it, if they wish to become economical and successful feeders.

Mr. Hoard, in his inimitable way, told several stories at the close of his address, but nevertheless he did not fail to draw a lesson from each story he told, and to send the truth home in such a way that it would not be quickly forgotten.

Mr. T. J. Dillon, of Prince Edward Island, in a short address, endorsed what Mr. Hoard had said, and remarked that cows like Mr. Tillson's best cow were wanted in every herd in the country. He thought that too often there was a lack of definite aim in breeding the cows. The aim the dairy farmer should have is the *production of more milk* with the same amount of feed.

ELECTION OF OFFICERS.

The nominating committee brought in their report, which was adopted at the close of the morning session. The officers for 1897 are, therefore, as follows:

Hon. president, Hon. Thomas Ballantyne, Stratford; president, A. McLaren, Stratford; vice-president, J. S. Pierce, London; second vice-president, H. Eagle, Attercliffe Station; third vice-president, A. Wenger, Ayton; directors, J. Prain, Harriston; J. N. Paget, Canboro; A. Pattullo, M.P.P., Woodstock; J. Connolly, Porter Hill; R. M. Ballantyne, Stratford; J. A. Jones, Nilestown; J. Carmichael, Arva; auditors, J. A. Nelles, London, and J. C. Hegler; representative to Industrial Fair, A. F. McLaren; representatives to Western Fair, J. S. Pierce and R. Robertson; representatives to Fat Stock Show, Harold Eagle and R. M. Ballantyne.

The association will be known in future as the Butter and Cheese Association of Western Ontario.

## THE ONTARIO POULTRY ASSOCIATION—ANNUAL MEETING.

(Specially reported for FARMING.)

The twenty-third annual convention of this association was held in Guelph on January 13 and 14.

At the morning session of the opening day the Hon. Sydney Fisher, Dominion Minister of Agriculture, addressed the association on the benefits of cold storage.

He thought that there was a good market in England for Canadian poultry. A large number of poultry had been sent to the British market from Canada during the past season and had arrived there in very good condition; but he believed that with the aid of a good chain of col-

storage facilities the poultry would arrive there in very much better condition. He wished to obtain information from the poultrymen present in regard to the best season for shipping poultry to the British market.

Mr. Allan Bogue, of London, said that he thought that from November to January would be the best shipping season.

Professor Robertson, Agricultural and Dairy Commissioner for the Dominion, said that if Canadian poultry could be supplied to the middle classes of Britain at from 7d. to 8d. per pound the importation of poultry into England would greatly increase. This price would mean from 9 to 10 cents a pound for the Canadian farmer. The birds should be put up in assorted sizes, each size being in a different case.

At the afternoon session Mr. Thomas Gowdy, of Guelph, president of the association, occupied the chair.

#### POULTRY CULTURE AS AN INDUSTRY.

The Rev. Thomas Geoghegan, of Hamilton, read a very interesting paper on "Poultry Culture as an Industry." He said a large portion of the expense of the Franco-Prussian war was paid for out of the proceeds of the French poultry yards. These, he said, send annually to the British market over \$15,000,000 worth of poultry products. The profit to be made in this industry depends very much upon the way the fowls are managed.

#### FERTILE EGGS AND HOW TO HATCH THEM.

Mr. J. P. Wagner, of Toronto, read a paper on this subject. He said that hens needed plenty of exercise and the proper sorts of food if fertile eggs were to be secured. He had found Wyandottes and Plymouth Rocks the best setters. The nests and the eggs for hatching should be kept clean, and the hen be kept free from vermin. The eggs should be tested after being set to see if they are all fertile.

Mr. James Anderson, of Guelph, gave his experience in poultry-raising. He doubted if the \$20,000 which had been spent by the Government of Ontario in trying to improve the poultry industry had done the good that it was intended it should do. It was intended that these grants from the government should promote poultry-keeping as a general industry among the people, which could only be when the poultry kept were those which were useful for the production of food, that is "utility fowls"; but instead of this the grants had been used largely for the promotion of the keeping of fancy birds that could be of no use in promoting the material interests of the country at large. He would like to see classes made at the poultry shows for farmers' birds.

