

During the first week in February:—

Early River Peaches: count 24, 4s. 6d.; 15, 5s. 6d. per box.

During the third week in April:—

Peaches: count, 32, 2s. 6d.; 28, 3s. 9d.; 20, 5s. 3d.; 15, 8s.

It costs the same to ship the large as the small fruit. Reckoning that it costs 2s. to ship a box of peaches, we will take the result of the sale during the third week in April last, the prices for that week happen to have been low, as there were over 6,500 boxes of peaches on the market, deducting 2s. per box from each count to show what the shipper got for his fruit, for 28 larger size 1s. 9d., for 20 large grade 3s. 3d., and for 15 very large peaches he got 6s., after deducting the cost of export. I am pointing this out to growers to impress upon them the necessity of growing more fruit of the large grades. I leave it to them to determine how to do it; but they must understand that it is quality, not quantity, that is wanted on the London market.

‘Quantities and Prices.’

This season there were 23,646 boxes of peaches exported, against 17,298 for 1909; this is also a reasonable increase, and I do not think the total quantity affected the prices. During the height of the export season, however, when over 6,500 boxes were landed in the course of one week, it was found very difficult to prevent a serious fall in the prices. The peaches, on the whole, did not arrive in a satisfactory condition. The transportation of this fruit to the oversea markets offers one of the most difficult problems to those connected with the trade. The Cape peaches usually arrive in London in a sound condition in so far as their appearance goes, but when tasted they are found to be dry, wooly and lacking in flavour.

The prices during the past season may be considered satisfactory.

During the last week of January, Early Rivers, in counts of 28 and 24, were making 4s. 6d. to 5s. 6d., and Alexanders 5s. to 8s.; during February different varieties of good attractive peaches were making 4s. 3d. to 5s. 3d. for counts of 28 and 24, and for larger fruits in counts of 20 and 15, prices ranging from 7s. to 10s. per box. During the last week of February when very large quantities were coming forward, the prices fell to about 2s. 6d. to 3s. 9d., and 5s. 3d. to 8s. for similar counts as above. During March good peaches were making 4s. 5s., 6s. per box, and exceptionally large and attractive fruit in counts of 25 and 15 made 8s., 9s., and up to 15s. per box.

I need not offer any suggestions as to packing, as this is now well understood by the shippers. I will, however, warn beginners to be very careful about the grading; the fruit contained in each box must be as nearly as possible of equal size and quality. I will recommend all shippers, the experienced as well as the beginners, to mark their boxes at the end with the words ‘Clingstone’ or ‘Freestone’ as well as the name of the variety and the count, but I must again point out that the English and Continental markets do not want yellow flesh peaches or clingstones, no matter what the variety is. The peach required by these markets must comply with the following description: It must be round in shape, a large size, with a good rich colour, white flesh and a free stone.

DEPARTMENT OF AGRICULTURE
DAIRY AND COLD STORAGE COMMISSIONER'S BRANCH
OTTAWA, CANADA

AN HISTORICAL AND DESCRIPTIVE ACCOUNT
OF THE
DAIRYING INDUSTRY
OF
CANADA

BY
J. A. RUDDICK
Dairy and Cold Storage Commissioner.

BULLETIN No. 28

DAIRY AND COLD STORAGE SERIES.

APRIL, 1911

LETTER OF TRANSMITTAL.

OTTAWA, April 20, 1911.

To the Honourable

The Minister of Agriculture.

SIR,—I beg to submit the manuscript for a bulletin which is intended to be an Historical and Descriptive Account of the Dairying Industry in Canada.

I have prepared this sketch believing it is worth while to record the main facts and principal events connected with the development of the dairying industry in this country, in permanent and convenient form for future reference, and to describe the present status of the industry for those who may take an interest in the subject.

I have the honour to recommend that it be published for general distribution as Bulletin No. 28 of the Dairy Cold Storage series.

I have the honour to be,

sir,

Your obedient servant,

J. A. RUDDICK,

Dairy and Cold Storage Commissioner.

CONTENTS.

	PAGE.
Introduction..	8
The first Domestic Cattle..	9
The cattle from New England..	10
First cows in Upper Canada..	10
First cows in Prairie Provinces..	11
First cows in British Columbia..	11
Table I, Horned Cattle in New France and Acadia..	12
Table II, Milch cows in British North America..	13
Table III, Milch cows in Canada, 1871-1901..	13
Introduction of pure bred Dairy Cattle..	13
The French Canadian	13
The Ayrshire..	14
The Jersey..	14
The Guernsey..	14
The Holstien	14
The Shorthorn..	15
Cheese and Butter production in Canada..	15
Cheese	15
No special Canadian varieties of cheese..	16
Federal law relating to cheese	17
Butter..	17
Federal law relating to Butter..	18
Some statistics of cheese and butter production..	19
Table IV, Cheese and Butter production by provinces, 1848-1901..	19
Table V, Butter made in creameries only..	20
Table VI, Cheese made in factories only..	20
Table VII, Cows and quantities of butter and cheese, by counties in Ontario, 1861-1901	21
Table VIII, Cows and quantities of butter and cheese by counties in Quebec, 1861-1901	22
Factory System..	23
Ontario..	23
Quebec	24
New Brunswick..	25
Nova Scotia..	26
Prince Edward Island..	26
Manitoba..	27
Saskatchewan..	27
Alberta..	27
Government operation of creameries..	28
British Columbia	28
Table IX, Cheese factories and creameries in Canada, 1910..	29
Plan for a cheese factory with a cool curing room..	32
Plan for a large cheese factory..	33
Plan for a separator creamery..	31
Plan for a gathered cream creamery..	30
Organization of the factory system..	34
Canadian Cheese	35
Composition of Cheddar cheese..	35
Historical..	35
The process of Cheddar cheesemaking as followed in Canadian factories..	36
Ripening the milk..	36
The fermentation starter..	37
The acidimeter..	37

	PAGE.
Cutting the curd..	38
Heating the curd	38
Drawing the whey..	39
Maturing the curd..	40
Pressing the cheese..	40
Curing the cheese..	40
Canadian creamery..	41
Condensed milk factories..	42
Milk powder..	42
Casein..	42
Export trade..	43
Table X, Exports of cheese and butter..	45
Table XI, Detailed statement of exports of butter..	46
Table XII, Detailed statement of exports of cheese..	47
Table XIII, Exports of condensed milk..	48
Export of cream..	49
Dairymen's Associations..	49
Dairy education in Canada..	51
Ontario..	51
Quebec..	52
New Brunswick..	52
Prince Edward Island..	52
Manitoba..	52
Dairy schools..	52
Travelling dairy schools..	53
Government aid to the Dairy Industry..	53
Provincial aid..	53
Dominion aid..	54
Canadian experts abroad..	56
Big cheese..	57

INTRODUCTION.

In collecting and preparing the material for the following pages, during the spare moments of a busy year, I have not attempted to do more than to arrange in something like chronological order some of the leading facts relating to the origin, growth and present development of the dairying industry in Canada.

In view of the importance of the industry to a large section of the farmers of Canada, and through them to the people at large, it would seem to be worth while to make a permanent record before it is too late, of the more important events connected with its early history, and particularly of those which relate to the factory system to which Canadian dairying owes so much.

I have taken some pains to verify dates and other facts. Contemporary writers and documentary evidence have been consulted as far as possible. In cases where there seemed to be some doubt, it will be found so stated. Some of the things mentioned may appear trivial, for it was hard to determine just where to draw the line between the important and unimportant. No doubt, there have been many items of interest omitted, and it may appear to some readers that a true proportion has not been observed in dealing with the subject. I can only plead to having done the best I could with the information available. As much time was spent in getting the material together as its importance would seem to justify. As it was, I fear I ran some risk of boring many good friends from whom I sought information, and whom I now find so numerous that suitable acknowledgment is out of the question.

One point which gave me some difficulty was that of making proper reference to various persons who have been prominent in connection with the industry, especially in later years, and on that account, the rule has been pretty generally observed of referring only to those who have been identified with the initiation of some of the more important movements. It does not follow, therefore, that those whose names have been mentioned herein are considered by the author as the only ones who are entitled to credit in the upbuilding of the dairy industry.

I hope that this acknowledgment will be accepted by all those kind correspondents who rendered such ready assistance in getting much of the material for this bulletin together.

J. A. RUDDICK.

OTTAWA, April 18, 1911.

THE DAIRYING INDUSTRY IN CANADA.

THE FIRST DOMESTIC CATTLE.

Sable island, that bleak inhospitable sandbank off the coast of Nova Scotia, was in all probability the scene of the first introduction of domestic cattle on this side of the Atlantic. History tells us that Baron de Lery, who sailed from France in 1518 with the object of founding a colony in the new world, became discouraged after searching in vain for a favourable location, landed his live stock, consisting of cattle and horses, on Sable island, and then returned home. As a somewhat interesting sequel to this story, it is said that the Marquis de La Roche made another attempt to found a colony in 1598, with a number of convicts whom he had been allowed to take from the jails in France. He marooned these people on the island while he searched for a suitable location for his settlement, but stormy weather drove his ships so far to the eastward that he decided to return to France, leaving his wretched colonists to shift for themselves. They were on the island seven years before they were rescued, subsisting largely on the flesh of the animals and clothing themselves in their skins. The cattle were finally exterminated about 1630 by expeditions organized for the purpose among the Puritans of Massachusetts, but the ponies are there to this day.

Cartier brought some cattle with him on his third and last voyage in 1541, but as he made no permanent settlement the cattle were probably killed for food or taken back to France.

The next attempt to introduce domestic cattle into what is now British dominions on this continent, was in 1606, when Poutrincourt brought some cows to the settlement founded by De Monts at Port Royal (now Annapolis, N.S.) in 1604. It is not at all likely, however, that this was a permanent introduction, because the settlement was destroyed in 1613 by an expedition from Virginia, under Argall, and if these pirates spared any of the cattle, the Indians would certainly not have overlooked such easy game.

The first permanent introduction of cows into Canada was undoubtedly made by Champlain, at Quebec, in 1608 or 1610. In the record of his voyages, he makes mention of the cutting of hay for the cattle in 1610, and in a map of Quebec, published in 1613, a place is shown where 'hay was grown for the cattle.' Champlain's colony had a farm at Cap Tourmente with 60 or 70 head of cattle in 1629. Some of these were killed by Kirke on his predatory expedition to the St. Lawrence in that year.

In 1660 the great minister Colbert, under Louis XIV began sending representatives of 'the best dairy cows of Normandy and Brittany' to New France.

De Tracey also brought some cattle from France in 1665 along with the famous Carignan-Salières regiment.

All authorities agree that the French Canadian breed of the present day is descended from the stock thus imported from Normandy and Brittany in the 17th century.

After 1632, when the Acadian settlements began to acquire a permanent character, more cattle as well as sheep were procured and 'fruit trees were planted.' Fur trading and fishing were to some extent abandoned for agricultural pursuits. In 1671 there were reported to be 866 head of 'horned cattle' in all Acadia. A census in 1693 showed 878 horned cattle at Port Royal, 461 at Minas, 309 at Chignecto and 38 on the River St. John (New Brunswick), probably at Jemseg.

It is stated that there were 1,557 cows and over 5,000 young cattle at the Basin of Minas alone at the time of the expulsion of the Acadians in 1755. Many of the cattle in those early days were undoubtedly used for draft purposes, so that the number of 'horned cattle'—the expression frequently used in old records—is large in proportion to the number of milch cows kept.

In 1713 when Acadia was ceded to England by the Treaty of Utrecht, a number of the Acadian families migrated to Prince Edward Island, or as it was then called, the Island of St. John, which still remained under French rule. These were the first settlers in the island province, and it is quite possible that they took some cattle with them. There was a further migration of Acadians at the time of the expulsion from Nova Scotia. When Captain Holland surveyed the island in 1764, he reported that the number of cattle at that time was inconsiderable.

Cattle from New England.

After the expulsion of the Acadians from Nova Scotia the fertile lands which they had occupied tempted many settlers from New England, who brought live stock with them to the various districts in which they settled. The first German settlers in British North America came to Lunenburg, N.S., in 1750-53. In 1754, the government supplied them with '74 cows, 867 sheep, 114 pigs, 164 goats, besides poultry.' By 1760 they had 600 cows, and were exporting both butter and cheese from the district.

In 1761 a company of 53 families from New Hampshire, of Irish descent, settled at Truro. They brought 117 head of cattle with them. During the same year a number of Puritans from Connecticut landed at Yarmouth, and they had 267 cattle in 1763, which number was increased to 954 in 1784.

When the United Empire Loyalists came to Nova Scotia, New Brunswick and Prince Edward Island in those memorable years of 1783-84 and 85, there were further additions made to the live stock of these provinces.

It was through the coming of the United Empire Loyalists that live stock was introduced into the Eastern Townships. The government of the day made a distribution of cows, implements, &c., to the new settlers in that district.

The extreme western portion of the Province of Quebec, south of the St. Lawrence, including the county of Huntingdon and the Seigniories of Chateauguay and Beauharnois was settled between 1800 and 1830. There were a few French Canadians, and some Loyalists who moved westward from Lacolle, but the principal settlers were Scotch families direct from the Old Country and Americans who drifted in from the neighbouring states. Many of the Americans recrossed the line when the war of 1812 broke out. The cattle for this district were procured from the States and from the older settled country around Montreal. The district of Beauharnois as it is now called, has developed into one of the best dairying and pure bred stock centres in Canada.

First Cows in Upper Canada.

When La Motte Cadillac made his way to the Detroit river in 1701, and there established a post, he took with him some young 'calves' the descendants of which were probably the first cows seen in Upper Canada. It was some years, however, after the settlement was planted before land was occupied on what is now the Canadian side of the river. It is safe to say that the real introduction of domestic cattle into Upper Canada was co-incidental with the coming of the United Empire Loyalists in 1783-1785. The government distributed cows among these settlers as it did in the Eastern Townships. The cows were procured from Lower Canada and from the States. The Loyalists settled along the St. Lawrence, and in the Bay of Quinte and Niagara districts. The Western 'peninsula' of Ontario was not settled until some years later. One of the first dairymen of record in this district was the celebrated Col. Talbot, who established himself on the shore of Lake Erie at what has since been

known, as Port Talbot, in Elgin county, in 1803. This eccentric son of an Irish nobleman, a youthful friend of the Duke of Wellington and an acquaintance of the sons of George III, came to Canada in 1790 to join the 24th Regiment at Quebec. He served on the staff of Governor Simcoe, and through his friends in high places he secured a large grant of land, in what was then known as the London district, on condition that he should place a certain number of settlers on it. His home farm was quite extensive, and as dairying was included among his industries, he was undoubtedly one of the very first dairymen in Western Ontario. The first settlers arrived in Oxford about 1795, but progress was slow for some years, and the writer has not been able to determine when the first live stock was brought in. In the more northerly counties of Wellington, Perth and Huron, there were few if any cows until after 1830.

First Cows in the Prairie Provinces.

Turning now to the Prairie provinces we look to find the first mention of domestic cattle in connection with Lord Selkirk's settlers on the Red river, the first company of whom were landed there in 1812. The writer is informed by Mr. E. H. G. G. Hay, that there is in the archives of the Hudson Bay Company at Lower Fort Garry a record to the effect that in 1813 Lord Selkirk shipped a bull and a cow, from Ballin Ghobhainn in Rosshire, to Stronoway and from thence with more colonists via Hudson Bay and York Factory. All communication with the colony, which was under the wing of the Hudson Bay Company, was by that route. There appears to be no record, however, of these animals ever having reached Red river, which is not very surprising considering the difficulties of the overland part of the voyage.

In 1823 a herd of 300 cattle were driven from the South and disposed of to the Red River colonists. Ross, the historian of the colony, says these were the first cattle in the settlement, 'with the exception of two English cows and a bull received from the Nor'-west Company,' but those who are familiar with the history of those times will hardly believe that the Nor'-West Company provided the Selkirk settlers with cows or anything else to their advantage.

In 1825, Ross, in his journey from Oregon to the Red river, found two cows and a bull at Fort Cumberland on the Saskatchewan and remarks that 'the introduction of domestic cattle from the colony of Red river gives a new feature of civilization to the place.' The same historian, speaking of the Red River settlement in 1831, refers to the decline in the price of dairy produce, as the result of over production. Butter had fallen from one shilling to seven pence per pound; cheese from six pence to four pence per pound. The quality of the butter and cheese was said to be very unsatisfactory.

In his evidence given before the Select Committee of the House of Commons (England) on the Hudson Bay Company in 1856, Col. Lefroy said 'there are domestic cattle at most of the forts now, even low down on the Mackenzie river.'

First Cows in British Columbia.

Some cows were evidently taken across the mountains into the northern interior of British Columbia as early as 1837. There is a reference to a bull, a cow and a calf in Hudson's Bay correspondence at one of the northern posts that year. P. S. Odgen, Chief Factor, at Stewart Lake, expresses his displeasure in a letter written in 1840, to William Thew, at Fraser Lake, 'for not sending the bull.*'

In 1843 the Hudson's Bay Company, realizing that the boundary question was likely to be settled, and the joint occupation of the Oregon territory ended, established a fort on the site of what is now the city of Victoria on Vancouver island, in order to be on the right side of the line, when its location was definitely fixed. For some years previously the company maintained large dairy farms at Nisqually on Puget Sound,

* History of the Northern Interior of British Columbia, Morice.

and at Fort Vancouver on the Columbia river. These farms were stocked with dairy cattle which had been driven up from California and were of Mexican (originally Spanish) origin, having been brought to California by the Mission Fathers.

The new fort was supplied with cattle and by 1846 there were two dairies of 70 cows each, under direction of Roderick Finlayson, who may be considered as British Columbia's first dairyman.

The produce of these farms was supplied to the northern posts and was also used in the trade with the Russians who then occupied Alaska.

From this brief statement respecting the introduction of domestic cattle into the various parts of Canada, it is clearly evident that even the very first colonists considered the possession of cows and oxen to be of prime importance, and one of the first necessities of a civilized existence, for we find that wherever permanent settlement was made, the cattle soon followed, although they were often obtained under the greatest difficulties. In addition to the difficulty of obtaining cows the first settlers in Eastern Canada found it no light matter to provide feed for them in a country almost completely covered with a dense forest. Unless there happened to be a sufficient supply of 'beaver meadow' hay available the poor animals often had to live for months on the young shoots of shrubs and trees, and many acres of fine Ontario and Quebec bush were felled to provide 'browsing' for the starving cattle.

A large proportion of the 'horned cattle' reported as being in the possession of the early settlers were used as draft oxen, so that the dairying industry of those times was not always as extensive as the number of cattle would indicate on a present-day basis.

It will now be evident that Canada may claim the honour of having been the first part of America, north of the Gulf of Mexico, at any rate, to receive domestic cattle. The Pilgrim Fathers at Plymouth did not have any until 1623. It is possible that the Spaniards may have brought cattle, as well as horses, to Mexico or Central America, during the 16th century, but the writer has been unable to determine that point definitely.

It follows that the common cow of this country comes from a very mixed ancestry. In the eastern provinces, there is strain of French or Normandy blood, along with various English and Scotch mixtures and also a trace of Dutch brought by some of the Loyalists, from New York State. In the western provinces there is reason to believe that many of the cattle which have come from the south, were of Spanish ancestry.

TABLE I.—Horned cattle in New France and Acadia.

	New France.	Acadia.
1667.....	3,107	
1671.....	6,983	866
1685.....	7,474	
1686.....		986
1693.....		1,648
1695.....	9,181	
1701.....		1,807
1706.....	14,191	
1720.....	23,388	
1734.....	33,179	

More than half the number of horned cattle given in the foregoing table would be made up of oxen and young cattle.

TABLE II.—Milch cows in British North America, from the end of the French Regime to Confederation.

Year.	Upper Canada.	Lower Canada.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Assiniboia (Manitoba.)
1765.....		22,748				
1784.....		44,291				
1808.....				56,972*		
1827.....	66,878	260,015		110,818*	22,925*	
1831.....	84,373					1,194†
1838.....	129,711					3,633†
1840.....	148,483	469,851*	90,260*		41,915*	4,045†
1851.....	296,875	295,552	50,955	86,856		6,463†
1861.....	451,640	328,370	69,437	110,504	60,912*	

* Horned cattle. Probably about one-third milch cows.

† Cows and calves.

It will be observed that Lower Canada led Upper Canada in the number of cows until about 1850; after that date Upper Canada forged ahead more rapidly.

TABLE III.—Showing the number of milch cows in Canada, by provinces, in the years 1871 to 1901.

Year.	Ontario.	Quebec.	New Brunswick.	Nova Scotia.
1871.....	638,759	406,542	83,220	122,688
1881.....	782,243	490,977	103,965	137,639
1891.....	876,167	549,544	106,649	141,684
1901.....	1,065,763	767,825	111,084	138,817

Year.	Prince Edward Island.	Manitoba.	British Columbia.	N. W. Territories
1871.....				
1881.....	45,895	20,355	10,878	3,848
1891.....	45,849	82,712	17,504	37,003
1901.....	56,437	141,481	24,535	102,735

In Canada—*1871..... 1,251,209
 1881..... 1,595,800
 1891..... 1,857,112
 1901..... 2,408,677

*Includes only Ontario, Quebec, New Brunswick and Nova Scotia.

