

SEVENTH REPORT
—OF THE—
DAIRY ASSOCIATION

—OF THE—
PROVINCE OF QUEBEC.

ANNEX TO THE REPORT OF THE HONORABLE THE COMMISSIONER
OF AGRICULTURE AND COLONISATION.

1888.

SUPPLEMENT
REPORT OF THE DAIRYMEN'S ASSOCIATION.

PRINTED BY ORDER OF THE LEGISLATURE.



QUEBEC:
PRINTED BY CHARLES FRANÇOIS LANGLOIS,
PRINTER TO HER MOST EXCELLENT MAJESTY THE QUEEN

1889.

THE DAIRY

SEVENTH ANNUAL REPORT OF THE DAIRY ASSOCIATION OF THE PROVINCE OF QUEBEC.

TO THE HON. THE COMMISSIONER OF AGRICULTURE,
AND COLONISATION,
Quebec.

SIR,

The board of directors of the Dairymen's Association of the Province of Quebec have the honour to present the following report of their proceedings during the year 1888, and of the annual meeting held at L'Assomption on the 23d and 24th January last.

The Secretary-Treasurer of the Dairymen's

Association of the Province of Quebec

(Signed) J. DE L. TACHÉ,

Quebec, 1st of February, 1889.

Officers and

Honorary President : Th
Vice-President
Secretary-Tres

DISTRICT.

Arthabaska
Beauce
Beauharnois
Bedford
Charlevoix
Chicoutimi and Sagou
Ioerville
Joliette
Kamouraska
Montmagny
Montreal
Quebec
Richelieu
Rimouski
St. François
St. Hyacinthe
Terrebonne
Trois-Rivières

Officers and Directors of the Dairymen's Association FOR 1889.

Honorary President : The Abbé Labelle, Deputy Commissioner of Agriculture and colonisation.

President : The Hon. P. B. de Labruère, St. Hyacinthe.

Vice-President : M. N. Bernatchez, M. P. P., Montmagny.

Secretary-Treasurer M. J. de L. Taché, Quebec.

DIRECTORS

DISTRICT.	NAME.	RESIDENCE.
Arthabaska	F. PREFONTAINE.....	South-Durham.
Beauce... ..	JEAN BILODEAU.. ..	St. Elzéar.
Beauharnois... ..	S. A. BRODEUR.....	Valleyfield.
Bedford.....	H. POIRIER.....	Roxton-Falls.
Charlevoix.....	CLÉOPHE CÔTÉ.....	Les Eboulements.
Chicoutimiand Saguenay	S. FORTIN	St. Prime.
Inerville.....	O. BERGERON	St. Athanase.
Joliette.....	J. J. A. MARSAN.....	L'Assomption.
Kamouraska.....	J. C. CHAPAIS.....	St. Denis-en-bas.
Montmagny.....	NUMA BERNATCHEZ....	Montmagny.
Montreal.....	ALEXIS CHICOINE.....	St. Marc.
Quebec.....	THE ABBÉ MONTMINY..	St. Agapit.
Richelieu.	DR. AD. BRUNEAU....	Sorel.
Rimouski	E. HÉBERT.....	St. Fabien.
St. François.....	A. MCCALLUM.....	Danville.
St. Hyacinthe.....	L. T. BRODEUR.....	St. Hugues.
Terrebonne.....	FRS. DION....	Ste. Thérèse.
Trois-Rivières.....	THE ABBÉ D. GÉRIN....	Trois-Rivières.

ASSOCIATION OF

on of the Province
ort of their proceed-
ld at L'Assomption

men's

vince of Quebec

J. DE L. TACHÉ,

LEGISLATION

45 VICT., 1882, CAP. LXVI.

AN ACT TO AUTHORIZE THE FORMATION OF A SOCIETY UNDER THE NAME OF
THE "INDUSTRIAL DAIRY SOCIETY OF THE PROVINCE OF QUEBEC."

[Assented to 1st May, 1882.]