#### POULTRY-RAISING.

Mr. L. G. Pequegnat, of New Hamburg, read a very concise paper dealing with the best and most profitable means of raising poultry. In it he gave a number of good suggestions in reference to feeding, treating diseases, and erecting poultry houses. This paper was of special interest to beginners.

#### A FEW REMARKS TO FARMERS.

Mr. Jos. Dilworth, Toronto, devoted a paper to a few remarks to farmers. In it he said that the chicken-pen should be erected in a dry place, where the birds would be sheltered from the north and northeast winds, and that it should be built so that its size could be increased according to the increase in the size of the flock. Good birds should be secured for stock, and the endeavor should be to constantly increase the quality of the flock. The culls and surplus stock should be disposed of by the 1st of

October. Never keep birds when they are no longer a source of revenue. Do not feed chicks or ducklings after they are full-grown and ready for market; avoid overcrowding; each fowl should have one square yard of floor space. The poultry-house and poultry must be kept free from vermin. A good coating of lime whitewash, with carbolic acid in it, put on twice a year, will aid in keeping the poultry-house free from vermin.

#### ROUP AND CANKER.

Following Mr. Dilworth's paper was a discussion on the best modes of treating roup and canker. Burning calomel, administering pulverized borax, iodoform, and dissolved alum, were all advanced as good modes of treatment. Others advised scraping off the cankerous growths.

#### DISEASES OF TURKEYS.

Mr. W. J. Bell, of Angus, gave a valuable paper on "The Diseases of Turkeys." He believed the best general remedy that could be used was the proverbial ounce of prevention, inasmuch as the pound of cure generally failed. When the turkeys were troubled with lice he recommended dusting them well with Persian insect powder. Diarrhoea was generally due to careless feeding. Roup was generally caused by overcrowding the birds.

Dr. Mills, of the Ontario Agricultural College, suggested that the vital organs of diseased birds should be sent to the bacteriologist at the college for examination.

Mr. A. G. Gilbert, Poultry Manager at the Experimental Farm, Ottawa, gave an excellent address, full of interesting information on poultry matters. Last year he fed 200 hens a wet mash in the morning, ten pounds of grain at noon, and the same quantity again at night. This year he had reduced the amount of feed one-half, and the result was two-thirds more eggs.

#### ABOLITION OF SCORING.

A most important decision was arrived at in the afternoon session of the second day, when it was agreed to discontinue the scoring system of judging at future exhibitions. The strongest objection urged against the scoring system was the length of time it takes to judge the birds. The motion, which was moved by Mr. John Crowe, Guelph, and seconded by Mr. J. Barber, Toronto, brought out a very warm discussion. But a very large majority of the breeders present were opposed to a continuance of the system.

#### TIMELY QUESTIONS.

Dr. Mills, of the Ontario Agricultural College, delivered a short address, which took the form of a series of questions: (1) Should the largest prize-money be given to those classes and varieties of fowl which admittedly possess the greatest value, viewed from the standpoint of egg production and table use? (2) Should not poultry judges be instructed and required to award prizes in the utilitarian classes on the basis of practical utility, laying comparatively little stress on fancy points in comb, plumage, etc.? (3) Should not buyers be urged to pay for eggs by the ounce or pound, and thus encourage farmers and others to keep those breeds and varieties which produce the largest weight of eggs per bird in the year? (4) Should not the Eastern and Western Poultry Associations be united on a basis similar to that on which the Creamery and Dairy Associations are uniting?

Mr. Robert H. Essex, Toronto, moved, seconded by Mr. Anderson, Guelph, that the directors of the association take into their consideration an increase in value of the prizes to be awarded to the utility breeds. After a long discussion as to what could be termed utility breeds the motion was carried.

London was decided upon as the next place for holding the annual show.

#### THE ELECTION OF OFFICERS.

The officers elected were as follows: President, Allan Bogue, London; vice-president, Dr. Mallory, Colborne; 2nd vice-president, Chas. Bonnick, Toronto. Directors—

Chas. Massie, Port Hope; Dr. Bell, Toronto; T. J. Senior, Hamilton; M. T. Burn, Tilsonburg; T. H. Scott, St. Thomas; D. C. Trew, Lindsay; Wm. McNeil, London; Rev. J. H. Scott, Ridgeway; W. J. Bell, Angus. Auditor, H. H. Donovan, Toronto. Mr. T. A. Browne, London, is the secretary of the association.