THE INTRODUCTION OF PURE-BRED DAIRY CATTLE.

The French Canadian.

We have already seen that the progenitors of the French Canadian cow were brought to this country in the early days of the French regime. They have been bred with very little intermixture of other blood in some localities, and since 1837, when the French Canadian herd book was established, they have been recognized as pure-bred.

The Ayrshire.

The Ayrshire breed came next, but it is impossible to determine exactly when the first animals of this breed were brought to Canada. Lord Dalhousie, who seems to have been very active in matters pertaining to the improvement of agriculture, both as Governor of Nova Scotia and afterwards as Governor of Canada, imported Ayrshire cattle into the latter province in 1821, for the purpose of improving the breed of cows. The secretary of the Canadian Ayrshire Breeders' Association states that there are Ayrshires recorded in the Canadian Ayrshire Herd Book that can be traced to the importations by Lord Dalhousie. In very early days Scotch shipmasters brought out Ayrshire cows for the use of the passengers on the voyage, and sold them at Quebec and Montreal. So popular did these cows become that farmers frequently induced the captains to bring several cows on a voyage, in order that they might secure them for breeding purposes. In 1850, importations of Ayrshires were made by John Dodds and John MacKenzie, of Montreal, followed by James Logan of the same place in 1853. The Montreal Agricultural Society and the Beauharnois Agricultural Society also made importations in the latter year. Mr. J. B. Ewart, of Dundas, Ontario, made an importation of Ayrshire cattle in 1845. After that, large numbers of Ayrshire cattle were imported into Ontario and Quebec.

The Jersey.

In 1868, Mr. Harrison Stephens, of Montreal, wishing to establish his two sons on stock farms, arranged for the importation of a herd of Jerseys. Mr. Andrew Allan, of Montreal, made further importations in 1871, and these were added to the Stephens' herd. Thus was founded the well known St. Lambert family of Jerseys. It was from this herd in 1881 that Valancey E. Fuller, of Hamilton, secured the famous Mary Anne, of St. Lambert, for whom he refused \$26,000 within three years. The Jersey became the fashion, and higher prices were paid for this breed during the early eighties than have been paid since. The Jersey has probably suffered some from the natural reaction which followed an unhealthy boom.

The Guernsey.

The late Hon. Sir John Abbott imported Guernseys in 1878, 1881 and 1883. His was probably the first direct importation. William Duffus, of Halifax, N.S., imported a few animals via the United States about the same time. Mr. E. R. Brown, of Charlottetown, P.E.I., made an importation in 1886.

The Hon. Sydney Fisher was one of the earliest breeders of the Guernsey in Canada. His herd was started in 1886.

The Guernsey has never been boomed to the extent that some other breeds have, but many well informed dairymen look upon her with very much favour.

The Holstein.

The breed commonly known in Canada as the Holstein, although officially recognized as the Holstein-Fresian, would in the author's opinion, be more correctly designated as the 'Dutch' breed. This was the last of the typical dairy breeds to be brought into Canada. Mr. A. C. Hallam, writing in the *Canadian Dairyman* in 1907, made the following statement:—

'Being fully convinced of the superior quality of Holsteins, and believing that they would make a desirable breed for this country, five progressive Canadian farmers ventured across the line in 1882 and 1883 to secure some of these celebrated cattle. A very peculiar part of this was that four or five men from different parts of the province started to import just about the same time, neither being aware of the others importation until they reached the quarantine station at Point Edward, where all cattle had to remain for three months at the owner's

risk. This entailed great expense, and often caused loss and injury to the animals. The first men to embark in this business were Messrs. M. Cook, of Aultsville, J. S. Hallman, H. Hillgartner, C. Wagler, New Dundee, Ont., J. W. Lee, Simcoe, Ont.

In the years 1884 and 1885, several importations were made direct from Holland to Canada, by American importers, and disposed of by public auction.

The Shorthorn.

The Shorthorn is not generally included among the special dairy breeds, but some excellent milk producers are found among the cows belonging to certain strains or families.

The Board of Agriculture for New Brunswick made the first importation of pure bred Shorthorns in 1825 or 1826. In 1826 Judge Robert Arnold of St. Catharines, Ont., bought a cow in the States, and a Mr. G. W. Smith, of St. Thomas, Ont., imported a cow and a bull from England during the same year. There were importations almost every year from 1832 down to 1854, when as stated by the Editor of the First Dominion Shorthorn Herd Book, 'there was a regular boom in importing.'

Early Prejudice against Pure-Breeds.

It is not the writer's purpose to take any part in the 'battle of the breeds,' but merely to record a few facts concerning their first introduction to this country. The advocates or promoters of the several breeds may be trusted to see that the merits of those they are interested in, and the demerits of the others, are kept prominently before the dairy farmers.

Until comparatively recent years, pure-bred cows of any breed were not held in high favour by the average dairy farmer. Croil in his History of Dundas County (1861) makes the following comment on that point.

'Very little attention has as yet been given to what is called the improved breeds of cattle. There has existed a prejudice against them in this county. It is difficult to give the objections to their introduction a tangible form. The prevailing idea seems to be that they consume too much food in winter, in other words, we are disappointed to find that they cannot endure the same amount of starvation as the natives. Jesse W. Rose was, many years ago, the first to introduce the Durham and Ayrshire breeds of cattle, but in leaving the country his stock became scattered, and being in most cases subjected to doubtful treatment, they were pronounced inferior to the natives.'

That this prejudice has disappeared is shown by the number of pure-bred cattle in Canada at the present time, and the high prices which are paid for choice animals of good breeding.

CHEESE AND BUTTER PRODUCTION IN CANADA.

Reference is made to cheese and butter production in many of the records of the early settlements in all parts of Canada. The art of buttermaking is easily acquired, but the manufacture of cheese, being a much more intricate and difficult process, requires more skill and experience to ensure success, although cheese of a sort can be made with very little previous training.

Cheese.

The early French colonists made both butter and cheese and, no doubt, the 'Fromage raffine' still made on the Island of Orleans is a relic of early attempts to follow some of the soft cheese processes known to them in France. The 'Fromage

raffine' is the nearest approach to a special Canadian variety of cheese that the writer has any knowledge of. Cream cheese have been made in different localities, and one from Rouville County, Que., has probably acquired the best reputation.

The United Empire Loyalists brought the art of butter and cheese making to the Eastern Townships, to the St. Lawrence valley and the Lake Ontario district. As early as 1801 there was a surplus of cheese and butter at Kingston, Ont., and some of it was exported to the United States.

In Gourlay's Statistical Account of Upper Canada, published in 1822, mention is made of butter and cheese in Sandwich, Walpole, Rainham, Norwich, Saltfleet, Bayham and other townships. The prices given vary from 18 to 30 cents a pound for butter, and 15 to 30 cents a pound for cheese.

Cheesemaking seems to have been carried on most successfully and extensively by some of the early English and Scotch settlers in Ontario and Quebec. Mr. Hiram Ranney, of Salford, Oxford county, was in his time probably the largest cheese producer in Ontario. He milked from 80 to 100 cows in the early fifties, and teamed his cheese to Hamilton and other points before the Great Western railway was built. There were some famous cheesemakers in Chateauguay and Huntingdon counties, in the province of Quebec, about the middle of the last century. Mr. James Brodie, of North Georgetown, George Cross, near Ormstown, and Nicholas Farlinger, in Dundee, were particularly prominent. Their cheese was made after the Dunlop method, and Mr. Cross especially seems to have been more than usually successful, as his cheese acquired an excellent reputation in Montreal. He won a silver medal at the Paris Exhibition in 1855, and another one at a Provincial Exhibition held about the same year. It would seem as though Mr. Cross might almost be credited with having anticipated the factory system, for it is said that he received milk from some of his neighbours, which was made up with his own.

In recent years, Mr. Fred. Parsons, of Guelph, Ont., has carried on the manufacture of English Stilton cheese, and has met with conspicuous success.

The Trappist Fathers brought to this country from France the secret of the manufacture of Port du Salut cheese, and they have been making an excellent article for several years at the monastery at Oka, Que. It is known in the market at 'Oka' cheese.

More recently the manufacture of 'Coulommier' cheese has been started at Macdonald College, and the process is being taught to students with success. It has also within the past year been made at the Experimental Farm at Ottawa. The Dairy Department at the Ontario Agricultural College, Guelph, has recently added soft cheesemaking to its curriculum.

There are several well known brands of 'potted' cheese, which are prepared by passing ordinary factory cheese through a pulping machine and packing it in jars or other receptacles.

'Sage' cheese, much relished by some people, was more common in the days before the factories were started than it is now. The difference between an ordinary plain cheese and a Sage cheese is simply the addition of the aromatic herb of that name. The process is not otherwise varied. There are different methods of adding the sage, but usually the finely broken leaves are mixed with the curd just before pressing.

A separate section will be devoted to a description of the cheese made in Canadian factories.

No Special Canadian Varieties of Cheese.

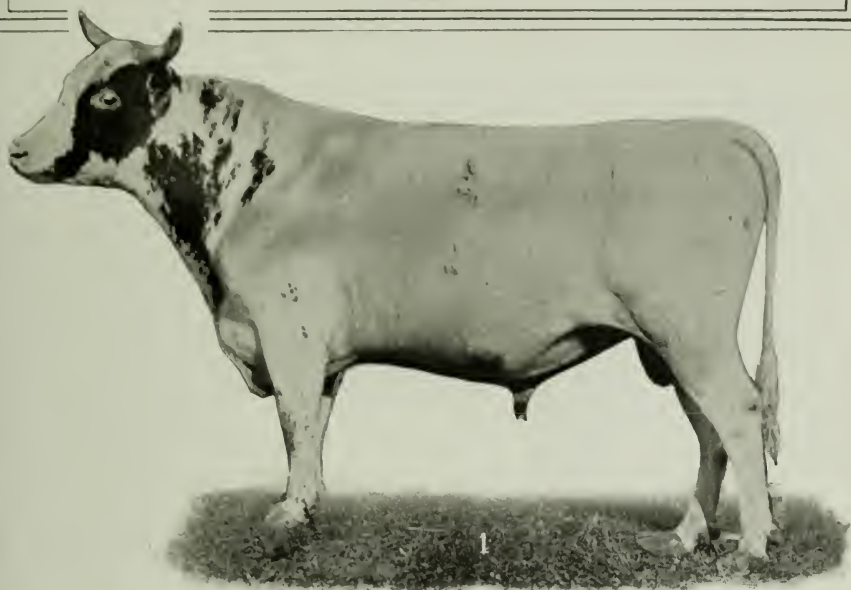
Cheese is made by precipitating the protein compounds of milk with rennet. The curd which is thus formed holds the fat of milk mechanically, and a certain amount of the water is also retained. A Canadian cheddar cheese, for instance, consists, roughly speaking, of one-third fat, one-third protein or casein compounds, and one-third water.



French Canadian Bull, Experimental Farm, Ottawa.



French Canadian Cow "Citerne".



Ayrshire Bull, "Pearl Stone of Glenard" Grand Champion, London, 1910.



Ayrshire Cow, "Barcheskie Lucky Girl", Winner of Dairy Test, Eastern Ontario Live Stock Show, 1911.



Guernsey Bull.



Guernsey Cow.



Jersey Bull. Pearl of Kirkfield, Champion at Toronto, 1910.



Jersey Cow.



Holstein-Friesian Bull, "Scheiling Sir Posch." Grand Champion, Toronto, 1910.



Holstein-Friesian Cow, "De Kol Pauline Sadie Val." Grand Champion,
Toronto, 1910.

The art of cheesemaking is infinitely more intricate and difficult than that of buttermaking. It deals with several constituents of the milk, two of which, the sugar and the casein, unlike the comparatively inert and stable fat, are peculiarly subject to bio-chemical changes, as yet not fully understood or studied by the chemist and the bacteriologist.

It requires only slight modifications of the process of cheesemaking to produce marked differences in the finished product. As a result, there are probably 100 distinct different varieties of cheese made in various parts of the world, and at least 25 well-known classes, varying greatly in appearance, texture and flavour—particularly in flavour.

They vary in texture from the Schabzieger of the Swiss Alps, so hard that it must be grated, or rasped, as the name suggests, to the soft and creamy French cheese, like Brie or Camembert; in the matter of flavour, there is the mild and genteel Cheddar on the one hand, and the loud and vigorous Limburger on the other; and as for size, they range from the dainty Neufchatel, a few ounces in weight, to the ponderous Gruyere, which may weigh over 100 lbs.

It may be asked why have Canadian makers not shown more originality in this respect? Why do they universally make a cheese which at best is only an imitation of the Cheddar cheese of England? An explanation is not hard to find. In the first place, the individual dairy cheesemakers had not been at it long enough to establish fixed types before the factory system came in, and when the factories were started cheesemaking on the farm ceased almost entirely. The factories adopted the Cheddar principle, first, because the process is the one of all the numerous kinds which is best adapted for the factory system, and second, because the English market, for which the factories at once began to cater, was already demanding the Cheddar quality in cheese. There have been important modifications in the process, as followed in Canadian factories, since the early days, as for instance, the change from the 'stirred' curd to the use of the curd mill in the seventies, and later, about 1880, when the so-called 'sweet' curd process was introduced by Prof. Arnold; but all these and subsequent minor modifications have been in the direction of bringing the quality of the cheese more nearly to that of English Cheddar.

Again, the inauguration of the factory system and its general adoption facilitated further organization, and dairy conventions and public discussions, followed later by systematic instruction, have all tended to prevent the factory makers from straying into those by-paths, which in other countries, lacking in such guidance, have resulted in the numerous varieties of cheese already referred to.

Federal Law relating to Cheese.

Sections 282, 283 and 283 A of the Inspection and Sale Act (as amended in 1908) provide:

(a) That all cheese manufactured from milk, either wholly or partially skimmed, shall be branded both on the package and on the cheese itself as 'Skimmed Milk Cheese.'

That no person shall:

(b) Manufacture any cheese known as 'filled' cheese, or substitute any foreign fat for milk fat, in the manufacture of cheese.

(c) Incorporate in a new cheese, during the process of its manufacture, any inferior curd or cheese, or knowingly sell, expose, or have in his possession for sale, any such cheese, without giving due notice thereof.

(d) Place in a cheese during the process of its manufacture, or at any time, any foreign substance.

Butter.

High class Canadian butter does not differ essentially from the best product of other countries.

The process of buttermaking is practically the same wherever scientific methods are followed, and it requires an expert to detect the slight differences of flavour and texture which may be found in well made samples of butter brought together from the ends of the earth. Of course, there is good and bad butter to be found everywhere, and it is the proportion of the two kinds produced in any country that makes or mars its reputation in this respect, rather than any distinctive quality or characteristic in the product which may be traced to locality of origin.

Canadian butter, compared with Australasian and European makes, has been characterized by a 'waxiness' of texture and high colour, although a change has been made of late years towards a lighter and more creamy butter, containing very little salt and none at all in much of the export butter. (See section the Canadian Creamery system.)

The Federal Law in relation to Butter.

For commercial purposes butter is divided into different grades or classes. In Canada we have so far recognized legally only two, namely: 'Dairy' and 'Creamery.'

The definitions for these two grades are laid down in Section 279 of the Inspection and Sale Act as follows:—

(1) 'Creamery' means a place where the milk or cream of not less than fifty cows is manufactured into butter;

(2) 'Dairy' means a place where the milk or cream of less than fifty cows is manufactured into butter in a building equipped with proper appliances;

(3) 'Butter' means the food product commonly known as butter, which is manufactured exclusively from milk or cream or both, with or without the addition of colouring matter, common salt, or other harmless preservative;

(4) 'Creamery Butter' means butter which is manufactured in a creamery;

(5) 'Dairy Butter' means butter which is manufactured in a dairy.

It is proposed to amend this section by adding the following:—

'Whey Butter' means butter which is manufactured from whey.

'Milled Butter' means any butter which consists of a mixture of creamery butter and dairy butter, or of two or more lots of dairy butter which have been manufactured in different dairies and mixed together.

It is also provided in the Inspection and Sale Act (Sections 298, 299 and 300) that:—

No person shall:—

(a) Manufacture or import into Canada, or offer, sell or have in his possession for sale any butter containing over sixteen per cent of water.

(b) Mix with butter any acid, alkali, chemical or any substance whatever, which is introduced or used for the purpose or with the effect of causing the butter to absorb water or any part of milk or cream.

(c) Manufacture, import into Canada, or offer, sell or have in his possession for sale, any oleomargarine, butterine, or other substitute for butter, manufactured wholly or in part from any fat other than that of milk or cream.

(d) Manufacture, import into Canada, or offer, sell, expose or have in his possession for sale, any renovated butter or process butter.

Other sections of the Inspection and Sale Act provide that:—

The Federal Law relating to both Butter and Cheese.

(1) All cheese and butter made in Canada destined for export shall have the word 'Canadian,' 'Canadien,' or 'Canada' marked on the packages.

(2) No person shall apply any brand, stamp or mark of the word 'Canadian,' 'Canadien,' or 'Canada' as a descriptive term on any cheese, or upon any box or package, which contains cheese or butter, unless such cheese or butter has been produced in Canada.

(3) No person shall knowingly sell, or offer, expose, or have in his possession for sale, any cheese or butter upon which, or upon any box or package containing which, is printed, stamped, or marked, any month other than the month in which such cheese or butter was made.

(4) No person shall supply to a cheese factory, creamery or condensed milk factory any milk which has been skimmed or adulterated in any way.

Some Statistics of Cheese and Butter Production.

In the various accounts of the early periods in the settlement and development of this country, mention is made of the quantities of butter and cheese produced in certain localities, especially in Nova Scotia, but as such returns are very incomplete, their publication might be misleading. Tables IV, VII, VIII and IX have been compiled from the census returns of 1848 to 1901. Tables IV, VII and VIII include both *home made* and *factory* butter and cheese. In the census of 1881 and 1891 the values only were given of the butter and cheese made in factories. The quantities have been calculated from the values by reckoning cheese at 10 cents a pound and butter at 25 cents.

TABLE IV.—Cheese and butter production by provinces from 1848 to 1901 (compiled from census returns).

Years.	ONTARIO.		QUEBEC.		NEW BRUNSWICK.	
	Butter.	Cheese.	Butter.	Cheese.	Butter.	Cheese.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1848.....	3,380,406	668,357				
1851.....			9,610,036	764,302		
1861.....	25,822,264	2,687,172	15,906,949	686,297	4,591,477	218,067
1871.....	37,623,643	3,432,797	24,289,127	512,435	5,115,947	154,758
1881.....	55,712,285	48,382,501	31,129,189	7,950,328	6,527,176	218,600
1891.....	56,764,948	73,334,962	32,337,054	27,896,891	7,806,268	310,236
1901.....	62,938,110	131,967,612	42,982,188	80,630,199	8,130,347	1,892,686

Years.	NOVA SCOTIA.		PRINCE EDWARD ISLAND.		MANITOBA.	
	Butter.	Cheese.	Butter.	Cheese.	Butter.	Cheese.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1848.....						
1851.....	3,613,890	652,069				
1861.....	4,532,711	901,296	711,487	109,133		
1871.....	7,161,867	884,853	981,939	155,524		
1881.....	7,465,285	908,225	1,688,690	196,273	957,152	19,613
1891.....	9,019,158	1,046,013	1,963,213	108,188	5,019,928	680,972
1901.....	9,394,953	568,147	1,969,332	4,457,519	10,233,671	1,289,413

TABLE IV.—Cheese and butter production by provinces from 1848 to 1901 (compiled from census returns)—*Continued.*

Year.	THE TERRITORIES.		BRITISH COLUMBIA.	
	Butter.	Cheese.	Butter.	Cheese.
	Lbs.	Lbs.	Lbs.	Lbs.
1848.....				
1851.....				
1861.....				
1871.....				
1881.....			360,587	83,252
1891.....	1,922,016	183,123	393,089	35,673
1901.....	4,290,851	27,693	1,488,363	

TABLE V.—Butter made in creameries only, by provinces, from 1881 to 1907.

Province.	1881.	1891.	1901.	1907.
	Lbs.	Lbs.	Lbs.	Lbs.
Ontario.....	849,920	1,200,452	7,559,542	8,862,618
Quebec.....	498,792	2,223,728	26,625,000	31,056,154
New Brunswick.....		8,000	287,814	969,167
Nova Scotia.....		8,040	334,211	198,238
Prince Edward Island.....			562,220	358,422
Manitoba.....		189,560	1,557,010	1,561,398
The Territories.....		24,584	745,134	1,640,500
British Columbia.....	17,200		395,808	1,238,797
Totals.....	1,365,912	3,654,364	38,066,739	45,885,294

TABLE VI.—Cheese made in factories only, by provinces, from 1881 to 1907.