HER MAJESTY, by and with the advice and consent of the Legislature of Quebec, enacts as follows :

1. The lieutenant governor in council may authorize the formation for the province of an association, having for its object to encourage the improvement in the manufacture of butter and cheese and of all things connected therewith, under the name of the : "Industrial Dairy Society of the Province of Quebec."

2. The society shall be composed of at least fifty persons, who shall sign a declaration in the form of the Schedule annexed to this act; and every member of the society shall subscribe and pay, annually, a sum of at least one dollar to the funds of the society.

3. Such declaration shall be made in duplicate, one to be written and signed on the first page or pages of a book, to be kept by the society for the purpose of entering therein the minutes of their proceedings, during the first year of the establishment of such society, and the other shall be immediately transmitted to the Commissioner of Agriculture, who shall, as soon as possible after its reception, cause to be published a notice of the formation of such society, in the *Quebec Official Gazette*.

4. From and after the publication, in the *Quebec Official Gazette*, of the notice of the formation of the society, it will become and shall be a body politic and corporate, for the purpose of this act, and may possess real estate to a value not exceeding twenty thousand dollars.

5. The society shall have power and authority to make by-laws, to prescribe the mode or manner of admission of new members, to regulate the election of its officers, and generally the administration of its affairs and property. The commissioner of agriculture and public works shall *ex-officio* be a member of the society.

6. The first meeting, on the 28th of the election of members connected with the

7. The society and place as shall those which may at such annual meeting-treasurer, and chosen from among

8. The officers at the annual meeting during the past year the amount subscriptions, improvement all the information industry.

We, the undersigned, in witness whereof, have signed our respective names at the laws of the said society

6. The first meeting of the society shall be held in the city of St. Hyacinthe, on the 28th of November next, to proceed to its organization and the election of members of the board of directors, and discuss all matters connected with the objects of the society.

7. The society shall afterwards hold an annual meeting, at such time and place as shall have been selected by the board of management, besides those which may have been prescribed and determined by the by-laws; it at such annual meeting, shall elect a president, and vice-president, a secretary-treasurer, and also one director for each judicial district of the province, chosen from among the members of the society domiciled in such districts.

8. The officers and directors of the society shall prepare and present, at the annual meeting of the society, a detailed report of their operations during the past year, indicating the names of all the members of the society, the amount subscribed and paid by each, the names of the factories, inventions, improvements and products which deserve public notice, and giving all the information which they deem useful in the interests of the dairy industry.

SCHEDULE.

We, the undersigned, agree to form ourselves into a society, under the provisions of the act 45 Victoria, chapter 66, under the name of the "Industrial Dairy Society of Quebec;" and we, hereby, severally agree to the treasury-yearly while we continue members of the society, the sums opposite to our respective names, and we further agree to conform to the rules and by-laws of the said society.

NAMES.	§	cts

EXTRACT

From 45 Vict., 1882. chap. 22. intituled : " An Act to impose certain direct taxes on certain Commercial Corporations ". as amended by 46 Vict., 1883, chap. 7.

HER MAJESTY, by and with the advice and consent of the Legislature of Quebec, enacts as follows :

1. In order to provide for the exigencies of the public service of this Province.....every Incorporated Company carrying on any undertaking, trade or business in this Province.....shall annually pay the several taxes mentioned and specified in section 3 of this Act, which taxes are hereby imposed upon each of such commercial corporations respectively.

2.....The term " Incorporated Company " does not include companies publishing newspapers or periodicals, nor societies or establishments, in this Province, for the manufacture of butter or cheese, or of both combined, established under the Act 45 Vict. chap. 65, nor the Dairy Association of the Province of Quebec, established by the Act 45 Vict., chap. 66, nor the Mutual Insurance Companies recognized by or established under the Act 42-43 Vict., chap. 39, and its amendments, nor the companies established for the construction and maintenance of toll-bridges, nor associations or companies established for drainage, agricultural or colonization purpose. This Act shall come into force on the day of its sanction.

CONSTITUTION OF THE DAIRYMEN'S ASSOCIATION.

Incorporated by the statute 45 Vic., Chap. 66 P. Q.

1. The Association takes as its designation : " The Dairymen's Association of the Province of Quebec."

2. The object of the association is to encourage the improvement of the manufacture of butter and cheese, and all things connected with the above manufacture.