## THE ONTARIO POULTRY SHOW.

(Specially reported for FARMING.)

The annual show of the Ontario Poultry Association was held in Guelph, January 11th to 15th, 1897. The show was the most successful one the association has ever held. There were 1,624 entries made this year, as against only 1,274 last year at Port Hope. Another encouraging feature of the show was the increased number of exhibitors. In this respect there was an increase of nearly one-third.

Some very high scores were made by some of the birds shown. Canada can boast of some of the most successful poultry fanciers on the continent. Annually the leading American shows are visited by poultry breeders from Ontario, who carry off a lion's share of their prizes, so that it is as difficult to win first place at the Ontario Poultry Show as at many of the leading shows of the continent.

The competition at Guelph this year was keener in the best market classes, such as the Plymouth Rocks, Wyandottes, Leghorns, etc.

The judges were Messrs. Sharp Butterfield, Windsor; T. H. Smelt, Woodstock; L. G. Jarvis, Guelph, for poultry; and T. B. Johnston, Toronto, for pigeons and pets.

#### Prize List.

##### UTILITY FOWLS.

**Light Brahmas.**—Cock—1st, John Cole, Hamilton; 2nd, Oldrieve & Wilkinson, Kingston; 3rd, John Cameron, Galt. Hen—1st, Oldrieve & Wilkinson; 2nd and 3rd, Cameron. Cockerel—1st, Cameron; 2nd, Cole; 3rd, Oldrieve & Wilkinson. Pullet—1st, Oldrieve & Wilkinson; 2nd, Cameron; 3rd, Cole.

**Dark Brahmas.**—Cock—1st, J. H. Saunders, London; 2nd and 3rd, Thorpe & Scott, London. Hen—1st, Saunders; 2nd, Thorpe & Scott; 3rd, Saunders. Cockerel—1st and 2nd, Thorpe & Scott. Pullet—1st and 2nd, Thorpe & Scott.

**Buff Cochins.**—Cock—1st, 2nd and 3rd, G. C. McCormick. Hen—1st, McCormick; 2nd, A. W. Bell, Toronto; 3rd, McCormick. Cockerel—1st, 2nd and 3rd, McCormick. Pullet—1st, 2nd and 3rd, McCormick.

**Partridge Cochins.**—Cock—1st, A. W. Bell; 2nd, L. G. Pequegnat, New Hamburg; 3rd, R. Oke, London. Hen—1st, Bell; 2nd, J. L. Corcoran, Stratford. Cockerel—1st, Bell; 2nd, Pequegnat; 3rd, Corcoran.

**White Cochins.**—Cock—1st, Wm. McNeil, London. Hen—1st and 2nd, McNeil; 3rd, Jos. Foster, Brampton. Cockerel—1st and 2nd, McNeil. Pullet—1st and 2nd, McNeil; 3rd, Foster.

**Barred Plymouth Rocks.**—Cock—1st and 2nd, E. Dickenson, North Glandorf; 3rd, Turpin & Peters, Kingston. Hen—1st, 2nd and 3rd, J. E. Bennett, Toronto. Cockerel—1st, Dickenson; 2nd, John Pleisch, Shakespeare; 3rd, Wm. McLeod, London. Pullet—1st, J. W. Kedwell, Petrolia; 2nd, Bennett; 3rd, McLeod.

**White Plymouth Rocks.**—Cock—1st, Thos. Rice, Whitby; 2nd, Gallinger Bros., Southend; 3rd, Geo. Bogue, Strathroy. Hen—1st and 2nd, Rice. Cockerel—1st, Rice; 2nd, Bogue; 3rd, Rice. Pullet—1st, Rice; 2nd, Gallinger Bros.; 3rd, Rice.

**Buff Plymouth Rocks.**—Cock—1st, 2nd and 3rd, R. H. Essex, Toronto. Hen—1st and 2nd, Essex; 3rd, Milton & Mitchellree, London. Cockerel—1st, Essex; 2nd, J. Colson, Guelph; 3rd, Essex. Pullet—1st, Essex; 2nd and 3rd, Milton & Mitchellree.