Province.	1881.	1891.	1901.	1907.
	Lbs.	Lbs.	Lbs.	Lbs.
Ontario.....	46,680,780	72,269,225	131,967,612	129,693,010
Quebec.....	7,391,050	23,625,950	80,630,199	69,887,625
New Brunswick.....	46,456	270,520	1,892,686	1,205,773
Nova Scotia.....	406,570	456,650	568,147	181,956
Prince Edward Island.....		84,480	4,457,579	2,250,316
Manitoba.....		564,970	1,289,413	1,266,592
The Territories.....		111,760	27,693	212,911
British Columbia.....	50,000	35,300		
Totals.....	54,574,856	97,418,855	220,833,329	204,698,183

Tables VII and VIII will be of interest for the purpose of comparing the status of dairying in Ontario and Quebec just before the factory system was introduced and when that system had been fairly well developed. As the figures in these tables are

taken from the census of 1861 and 1901, the comparison by counties is not strictly accurate in every case, because of a difference in the county or district boundaries in the two periods.

TABLE VII.—Showing the number of cows, and the quantities of butter and cheese produced on farms and in factories, by counties, in Ontario in 1861 and in 1901.

Counties.	Number of Cows.		Lbs. Butter.		Lbs. Cheese.	
	1861.	1901.	1861.	1901.	1861.	1901.
Algoma	432	4,074	1,715	1,076,660	60	97,075
Brant	8,447	12,989	556,167	370,376	73,028	157,136
Bruce	8,276	32,633	365,877	3,076,463	20,324	1,814,197
Carleton	12,208	16,762	684,175	522,333	23,934	2,573,655
Dundas	8,727	28,007	608,110	747,467	18,377	8,780,315
Durham	13,112	16,002	546,534	1,229,186	88,927	1,173,392
Elgin	13,602	25,185	868,815	2,021,361	86,928	2,635,519
Essex	7,145	18,236	296,763	1,391,732	22,526	361,937
Frontenac	9,582	14,719	639,452	312,794	18,399	3,274,965
Glengarry	9,950	27,293	429,661	591,380	122,627	5,648,805
Grenville	9,534	13,319	611,668	311,120	43,231	3,829,034
Grey	11,734	45,020	591,155	4,674,444	37,441	530,071
Haldimand	8,048	12,160	553,848	806,753	31,539	1,006,935
Halton	9,569	10,266	530,037	1,048,938	37,938	33,171
Hastings	14,748	46,674	797,911	1,283,380	77,979	10,467,507
Huron	15,927	30,322	749,256	2,356,550	45,648	1,293,059
Kent	10,534	11,922	593,881	985,434	49,257	96,141
Lambton	8,101	18,360	557,816	1,236,702	31,748	924,441
Lanark	14,991	33,165	928,570	1,147,439	27,531	6,111,488
Leeds and Brock	17,119	48,096	1,128,747	1,085,001	83,259	12,986,376
Lennox and Addington	11,886	37,402	866,538	1,129,546	44,290	7,297,681
Lincoln and Niagara	7,735	7,455	522,021	707,559	45,678	193,017
Middlesex	19,006	46,491	1,031,805	3,160,888	79,100	5,000,658
Norfolk	8,912	29,974	608,671	1,552,475	56,397	6,490,880
Northumberland	13,413	25,926	700,148	853,446	108,273	5,145,139
Ontario	13,856	25,718	679,200	2,480,006	110,853	256,480
Oxford	17,792	38,463	1,036,234	1,488,855	457,348	7,843,293
Peel	9,809	8,373	711,100	867,436	33,008	112,249
Perth	12,201	27,013	645,142	2,242,451	47,425	3,563,503
Peterborough	7,709	23,144	427,529	898,745	55,599	3,864,938
Prescott	5,416	22,241	308,671	493,307	34,436	4,838,615
Prince Edward	8,494	14,633	532,823	497,153	89,601	3,337,115
Renfrew	5,693	29,128	280,675	1,855,218	12,173	1,902,358
Russell	1,937	29,133	108,922	794,739	4,316	5,691,829
Simcoe	13,166	34,959	734,412	2,849,523	37,749	424,704
Cornwall and Stormont	7,406	25,703	361,217	20,751	22,023	5,839,827
Victoria	6,725	21,865	350,206	1,389,919	16,939	1,545,545
Waterloo	12,414	16,460	604,116	1,752,756	79,320	830,346
Welland	7,322	6,830	521,673	601,436	23,513	163,646
Wellington	15,239	38,116	866,715	3,146,600	80,447	1,890,055
Wentworth	10,326	25,511	697,395	2,201,522	83,518	1,216,880
York	19,546	25,764	1,103,675	1,916,268	218,465	261,076
Nipissing	98	7,080	3,210	495,322	.....	.....
Cities in Upper Canada	3,753	.....	.....	.....	.....	.....
* { Cardwell .....	.....	8,837	.....	627,864	.....	74,000
{ Bothwell .....	.....	11,409	.....	875,910	.....	215,975
{ Muskoka & Parry Sound .....	.....	12,927	.....	1,141,654	.....	120,554
Totals	451,649	1,065,763	26,828,264	62,938,110	2,687,172	131,967,612

* Counties not mentioned in 1861.

TABLE VIII.—Showing the number of cows, and the quantities of butter and cheese produced on farms and in factories, by counties, in Quebec in 1861 and 1901.

Quebec—Districts.	No. Cows.		Lbs. Butter.		Lbs. Cheese.	
	1861.	1901.	1861.	1901.	1861.	1901.
L'Assomption.....	8,175	10,763	368,262	2,492,965	1,637	.....
Argenteuil.....	6,288	15,217	362,078	459,931	22,825	1,613,263
Bagot.....	5,476	14,542	238,409	1,465,288	1,504	2,663,740
Beauce.....	8,619	32,088	316,209	1,239,274	485	4,496,892
Beauharnois.....	4,318	9,744	174,258	292,994	4,701	1,359,199
Bellechasse.....	5,755	12,941	340,409	1,678,279	8	476,409
Berthier.....	6,449	11,253	240,877	501,547	1,592	1,881,074
Bonaventure.....	3,046	7,424	145,663	441,090	3,871	152,818
Brome.....	7,201	21,899	664,113	2,310,230	99,342	2,501,232
Chambly and Vercheres.....	10,566	10,823	407,979	1,741,254	6,158	748,839
Champlain.....	6,206	16,930	146,315	665,331	1,276	2,528,529
Charlevoix.....	4,905	7,398	230,495	366,156	.....	527,946
Chateauguay.....	7,079	14,123	246,627	1,918,296	24,104	1,964,881
Chicoutimi and Saguenay..	2,889	22,191	67,253	631,357	.....	2,966,373
Compton.....	3,945	16,964	250,063	1,053,098	68,369	1,239,710
Dorchester.....	6,707	18,011	384,055	983,595	131	2,219,478
Drummond and Arthabaska.....	7,248	32,790	383,969	700,779	4,932	5,450,204
Gaspé.....	2,430	7,064	103,371	630,374	1,725	.....
Hochelaga.....	7,037	1,230	200,965	3,530	8,151	.....
Huntingdon.....	8,660	18,811	485,322	1,211,292	17,111	1,820,236
Jacques Cartier.....	4,437	6,842	286,060	324,133	1,778	.....
Joliette.....	6,464	14,810	198,919	2,296,039	2,084	665,956
Kamouraska.....	8,016	12,242	392,614	612,049	36	1,743,945
Laprairie and Napierville..	10,208	11,352	295,377	2,277,430	2,297	133,579
Laval.....	3,552	8,753	182,920	822,991	4,144	250,742
Lévis.....	4,691	7,426	307,891	416,787	872	504,994
L'Islet.....	5,053	7,315	277,626	1,994,934	.....	124,776
Lotbinière.....	6,545	13,912	392,987	1,162,765	1,485	1,993,458
Maskinonge.....	4,677	9,848	221,076	421,267	665	2,093,829
Megantic.....	5,417	16,071	313,321	743,282	5,784	2,221,788
Missisquoi.....	10,438	20,324	469,159	2,062,814	195,117	1,841,454
Montcalm.....	6,295	8,923	287,209	1,365,519	1,586	202,281
Montmagny.....	5,404	7,656	382,808	1,006,473	99	320,372
Montmorency.....	4,177	7,032	171,606	1,319,788	4,935	36,520
Nicolet.....	7,346	18,699	253,409	645,525	140	3,541,426
Ottawa.....	6,687	.....	296,521	.....	6,389	.....
Pontiac.....	4,106	14,977	262,212	884,506	4,597	467,283
Portneuf.....	6,712	17,160	286,113	1,780,411	160	1,665,738
Quebec.....	6,701	9,219	230,325	723,260	2,886	33,600
Richelieu.....	5,287	8,060	153,248	423,418	611	1,365,784
Richmond and Wolfe.....	4,399	24,055	327,149	1,672,905	29,279	2,982,954
Rimouski.....	5,185	19,396	221,056	1,607,877	1,089	1,468,745
Rouville.....	6,609	14,564	263,359	326,294	2,729	3,464,029
Shefford.....	6,177	27,386	433,891	1,706,692	51,402	4,502,141
Soulanges.....	4,231	6,351	157,331	1,144,563	11,237	204,613
St. Hyacinthe.....	6,997	11,989	154,555	241,295	604	2,329,555
St. Johns and Iberville.....	9,773	14,478	442,867	2,220,225	8,492	1,592,435
Stanstead.....	4,653	15,773	348,626	1,963,390	51,022	1,523,969
Three Rivers and St. Maurice..	3,994	7,880	220,953	994,857	476	834,119
Sherbrooke.....	1,093	4,630	78,616	723,841	9,000	196,885
Temiscouata.....	5,699	15,471	269,953	2,574,410	24	203,570
Terrebonne.....	6,989	14,790	327,125	2,085,875	2,356	495,502
Two Mountains.....	7,141	12,167	410,711	1,764,404	5,426	1,134,828
Vaudreuil.....	4,334	8,240	255,788	727,802	8,576	762,047
Wright.....	.....	16,915	.....	1,275,096	.....	307,249
Yamaska.....	5,818	12,312	176,907	142,545	100	2,823,633
Maisonneuve.....	.....	1,659	.....	760	.....	.....
Labelle.....	.....	16,943	.....	857,855	.....	1,985,577
Totals.....	328,370	767,825	15,906,949	42,982,188	686,297	80,630,199

THE FACTORY SYSTEM.

There were over 1,000,000 cows in British North America in 1861. The home market was supplied with butter and to a large extent with cheese, although the imports of the latter article were considerably in excess of the exports until after the cheese factories began to operate. The dairy outlook in the early sixties was not encouraging. Progress was impossible under the conditions which then existed. Cows were kept in most cases as a sort of side line, the butter and cheese being made by the women of the household, who, after supplying the needs of the family, 'traded' the surplus for groceries and other requirements at a valuation often below the actual cost of production. The production was limited to the amount of labour which the farmer's wife and daughters could spare from other arduous duties.

The introduction of the factory system saved the situation and gave a new impetus to milk production. The factory product was more suitable for the English market than the home made article, and the great export cheese trade which then began was made possible.

The system of making cheese in factories originated in Herkimer county in the State of New York, about 1851, and for some years that district set the standards and fashions for the rest of America in connection with the industry.

The factory system was exactly suited to the labour and other conditions in Ontario and Quebec, and as a consequence it was extended very rapidly directly it became known and understood. The results were so important that the rise of the dairying industry in Canada has been associated in the popular mind with the beginning of the factory system. That view, of course, is hardly correct, but it must be admitted that the day which saw the first cheese factory started marked a distinct epoch in the progress of the industry in this country. It will not be out of place then to record some of the facts relating to the 'first' factories in the principal dairying districts, and the matter will be simplified if we refer to them under the heads of the several provinces.

ONTARIO.

Cheese Factories.—In the year 1863 Mr. Harvey Farrington, a successful cheesemaker of Herkimer county, paid a visit to some friends in Oxford county, became impressed with the suitability of the district for cheesemaking, and finally decided to move his family there and engage in the business. Accordingly, in the spring of 1864 he started the first cheese factory in Canada, on the farm of G. V. de Long in the Township of Norwich. It is a striking commentary on his judgment that Oxford has ever since been the foremost dairying county in Canada. Mr. Farrington was the right type of man for a pioneer. His clear judgment, enterprise and public spirit had much to do with establishing the industry on a sound and lasting basis.

The following year saw four other factories erected in the county, namely, the 'Ingersoll factory' by James Harris and associates, the 'Galloway' factory on the 2nd concession of West Oxford, one built by Andes Smith & Son in Norwich, and another by John Adams in Nissouri. Ingersoll became the head centre of the cheese industry and, for some years, her 'right there was none to dispute.'

Another American, Mr. P. W. Strong, came to Leeds county in 1865 and began the manufacture of cheese at Farmersville (now Athens.) Mr. Strong became identified with several factory enterprises in the Brockville district, and he deserves credit for the improvements in buildings and machinery which he introduced.

Mr. M. K. Everts was another Leeds County pioneer, who in company with a Mr. Coolege built a factory at Frankville in 1866. Both Mr. Strong and Mr. Everts are still actively connected with the industry.

The Belleville district was not far behind its rivals, for in 1866 the late Mr. Ketchan Graham and the Hon. Robt. Reid, also deceased, erected a factory near Belleville, which was widely known as 'The Front of Sidney' factory. Mr. Reid and

Mr. Graham both took an active interest in cheesemaking during the remainder of their lives, and did much to promote the industry. Each had a large herd of dairy cows on his own farm.

Other factories soon followed in both the Brockville and Belleville districts, and the business assumed large proportions in a very few years.

The first factory in the extreme eastern part of the province was started in 1867 at Grey's Creek, about 3 miles east of Cornwall, by Mr. De Bellefeuille MacDonald although 'dairy' cheese was made on quite a large scale at 'Fraserfield' the estate of Col. Fraser, near Williamstown in Glengarry, as early as 1848.

From these beginnings the number of cheese factories multiplied so rapidly that there was estimated to be over 200 factories in Ontario in 1867. Many of the buildings erected during the first three or four years are still in use, and one is obliged to say that for style and appearance, some of them that have been kept in repair will put to shame many since erected.

Creameries.—A creamery was started at Teeswater in 1875 by Mr. John Inglis.* This was probably the first creamery in Ontario. It was operated on the Schwartz or shallow pan system.

Mr. Moses Moyer started a creamery at Breslau, Waterloo county, in 1877, using the Schwartz or shallow pan system. This was changed to the cream gathering system the following spring (1878), the patrons using the 'Cooley' deep can.

The firm of Gales, Woodcock & Co., built a combined cheese factory and creamery at St. Jacob's in the fall of 1877, and operated it in 1878 along with two others, one at New Dundee and one at Haysville. These were all in Waterloo county.

Mr. Aaron Wenger of Ayton, Grey county, states that the Ayton creamery was built by his father, the late Isaac Wenger, in 1879. Mr. Wenger is inclined to think it was the first creamery in Ontario, but the evidence seems to be opposed to that view.

These creameries were all operated on the Schwartz system at first, but were soon converted to the cream gathering plan.

Mr. Vickers Chown started a creamery in the Township of Pittsburg, Frontenac county, in 1880, also on the pan system, but it soon failed for lack of support.

There was a small creamery known as the 'Farlinger Creamery' near Morrisburg in the late seventies.

In 1881 the Sprague creamery was started at Ameliasburg, Prince Edward county, using the Cooley cans at the creamery instead of at the farms.

An 'Alpha' cream separator was installed in this creamery in 1884. The Grahams at Belleville used a Burmeister and Wain (Danish) separator in a private dairy in 1883. These were probably the first cream separators in Ontario, but not the first in Canada, as we shall presently see.

It has been claimed that the word 'creamery' was first applied to butter factories in Ontario. The claim may be correct but we find the word used in Willard's 'Practical Dairy Husbandry' published in 1872, in connection with a description of certain establishments in New York State, where part of the cream was removed from the milk for city trade, and the skimmed milk manufactured into cheese.

QUEBEC.

Cheese Factories.—While Ontario can claim to have had the first cheese factory in Canada, there is very little to boast about, as the first factory in the Province of Quebec was built in 1864, but was not operated until 1865, or one year after Farrington started his factory. The original building, erected by Mr. E. E. Hill, in the village of Dunham, Missisquoi county, is still used as a cheese factory by the present proprietors, Messrs. Barraud Bros.

* See report of Ontario Agricultural Commission, 1880.

Mr. Jos. Selby of Dunham, has in his possession the can in which he, as a small boy, delivered the first lot of milk to the factory on the morning its doors were opened.

Mr. J. C. Pettes opened the West Brome factory in 1867, and in the following year A. Wales built a factory at East Dunham and Samuel Benham one at Sweetsburg.

The first cheese factory in a French district was opened at Rougemont, Rouville county, in 1872 by Messrs. Fregeau Bros. Others soon followed in St. Hyacinthe. A combined cheese factory and creamery was opened at St. Denis, Kamouraska county, in 1881, by Chapais and Rossignol, after which date factories multiplied rapidly throughout the province.

The first cheese factory in Huntingdon district was opened at Dewittville on the 23rd of June, 1873, by John Stewart and J. B. Gibson. Another was started about the same date by F. A. Cantwell at Franklin centre. McFarlane and Switzer began to make cheese at Kelso in 1874, and R. A. Cowan started a factory in Huntingdon village the same year. Factories were also opened at Havelock and at Ormstown in Chateauguay county in 1874.

Creameries.—Although Ontario can claim the first cheese factory, the first creameries and the first cream separator must be conceded to Quebec.

The first creamery in Canada, as far as the writer can learn, was started at Athelstan, Huntingdon county, in July, 1873, by a company of farmers. It only ran ten weeks and caused a heavy loss to the promoters. Another one was started about one month later at Helena in the same county. A third one was in operation at Rockburn in 1874, and there was one at Russelltown Flats in 1877, owned by Cyrille Turcotte. These creameries were all operated on the Schwartz system, setting the milk in large flat pans.

In 1878, Mr. S. M. Barré started the first cream gathering creamery in Quebec at L'Avenir, Drummond county.

In 1882, the late Lt.-Col. Henri Duchesnay, an enterprising resident of Beauce, imported from Denmark what the writer believes to have been the first centrifugal cream separator used in Canada. It was installed in a creamery at Ste. Marie, Beauce county, under the direction of Mr. Barré, who had been sent to Europe by the Quebec government in 1879 to study Danish methods. Col. Duchesnay deserves a niche in the Dairymen's Hall of Fame for having been the first to introduce what has proved to be one of the greatest improvements in dairy apparatus. The following letter in reference to the first separator will be of interest:

COPENHAGEN, DENMARK, October 21, 1909.

J. A. RUDDICK, Esq.,

DEAR SIR,—We are in receipt of your favour of the 7th inst. and beg to say that after exhaustive investigation we ascertain that Professor Barré, of Canada, was the first party on the continent of America, to whom we sold one of our cream separators from here.

The machine was forwarded on the 27th April, 1882, and the number stamped on it was No. 94; in this connection it may be of interest that the first machine we manufactured was numbered No. 21; the foregoing were test machines.

Yours truly,

BURMEISTER & WAIN EXPORT CO., LTD.

Mr. Philippe Hudon opened a creamery at Hebertville, Lake St. John, in 1883, which I am informed, was the first factory in that district.

NEW BRUNSWICK.

Cheese Factories.—New Brunswick made an early start in factory dairying. In the winter of 1868-69 Mr. Geo. H. Wallace, of Sussex, was sent to Ingersoll to secure information relative to the organization and equipment of a factory, and on his

return with an outfit, Messrs. Robt. Keltie, of Sussex, and Logan & Lindsay, of St. John, arranged to have a factory erected on Mr. Keltie's farm near Sussex. The cheesemaker in 1869 was John Graham, of Ingersoll, Ont.

The second cheese factory was started at Roachville, a few miles from Sussex, in 1875, by R. E. McLeod.

Creameries.—The first creamery was started at Sussex in 1884. In 1883 a Centennial Exhibition was held at St. John. Prof. Sheldon, of England, had been invited to come over and bring with him an outfit of modern dairy appliances. Among other things he brought a Centrifugal Cream Separator, which was bought by the government and offered to any person who would start an up-to-date creamery. The offer was accepted by Col. E. B. Beer and other farmers near Sussex, who ran a small creamery for several years. The apparatus was afterwards moved to Upper Sackville.

NOVA SCOTIA.

Cheese Factories.—The pioneer cheese factory of Nova Scotia was located at Paradise, in Annapolis county. It was erected and operated by A. Longley, in 1870. After running some years it was closed for lack of support. The industry was revived in the same locality in more recent years. A second factory was started by a company of farmers in Onslow, near Truro, in 1871. This factory formed the nucleus of what is now the Truro Condensed Milk Co., the first milk condensery in Canada. Col. Wm. Blair was one of the prime movers in promoting the factory at Onslow.

In 1888 Mr. L. C. Archibald, of Antigonish, engaged Mr. James Burnett, of Farnham, Que., to build and equip four cheese factories and operate them for one year in Antigonish county, all of which were started in 1889.

Creameries.—The first creamery in Nova Scotia was built at Nappan, Cumberland county, in 1892, through the efforts of Col. Blair. It was afterwards taken over by the Dominion Department of Agriculture and operated for several years as a dairy station. Then followed a creamery at Brookfield in 1893, and one at Wolfville in 1894.