3. To become member of the association, a subscription of at least one dollar (\$1.00) a year is all that is requisite.

4. The affairs of the association shall be under the direction of a president, a vice-president, a secretary-treasurer, and certain directors named in accordance with the act of incorporation, all of whom shall form the Board of Directors of the association, and shall make a report of the operations of the association at the annual general meeting of the association.

5. The electi annual general me insure the right o subscriptions will

6. When mor voting shall be by count the votes, a have the majority

7. The officers and shall be re-elig

8. The preside meeting of the boar

9. The preside board of directors.

10. To the sec other valuables bel gister, minutes of a directors, and these sence, by the vice-p sides, keep books i all the monetary o of the association, t of accounts for the c

11. The vacanci temporarily filled up directors for those ju

12. The board, t the services of speci

Rules and

1. The annual oi of the board of direc retary treasurer to board. Notice of th month beforehand.

2. At the request president may call a shall be in the form n

3. At the meeting exclusive of the presi

5. The election of the officers and directors shall take place at the annual general meeting, the date of which shall be fixed by the board: to insure the right of voting at the above election, the previous payment of subscriptions will be requisite.

6. When more than one candidate is proposed for the same office, the voting shall be by *sitting* and *standing* (*assis et levés*), the secretary shall count the votes, and the president shall declare the candidate who shall have the majority of votes.

7. The officers elected shall remain in office until the following election, and shall be re-eligible.

8. The president shall take the chair at the general meetings, and at the meeting of the board of directors.

9. The president shall be, *ex-officio*, a member of all the committees of the board of directors.

10. To the secretary-treasurer shall be entrusted all the money and other valuables belonging to the association; he shall keep in a special register, minutes of all meetings of the association as well as of the board of directors, and these minutes shall be signed by the president, or, in his absence, by the vice-president, and by the secretary-treasurer; he shall, besides, keep books in which shall be entered, regularly and without delay, all the monetary operation, of the association. At the end of the fiscal year of the association, the secretary shall present before the board a statement of accounts for the directors' approbation.

11. The vacancies which occur among the officers or directors shall be temporarily filled up by the board, and the board shall also nominate the directors for those judicial districts which are not as yet represented.

12. The board, to insure greater efficacy, shall be at liberty to claim the services of specialists as advisers.

Rules and Regulations of the Dairymen's Association.

1. The annual or general meetings of the association, as well as those of the board of directors, shall be called by notice in writing from the secretary-treasurer to each of the members of the association and of the board. Notice of the meetings of the association shall be given at least a month beforehand.

2. At the request of three directors or officers of the association, the president may call a general meeting of the board of direction; the call shall be in the form mentioned above.

3. At the meeting of the board of directors, three shall form a quorum, exclusive of the president and vice-president.

4. The board of directors may name, from among its members, a committee to audit the accounts, and other committees for any purpose it may think necessary.

5. The order of business at general and official meetings shall be determined by the board of directors.

6. No question shall be submitted for discussion except it be in writing and placed before the secretary treasurer.

7. The secretary treasurer shall be obliged to furnish security to the amount of \$400.00 which security shall be subject to the approval of the board.

MEETING

SEVENTH A

The members of
of the College of P

The President
the chair at 10 A.

The secretary
unable to be present
Alexis and Ste. Ju
at Ste. Croix de La
financial position of
of accounts was laid

A committee, c
was appointed to e
by M. Alexis Chic

After some rou

The session was
lecture on Hoed-Cr

M. Téléphore
facture of beetroot s

In the absence
Agriculture, the sec
and their office, and

MEETING OF THE 23rd AND 24th JANUARY, 1889.

SEVENTH ANNUAL MEETING HELD AT L'ASSOMPTION.

MINUTES OF THE MEETING.

L'Assomption, January 23rd 1889.

The members of the Dairymen's Association met in the Academic Hall of the College of l'Assomption.

The President of the Association, The Hon. P. B. de la Bruère, took the chair at 10 A. M.