**White Wyandottes.**—Cock—1st, N. T. Kettlewell, London; 2nd, Chas. Massie, Port Hope; 3rd, Gallinger Bros., Southend. Hen—1st, Massie; 2nd, Kettlewell; 3rd, Massie. Cockerel—1st, Massie; 2nd and 3rd, Kettlewell. Pullet—1st, Massie; 2nd and 3rd, Kettlewell.

**Golden Wyandottes.**—Cock—1st, J. H. Magill, Port Hope; 2nd, Oldrieve & Wilkinson; 3rd, Magill. Hen—1st, Oldrieve & Wilkinson; 2nd, Graham; 3rd, Magill. Cockerel—1st, Oldrieve & Wilkinson; 2nd, G. W. Blyth, Marden; 3rd, J. J. Foley, Branford. Pullet—1st, Magill; 2nd, Oldrieve & Wilkinson.

**Black Wyandottes.**—Cock—1st, G. Bogue; 2nd, Oke; 3rd, C. Grimsley, Toronto. Hen—1st, Grimsley; 2nd, Bogue. Cockerel—1st and 2nd, James Wedgery, Woodstock; 3rd, Grimsley. Pullet—1st and 2nd, Grimsley; 3rd, Wedgery.

**Buff Wyandottes.**—Cock—1st, Fred. Field, Cobourg. Hen—1st, J. E. Meyer, Kossuth; 2nd, Field. Cockerel—1st, Meyer; 2nd, Magill; 3rd, Field. Pullet—1st, Meyer, 2nd, Magill; 3rd, Field.

**Single Comb White Leghorns.**—Cock—1st, Thomas Rice, Whitby; 2nd, D. C. Trew, Lindsay; 3rd, J. Pleisch, Shakespeare. Hen—1st and 2nd, Rice; 3rd, A. W. Graham, St. Thomas. Cockerel—1st, 2nd, and 3rd, Rice. Pullet—1st and 2nd, Rice; 3rd, Trew.

**Single Comb Black Leghorns.**—1st, A. G. Brown, Watford; 2nd, R. H. Kemp, Grimsby. Cockerel—1st, A. G. Brown; 2nd, W. M. Osborne, Brockville; 3rd, Kemp. Pullet—1st, A. G. Brown; 2nd, W. Readwin & Co., Guelph; 3rd, Brown.

**Single Comb Brown Leghorns.**—Cock—1st and 2nd, Rice; 3rd, Saunders. Hen—1st and 2nd, Rice. Cockerel—1st and 2nd, Rice; 3rd, Pleisch. Pullet—1st, Rice; 2nd, J. R. Wilson, Toronto; 3rd, Rice.

**Buff Leghorns.**—Cock—1st, G. F. Horsford, Port Hope; 2nd, Geo. Whillans, Toronto; 3rd, G. Berner, Toronto. Hen—1st, Whillans; 2nd, Wagner Incubator Co., Toronto. Cockerel—1st, S. F. Baulsch, Woodstock; 2nd, James Dundas, Deer Park; 3rd, Horsford. Pullet—1st, Wagner Incubator Co.; 2nd and 3rd, Dundas.

**Rose Comb Brown Leghorns.**—Cock—1st, Oldrieve & Wilkinson; 2nd, McNeil; 3rd, H. M. Heinrich, New Hamburg. Hen—1st, McNeil; 2nd and 3rd, Oldrieve & Wilkinson. Cockerel—1st, McNeil; 2nd, J. L. Page, Woodstock. Pullet—1st and 2nd, Page.

**Rose Comb White Leghorns.**—Cock—1st and 2nd, Oke; 3rd, W. J. Bell, Angus. Hen—1st, Bell; 2nd and 3rd, Oke. Cockerel—1st and 2nd, Bell; 3rd, Oke. Pullet—1st, Bell; 2nd, Oke; 3rd, Bell.

**Black Langshans.**—Cock—1st, T. H. Scott, St. Thomas; 2nd, Oldrieve & Wilkinson; 3rd, Turpin & Peters, Kingston. Hen—1st, 2nd, and 3rd, A. T. Little, Churchill. Cockerel—1st and 2nd, Scott; 3rd, H. Karn, Guelph. Pullet—1st and 2nd, Scott; 3rd, Karn.

**Langshans, A. O. V.**—Hen—1st, Knight & Smith, Guelph. Cockerel—1st and 2nd, Knight & Smith. Pullet—1st, Knight & Smith.