PRINCE EDWARD ISLAND.

Cheese Factories.—Last but not least in a dairy sense among the maritime provinces, we come to the 'Garden of the Gulf,' and on looking up the records, we find that Geo. Full started the first factory at Little York in 1882. Mr. Full built a second one at Hunter River in the following year. A joint stock company built a factory at St. Eleanor's in 1883, which was managed and afterwards owned by Sydney Richardson. A factory was also started at Central Bedeque in 1883 by F. F. Newberry, which was purchased in 1893 by the present company.

Any reference to the origin and growth of the cheese industry in Prince Edward Island would be incomplete without some notice of the part played by the Dominion Department of Agriculture in organizing and managing a number of factories in 1891, and succeeding years. The Government did not, as is often stated, build or equip any of these factories at the public expense. The factories were planned and their erection supervised, and they were then operated for a number of years on a purely commercial plan. This gave stability to the undertakings, and ensured capable management until the people acquired a knowledge of the business themselves. Altogether 11 factories were started in this way. The work was planned and directed by Prof. Jas. W. Robertson, Dairy Commissioner, and he was ably assisted by Thos J. Dillon, whose energy and enthusiasm inspired the people to unusual efforts. The status and prosperity of the industry on the Island to-day is the best evidence of the efficiency of the service rendered by these officers.

Creameries.—The first creamery was opened at Tyron in 1894, and another one was started at Crapaud a little later the same season.

A central creamery was operated in Charlottetown in the winters of 1895-96 and 1896-97.

MANITOBA.

Cheese Factories.—It would appear that the first cheese factory in Manitoba was located at Shoal Lake. It was owned and operated by a Mr. Waldock for about 3 years beginning in 1886. A co-operative factory was started at Birtle in 1887, but it also was closed for lack of milk after 3 years' existence. Factories were started at Rossburn, Cartwright, Manitou, Deloraine, Headingly and other places in the early nineties, but all met the same fate—lack of support. A number of factories have continued operations east of the Red River, at Ste. Agathe, Cartier, Ste. Anne and other places. These were started about 1888.

Creameries.—In 1886, Mr. S. M. Barré went to Manitoba and started what he claims was the first creamery in the province, at St. Pierre. Another was started at St. Charles, and in 1887 butter from these two creameries was exhibited at Toronto and Ottawa, winning a first and a second prize. The St. Pierre creamery was operated on the separator plan.

Other creameries followed on the cream gathering plan, but these have been to some extent superseded by large centralized creameries at Winnipeg and Brandon as being more adapted to the peculiar conditions prevailing in the province.

SASKATCHEWAN.

Cheese Factories.—The cheese factory can hardly be said to have taken a permanent root in 'the land of wheat.' An attempt was made to establish the industry in 1891, at Springfield, ten miles south of Moosomin, by Mr. R. J. Phin and some associates. The factory was operated for four years. The management endeavoured to meet the difficulty of securing a sufficient milk supply by renting a number of cows and pasturing them on the country near the factory. Factories were started in 1895 at Glen Adelaide and Cannington Manor, but both were closed after a short career. Two small factories were in operation in 1910.

Creameries.—The cream-gathering creamery had a better chance of success in a land of great distances and sparse settlement. The first one was started at Saltcoats in 1890, and was therefore the first 'factory' in the province. It was built by a joint stock company, and Mr. Thomas McNutt was the first secretary. The Saltcoats creamery continued operations until 1904. Other creameries were organized and put into operation between 1894 and 1900 at Moose Jaw, Maple Creek, Regina, Prince Albert, Saskatoon, Yorkton, Grenfell, Wolseley, Indian Head and Whitewood, but these have all disappeared. Only three creameries of that period are still in operation, namely, the ones at Qu'Appelle, Moosomin and Churchbridge. Several of the defunct creameries did a good business for a few years, but changed conditions and more attention to wheat growing destroyed interest in dairying. Other creameries organized in more favourable localities in recent years are proving very successful. The tendency is towards centralization. There will some day be a large dairy production in Central Saskatchewan.

ALBERTA.

Cheese Factories.—The conditions in Alberta are not yet very favourable to the cheesemaking industry and so far that branch of dairying has not made much progress. A small factory was started at Springbank near Calgary in 1886 by Mr. E.

Healy, but it ceased operations many years ago. A combined cheese factory and creamery was started at Innisfail in 1894. This factory attracted some attention by exhibiting a 1,000 pound cheese at the Territorial Exhibition held at Regina in 1895. After the first two or three years the Innisfail Company devoted their attention entirely to buttermaking. The cheese factories now in operation have been started in recent years.

Creameries.—The creamery industry has flourished in Alberta ever since it was fairly started. Some mistakes were made in the beginning by people who meant well, but lacked experience. The attempt to operate separator creameries failed owing to cost of hauling the milk.

The combined factory already mentioned as having been started at Innisfail in 1894 by the Innisfail Union Butter and Cheese Manufacturing Company, was probably the first buttermaking plant set up in Alberta. Another followed at Calgary in 1895 or 1896. From that time forward progress has been good. There has been no turning back, and the revenues from dairying have been the mainstay of many Alberta farmers. The industry is confined to the country lying between Calgary and Edmonton, but there is room there for the tremendous development which is confidently expected.

Government Operations of Creameries.

These two western provinces (Alberta and Saskatchewan) have been the scene of an unique and rather abrupt departure from the line which has generally been followed by governments in assisting agricultural effort.

The first creameries started in the 'Territories,' either as private or co-operative ventures, got into difficulties in the course of a year or two, from one cause or another, and failure was acknowledged.

The new settlers, who were depending almost wholly on dairying as a means of livelihood, were in a serious position, because, while it was possible for them to make butter on their farms, their facilities were very poor, and there was no way by which the individual farmer could find a profitable market for his butter at that time.

The Dominion Government came to the rescue, and the Dairy Commissioner was authorized by the Honourable the Minister of Agriculture to take over the management of the existing creameries, to advance sufficient money to pay off their pressing debts, and to make loans for the equipment of new creameries that would come under the same management. Confidence was at once restored and under expert supervision the business grew and prospered, so that the Department of Agriculture was able, at the end of 1905, to give up the active control of a large number of creameries which had been assisted to a position of independence and stability. New markets had been found for the butter in the Orient and in the Yukon, and a reputation had been established which is of great value to the industry in that part of the country to-day. The money that was advanced to the creamery associations has all been repaid, except a few trifling amounts.

The new provincial governments are following the policy adopted by the federal authorities, and with a modified plan continue to foster the industry. Knowing the circumstances, as the writer does, he has no hesitation in asserting that this action on the part of the government, call it paternalism if you like, saved that part of the country from a most serious setback, and carried the early settlers over the most critical and trying period of their experience.

BRITISH COLUMBIA.

Cheese Factories.—The relatively high price of butter on the local markets has made it impossible for the manufacture of cheese to compete with butter to any extent, in British Columbia. Evans Bros. started a cheese factory near Chilliwack in 1895 and operated it for two years, when they joined Mr. A. C. Wells and others in estab-

lishing the Eden Bank creamery at Sardis. A Mr. Wills opened a cheese factory at Langley in 1900 and ran it four years, when the milk was drawn away to the condenser at Mission Junction. E. G. Sherwood built another factory at Langley in 1906, which is still operated for about two months during the flush of the season, when there is a surplus of milk over the demand for city supply. This accounts for the cheese-making industry in British Columbia, except what may have been made on farms. Mr. A. C. Wells of Sardis, who was a prominent pioneer dairy farmer of the province, made some cheese in his dairy in earlier days.

Creameries.—The Delta Creamery, near Ladner, was started in 1895, and was the first regular creamery in British Columbia, although Mr. Wells had been making butter on quite a large scale at his own farm for some years previously. The Cowichan Creamery at Duncans was started in 1896. This creamery, which is organized on a co-operative basis, receives eggs from its patrons, and has also established a co-operative feed warehouse for the benefit of the members of the association.

TABLE IX. Cheese Factories, Creameries and Combined Factories in Canada in 1910.

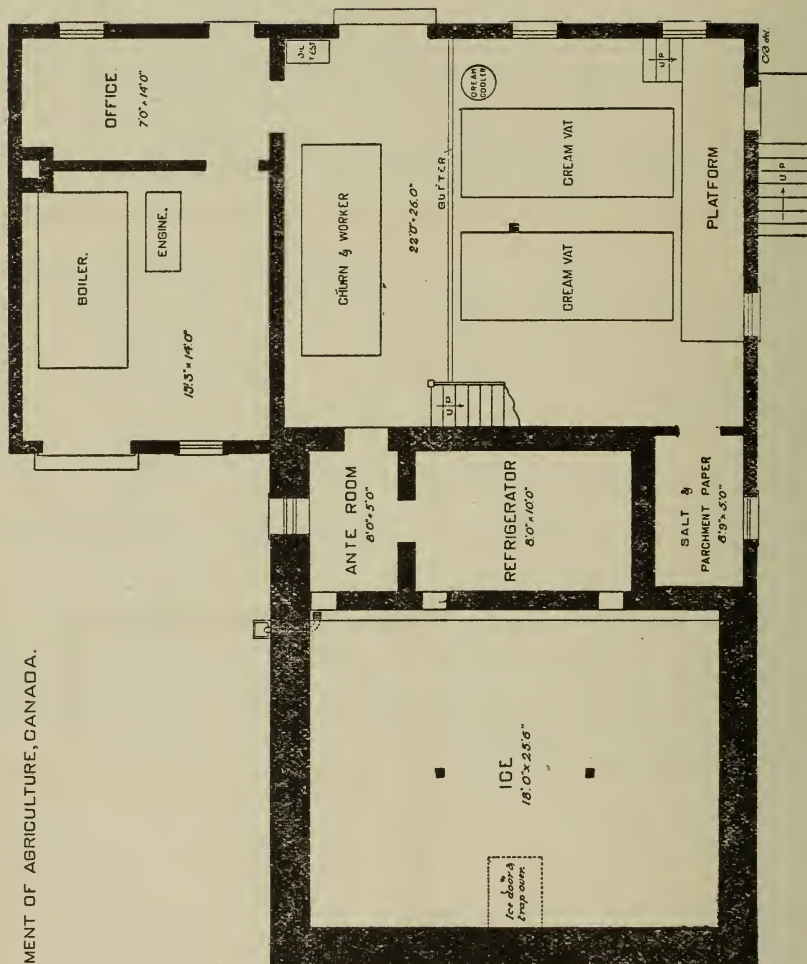
Province.	Cheese Factories.	Creameries.	Combined Factories.	Total.
Ontario.....	1,083	112	39	1,234
Quebec	1,094	548	523	2,165
New Brunswick.....	23	14	5	42
Nova Scotia.....	7	6	1	14
P. E. Island.....	37	9	.....	46
Manitoba.....	32	20	2	54
Saskatchewan.....	2	12	.....	14
Alberta.....	12	67	.....	79
British Columbia.....	1	23	.....	24
Totals.....	2,291	811	570	3,672

The preceding table may not be absolutely correct as far as Ontario and Quebec are concerned. It seems to be impossible to determine the exact number of factories in these provinces, except in the census years. Other estimates have given a slightly larger total, but there is no reason to believe that there is any actual decrease in the number of factories. A decrease would be an advantage in some localities where there are far too many small factories.

GATHERED CREAM CREAMERY.

DESIGNED BY J. A. RUDDICK, DAIRY COMMISSIONER.

DEPARTMENT OF AGRICULTURE, CANADA.

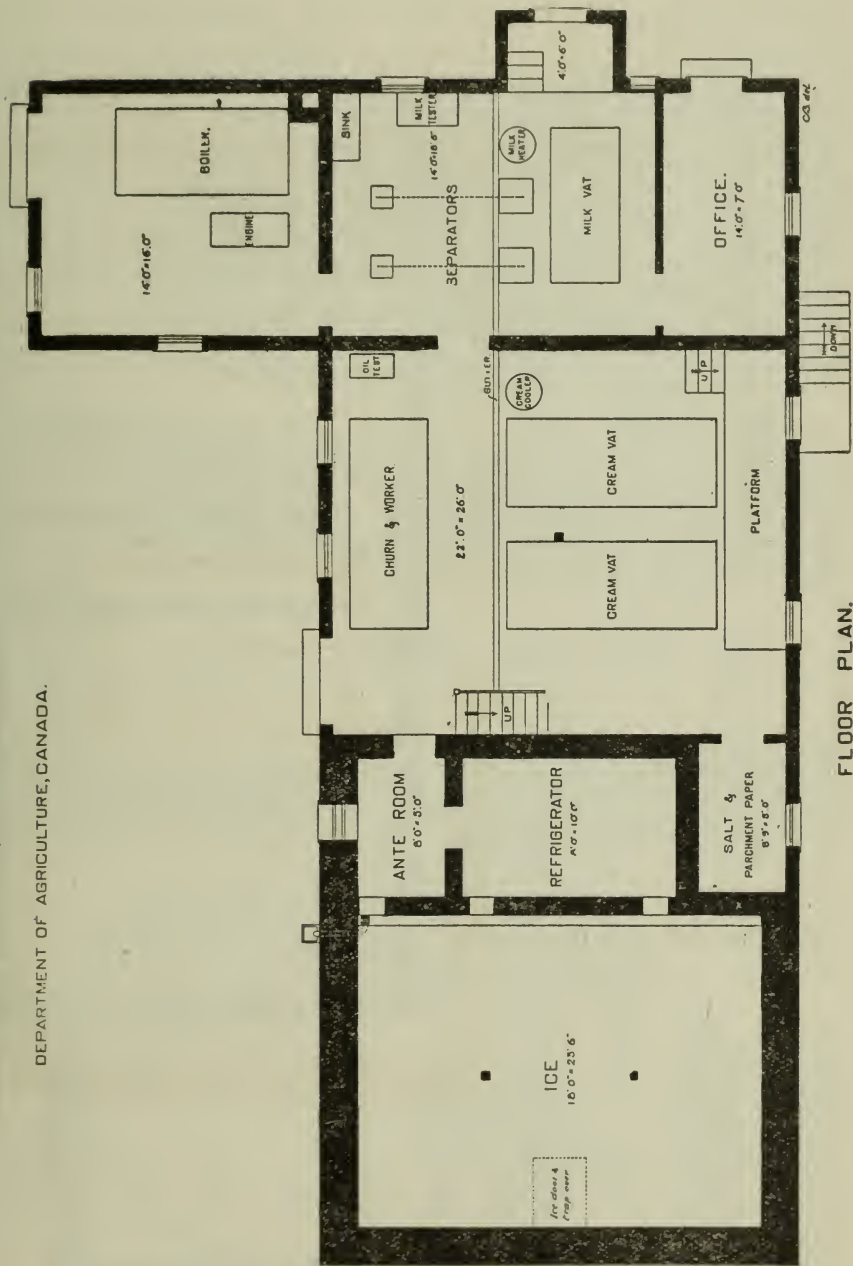


FLOOR PLAN.

SEPARATOR CREAMERY

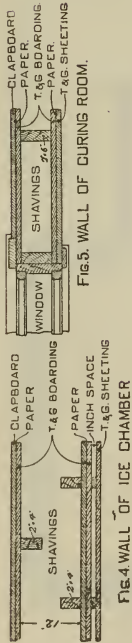
DESIGNED BY J.A. RUDDICK, DAIRY COMMISSIONER

DEPARTMENT OF AGRICULTURE, CANADA.

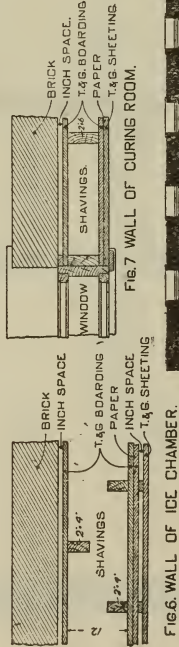


FLOOR PLAN.

DETAIL OF FRAME CONSTRUCTION



DETAIL OF BRICK CONSTRUCTION



CHEESE FACTORY WITH COOL CURING ROOM PLATE I

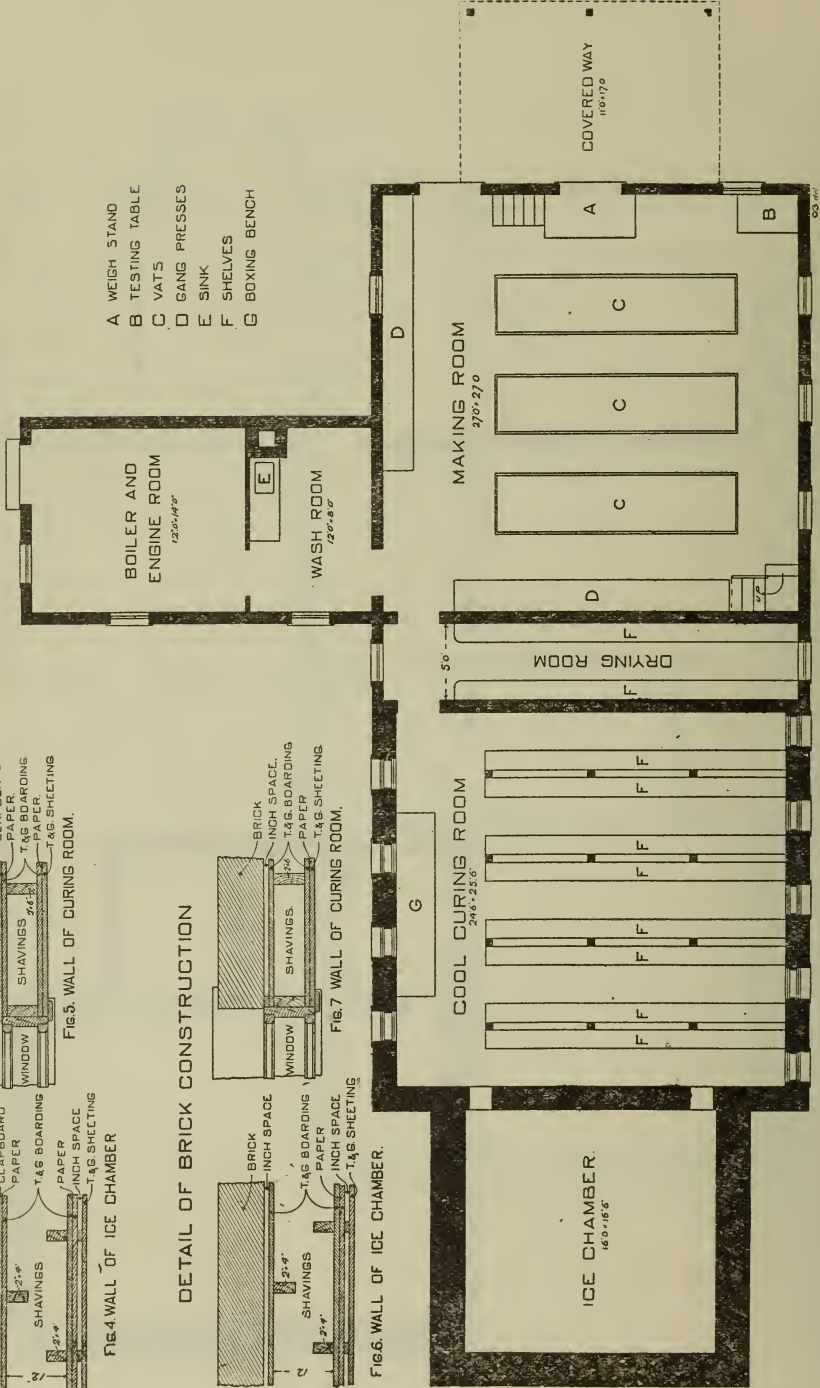


Fig. 3. PLAN OF GROUND FLOOR



1. The First Cheese Factory in the Province of Quebec, at Dunham Mississquoi County.
2. The Creamery Building at Ste. Marie, Beauce County, Quebec, Where the first Centrifugal Cream Separator was used in Canada.
3. The St. Denis Factory, Kamoursaska County, where the first classes for Cheesemakers were held.



SOME EASTERN ONTARIO CHEESE FACTORIES.

(1) A small Cheese Factory in Renfrew County, with a cool curing room. (2) "Mountain View" Cheese Factory, Prince Edward County. (3) Bloomfield Cheese Factory, Prince Edward County.



SOME WESTERN CREAMERIES.

1. The Dauphin Creamery, Manitoba.
2. The Wadena Creamery, Saskatchewan.
3. The Ferry Bank Creamery, Alberta.
4. The Edenbank Creamery, British Columbia.



SOME QUEBEC FACTORIES.

1. A Modern Creamery at St. Hughes, Que.
2. A creamery at Cowansville, Mississquoi County.

3. St. Prosper Butter and Cheese Factory, Champlain County.
4. Creamery at St. Bernard.



FOUR OF THE FIRST CHEESEMAKER'S IN CANADA.

1. Thos. Grieve.
2. Jas. A. Crawford.

3. Jas. Ireland.
4. The late Robt. Facey.



SOME WESTERN ONTARIO CHEESE FACTORIES.