The secretary read letters of apology from several persons who were unable to be present, and the reports from the creameries at Cap-Santé, St. Alexis and Ste. Julienne de Montcalm, as well as from the cheese-factories at Ste. Croix de Lotbinière: A summary of the transactions and of the financial position of the association was also read, and the result of the audit of accounts was laid before the meeting.

A committee, composed of Mssrs. Vaillancourt, Pickett and Langlois, was appointed to examine the samples of butter submitted to the meeting by M. Alexis Chicoine, of St. Marc, with instruction to report thereon.

After some *rouvine-business*, the session was adjourned at 11.30.

January 23rd, 1.30 P. M.

The session was opened by the reading, by Dr. Bruneau, Sorel, of a lecture on Hoed-Crops.

M. Téléphore Bran, agricultural chemist, read an essay on *The manufacture of beetroot sugar as connected with the dairy-industry.*

In the absence of Mr. Arthur R. Jeaner Fust, editor of the Journal of Agriculture, the secretary read an essay by that gentleman on *Hoed-crops and their office, and on the mode of utilizing the bones and ashes of our*

farms as manure. Then followed a lecture by Mr. D. McPherson, Lancaster, on the manufacture of cheese; after which a discussion ensued on the questions treated by Mr. McPherson, who gave the explanations required.

Mr. Saul Côté presented the report of the experts employed to examine the samples of butter sent by Mr. Chicoine: this report was laid on the table for future discussion.

Followed the election of officers with the result:

OFFICERS

Honorary-President: THE ABBÉ LABELLE, Deputy-minister of Agriculture.

President: THE HON. P. B. DE LABRUÈRE, St. Hyacinthe.

Vice-President: M. N. BERNATCHEZ, Montmagny.

Secretary-treasurer: M. J. DE L. TACHÉ, Québec.

DIRECTORS

DISTRICTS.	NAMES.	RESIDENCE.
Arthabaska.....	F. Préfontaine.....	South Durham.
Bedford.....	H. Poirier.....	Roxton Falls.
Beauce.....	Jean Bilodeau.....	St. Elzéar.
Chicoutimi and Saguenay.	S. Fortin.....	St. Prime.
Charlevoix.....	C. Côté.....	Les Eboulements.
Beauharnois.....	S. A. Brodeur.....	Valleyfield.
Joliette.....	J. J. A. Marsan.....	L'Assomption.
Iberville.....	O. Bergeron.....	St. Athanase.
Kamouraska.....	J. C. Chapais.....	St. Denis-en-bas.
Montreal.....	Alexis Chicoine.....	St. Marc.
Montmagny.....	N. Bernatchez.....	Montmagny.
Quebec.....	The Abbé Montminy.....	St. Agapit.
Richelieu.....	Dr. Bruneau.....	Sorel.
Rimouski.....	E. Hébert.....	St. Fabien.
Terrebonne.....	Frs. Dion.....	Ste. Thérèse.
Three-Rivers.....	The Abbé Gérin.....	Ste. Ursule.
St-Hyacinthe.....	L. T. Brodeur.....	St. Hugues.
St-François.....	A. McCallum.....	Danville.

After a few words of thanks from the President, M. Saul Côté, inspector of creameries, engaged by the government and by it placed at the service of the association, read the report of the inspections made by him in the year 1888.

A short discussion followed between Messrs. Côté, Magnan, Vaillan-

court, Taché and
respective merits
making.

The session ac

The President

His Honor, M.
the Town-Council,
members of the Da

After due ackn

The President

M. Louis Beau

The Abbé Lab
invitation of the Pi
ferred the excuses of
was prevented from
done by the Associ

The Hon. J. J.
Abbé, making some
thereto allied, on e

Then came an e
duction considered

And the session

At 9.30 A. M., t

M. J. J. Chapai
committee be appoin
bited at the meeting.

The Rev. Father
Marsan and Archamb

M. Jules Paquet
of farm buildings, ill

court, Taché and Chapais, on certain remarks made by M. Magnan on *The respective merits of pans and centrifugal cream separators in butter-making.*

The session adjourned at 6 o'clock.

January 23rd. 8 P. M.