**Silver Grey Dorkings.**—Cock—1st and 3rd, Corcoran, Stratford; 2nd, A. Noden, Hen—1st and 3rd, Bogue; 2nd, Corcoran. Cockerel—1st, Corcoran; 2nd, J. McKeel; 3rd, J. Lawrie.

**Colored Dorkings.**—Cock—1st, Lawrie; 2nd, Corcoran. Hen—1st, Lawrie; 2nd, Bogue; 3rd, Corcoran. Cockerel—1st, Corcoran; 2nd and 3rd, Lawrie. Pullet—1st, Corcoran; 2nd, Bogue; 3rd, Lawrie.

**White Dorkings.**—Cock—1st and 2nd, A. Bogue. Hen—1st and 2nd, Bogue. Cockerel—1st and 2nd, Bogue. Pullet—1st and 2nd, Bogue.

**Black Javas.**—Cock—1st, G. C. McCormick, London. Hen—1st, McCormick; 2nd and 3rd, Heinrich. Cockerel—1st and 2nd, Thomas Brown, Durham; 3rd, F. R. Webber, Guelph. Pullet—1st, McCormick; 2nd and 3rd, Bruce & Acres, Hamilton.

**A. O. C. Javas.**—Cock—1st, Oke; 2nd, Webber. Hen—1st and 2nd, Webber; 3rd, Oke. Cockerel—1st, Webber. Pullet—1st, Webber.

**Black Minorcas.**—Cock—1st, Rev. W. E. Scott & Son, Ridgeway; 2nd, T. J. Senior, Hamilton. Hen—1st, Senior; 2nd, Scott & Son. Cockerel—1st, 2nd, and 3rd, Scott & Son. Pullet—1st, Senior.

*White Minorcas*.—Cock—1st, Senior; 2nd and 3rd, Osborne. Hen—1st, Senior; 2nd and 3rd, Scott & Son. Cockerel—1st and 2nd, Scott & Son. Pullet—1st, Scott & Son; 2nd, Osborne; 3rd, F. Kennedy, Malvern.

*Dressed Poultry*.—Best and heaviest fowl, male or female, 1st and 2nd, Parsons.

#### GESE.

*Toulous*.—Gander—1st, A. Bogue; 2nd, J. Pletsch, Shakespeare; 3rd, A. G. H. Luxton, Georgetown. Goose—1st and 2nd, A. Bogue; 3rd, O'Brien & Colwell, Paris Station. Gander of 1896—1st, Pletsch; 2nd, McCormick & Weir, West Flamboro; 3rd, O'Brien & Colwell. Goose of 1896—1st, Pletsch; 2nd and 3rd, McCormick.

*Bremens*.—Gander—1st and 3rd, O'Brien & Colwell; 2nd, Wm. Main, Milton West. Goose—1st, Main; 2nd and 3rd, O'Brien & Colwell. Gander of 1896—1st and 3rd, Main; 2nd, O'Brien & Colwell. Goose of 1896—1st, Main; 2nd, O'Brien & Colwell.

*A.O.V. Geese*.—Gander—1st, O'Brien & Colwell; 2nd, Jos. Foster, Brampton; 3rd, Luxton. Goose—1st, O'Brien & Colwell; 2nd, Jos. Foster; 3rd, Luxton. Gander of 1896—1st, Foster; 2nd, Luxton; 3rd, Reid. Goose of 1896—1st O'Brien & Colwell; 2nd, Luxton; 3rd, Reid.

#### DUCKS.

*Aylesburys*.—Drake—1st, Bogue; 2nd, F. R. Webber; 3rd, O'Brien & Colwell. Duck—1st, Bogue; 2nd, Webber; 3rd, O'Brien & Colwell. Drake of 1896—1st, and 2nd, Bogue; 3rd, Reid. Duck of 1896—1st, Bogue; 2nd, Reid; 3rd, Webber.

*Rouens*.—Drake—1st and 3rd, Main; 2nd, J. Colson, Guelph. Duck—1st and 2nd, Main; 3rd, Colson. Drake of 1896—1st, Colson; 2nd, Main; 3rd, Bogue. Duck of 1896—1st, Main; 2nd, Colson; 3rd, O'Brien & Colwell.