1. "Strathallan" Cheese Factory, Oxford County. Probably the largest Factory in Canada.
2. Black Creek Cheese Factory, Perth County.
3. East and West Oxford Cheese Factory, Oxford County. Cool curing room not shown.



1. Interior of a Cheese Factory, showing the milk vats.
2. Interior of a large Cheese Factory, showing the presses and curd in the sinks.
3. Interior of a cheese curing room.



A New Brunswick Creamery.



A Prince Edward Island Cheese Factory.



A Nova Scotia Creamery.



(1) St. Mary's Creamery, St. Mary's, Ont. (2) Spragues Creamery, Prince Edward County, the first separator creamery in Ontario. (3) Pleasant View Creamery, Owen Sound, Ont., showing tanks for collecting cream.

PORCH

GROUND PLAN FOR A LARGE CHEESE FACTORY.

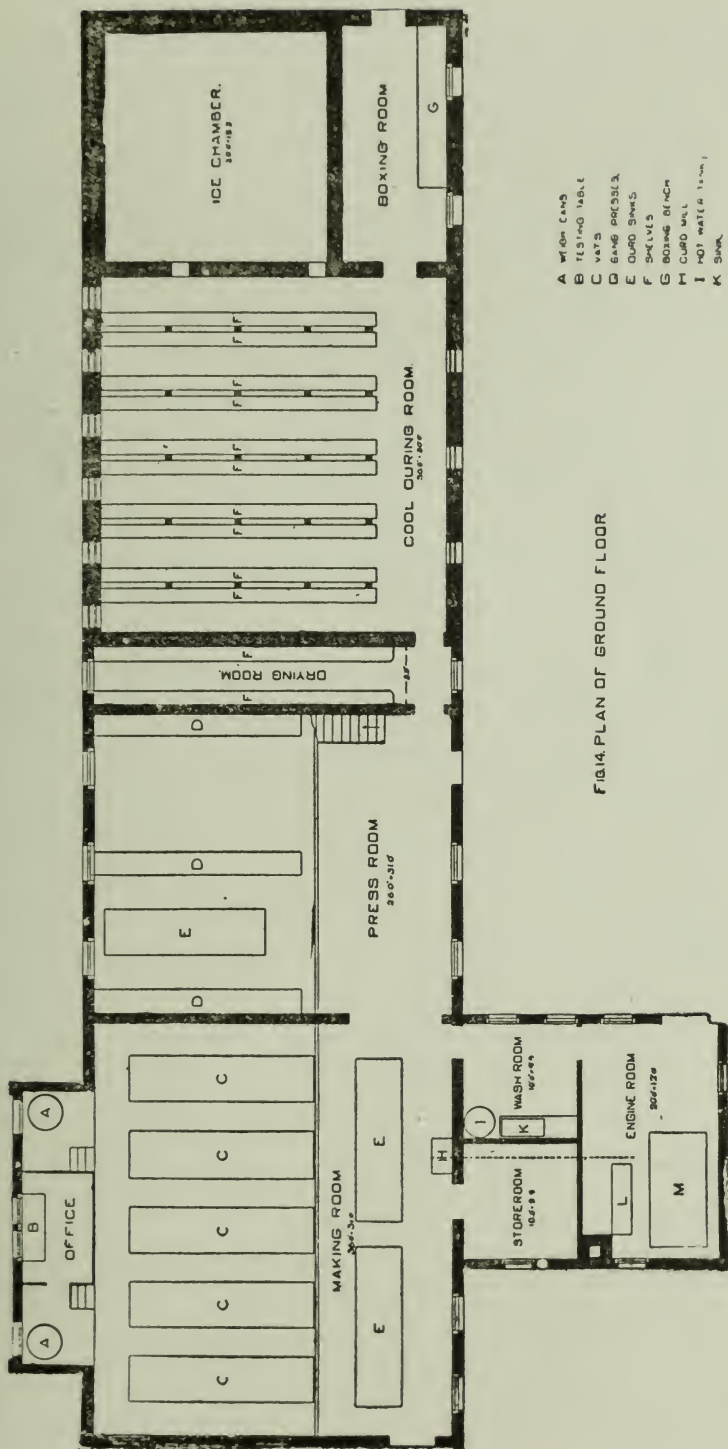


FIG. 14. PLAN OF GROUND FLOOR.

The Organization of the Factory System.

The first factories were purely proprietary, owned by individuals in some cases, and in others by partners or associates. Later on, joint stock companies were organized for the purpose of engaging in the manufacture of cheese or butter. The capital in these so-called co-operative companies is divided into small shares of \$5 to \$25 each, with a view of distributing it among the 'patrons' as the milk suppliers are called in Canada. In many cases, non-suppliers ('dry' shareholders) were encouraged to take shares for the sake of the assistance thus secured in raising the necessary money. In such cases, it was, and is, usually necessary to provide for dividends on the paid up share capital. In some companies each share carries a vote, and in others the rule is 'one man, one vote,' regardless of the number of shares held. There is no uniform plan followed.

In practically all forms of organization there is a fixed charge for manufacturing which will vary according to the size of the factory and in different parts of the country. This charge, whatever it may be, gives the proprietor his revenue and the joint stock company its working expenses and dividends, if any are paid. There are some joint stock factories where no dividends are paid, and in such cases the manufacturing charge is fixed each year with a view of meeting current expenses only. Should there be either a deficit or a surplus it is carried over to the next year.

It has never been the practice at cheese factories or creameries to purchase the milk outright. The product belongs to the milk suppliers and they receive, usually once a month, the full value of the cheese or butter, less the manufacturing charge. A salesman is appointed by the patrons. In the proprietary factories the owner is usually entrusted with that duty, but not always.

Every cheese factory and creamery organization contains the germ of co-operation, but the true spirit of association is very generally lacking, except in a comparatively few instances. It is unfortunate that it is so, but in this respect the dairy-men do not differ from the farmers engaged in other lines. Co-operation as a principle has not yet been received with much favour by Canadian farmers.

The proprietary factories greatly outnumber the so-called co-operative establishments, but many of the largest and most successful factories are co-operative. The cheese factories in Western Ontario are very much larger, on the average, than those in other parts of the country.

In the extreme eastern part of Ontario and in Quebec, where small factories are the rule, many of those who have engaged in cheese manufacturing as a business, have found it expedient to operate more than one factory. Out of this condition, there grew up in the early eighties large combinations of factories under one management. The most celebrated of these was the 'Allengrove' Combination, owned by Mr. D. M. Macpherson, of Lancaster, Ont. Mr. Macpherson started his first factory in 1871, at Bainsville, in Glengarry county, and being a man of unbounded energy and enterprise, he had in 1889 no less than 70 factories under his control. He was justly entitled to the appellation of 'Cheese King' by which he was known for many years. The present writer was superintendent of this combination from 1883 to 1888. The Allengrove Combination, which pretty well covered the counties of Glengarry and Huntingdon, is now broken up.

It was the practice for several years after the cheese factories were first organized to deliver the milk twice a day. Mr. Macpherson claims that he was the first manufacturer in America to receive the milk once a day only.

There were many other lesser combinations formed, some of which are still in existence, while others have met the fate of the Allengrove.

Many of the single factories are owned by the cheesemaker, and if he is a good man, the combination of cheesemaker and owner works out very well.

CANADIAN CHEESE.*

Canadian cheese is of the Cheddar type and belongs to the class known as the 'hard' or pressed cheese, which includes such other varieties as the Cheshire and the Gloucester of England, the Dunlop of Scotland, the Edam and the Gouda of Holland, the Guyère of Switzerland and certain departments of France, and the Parmasan of Italy.

There are several varieties of semi-hard cheese, the manufacture of which involves to some extent the principles employed in the manufacture of both the hard cheese and the soft mouldy cheese. To this class belong the famous Stilton of England, the Roquefort of France, and the Gorgonzola of Italy, in all of which the growth of mould is encouraged to destroy the extreme acidity resulting from the method of handling the curd in its early stages.

The Cheddar well deserves the pre-eminence which it has attained, for the following reasons.

- (1) It is produced in larger quantities than any other cheese.
- (2) Its production has spread further from the field of its origin than that of any other variety, thus proving its adaptability to varying conditions and circumstances.
- (3) The process of its manufacture has been reduced to a more exact science than that of any other variety.
- (4) It is the one variety peculiarly adapted for the factory system.
- (5) It is suitable to be used as a food, and is thus unlike many other varieties which are used more as condiments.

The Composition of Cheddar Cheese.

The percentage composition of Cheddar cheese varies greatly in different samples. The slightest modification at different stages of the process of its manufacture, and the age of the cheese, are important factors in this connection. A cheese when green shows a much higher percentage of water than it will when well ripened, the difference often being as much as 5 or 6 per cent. The following figures have been compiled from various sources and represent an average:—

COMPOSITION OF FULL CREAM CHEDDAR CHEESE.

Water.		Fat.		Proteids.		Ash, etc,	
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
33·90	27·19	33·00	30·70	36·60	27·56	5·55	4·15

Historical.

The Cheddar cheese derives its name from the quaint old village of Cheddar, in the southern part of the County of Somerset, England, which place first became famous for its manufacture. Just how long it has been made in that locality it is impossible to determine, but most authorities agree that it dates back over 200 years. The process of its manufacture was brought to the United States, probably by English settlers, early during the last century, and to Canada some years later. In both Canada and the United States it was for some years made only on farms, as it is made to this day in its natal County of Somerset.

* Adapted from an article by the author entitled 'The Making of Cheddar Cheese,' in the *Cyclopedia of American Agriculture*, copyrighted 1898 by the MacMillan Company, New York.

The manufacture of cheese has for many years been an important industry on the farms in the south-western counties of Scotland. The Dunlop, a somewhat softer and higher acid cheese than the Cheddar, was the original variety, and, like the Cheddar, takes its name from the village of Dunlop, in Ayrshire. The farmers of Ayrshire and Kircudbrightshire gradually acquired a knowledge of the Cheddar process, and 'Scotch Cheddars' now compete with those from the south and west of England, and there is great rivalry and close competition at all the big British dairy shows between the English and Scotch schools of Cheddar cheesemakers.

The New Zealanders adopted the Cheddar type and no other variety is manufactured in that country. It is not made on the continent of Europe to any great extent, although some years ago an attempt was made to introduce it into Russia.

The Process of Cheddar Cheesemaking as Followed in Canadian Factories.

The principles underlying the Cheddar process are probably more clearly defined and better understood than those of any other variety of cheese. The Cheddar process differs in one essential from practically all others, inasmuch as a considerable development of acidity is necessary in the milk before the rennet is added, and a higher percentage of acidity is allowed in the curd before it is finally removed from the whey. It is this feature of the Cheddar process which makes it so well adapted to the factory system, in which the milk is most conveniently delivered only once a day. At certain seasons of the year there is naturally considerable development of acidity in the milk before the cheesemaking process can be started.

As the English taste typifies the highest development in Cheddar cheese, a description of the process necessary to meet that demand will best exemplify the details of the Cheddar system.

True Cheddar cheese should be firm, without being dry; show a meaty, waxy texture when well matured, and develop a clean, cheesy flavour when cured at a proper temperature.

In order to secure this ideal it is necessary that the milk should be produced under good conditions and kept free from contamination of any kind, or infection with the germs of injurious fermentations which develop objectionable flavours. During hot weather the night's milk, which is kept at the farm, should be cooled to a temperature of at least 65 degrees in order to prevent it from developing too much acid when delivered with the morning's milk at the factory. It is generally recommended that the night's and morning's milk should be kept in separate vessels.

As the milk is received at the factory it is passed over a weighing machine and delivered into a large steam or water jacketed vat, where the temperature is raised by the application of steam or hot water until it reaches 86 degrees F. Tests are then applied and if the milk shows the required acidity the rennet is added in sufficient quantity to bring about complete coagulation in 30 to 40 minutes. If the cheese are to be coloured the prepared annatto or other colouring matter is added to and thoroughly mixed with the milk just before renneting. The extract of rennet, which is now universally used, is prepared from the fourth stomach of young calves. About 3 liquid ounces of the standard brands to 1,000 lbs. of milk is usually sufficient to produce the desired result.

Ripening the Milk.

If the acidity is found to be too low after the temperature is raised to the 'setting' (renneting) point, the milk is allowed to 'ripen,' the test being applied from time to time to note the development of the acid. In such cases the common practice now is to use a fermentation 'starter,' of $\frac{1}{4}$ to $\frac{1}{2}$ per cent of sour milk which has been specially selected and prepared for the purpose. Possibly no other practice in the whole art of cheesemaking has given rise to so much discussion and difference of opinion as has this matter of using a starter, owing to a confusion of what is mere practice on the one hand with what is a true principle on the other. The principle of the starter is correct, but the practice has often been wrong, and those making the

mistakes have been unable to see that they were violating the principle underlying the practice. Others have judged the principle by the results of wrong practice. It has come to be pretty generally recognized, however, that a well prepared starter is a great aid to the cheesemaker in advancing the acidity of the milk and also in overcoming wrong fermentations, which, if allowed to proceed unchecked, would result in objectionable flavours being developed. The judicious use of a good starter gives the cheesemaker a measure of control over the flavour and even the texture of his cheese, which is very desirable.

The Fermentation Starter.

There are two ways of preparing a fermentation 'starter.' The cheesemaker may purchase a so-called 'pure culture' from his dairy supply house, from which to make his mother starter, or he may propagate it himself. If the former plan is adopted it will be necessary to secure a quart or two of pasteurized milk, to which the pure culture is added. This allowed to stand in a sealed jar until it has curdled, when it is added to the right quantity of pasteurized milk to provide the necessary one-half per cent of starter for the next day's cheesemaking. Hence the name 'mother starter.' As soon as the mother starter is added a small quantity of the milk is preserved in a sealed jar to be added to more pasturized milk for the following day, and so on indefinitely, or at least as long as the starter retains its desirable flavour and character.

It is a good plan to have a covered box or tank, with steam and cold water connections, of a capacity to hold one starter can for each vat of milk. Each can should contain the right quantity to make one-half per cent of the milk in the vat. With these conveniences the heating and subsequent cooling are very easily done.

The starter will be most effective if used very soon after the milk is curdled or with an acidity of .6 to .85 per cent. Some care and judgment are therefore necessary to ensure that the right quantity of mother starter is added, and the right temperature maintained to produce curdling at the proper time.

The starter has been abused by ignorant and careless cheesemakers. Some have failed to realize that the principle of the starter is based on the law that 'like produces like,' and if a bad flavoured starter is used it is almost certain that bad flavoured cheese will be the result. The use of too large a percentage of starter may give the cheese an acidity texture. A proper starter having a clean, pleasant, acid taste and flavour is a great advantage to the cheesemaker, but it requires skill and care to prepare and use it. The greatest care must be taken to sterilize all vessels or utensils coming into contact with it. The starter should not be allowed to become too cold, because putrefactive ferments are apt to gain the ascendancy.

The Acidimeter.

Nothing has helped more to systematize the process of Cheddar cheesemaking than the comparatively recent introduction of acidimetry, or the adoption, for the use of the cheesemaker, of the process known to chemists for determining the strength of acids. With this test the cheesemaker may learn the exact acidity of the milk as received at the factory, and is enabled to regulate the ripening, or the addition of starter, in an intelligent manner. An accurate guide is also provided for the proper development of acidity in the curd by applying this test to the whey.

For the purpose of making the test, a standard alkaline solution is provided and kept in a well stoppered bottle. A burette to measure at least 10 cubic centimeters, a white cup or dish, a 10 cubic centimeter pipette, a bottle of phenolphthalein indicator and a glass stirring rod complete the outfit. Ten cubic centimeters of the milk or whey to be tested is measured into the white cup and a few drops of the indicator are added. The alkaline solution is now allowed to drop slowly into the milk, which is stirred constantly during the operation. The phenolphthalein gives no colour re-

action in an acid medium, but as soon as sufficient of the alkaline solution has been added to the milk to neutralize the acid, a pink tinge appears. The addition of the alkaline solution is stopped as soon as this pink tint is permanent. The number of cubic centimeters and fractions thereof, of the solution, required to produce the pink colour, indicates the percentage of acidity, each cubic centimeter representing .1 per cent of acid. Milk will show on the average .18 to .21 per cent of acid when ready for the addition of the rennet, but the exact percentage can only be determined by experience for each locality. The whey, immediately after cutting and stirring begins, will show a lower acidity than the milk did before the rennet was added because of the acid reaction of the casein which is retained in the curd. The percentage of acid in the whey, immediately after cutting should be .13 to .15 per cent, or about .05 per cent less than shown in the milk. Any variation from that is the guide to the cheesemaker either to hasten or retard the subsequent heating and cooking of the curd. The whey should be removed when its acidity is about .01 less than the acidity of the milk at the time of adding the rennet. If it is 'working' faster, rather more margin should be given. There are various other modifications of this test, for which apparatus and supplies may be procured from dealers in dairy utensils.

Cutting the Curd.

The object of cutting the curd is to facilitate the removal of the whey. For this purpose two knives are used, commonly known as horizontal and perpendicular knives. The horizontal knife is from 6 to 10 inches wide with thin blades held in an iron frame from $\frac{3}{8}$ to $\frac{1}{2}$ inch apart. The perpendicular knife commonly used now is about 8 inches wide with fine wires stretched perpendicularly in an iron frame. The wires are from $\frac{1}{4}$ to $\frac{3}{8}$ inches apart.

When the curd is firm enough, the horizontal knife is passed lengthwise of the vat and then the perpendicular knife is used crosswise and lengthwise, leaving the curd theoretically in cubes, the size of which corresponds with the distance between the blades and wires of the knives. Great care must be exercised in the cutting, because the curd at this stage is very jelly-like and easily displaced, and there is apt to be much unevenness in the size of the cubes and loss of solid matter unless the work is carefully done. As the finer the curd is cut the more quickly it becomes firm, it is obviously important, for the sake of uniformity, to have the curd cut or broken as evenly as possible. If the milk is over-ripe, it is an advantage to cut the curd somewhat finer than if the conditions are normal. Some makers follow the practice of allowing the curd to stand for a few minutes between each cutting, while others finish the work when once begun, without any delay.

Heating the Curd.

After the cutting is finished, stirring should begin, very gently at first; otherwise the bruising of the curd, in its tender state, will cause serious loss of the solid constituents. After ten or fifteen minutes careful handling, the curd becomes firmer and the freshly cut surfaces more or less healed over, so that the stirring can be proceeded with more vigorously. As a matter of fact, it is necessary to accelerate the stirring as the heating progresses, because as the curd becomes firmer and more solid its density is increased and there is more tendency to settle and pack in a mass in the bottom of the vat. Towards the end of the heating period, which should cover about 40 minutes—at the rate of one degree every three minutes—stirring cannot be too vigorous.

The 'cooking' temperature, so-called, requires to be varied according to localities and the character of the milk. In some places it has been found necessary to raise the temperature as high as 108 to 110 degrees F., in order to get the curd sufficiently firm and to expel a proper amount of moisture, while in other districts much better results are obtained at a temperature of 96 degrees. A very common rule is to fix 98

degrees as the standard temperature and then vary it according to circumstances. The maker must use his own judgment in matters of this kind. If he finds that his cheese are turning out too firm and dry, a lower cooking temperature will have some effect in the opposite direction, but there may be other reasons for the dryness of the cheese, and that is where the exercise of judgment is required. If, on the other hand, it is found that the cheese retain too much moisture and are inclined to show excess of acidity, the cooking temperature may be raised a degree or two and the result noted.

There are several things in the process of cheesemaking which affect the amount of moisture retained in the curd, and success or failure in cheesemaking hinges on that point. In the first place the size of the particles into which the curd is cut or broken has considerable influence. The cooking temperature also affects the amount of moisture retained in the curd. If a part of the whey is removed from the vat as soon as the heating is finished, or even before, the increased pressure on the curd and the extra handling which it gets also tend to expel the moisture.

Drawing the Whey.

It should take from two and a half to three hours from the time the rennet is added until sufficient acidity is developed to permit of the whey being entirely removed. If it takes longer it is wise to allow the ripening of the milk to advance a little further before the rennet is added. If it takes less time it is evidence that the milk is over-ripe and every effort should be made to have it delivered in a sweeter condition, and the process should be modified on the lines already mentioned, so as to retard the development of acidity by hastening the removal of the whey. It is the development of acidity beyond a certain point in the curd before it has become sufficiently firm or free from moisture which makes a sour cheese. The curd should be firm enough to have a slightly elastic consistency when pressed in the hand, by the time the acidity has reached .18 or .20 per cent.

The 'hot iron test' was generally used, until recent years, to determine the proper stage for removal of the whey, and many cheesemakers still depend on it. This test, which is of American origin, is simplicity itself as far as apparatus goes, but the difficulty experienced in acquiring the knack of applying it usually surprises the novice. The test consists in pressing a handful of curd, from which the surplus whey has been squeezed, against a heated iron surface. Given the right temperature in the iron, and proper manipulation, the curd sticks to it and at a certain stage begins to spin fine threads when slowly drawn away. In the best practice the whey is removed when these threads may be drawn out $\frac{1}{2}$ to $\frac{3}{4}$ of an inch, which is usually equivalent to about .18 to .20 per cent of acidity as shown by the acidimeter.