The President took the chair at 8 o'clock.

His Honor, M. Archambault, Mayor of l'Assomption, accompanied by the Town-Council, presented *an address of welcome* to the President and members of the Dairymen's Association.

After due acknowledgments from the President, the session was resumed.

The President read the official opening speech of the Meeting.

M. Louis Beaubien next gave a lecture on *The Silo.*

The Abbé Labelle, the Honorary President of the Association, at the invitation of the President addressed a few remarks to the meeting; he offered the excuses of the Hon. Minister of Agriculture and Colonisation, who was prevented from being present, and declared his appreciation of the work done by the Association.

The Hon. J. J. Ross, at the instance of the President, followed the Abbé, making some observations on the dairy-industry, and on questions thereto allied, on ensilage, among others.

Then came an essay from The Abbé Caisse, curé of St. Sulpice, on *Production considered as a question of political economy.*

And the session adjourned at 11.30 P. M.

Thursday, January 24th. 10.30 A. M.

At 9.30 A. M., the President took the chair.

M. J. J. Chapais, seconded by the Abbé Montminy, proposed that a committee be appointed to examine the different samples of ensilage exhibited at the meeting.

The Rev. Father Jean-Baptiste, Oka, the Rev. M. Labonté, and Messrs. Marsan and Archambault, were chosen as members of this committee.

M. Jules Paquet, St. Nicolas de Lotbinière, spoke on the construction of farm buildings, illustrating his lecture by means of eight large drawings.

The Abbé Montminy followed treating the subject of the *Connection of Agricultural clubs with the dairy-industry.*

A discussion then took place, between Messrs. Beaubien, Casavant and Paquet, on the latter gentleman's lecture.

A few words were said on the question of dairy-work, and the session adjourned at noon.

January 24th, 1.30 P. M.

At 1.30, the President took the chair.

At the request of M. Archambault, the secretary read the report of the school factory of St. Hyacinthe.

M. Jos Painchaud read to the meeting a report of his inspections made, under the control of the Association, for the government, for the year 1888; whence arose a discussion, between Messrs. Archambault, Painchaud, Tassé, Dubeau, Préfontaine, Tathé, Jobin, Allard, Ayotte, Côté, Vigneau and Ross, on certain points concerned in the manufacture of cheese, &c.

Letters of excuse from directors and others who were unable to be present, were read by the secretary.

A lecture on *The construction of a Piggery* was read by M. Casavant, St. Dominique, followed by questions and remarks from MM. Paquet, Casavant, Chapais and Couture.

M. F. X. Thibault, advocate and farmer, Ste. Thérèse de Blainville, read an essay on *The sugar-beet and its cultivation*: questions on this subject were asked by M. Jobin and answered by the lecturer.

M. Auguste Gérin, Montreal, cheese-maker, who had translated Mr. J. A. Macdonald's report, now read it.

The Abbé Montminy submitted to the meeting a resolution passed on Tuesday evening, the 22nd, by the board of directors, appointing Arthabaskaville as the place for the next annual meeting of the association, which motion was unanimously agreed to.

M. Chapais, seconded by M. L. T. Brodeur, submitted for approbation, a resolution, passed at the same meeting of the board of directors, to the following effect: "That for the future, those members who report on the operations of their cheese or butter-factories, be requested to add to their documents the declaration required by the statute for the suppression of voluntary and extra-judicial oaths, and to make their reports in accordance with a form which will be furnished by the Association.

This resolutio

M. L. Beaubien, Lordship, the Bishop's patronage on the part of each diocese, the labours of the

And the sessi

In the absenc

The session w

To him succee
agriculture bearin

A discussion f
Bruneau and Lem

M. Alexis Chi
turing the samples
followed by remar
from the experime

The Abbé Mor
a federal associati
as president, *pro te*
Rev. Gentlemen of
of the society for
that it had receive
that this annual m

This resolution, too, was carried unanimously.

M. L. Beaubien made a few remarks, in which he suggested that their Lordship, the Bishops of the Province, be requested to confer their active patronage on the association by sending to the meetings a delegated priest from each diocese, who shall be specially charged with the duty of observing the labours of the association.