*Pekins*.—Drake—1st and 3rd, Bogue; 2nd, O'Brien & Colwell. Duck—1st and 3rd, Bogue; 2nd, O'Brien & Colwell. Drake of 1896—1st, Bogue; 2nd and 3rd, Colson. Duck of 1896—1st, O'Brien & Colwell; 2nd, Webber; 3rd, Bogue.

*A.O.V. Ducks*.—Drake—1st, J. E. Howitt, Guelph; 2nd, Geo. Bogue, Strathroy. Duck—1st, Howitt; 2nd, Bogue; 3rd, Luxton. Drake of 1896—1st, Howitt; 2nd, Bogue; 3rd, Luxton. Duck—1st, Howitt; 2nd, Bogue; 3rd, Luxton.

#### TURKEYS.

*Bronze Turkeys*.—Cock—1st, Jas. Ford, Drumquin 2nd, Wm. Main; 3rd, W. H. Beattie, Wilton Grove. Hen—1st, Beattie; 2nd, Jas. Anderson, Puslinch; 3rd, W. J. Bell. Cockerel of 1896—1st, Main; 2nd, Beattie; 3rd, Bell. Pullet—1st, Beattie; 2nd, Bell; 3rd, Main.

*White or Black Turkeys*.—Cock—1st and 2nd, Beattie. Hen—1st and 2nd, Beattie. Cockerel of 1896—1st and 2nd, Beattie. Pullet—1st and 2nd, Beattie.

*A. O. V. Turkeys*.—Cock—1st, Beattie. Hen—1st, Reid. Cockerel of 1896—1st, Anderson. Pullet of 1896—1st, Reid; 2nd, Anderson.

#### SPECIAL PRIZES.

Six highest scoring Laced Wyandottes or Barred Plymouth Rocks, Oldrieve & Wilkinson.

Six highest scoring Asiatics, solid color, T. H. Scott.

Six highest scoring Asiatics, particolored, Thorpe & Scott.

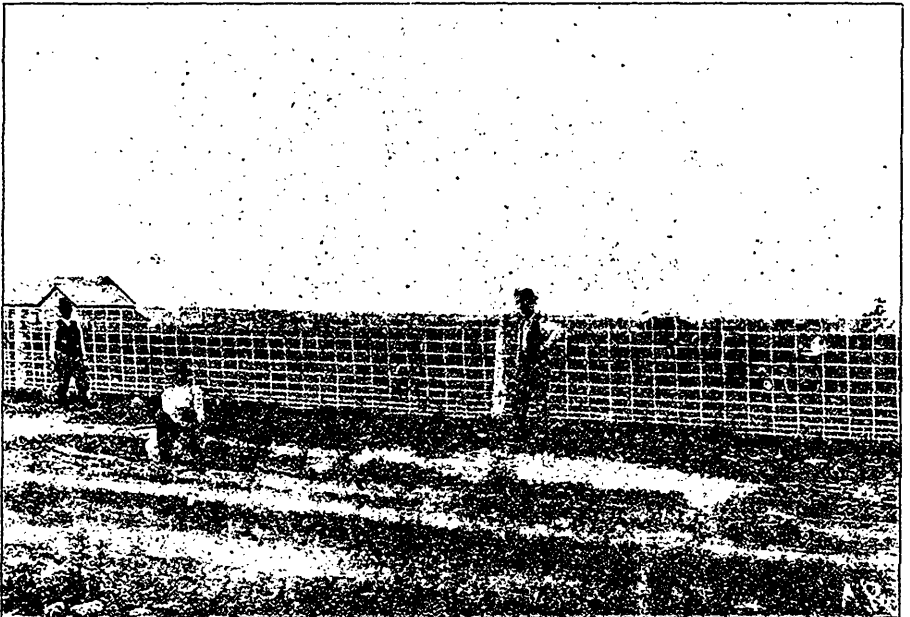
Six highest scoring fowls in Mediterranean class, Thomas Rice.

Six highest scoring ducks, Allan Bogue.

The heaviest turkey on exhibition, James Ford.

The heaviest goose on exhibition, James Main.

Highest scoring java cock or cockerel, Thomas Browne.



Fencing as done on an up-to-date Farm.

Farm of Mrs. A. Ronald, Minesing, Ont., enclosed with Page Wire Fence.