As the whey is being removed the curd is stirred and finally placed on racks, which are covered with a linen cloth, to facilitate the drainage of the whey. The racks may be placed for this purpose on the bottom of the cheese vat, or they may be in a special frame technically called a 'curd sink.' One advantage of the sink is that it can be fitted with castors and wheeled from place to place, which permits of a different plan of building and arrangement of machinery as compared with a factory where the racks are used in the vat. Both plans have their advantages and disadvantages, but the choice is one of convenience and suitability for a particular building rather than any essential difference as far as the art of cheesemaking is concerned. In either plan a cover should be provided to retain the heat in the curd and to prevent it from drying on the surface.

Only experience can teach the right amount of stirring or handling of the curd at this stage to ensure the proper amount of moisture in the cheese. A prominent instructor used to say to his students: "Always stir the curd until it 'squeaks' between the teeth," and the rule is a very good one.

Maturing the Curd.

When the curd has been allowed to stand long enough for the particles to adhere and form a solid mass, it is cut or broken into pieces of convenient size for handling, and then turned from time to time in order to further facilitate the removal of the whey and to preserve an even temperature and colour. At the second and subsequent turning the pieces are usually piled two or three layers deep.

When the curd draws about 1 inch on the hot iron, or the whey which drains from it shows .6 to .85 per cent of acid, it is milled and then frequently stirred until it becomes mellow and velvety, when the salt is applied at the rate of $1\frac{1}{2}$ to 3 lbs. per 1,000 lbs. of milk, according to the season of the year and the yield of cheese from the milk, the smaller quantity being used in the spring, when the milk is poor and when the cheese are usually wanted for quick consumption. The whey dripping from the curd should test from 1.0 to 1.25 per cent of acid before the salt is added. After the salt has been thoroughly mixed with curd, it is allowed to stand for about 20 minutes.

Pressing the Cheese.

The curd is now ready for the moulds or presses. A standard Canadian Cheddar cheese has a diameter of $14\frac{1}{2}$ to $15\frac{1}{2}$ inches, varies from 10 to 12 inches in height and weighs from 70 to 90 lbs.; but there is no limit to the size or shape into which this cheese may be moulded. Other shapes take the form of 'twins,' which are of standard diameter, but half the usual height, so that two go in a standard box; 'flats,' also of standard diameter, but shallower; 'Young Canadians' or 'Stilton' shapes, 6 or 7 inches in diameter, weighing 10 to 12 lbs. For show purposes Canadian Cheddar cheese are often made to weigh 1,000 to 1,200 lbs.

When ready for pressing the curd is weighed into the moulds or 'hoops' to ensure uniformity in size, and the pressure applied, lightly at first, but gradually increased until the full strength of the press is reached. In the course of about one hour the cheese are temporarily removed from the hoops and the bandage trimmed and adjusted so as to secure a neat and attractive finish. The cheese are then left under heavy pressure over night. In the best factories they are again turned in the morning, repressed and finally removed in time to make room for the next day's curd.

Curing the Cheese.

It has often been said that cheese are only half made when they are placed in the curing room. At any rate the best of cheese are seriously injured in quality if exposed to a temperature of over 60 degrees, and there is from 1 to 2 per cent of unnecessary shrinkage. The texture becomes more or less 'mealy' and objectionable, and bad flavours are apt to be developed. It has been demonstrated that curing, or ripening, will proceed at very low temperatures, even below 32 degrees, but more slowly as the temperature is reduced. Extremely low temperatures are inadvisable, because, while such practice may result in an absence of bad flavour, it also has the further negative effect of preventing the development of the characteristic cheesy flavour which is an essential quality in first-class typical Cheddar. The ideal cheese has a positive as well as a negative quality of flavour. On the whole a temperature of 60 degrees seems to be best suited to produce this desired result.

A curing room with walls slightly insulated, with tight fitting doors and windows, and with a cement floor to utilize the cooling power of the earth, will ensure the proper temperature except in very hot weather. To remove the moisture which exudes from the cheese, and that which results from the reduction of air temperature, and also to ensure a proper temperature, it is advisable to provide a well insulated ice chamber adjoining the curing room, with a provision for the circulation of air, under control, between the curing room and the ice chamber. The air is thus cooled in hot weather and the moisture which it collects is deposited on the uncovered surface of the ice.

If properly constructed, the ice chamber need be only about one-third the size of the curing room in cubic capacity, assuming, of course, that the curing room is no larger than it need be.

CANADIAN CREAMERY BUTTER

Canadian creameries are now operated on two plans. There is (1) the whole milk or separator creamery where the milk is brought to the creamery, separated, and the skim milk returned to the farm, and (2) the gathered cream creamery where the milk is separated at the farm and only the cream delivered to the creamery.

The first Canadian creameries (they were called 'butter factories' in those days) were operated on the 'Schwartz' or shallow pan system. The whole milk was delivered at the creamery twice daily, where it was run into large water jacketed pans about 8 inches deep, the cream being removed after 24 hours. The large loss of butter in the skim milk resulted in this system being discarded for the 'deep setting' system, in which the milk was placed in cans $8\frac{1}{2}$ inches in diameter and 20 inches deep and surrounded with cold water, in which ice was used with advantage. This system was used at some of the early creameries, but in most cases the cream gathering system was adopted, when the deep setting cans came into use. As we have already noted, the first centrifugal cream separators were used in Quebec in 1882, and in Ontario in 1884. On the introduction of the centrifugal separator, most of the creameries adopted its use, except in Northwestern Ontario (Georgian Bay and Lake Huron counties) where the conditions favoured the cream gathering plan. The creameries in the western provinces tried the separator system at first, but they have all been obliged to adopt cream gathering, in order to extend their operations over a sufficiently large area to put the business on a self-sustaining basis. The advent of the hand separator about 1890, gave an impetus to the cream gathering system and at present that system prevails practically all over Canada, except in the Province of Quebec.

The methods of making the butter are practically the same in all systems. In the separator creamery, the buttermaker has the best control of the cream ripening. Unless the cream is sweet when delivered at the cream gathering creameries, it is difficult to secure a uniform flavour in the butter. When milk is delivered, each patron's milk is weighed separately and delivered into a large receiving vat, from which it either flows by gravity or is pumped to the separators. A small sample of each patron's milk is taken every day and put into a glass jar. These composite samples are kept for one or two weeks by adding a small quantity of preservative, and are then tested with a Babcock tester for percentage of butter fat. The milk is paid for according to the quantity of fat delivered. At some creameries the skim milk is heated to 160 or 180 degrees before it is returned to the patrons. Pasteurization has not been generally adopted at Canadian creameries, but the tendency is in that direction.

The ordinary practice is to allow the cream to ripen in vats over night and churn it early the following morning. From 10 to 15 per cent starter (pasteurized milk showing from .5 to .8 per cent acidity) is usually added to the cream shortly after skimming is finished. This assists in developing the required amount of acid in the cream before churning (.4 to .6 per cent), and helps to control the flavour of the butter.

At some creameries the cream is churned the same day that it is separated. This method is called 'sweet cream buttermaking.' As the cream flows from the separator, it is immediately cooled to churning temperature. A rich cream is skimmed containing 25 to 45 per cent of fat, and a large quantity of starter (from 20 to 30 per cent) is added, and churning is commenced in one to four hours after separating is finished. This method gives a very mild flavoured butter, especially suitable for export trade.

At the cream gathering creameries, the cream is collected two or three times a week. In most cases, it is collected in jacketed cans or in large tin-lined tanks. Some creameries collect the cream in separate cans for each patron, and it is weighed at the

creamery in the same manner as the milk is at the separator creameries. When it is collected in jacketed cans or tanks, the weighing is done at the farm by the cream collector, and a small sample of each patron's cream is put into a glass jar and taken to the creamery, where it is added to the samples of previous collections and tested once or twice a month in the same manner as milk samples.

In nearly all the creameries the box churn is being replaced by the combined churn and worker. These labour-saving churns are very suitable for Canadian creameries, as the temperature of the butter can be controlled much more effectively while being worked in hot summer weather than it can be when the old style workers are used.

Canadian creamery butter is put up in packages of different styles, but the 56 pound square box is most generally used, especially for export. The bulk of the butter for local trade is put up in one pound blocks or prints, wrapped in parchment paper, with a neat brand on each wrapper.

A considerable quantity of butter is exported from the maritime provinces to the West Indies in hermetically sealed tins, and has given excellent satisfaction in that market.

Nearly all the creameries have cold storage rooms attached. Several have mechanical cold storage, but the majority use ice as the cooling agent.

Very little butter is stored at the creameries, the usual practice being to sell and ship the butter each week.

Refrigerator cars arranged for by the Department of Agriculture, run weekly over practically all the railway lines in the buttermaking districts. Butter in any quantity can be loaded into these cars, and carried to the seaport or large cities at a temperature of about 50 degrees, which keeps it in good condition during the short time it is in transit.

CONDENSED MILK FACTORIES.

The first condensed milk factory in Canada was established at Truro, N.S., in 1883, and has been in continuous operation ever since. There are now eleven condenseries and one milk powder factory in operation. Several dairy companies have installed condensing plants which are operated intermittently.

There has been a good home demand for condensed milk in recent years, and the quantity produced is sufficient to supply it, with a small surplus for export.

Both the sweetened and the unsweetened condensed milks are produced in the Canadian factories. The latter product has sometimes been sold as 'Evaporated Cream,' which is a misnomer.

MILK POWDER.

Milk powder is the solids of milk obtained by a rapid process of evaporation. It can be redissolved in water and used as milk, but so far it is chiefly used by confectioners.

Milk powder is made from whole milk, or from milk which is wholly or partly skimmed. Great improvement has been made in this product in recent years, and it may be more heard of in future.

CASEIN.

Casein is the trade name given to the dried curd of skimmed milk. There is a growing demand for this product, which is used for a great variety of purposes, such as substitutes for ivory and celluloid, pencil erasers, toilet creams, wood fillers, adhesives, etc., etc. It is also used in the preparation of certain patented foods. At the advanced prices which are now being offered, this by-product of the separator creamery promises to be of considerable importance. Its preparation is very simple.

The skim milk is run into a vat where it is curdled with rennet or a weak solution of sulphuric acid. The whey is separated by stirring and the application of heat and pressure. It is then milled and thoroughly dried in ovens. The whey thus obtained is available for feeding purposes, and it does not differ materially from the whey that is left after cheesemaking. The manufacture of casein at present prices will add considerable to the returns from the milk at a creamery, and creamery owners would do well to look into the matter carefully. The manufacture and sale of casein may be the means of checking the spread of the hand separator.

EXPORT TRADE.

The export trade in dairy products, accounting as it does for only about 25 per cent of the total production, should not be taken at any period as an indication of the progress or development of the industry. Even when the population was stationary, or nearly so, the yearly increase in the surplus for export did not represent the increased output, because there has been from the first a steady growth in the per capita home consumption, due to the improvement in the quality of the products, and the increasing ability of a large majority of the people to purchase milk and its products in greater quantities every year. The annual consumption of dairy products, including milk, is estimated to be at least \$10 per capita in this country. On this basis, the total annual consumption must be about \$80,000,000 a year, or \$25,000,000 greater than it was eight or ten years ago.

Small quantities, comparatively speaking, of cheese and butter were exported from British North America early in the last century. Nova Scotia shipped both butter and cheese to the West Indies over a hundred years ago. One historian mentions the export of butter and cheese from the Kingston, Ont., district (presumably to the United States) in 1801. The quantities were so small that they appear trivial compared with the enormous volume of our exports in recent years, but the trade was, no doubt, of considerable importance to the struggling colonists of those days.

Cheese.

Strictly speaking, our present export cheese trade began after the establishment of factories in 1864, and it would appear that the first lot of factory cheese to be exported to Great Britain came from the Dunham factory in Missisquoi county, Quebec. The author is indebted to Mr. A. A. Ayer, the well known cheese exporter of Montreal for the following statement:—

The late Mr. Heath, of the firm of Heath & Finnimore, London, Ontario, was living in Waterloo, Quebec, for some time before and after 1864-65. He bought and shipped to England the first product of the Dunham factory, including the make up to August 1, 1865. The Dunham factory was started in 1864. I am positive about the shipments to England from May 1, 1865, but not so positive about any shipments having been made in 1864.*

I personally bought about 1,100 cheese from the Dunham factory, being the make of August, September and October, 1865. Only a small portion of this, however, was shipped to England, the balance being required for the local trade in Montreal and Quebec. From that date forward there was a gradual increase in the shipments of Canadian cheese to England, and the writer has been actively connected with the trade from the time that the first factory cheese were made in Canada.

Mr. Adam Brown, the present postmaster of Hamilton, would seem to be entitled to the credit of having made the first export shipment of cheese from western Ontario. The story is told in Mr. Brown's own words as follows:—

* The Dunham factory was built in the fall of 1864, but did not begin operations until 1865.—J.A.R.

'It was, I think, in 1866 that I had arranged for an extended trip to England with my family, and before going I went to Ingersoll to make contracts for a supply of cheese for my firm, Brown, Gillespie & Co., wholesale grocers, Hamilton, to supply our customers for the fall trade.

'In company with the late E. Caswell, of Ingersoll, I spent two days or more visiting the several cheese factories and smaller makers in the county of Oxford. I well remember on our driving back to Ingersoll, after having completed my purchases, saying to Mr. Caswell, "I would like nothing better to occupy a portion of my time in England than introducing Canadian cheese," but I remarked it could not be done unless we had boxes to ship them in. Of course, boxes could have been got from the United States, but I wanted Canadian boxes.

'When we reached Ingersoll, we happened to see the late Adam Oliver, and on telling him what we had been talking about, he promptly said, "Don't let that stop you; I will see that boxes are ready for any orders you may send over, and I will start a factory and make them." Well, soon after that, I went to England and, fortified with an open letter of introduction from my firm's bankers in London, I visited several of the leading cities in England, and, soliciting business from the largest provision dealers in those places, I sought to impress them with the excellence of Canadian cheese, and worked hard to get them to order fifty boxes, or if they would not buy at market price, to accept a consignment of fifty boxes or whatever they might name, and sell them on arrival on their merit, and I stated that my firm would not draw against shipment and would be satisfied with proceeds, so sure was I of results. I sold some and consigned some.'

The author is of the opinion that Mr. Brown must have made his first shipment in 1865. The following extract from the *Ingersoll Chronicle* of September 21, 1863, would indicate that a considerable trade had been established in that year.

THE CHEESE TRADE.

The magnitude and importance of the cheese trade in this part of the country is, we believe, not generally known. Mr. Edwin Caswell, our energetic townsman—who has purchased, with one or two exceptions, the cheese manufactured by all the factories in the county—deserves great credit for his enterprise. Already this season he has shipped over four thousand cheese—a large quantity of this to Liverpool, London and Glasgow. One order which he filled this week was for fifty tons, the largest sale, we believe, ever made in Canada. Before the season is over Mr. Caswell will have paid our cheese manufacturers over two hundred thousand dollars. By shipping direct to the old country, a trade is at once opened up which must prove highly beneficial to every man in the country.

Butter.

Value of the butter exported from Canada exceeded that of cheese, down to 1873. Since the year cheese has taken the lead although the difference in the value of the two products exported was less than one million dollars as late as 1880. From 1881 to 1890 there was a rapid decline in butter exports, the total value in the latter year being only \$331,958, which was the smallest export there has been since Confederation. There were two things responsible for this decline. In the first place the quality of Canadian butter had not improved in keeping with that of other countries and the keen competition destroyed the demand for Canadian butter in the British market. The rapid extension of the cheese factory system during that period also had something to do with it. Beginning with 1890 there was a revival which continued until 1903, in which year the butter exported amounted to over thirty four million pounds, valued at nearly \$7,000,000. The establishment of the cold storage service in the nineties was responsible to a large extent for this increase, because without these

facilities such a trade would be impossible in the face of modern competition. Once more the export of butter is on the decline, and from an entirely new cause, namely, the enormous increase in home consumption.

Down to 1880, and even later, the butter which was exported consisted of dairy butter made on the farms, collected by country store keepers and in some localities by special butter buyers. In fact, the country butter buyer was for many years a rather important element in rural commercial circles. Some very picturesque stories are related as to the conditions under which this business was conducted. There was no cold storage, in those days, and the butter was often held in the farmers' cellars and by the storekeepers for several months at a time. There were several districts which acquired quite a national reputation for the manufacture of high-class dairy butter, Of these the Eastern Townships may be accorded first place. Forty years ago 'Morrisburg' butter probably had the best reputation of any made in Ontario.

TABLE X.—Exports of Cheese and Butter, years ending June 30.

Year.	Cheese.		Butter.	
	Lbs.	Value.	Lbs.	Value.
1868..	6,141,570	\$ 620,543	10,649,733	\$1,698,042
1869..	4,503,370	519,572	10,853,268	2,342,270
1870..	5,827,782	674,486	12,260,887	2,353,570
1871..	8,271,439	1,109,906	15,439,266	3,065,234
1872..	16,424,025	1,840,284	19,068,448	3,612,679
1873..	19,483,211	2,280,412	15,208,633	2,808,979
1874..	24,050,982	3,523,201	12,233,046	2,620,305
1875..	32,342,030	3,886,226	9,268,044	2,337,324
1876..	35,024,090	3,751,268	12,250,066	2,510,894
1877..	35,930,524	3,748,575	14,691,789	3,073,409
1878..	38,054,294	3,997,521	13,066,626	2,382,237
1879..	46,414,035	3,790,300	14,307,977	2,101,897
1880..	40,368,678	3,893,366	18,535,562	3,058,009
1881..	49,255,523	5,510,443	17,649,491	3,573,034
1882..	50,807,049	5,500,868	15,161,839	2,936,156
1883..	58,041,387	6,451,870	8,106,447	1,705,817
1884..	69,755,423	7,251,989	8,075,537	1,612,481
1885..	79,655,367	8,265,240	7,330,788	1,450,945
1886..	78,112,927	6,754,625	4,668,741	832,355
1887..	73,604,448	7,198,978	5,485,509	979,126
1888..	84,173,267	8,928,242	4,415,381	798,673
1889..	88,534,837	8,915,684	1,780,765	331,958
1890..	94,260,187	9,372,212	1,951,585	340,131
1891..	106,202,140	9,508,800	3,768,101	602,175
1892..	118,270,052	11,652,412	5,736,696	1,056,058
1893..	133,946,265	13,407,470	7,036,013	1,296,814
1894..	154,977,480	15,488,191	5,534,621	1,035,588
1895..	146,004,650	14,253,002	3,650,258	697,476
1896..	164,689,123	13,956,571	5,889,241	1,052,039
1897..	164,220,699	14,676,239	11,453,351	2,089,173
1898..	196,703,323	17,572,763	11,253,787	2,446,686
1899..	189,827,839	16,776,765	20,139,195	3,700,873
1900..	185,984,430	19,856,324	25,559,737	5,122,156
1901..	195,926,397	20,696,951	16,335,528	3,295,663
1902..	200,946,401	19,686,281	27,855,978	5,660,541
1903..	229,059,925	24,712,943	34,128,944	6,954,618
1904..	233,980,716	24,184,566	24,568,001	4,724,155
1905..	215,733,259	20,300,500	31,764,303	5,930,379
1906..	215,834,543	24,433,169	34,031,525	7,075,539
Years ending March 31.				
1907 (9 months)...	178,741,567	22,006,584	18,078,508	4,011,609
1908..	189,710,463	22,887,237	4,786,954	1,068,703
1909..	164,907,139	20,384,666	6,326,355	1,521,436
1910..	180,859,886	21,607,692	4,615,380	1,010,274
1911..	181,893,724	20,739,507	3,142,682	744,288

TABLE XI.—Detailed Statement of Exports of Butter in fiscal years 1902 to 1910, inclusive. (Years ending June 30, 1902 to 1906; years ending March 31, 1907 to 1910.)

To	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
	\$	\$	\$	\$	\$	\$	\$	\$	\$
Great Britain.....	5,459,300	6,554,014	4,400,774	5,568,990	6,802,003	3,805,925	823,761	1,273,484	587,493
British West Indies.....	71,816	112,968	127,790	80,323	87,085	59,313	35,371	95,370	76,026
British Guiana.....	6,796	7,565	6,412	8,929	11,554	8,113	12,861	7,711	9,497
Other British Possessions.....	284	72					5		544
Hong Kong.....	47,066	69,017	82,422	82,387	48,283	56,516	34,931	54,552	50,074
Newfoundland.....	78	141	1,763	562	761	5,041	1,319		
China.....	243	202	796	658	285	1,034	720	96	22
Cuba.....	1,581	5,077	5,868	4,473	4,560	3,664	4,939	4,418	4,697
Danish West Indies.....		1,020							
French West Indies.....	101	13	25,644						9,777
Germany.....		115							
Hawaii.....		38							
Hayti.....	1,013	1,816	6,027	6,496	9,373	9,062	4,258	3,019	1,002
Japan.....	27,102	28,655	26,598	21,827	17,668	17,615	18,749	14,036	14,036
St. Pierre.....	41,149	10,225	6,497	70,580	33,965	3,539	38,899	18,246	199,854
United States.....	12	133,958	16,417	4,914	2,056	265		22,458	1,873
British Africa.....		4,685			1,268	484	265	660	986
Mexico.....	1,608	3,084							
Brazil.....	2,040	1,175	2,272	200	1,747	2,145		1,105	882
Dutch West Indies.....	92	6,187			47,045	33,900	83,177	14,273	43,688
U. S. Colombia.....	260				4,155				
Australia.....									
Bermuda.....									
France.....			14	50,482					
San Domingo.....		1,351		14,440					
Holland.....									
Venezuela.....		6,240	8,175	13,680					
Belgium.....			10	116					
Central America.....			686	1,062	3,431	4,932	9,448	7,074	2,590
Corea.....				15					15
Dutch Guiana.....				186	30	40			48
Turkey.....				50		21			
Porto Rico.....					170				
Panama.....								4,229	7,320
Austria-Hungary.....								1	
Totals.....	5,660,541	6,954,618	4,724,155	5,930,379	7,075,539	4,011,609	1,068,703	1,521,436	1,010,274

TABLE XII.—Detailed Statement of Exports of Cheese in Fiscal Years 1902 to 1910 inclusive.
(Years ending June 30, 1902 to 1906, and years ending March 31, 1907 to 1910.)

To	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
	§	§	§	§	§	§	§	§	§
Great Britain.....	19,620,239	24,620,004	24,009,004	20,174,211	24,300,908	21,909,879	22,763,736	20,268,106	21,481,566
Australia.....	6,862	6,913	6,247	5,411	5,350	245	525	223	171
British Africa.....	868	2,514	7,539	10,612	16,623	18,261	16,362	12,466	16,155
B. W. Indies.....	18,542	44,674	34,253	36,176	25,509	13,666	27,533	26,940	24,635
B. E. Indies.....	60	40	315	62	20				
British Guiana.....	1,833	2,162	1,193	2,571	3,860	3,143	6,228	4,452	5,222
Other British Possessions.....	746	563	216				9	1	1,011
Hong Kong.....		161	1,253	1,079	1,029		851	2,452	733
New Zealand.....	216	983	1,039	1,642	1,795	1,690	1,862	549	1,267
Newfoundland.....	20,100	21,334	21,751	35,171	30,992	37,748	35,792	41,163	36,912
Belgium.....			10	22	287		2,080		
Argentina.....		14							17
Cuba.....	350	331	211	102	811		57		756
China.....	1,409	1,734	1,899	2,013	2,195	2,206	1,572	568	2,453
Danish West Indies.....	332	2,037	1,986	2,046	2,056	1,568	1,985	1,937	
France.....			44	700	7,203		10	81	
Japan.....	821	1,076	1,609	759	775	1,071	1,444	2,200	1,208
Philippine Islands.....		289	100						211
St. Pierre.....	158	120	356	341	875	318	190	364	23,995
United States.....	12,038	7,779	5,886	14,182	16,082	6,900	17,732	19,428	
Dutch West Indies.....	538			104	994	54	3		102
Norway and Sweden.....				361			9,080	3,174	11,385
Germany.....	1,179	170		12,505	14,033	9,080	9,245		
Bermuda.....				18	13	9			
Dutch Guiana.....		15	21						
Egypt.....		30							
Mexico.....			139	329	1,594	630	168	499	103
French West Indies.....		7					347	3	
Central America.....				80		110			
Holland.....					97				
U. S. of Colombia.....					68				5
Other countries.....							6		
Totals.....	19,686,291	24,712,943	24,184,576	20,300,500	24,433,169	22,006,581	22,887,237	20,384,606	21,607,692

TABLE XIII.—Exports of Condensed Milk by Countries (Values only).

Countries.	1903.	1904.	1905.	1906.	1907. (9 months).	1908.	1909.	1910.	1911.
	\$	\$	\$	\$	\$	\$	\$	\$	\$
Great Britain.....	795	30	245	9,280	7,069	7,691	11,871	9	7,583
United States.....	1,045	5,184	16,664	2,046	556	3,854	9,124	223,028	11,474
British Africa.....	81,903	103,437	103,208	99,086	22,082	23,866	23,715	104,258	96,457
Australia.....	888	363	400		35				
New Zealand.....						175			
B. W. Indies.....	93	306	2,248	4,363	2,469	309	2,318	1,258	
China.....	55,145	20,202	89,444	3,521	3,255		346	25,157	
Cuba.....	55,887		3,500	2,400	3,251		24,693	142,194	
Hong Kong.....	10,427	1,179	1,575	1,200				2,940	
Japan.....	18,183	3,439	1,278		310	3,953	17,641	16,800	
Newfoundland.....	6,443	5,918	10,318	6,482	6,621	3,903	11,241	8,992	
Philippines.....	11,688	12,006	39,086					10,268	
St. Pierre.....	42			326	38			3	
Bermuda.....				245		10	772	859	
Mexico.....						113	128	5,640	
Other Countries.....		1,697	843	554	701		539	2,711	131,418
Totals.....	242,539	153,761	268,899	129,233	46,387	43,874	91,388	544,124	469,406



FOUR WESTERN ONTARIO PIONEERS.

1. Harvey Farrington.
2. C. E. Chadwick.

3. Hon. Thos. Ballantyne.
4. Hiram Ranney.



James Whitton.



Howard Bissell.

THE FIRST CANADIAN DAIRY INSTRUCTORS.



(1) One of the Buildings of the Ontario Agricultural College Dairy School, Guelph, Ont. (2) The Provincial Dairy School at Sussex, N.B. (3) The Kingston, Ont., Dairy School.



1. The first St. Hyacinthe Dairy School.

2. The present St. Hyacinthe Dairy School.

3. The first Manitoba Dairy School.



FOUR EASTERN ONTARIO PIONEERS.

1. P. W. Strong.
2. Ketchan Graham.

3. Hon. Robt. Reid.
4. M. K. Evertt.



SOME EASTERN TOWNSHIPS LEADERS.

1. H. S. Foster, First President of the District of Bedford Dairymen's Association.
2. W. H. Walker, M.L.A., First Secretary of the Huntingdon District Dairymen's Association.
3. Robt. Ness, President Huntingdon District Dairymen's Association.
4. The late Jas. Burnett.



Hon. D. Derbyshire, for many years President of the Ontario Creameries Association and Dairy-men's Association of Eastern Ontario.



D. M. Macpherson, at one time the largest cheese manufacturer in the world. President of the Dominion Dairy-men's Association.



Valancey E. Fuller, First President Ontario Creameries Association.

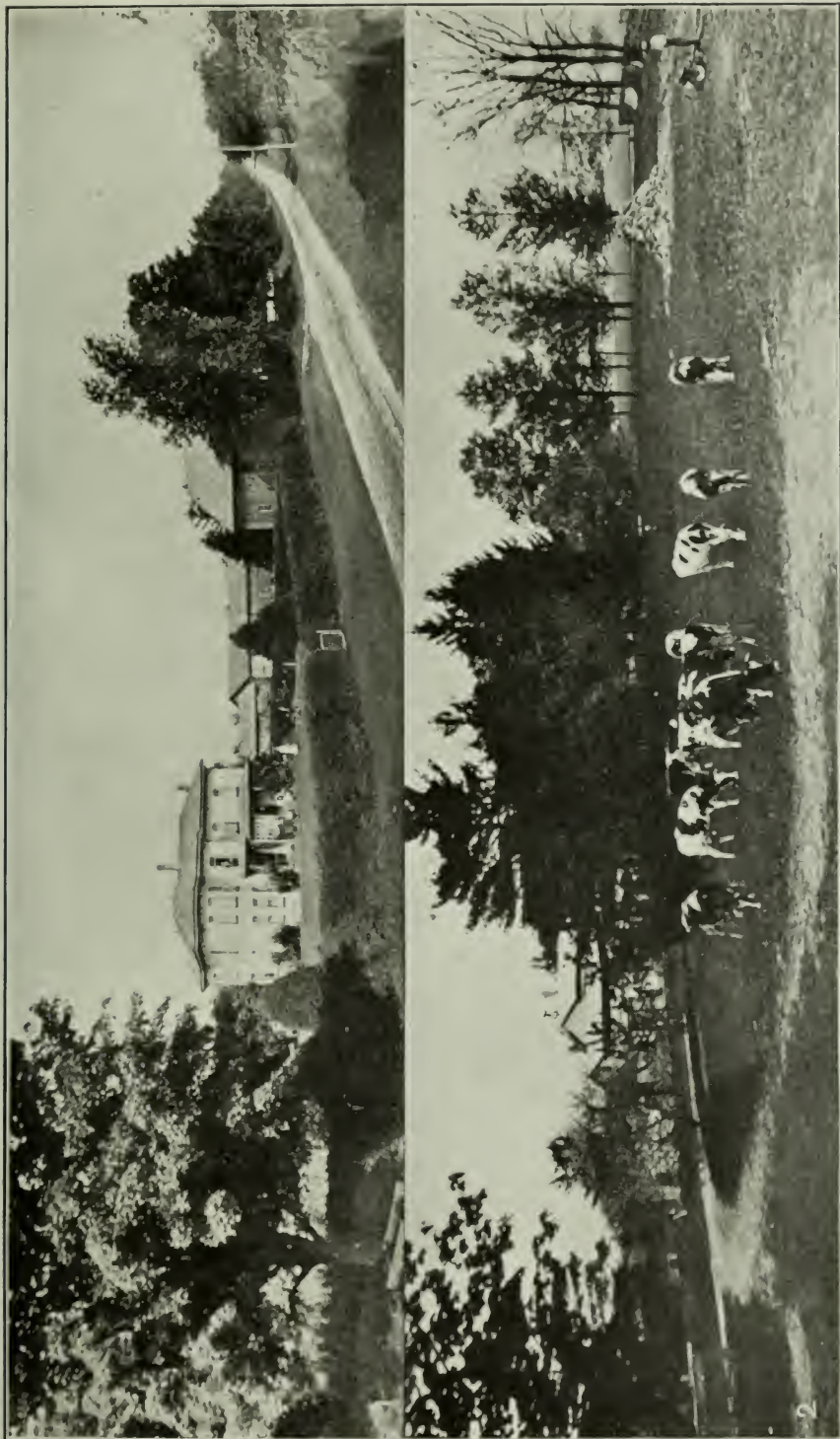


SOME EARLY QUEBEC LEADERS.

1. Hon. Boucher de La Bruère, First President of the Quebec Dairymen's Association.
2. The Rev. Abbe Montuigny, a great friend of the Dairy Industry.
3. J. de L. Taché, First Secretary of the Quebec Dairymen's Association.
4. The late Ed. Barnard, Director of Agriculture for Quebec.



1. J. D. Leclair, The First Inspector-General for Butter in Quebec.
2. Saul Coté, One of the First Instructors in Quebec.
3. Eli Bourbeau, The First Inspector-General for cheese in Quebec.
4. Alex Chicoine, an old Buttermaker who did useful pioneer work.



Two Oxford County Dairy Farms.



1. Large cheese made at the Ingersoll factory in 1866. Photograph taken at Syracuse, N.Y., weight 7,000 pounds.

2. Mammoth cheese made at Perth, Ont., in 1892. Shown at the Worlds Fair, Chicago, 1893. Weight 22,000 pounds.

3. The Mammoth cheese in London, Eng



Jas. W. Robertson, C.M.G., L.L.D., Appointed Dairy Commissioner in 1890, later Commissioner of Agriculture and Dairying, resigned Dec. 1904.



J. A. Ruddick, Dairy and Cold Storage Commissioner.



J. C. Chapais, Assistant Dairy Commissioner.

Export of Cream.

Owing to a change in the United States tariff in August, 1909, by which the duty on cream was reduced from 2 cents a pound to 5 cents a gallon, while the duty on butter remained as it had been, at 6 cents a pound, a large export of cream was at once begun. Down to the end of the fiscal year ending March 31, 1910, cream was included with condensed milk in the Trade and Navigation returns, but the Customs Department have kindly separated the figures, which show that the exports of cream from Canada to the United States from August, 1909, to March, 1910, inclusive, amounted to 236,222 gallons, valued at \$244,442. Many of the cheese factories and creameries along the Quebec border and also at convenient points in Ontario have been engaged in this cream trade during 1910. The farmers generally received about one cent a pound more for the butter fat in the milk than they would have realized if it had been manufactured into butter and cheese.

TABLE XIV.—Showing Detailed Exports (by Countries) of all Dairy Products for the fiscal year ending March 1911 (Values only).

Country.	Cheese.	Butter.	Cream.	Condensed Milk.	Fresh Milk.	Casein.
	\$	\$	\$	\$	\$	\$
Great Britain	20,577,542	401,621	.....	7,583	.....	.....
United States	36,034	91,313	1,714,528	11,474	5,391	37,009
Newfoundland	33,855	57,198	.....	.....	.....	.....
B. W. Indies	25,844	70,444	.....	.....	.....	.....
B. S. Africa .....	.....	.....	.....	36,457	.....	.....
Cuba .....	.....	.....	.....	222,474	.....	.....
Other Countries	60,192	123,712	.....	131,418	.....	.....
Totals	20,739,507	744,288	1,714,528	469,466	5,391	37,009

Total value of all products, \$23,710,129.

THE DAIRYMEN'S ASSOCIATIONS.

The Dairymen's Associations in the several provinces have always been an active force in the progress and improvement of the industry. The first organization was known as the Canadian Dairymen's Association. It had its inception at a meeting of a few leading spirits in 1866 at the Maple Leaf cheese factory near Ingersoll, Ont., then owned by Mr. Jonathan Jarvis, and now by Mr. Thomas Caddie. The organization was completed at a convention which was held in the Town Hall, Ingersoll, on July 31 and August 1, 1867. Mr. C. E. Chadwick was the first president, and James Noxon, the first secretary. The association aimed to cover the whole province, but wished to have everything centered at Ingersoll. This did not satisfy the Belleville district representatives, who broke away in 1872, and organized the Ontario Dairymen's Association, with headquarters at Belleville. When representatives of both associations waited on the Ontario Government to ask for an annual grant they were told that such assistance would be given only to one representative association for

the province. An amalgamation was effected at a convention held in Ingersoll in 1873, and a new organization to be known as 'The Dairymen's Association of Ontario' was the result. The understanding was that the annual convention should be held in Belleville once in every three years. This arrangement continued until 1877, when a division again took place that resulted in the organization of the Dairymen's Association of Western Ontario and the Dairymen's Association of Eastern Ontario. Mr. Ketchan Graham was elected the first president of the Eastern Association, and Mr. Harford Ashley, secretary.

In 1885, the Creameries Association of Ontario was organized, with Mr. Valency E. Fuller, of Jersey fame, as president. These three associations continued to receive annual grants from the Ontario Government until 1897, when the butter and cheese interests were united in two associations known as the Butter and Cheese Associations of Eastern and Western Ontario, respectively. The names seemed to be unsatisfactory, however, and in 1900 it was decided to revert to the old names of the Dairymen's Association of Eastern Ontario, and the Dairymen's Association of Western Ontario, under which titles they are still known.

In 1883, Mr. D. M. Macpherson organized a dairy convention at Huntingdon, Que., which became an annual affair. Permanent organization was finally effected under the name of the Huntingdon District Dairymen's Association, with Mr. Macpherson as president, and Mr. W. H. Walker, as secretary. Mr. Robert Ness has been president since 1888. This was the first association in the province of Quebec.

In 1884, the Dairymen's Association of the Province of Quebec was organized, with M. Boucher de la Bruère as president, and Mr. J. C. de L'Taché, secretary. The headquarters of this association have always been at St. Hyacinthe. This association has taken a very active part in the development of the industry in that province, as will be shown in another section.

The District of Bedford Dairymen's Association was organized in 1885, largely through the efforts of Mr. Jas. McKinnon and Mr. H. Sewell Foster of Knowlton, who has been its permanent president. Mr. Foster has been untiring in his efforts to advance the dairying industry in the 'townships' during the past twenty-five years. The functions of these two district associations are confined to holding an annual convention in the English language. The proceedings at the meetings of the Provincial Association are naturally conducted chiefly in the French language.

The Dairymen's Association of British Columbia was organized on March 1st, 1906, with Mr. A. C. Wells as President. Prior to 1906, there was an organization known as the Live Stock and Dairy Association.

Dairymen's Associations have been organized in all the other provinces except New Brunswick and Nova Scotia. In Prince Edward Island the association, which was organized in 1899, with Mr. Arthur Simpson as President, and Mr. John Anderson as Secretary, maintains and directs a service of instruction and inspection among the factories. In the other provinces, the associations exist largely for the purposes of holding annual conventions. In New Brunswick and Nova Scotia, the dairymen are associated with fruitgrowers and others in the Farmers' Associations.

As an outcome of a series of letters to the press by W. H. Lynch of Danville, Que., delegates from all the Provincial Associations assembled at Ottawa on the 9th of April, 1889, and organized a Dominion Dairymen's Association. Mr. H. S. Foster, of Knowlton, Que., was the provisional chairman and Mr. J. de L'Taché, St. Hyacinthe, secretary. After organization was completed, Mr. D. M. Macpherson was elected president and Mr. J. C. Chapais, secretary. The Association, at the first meeting, petitioned the Dominion Government to create the office of Dairy Commissioner, and the result was the appointment of Prof. James W. Robertson, on February 1st, 1890. The Dominion Dairymen's Association held a second Annual Convention at Ottawa in February, 1890, and then seems to have died a natural death.

DAIRY EDUCATION IN CANADA.

In the matter of instruction for butter and cheese makers Canada has always been a leader, and in no other country has such work been so extensively or more systematically carried out. One result of this policy is that Canadian dairy experts have been in demand from abroad for many years, and a large number have gone to fill good positions in several countries, but the most important result is found in the high average quality of our butter and cheese.

The Dairymen's Associations in Canada are entitled to the credit of having inaugurated a scheme for dairy improvement, when they first employed instructors to visit the factories, which has since been adopted in some measure by every important dairying country in the world.

ONTARIO.

The first attempt at factory instruction in Canada was made in 1879, when, through the instrumentality of the late Hon. Thomas Ballantyne, Prof. L. B. Arnold, of New York State, was engaged to visit the cheese factories in Western Ontario, for the purpose of teaching a variation in the practice, as then followed, which it was believed would result in much improvement in the quality of the cheese. Prof. Arnold was not entirely successful at first and the association declined to re-engage him for the following season. Mr. Ballantyne had faith, however, and paid for his services in 1880, out of his own pocket. Arnold was undoubtedly on the right track and his work eventually resulted in a change being made from the old 'acid' system to the comparatively sweet curd system which is now followed.

It may not be out of place here to say that no man in Canada ever did more to promote the best interests of the cheesemaking industry than Mr. Ballantyne did. He spent his time and money unselfishly in the formative years when his sound advice and enthusiasm were of the greatest possible assistance.

The next move was made by the Dairymen's Association of Eastern Ontario, who employed Mr. J. B. Harris, also of New York State, during the summer of 1880, and two following seasons. In 1883, Mr. Harris was employed by the Dairymen's Association of Western Ontario.

In 1883, Canadians were employed in this capacity, for the first time, by the Eastern Ontario Association in the persons of Messrs. James Whitton and Howard Bissell. They applied themselves to the task of improving the manufacture of the cheese with skill, industry and tact, and produced such good results that it has not been considered necessary since to go outside of Canada for dairy teachers, while on the other hand the United States, New Zealand, Australian, Scottish and South African authorities have induced many Canadian experts to accept service in those countries. The Eastern Association continued to employ instructors year after year, increasing the number as the demand for their services grew until in 1902, there were 9 instructors on the pay roll of the association.

Beginning in 1888 the Dairymen's Association of Western Ontario again sent out instructors, conducting the work along lines similar to those followed in eastern Ontario. The first instructors were James Hopkins, H. O. Foster, Ed. Hunter and John R. Isaacs, all local men. The number of instructors employed varied from year to year and in 1902 there were four men engaged by the association. It was in this year, that the provincial government made a beginning towards what resulted eventually in complete control and payment of all the instructors. Mr. George H. Barr was assigned to a group of factories in Lambton, and Mr. G. G. Publow to a similar group in Lanark county, and their salaries and expenses were paid by the government. Practically all the factories in the province were divided the following year into groups, with an inspector over each, and Messrs. Barr and Publow as chief instructors and government officers for western and eastern Ontario respectively. Down to 1906 the factories were assessed for a share of the expense, but in 1907 the government assumed full responsibility and created a Dairy Branch with Mr. George A. Putnam

as director. In 1910 there were 25 instructors in Eastern Ontario under Mr. Publow, as chief, and eight in western Ontario under Mr. Frank Hems, who succeeded Mr. Barr in 1907.

In 1887 Mr. Mark Sprague was employed as instructor for the Ontario Creameries Association and his services were continued until the amalgamation of the associations in 1897.

QUEBEC.

The Dairymen's Association of the province of Quebec has employed instructors to visit the factories practically since it was organized in 1884.

In 1890 the District of Bedford Dairymen's Association secured a grant of \$275 from the government on the appeal of the Hon. Sydney Fisher and Mr. H. S. Foster, for the purpose of employing an instructor for the district. Mr. Robert Wherry was engaged as a cheese instructor, and during the course of several years' service he did much to raise the standard of quality in the cheese from the Bedford district. Wherry was strongly supported by Mr. Foster in urging the necessary reforms in the production and handling of the milk and in the manufacture of cheese. The syndicate system thus inaugurated in 1890 was taken up vigorously by the provincial association in 1891. The factories organize the syndicates, engage the instructor and receive a grant from the Dairymen's Association to assist in paying the expenses. The instructor must hold a certificate from the Dairy School at St. Hyacinthe. There were over 60 syndicate inspectors employed in 1910, under the direction of Mr. J. D. Leclair, inspector general for butter, Mr. Eli Bourbeau, inspector general for cheese and Mr. J. A. Plamondon, assistant inspector general. The provincial Department of Agriculture employs several instructors or inspectors who visit the factories that have not been syndicated.

NEW BRUNSWICK.

The New Brunswick Department of Agriculture appointed Mr. John Robertson, father of Prof. Robertson, as dairy superintendent in 1892, which position he held for several years. Mr. Harvey Mitchell was added to the staff in 1895, Mr. J. F. Tilley in 1896 and Mr. L. C. D'Aigle in 1897.

PRINCE EDWARD ISLAND.

In 1899 the newly organized Dairymen's Association engaged Mr. Fraser T. Morrow as instructor, and he still fills the position.

MANITOBA

The government of Manitoba created the office of dairy superintendent in 1895, which office has been merged with that of professor of dairying since the establishment of the Agricultural College and Dairy School. Mr. C. C. MacDonald was the first superintendent in Manitoba.

Dairy Schools.

The first classes for instruction in the art of cheese manufacture conducted in Canada, if not in America, were held at St. Denis, Kamouraska county, Que., in 1881 and 1882 at the factory established by Mr. J. C. Chapais, now Assistant Dairy Commissioner, and Mr. D. Rossignol. In 1882 and 1883 classes for creamery butter-makers were held at the creamery at Ste. Marie, Beauce county, Que., already referred to as the first centrifugal separator creamery in Canada. These classes were held under the direction of the late Mr. Ed. Barnard, Director of Agriculture for Quebec. The instructor at St. Denis was a Mr. J. M. Joscelyn, who was brought from the

States for the purpose. The instructor at Ste. Marie was Mr. S. M. Barré. These two factories received a grant from the Quebec government to enable them to carry on the work.

Two of the students trained at St. Denis, Mr. Joseph Painchaud and Saul Côté, were afterwards engaged as instructors by the Quebec Dairymen's Association.

The Quebec Dairymen's Association which was organized in 1884, started classes in the Archambault factory near St. Hyacinthe that year. Classes were afterwards held at St. Hughes and continued until the Dairy School was established at St. Hyacinthe. This school was built by the Dairymen's Association and was conducted for several years by the Dairying Service of the Dominion Department of Agriculture. It was opened on November 27, 1892, and was the first regular Dairy School in Canada. A fine new building was erected and opened in 1905. Mr. J. D. Leclair was the first superintendent, and the late Mr. E. Castel, secretary. Mr. Castel was succeeded by the present secretary, Mr. O. E. Dalaire.

In the spring of 1891 the Dairymen's Association of western Ontario arranged with Mr. Adam Bell to hold classes for the instruction of cheesemakers in his factory at Tavistock. These were conducted for three seasons.

The Dairy School was opened in connection with the Ontario Agricultural College at Guelph on February 15, 1893, in charge of Prof. H. H. Dean. The Kingston Dairy School, erected and equipped by the School of Mining and Agriculture, affiliated with Queen's University, was opened in December, 1894, and was operated for two winters by the Dominion Dairying Service with the writer as Superintendent. It was then taken over by the Ontario Department of Agriculture.

The Western Dairy School was opened at Strathroy, Ont., in 1896, with Mr. F. J. Sleightholm in charge. It was closed in the spring of 1907.

The Provincial Dairy School at Sussex, N.B., was opened in 1894, with Jas. E. Hopkins as Superintendent. Courses are arranged for factory butter and cheesemakers only.

A Dairy School was opened in connection with the Manitoba Agricultural College at Winnipeg in 1907. The courses at this school include Home Dairying as well as instruction for cheesemakers and buttermakers.

Travelling Dairy Schools.

In 1891 the Ontario Agricultural College sent out a Travelling Dairy in charge of one of its graduates, Mr. J. W. Palmer, now Director of Agriculture in the Orange River Colony. An outfit for farm buttermaking was carried along and demonstrations and lectures covering one or two days were given in the handling of milk and in the manufacture of butter on the farm. This work was carried on for several years.

In 1894 the Dominion Dairy Service sent two Travelling Dairies through Manitoba and the Northwest Territories. In 1895 and 1896 the province of British Columbia was included.

The Department of Agriculture for Nova Scotia started a travelling dairy school with Miss Laura Rose in charge in July 1901. The work was so successful that it was continued for seven years, two schools being sent out in 1903.

The Provincial Department of Agriculture for New Brunswick sent out a Travelling Dairy in 1895 in charge of Mr. Abram Alward.

GOVERNMENT AID TO THE DAIRYING INDUSTRY.

Provincial Aid.

Speaking generally the burden of all purely educational work such as dairy schools, instruction at cheese factories and creameries, travelling dairies, &c., has been borne by the Provincial governments. The grants to the Dairymen's Associations have for the most part come from the same source. These services, which have

already been described, have been of great advantage and benefit to the dairying industry. When the dairy schools were started in the early nineties, many cheese factory and creamery owners were inclined to scoff at the character of the instruction given, but to-day very few owners would care to employ a cheesemaker or butter-maker who had not attended at least one course at some dairy school. The dairy schools in Canada have been conducted along very practical lines, giving the students as much of the scientific side of dairying as they are able to assimilate. The general adoption of the system of factory instruction, after 20 years' trial, is the best proof of the usefulness of that scheme of education.

Dominion Aid.

A Conference of Delegates from all the Dairymen's Associations in the different provinces met at Ottawa on April 9, 1889, and petitioned the Dominion government to appoint a Dairy Commissioner. The suggestion was received in a very friendly spirit by the government, and it was strongly supported by members on both sides of the House. The result was that on February 1, 1890, Prof. James W. Robertson became Dairy Commissioner for the Dominion, with Mr. J. C. Chapais as Assistant Commissioner. This marked the first important step by the Federal government for direct assistance to the dairy industry. The commissioner visited all parts of Canada during the summer of 1890 to study the needs of the situation, and in the spring of 1891 organized a staff of experts to carry on the various services which had been planned. It would be impossible without over-loading these pages to relate all that has been done by this service during the past twenty years. Some of the more important undertakings for the advancement of the industry were as follows:—

1. Experimental work was carried on at several places in 1891 and 1892 to determine the relative value, for cheesemaking purposes, of milks containing different percentages of fat, with a view of establishing the payment for milk at the cheese factories by the fat test.

2. The organization and operation of winter creameries to demonstrate the possibility of operating creameries the year around in Canada was begun in the winter of 1891-2. Previous to that time there were no winter creameries in operation in Canada. People said creameries could not be operated in the winter months. The butter trade suffered as a result of the intermittent character of the supply of fine creamery butter. That which was needed for winter use was accumulated in the autumn and held in storage until required. The result was that the quality deteriorated considerably before it reached the consumer and, in consequence, the trade in butter was curtailed to a considerable extent. At the end of the cheesemaking season of 1891, two cheese factories were secured in Oxford county (East and West Oxford and Mt. Elgin) and with slight improvements to the buildings to fit them for the cold weather, and the installation of buttermaking machinery, a start was made which has since grown into large proportions. It was easily demonstrated that creameries could be operated successfully during the winter months, and a first class quality of butter manufactured at that season of the year. With a more regular supply of a freshly made article, the consumption of butter increased rapidly, and there are now many factories making butter during the winter months.

3. In the year 1892 the Commissioner was authorized by the government to start a co-operative cheese factory at New Perth in the Province of Prince Edward Island. The machinery was loaned by the government and was afterwards purchased by the co-operative society. An expert was sent to organize the business and to run the factory as a government dairy station. In the autumn of 1892, \$3,600 worth of the cheese manufactured at the station was exported to London on consignment, and it was sold for the top market price. When the Island people knew that they could get

full prices for their cheese, it assured them that they could make an article of finest quality. New factories were organized and the government supervision was continued for several years, and was extended to 11 factories.

When the census of 1891 was taken there were only 4 cheese factories in Prince Edward Island with an annual output of \$8,448. The business was going backward for want of information and education. When the census of 1901 was taken there were 47 cheese and butter factories with an output valued at \$556,824. That was the result of organization and education.

Other dairy stations were established in Nova Scotia and New Brunswick to illustrate the operation of cheese factories and creameries.

4. In 1895, the work of organizing the cold storage services began. The export butter trade of Canada, owing to improvements in other countries and keener competition from abroad, had shrunk to almost nothing. There was no organization in respect to the carriage of butter in cold storage. No one could get a refrigerator car unless he had a car load to ship. There was no cold storage on ship-board and few creameries had any facilities of that kind. The Commissioner was authorized to arrange with the railway companies to run refrigerator cars once a week over stated routes for the purpose of developing the butter trade. Only a few routes were started at first, but the service was extended until cars were run weekly on some 60 different routes from country points to Montreal. Under this arrangement, a small shipper with a few packages of butter can have it carried as safely as the shipper who has hundreds of packages in his lot. The government guarantees two-thirds of the earnings of a minimum car load (20,000 lbs.) from starting point to destination and pays \$4 per car for icing.

The creameries were encouraged to erect cold storage rooms by the payment of a bonus of \$100 to those who provided such equipment. Plans and specifications were furnished free by the Commissioner.

In 1897 the steamship companies were induced to provide refrigerated chambers, and the government paid half the cost of installing the machinery on a number of the trans-Atlantic ships. With these improvements, the butter trade began to develop and the export trade from Montreal, which was only 32,000 packages during the season of 1894, increased to 539,000 in 1902—sixteen-fold in eight years. The 'Cool Air' service on steamships, also subsidized by the government, has been of great benefit to the cheese trade, by eliminating the 'heated cheese' which at one time was a serious menace to it.

5. The assistance to the creamery industry in the Northwest Territories which has already been referred to, was begun in 1894 and continued until 1905.

6. In 1902, the dairying service undertook to demonstrate the advantages to be derived from the curing of cheese at a proper temperature. It had been well known for years that the ordinary summer temperatures in Canada are too high to produce a cheese with a mild flavour and mellow texture, which qualities have such a high value in Cheddar cheese. Owners of cheese factories had been urged to provide the necessary equipment to control the temperature in their curing rooms, but although the advantages were generally admitted, no progress was made in that direction. It was decided, therefore, to build and equip four large central cool cheese curing rooms, to illustrate in a commercial way the advantages of the proper method of curing. The results were so satisfactory that no cheese factory is now considered up to date unless it is provided with cool curing equipment to prevent the temperature rising higher than 60 degrees.

7. The cow testing movement, begun in 1904, has reached large proportions and is still growing. It has for its object the improvement of dairy herds in the important matter of milk yield, and some striking results have already been obtained. The Dominion Dairying Service assumes the full cost of supervising this work, the keeping of the records and the testing of the samples.

8. The cargo inspection service at Canadian and British ports which was inaugurated in 1901, and through which reports are received on the loading and discharge of every shipment of butter and cheese, has enabled the officers of the department to bring about many improvements in the handling and transportation of dairy produce.

9. The publication of bulletins, giving the results of experimental investigations and other information; a voluminous correspondence through which inquiries relating to dairying, are answered and advice given; and addresses by members of the dairy staff at many meetings throughout the course of a year, are some of the other channels through which assistance is given to the dairy industry.

CANADIAN EXPERTS ABROAD.

The first Canadian dairy expert to receive an appointment abroad was Mr. R. J. Drummond, who had been a very successful cheesemaker in Oxford county. He was engaged in 1885 to conduct itinerant classes in the southwestern counties of Scotland.

Mr. John Robertson, brother of Prof. Robertson, was engaged as instructor by the Dairy Association of Wigtonshire and Dumfriesshire in 1888. Mr. Robertson gave up the work in 1891 to engage in the commercial side of the dairy business, but Prof. Drummond became principal of the Kilmarnock Dairy School in 1889, which position he still holds with much credit to himself and his Canadian training. The Kilmarnock Dairy School is one of the most successful institutions of its kind in Great Britain.

In 1894, Mr. J. B. MacEwan, who was then a member of the Dairy Commissioner's staff, received and accepted an offer to go to New Zealand, as Chief Dairy Expert. Mr. MacEwan was only two years in the dairying service of New Zealand, but to the writer's personal knowledge, he left a most excellent record behind him.

In 1898 the writer, who was then superintendent of the Kingston, Ont., Dairy School, received the appointment of Dairy Commissioner for New Zealand, which position he filled until 1900, when he returned to Canada to re-enter the Dominion service. Modesty forbids him to say what happened to New Zealand dairying during his term of office.

In 1899, Mr. J. A. Kinsella, who was at that time employed in the Dominion dairying service, was engaged to go to New Zealand as a creamery expert. Mr. Kinsella's labours among the creameries in New Zealand showed instant and far-reaching results, and New Zealand butter came rapidly to the front from that time forward. Mr. Kinsella succeeded the writer as Dairy Commissioner in New Zealand, and afterwards went to South Africa, and from there to western Australia.

In 1901, New Zealand again looked to Canada for an expert and found one in the person of W. M. Singleton, who as cheese expert and assistant Director of Dairying, has made a splendid record.

Dr. C. A. Publow, who went to Cornell, as Assistant Professor of Dairying, D.M. Wilson, as Dairy Commissioner in Kansas, J. W. Hart, Archie Smith, W. J. Carson, J. McCready and several others who have gone to the States have all done credit to their Canadian training.



Two Ontario Dairy Farm Homes.



The Buildings on a Prince Edward County Dairy Farm.



(1) A Dairy Farm in Stanstead County. (2) "Having their picture taken".



Two Oxford County Dairy Farm Homes.



SOME EASTERN TOWNSHIPS SCENES.

1. Knowlton, Brome County an Important Dairying Centre.
2. A Dairy Farm in Brome.
3. A Farm Home in the St. Francis Valley.



1. A Nova Scotia Dairy Farm. 2. A Dairy Farm in Prince Edward Island.
3. Near Edmonton, Alberta,



1. A Quebec Dairy Farm. 2. Milking time, Ontario.
3. An Eastern Townships Dairy Farm.



1. On the 13th line of Zorra, Oxford County.

2. An Ontario barn with stables underneath.

3. An Ontario Farm Home.

BIG CHEESE.

Canada certainly holds the record for big cheese. Mr. Hiram Ranney, of Oxford county, already mentioned as one of the pioneer cheesemakers of Ontario, was probably the first to attempt anything out of the ordinary in this line. He made several large cheese in his farm dairy about 1860, and succeeded in turning out one which weighed 1,200 pounds.

In 1865, Mr. Andes Smith of Norwich, Oxford county, made one at his factory which weighed 4,000 pounds, and an issue of the *Toronto Globe* in September, 1865, contained this reference to it.

The chief feature of the New York State agricultural show last week was the monster cheese from Canada.

They fancy that they know something about cheese in the State of New York, and cheese was made a great feature of the show, a special building being devoted to the immense number of samples forwarded to compete for prizes. The New Yorkers did their best and thought they had done a good deal, but Canada, as might have been expected, carried away the palm.

Mr. Smith, of Norwich, exhibited a cheese of just a little over four thousand pounds in weight, which laid the New Yorkers as flat as pancakes. They were crushed by it, and no wonder. At first, our Yankee cousins were not inclined to succumb, and were clear that the cheese was not as good as it was great. They did not succeed in picking that hole in the Canadian grey coat of Mr. Smith, however. The cheese was carefully examined by the judges and pronounced full up to the mark.

The Herkimer county farmers felt that Canada had beaten them and vowed with many strange assertions that next year they would show what their county would do in the way of a big cheese.

The visitors to the show exhibited no mortification over the matter. They seemed to be well pleased with the Canadian display and perhaps guessed that if the Canadians made such large cheeses they would have to be annexed whether they liked it or not.

The great cheese which has won such honour is to be exhibited at London, Ont., and we recommended all our readers to go there to see the sights of the beautiful little city, and not forget to look at the milky mammoth.

Afterwards, it will be shipped to England, and there, also, it will spread the name and fame of Canadian dairies.

Seriously speaking, the promptitude with which our Canadian farmers have taken up the idea of establishing cheese factories on a large scale is exceedingly gratifying, and an earnest of good for the future prosperity of the country.

Not only is cheesemaking exceedingly profitable, but the fact shows life and enterprise among our farming community which will bear fruit in other matters, as well as cheese.

Mr. Ranney, not to be outdone, joined with his son-in-law, Mr. James Harris, proprietor of the Ingersoll factory, where in 1866, they turned out a cheese which weighed 7,000 pounds.

The following extract from the *Ingersoll Chronicle* of September 7, 1866, refers to it:

An unusual excitement was created amongst our citizens last evening by the removal of the mammoth cheese, mounted on a car made specially for the purpose, drawn by twelve powerful grey horses, and preceded by the Ingersoll Brass band, passing through our streets on its way to the railway station to be shipped to the New York State Fair, which is to be held next week at Saratoga.

A large number of our townspeople collected at the station to signify their appreciation of the spirit and enterprise displayed by the proprietors of the

Ingersoll Cheese Factory in producing from their extensive establishment the largest cheese ever known to be made.

Appropriate speeches were made by Messrs. Chadwick, Noxon, Harris, Blackmair and Gibson, and the occasion made a very agreeable and pleasant one.

During the eighties, Mr. James Ireland, the veteran cheesemaker, who was then in charge at the Galloway factory, near Ingersoll, made no less than 35 large cheese, 11 of which weighed 5,500 pounds each. The others weighed from 600 to 1,000 pounds.

Between 1886 and 1895, Mr. D. M. Macpherson, proprietor of the Allengrove combination of cheese factories, made upwards of 100 cheese weighing 1,000 to 1,200 pounds. The regular output of one or two of his factories in Glengarry county, consisted of these for several years. These cheese were mostly intended for show window purposes in Great Britain.

The largest cheese on record was made at Perth, Ont., in September, 1892, and it was shown at the World's Fair, Chicago, in 1893. The special press for this cheese was set up in the Canadian Pacific railway freight shed at Perth station. At the proper stage, on the appointed day, the curd from twelve cheese factories was carried in milk cans to the station and dumped into the hoop, which was made of $\frac{1}{4}$ -inch steel boiler plate. It required two days' curd from the twelve factories, and a further supply on the third day from three of them to fill the hoop. The curd was pressed after each filling, twelve large jack screws being used for the purpose. A pressure of more than 200 tons was applied.

The following particulars are taken from a leaflet distributed at the fair:—

'The Canadian Mite' was manufactured at the Dominion Experimental Dairy Station at Perth, Lanark county, Ontario, under the supervision of Prof. James W. Robertson, Dominion Dairy Commissioner.

The total quantity of milk used in making this cheese was 207,200 pounds. That quantity is equal to the milk for one day in September of ten thousand cows. Mr. J. A. Ruddick, of the Dairy Commissioner's staff, was the cheesemaker, and he was assisted by cheesemakers at twelve adjacent factories. Their names are:

- Mr. James McCann, Riverside Factory.
- Mr. James Clark, Mississippi Factory.
- Mr. Richard Halpenny, Drummond Centre Factory.
- Mr. Wallace Symes, Balderson's Corners' Factory.
- Mr. David Ennis, Falbrook Factory.
- Mr. Wrathall, Harper's Corners' Factory.
- Mr. Max Gibson, Bathurst Mutual Factory.
- Mr. John McMunn, Tay Banks Factory.
- Mr. Wiltsie, S. L. U. Factory.
- Mr. James Kirkland, Lone Star Factory.
- Mr. Thomas Wright, Stanleyville Factory.
- Mr. Elijah Hughes, Clear View Factory.

The cheese weighs 22,000 lbs. net. It is incased in the mould or hoop of steel in which it was pressed. It measures twenty-eight feet in circumference by six feet in height.

A special truck has been made for transporting it through Great Britain after it leaves Chicago. It has been sold to Mr. T. J. Lipton, of London, England.

Mr. (now Sir Thomas) Lipton having failed to carry out his part of the contract, the cheese was shipped to A. J. Rowson, of London, England, and by him disposed of to a well-known caterer. A large section of it was returned to Ottawa in May, 1894, when it was found to be in excellent condition, although then over a year and a half old, during six months of which it stood in the exhibition building under a glass roof

and exposed to great heat. The writer has a small piece of it yet, which is dried as hard as a bone, but is perfectly sound.

The manufacture of large cheese has probably not advanced the science of cheese-making to any appreciable extent, but they served the purpose for which they were intended, namely, to attract attention to the industry. No single exhibit at the Chicago Fair was more talked about than 'the big cheese from Canada.'