And the session adjourned at 5.30.

Thursday, 7.30 P. M.

In the absence of the President, the Abbé Montminy took the chair.

The session was opened by M. Chapais, who read an essay on "Milk."

To him succeeded M. Marsan, who spoke of *Certain improvements in agriculture bearing on the production of milk.*

A discussion followed, in which Messrs. Chapais, Marsan, Casavant, Bruneau and Lemire took part.

M. Alexis Chicoine gave some details concerning the mode of manufacturing the samples of butter sent by him to the meeting. This report was followed by remarks on butter making, and on the conclusions to be drawn from the experiments made by M. Chicoine, by M. J. de L. Taché.

The Abbé Montminy mentioned that, during the approaching session, a federal association of the Dairy-industry would be held at Ottawa; and, as president, *pro temp.*, he offered to the citizens of L'Assomption, to the Rev. Gentlemen of the College, and to M. J. J. A. Marsan, the official thanks of the society for the generous hospitality and the numerous attendance that it had received at this annual meeting, and the Abbé then, declaring that this annual meeting was closed, left the chair.

REPORT OF THE MEETING

St. HYACINTHE, JANUARY 22nd. 1888.

J. DE L. TACHÉ.

MY DEAR SIR,

Up to the very last moment, I hoped to be at the meeting, but I find to day that it is impossible. A fresh cold, caught during the last few days, obliges me to stay at home.

Your devoted

J. B. CHARTIER, PTRE.

J. DE L. TACHÉ,

Sec.-Tres.

SIR,

Unforeseen business prevents me from being at the meeting this year. Still, if my body be absent, I shall be there in spirit, for I regret very much not to be able to go, and I wish you every success.

As to the silage you asked for in your last, I must tell you that I had the misfortune to lose my maize last spring: it never came up, and, in consequence, I could not fill my silo.

With great respect, I remain your devoted

E. DUFAULT.

STE HÉLÈNE DE BAGOT, JAN. 22ND. 1889.

St. ELZÉAR, BEAUCE, JAN. 21st. 1889.

J. DE L. TACHÉ, ESQR.

DEAR SIR,

In spite of the pleasure I should have enjoyed in being present at the

meeting of the
come, as I am v

I am very s
to make with re
neral applicatio
prudence, take :

Pray belie

J. DE L. TACHÉ

DEAR

I am sorry I
forward to a plea
believe to be the

I trust you w

To the meml

GENTLEMEN,

We take the
1890, in this villa
sant.

meeting of the Dairymen's Association of the Province of Quebec, I cannot come, as I am very unwell: to take so long a journey would be imprudent.

I am very sorry things have turn out thus, for I had many observations to make with reference to my own county, though they would admit of general application. Still, I hope the directors who are present will, in their prudence, take all proper measures.

Pray believe me, Mr. Secretary,

Your entirely devoted servant,

JEAN BILODEAU,

Director for Beauce.

DANVILLE, JAN. 22nd, 1889.

J. DE L. TACHÉ,

DEAR SIR,

I am sorry I cannot get away to the convention. I have been looking forward to a pleasant time and to a meeting with those interested in what I believe to be the most important industry in our province.

I trust you will have a profitable meeting.

Yours truly,

A. McCALLUM.

ARTHABASKAVILLE, JAN. 21st, 1889.

To the members of the Dairymen's Association of the Province of Quebec.

GENTLEMEN,

We take the liberty of inviting you to hold your meeting in January 1890, in this village, and we will do our best to make your stay here pleasant.

Accept gentlemen, the assurances of esteem and consideration with which we have the honour to be

Your very obedient servants,

B. THÉROUX, JR.	WILFRID LAUCHER.
A. B. DESROCHERS:	G. GENDREAU.
ISIDORE BÉLAND, PRIEST.	M. A. PLAMONDON, J. C. S.
L. C. PEPIN.	EUGÈNE CRÉPEAU.
J. E. MÉTHOT.	A. POISSON.
CHAS. C. BERNIER.	ROMÉO POISSON.
ADÉLARD PICHÉ.	L. J. CANNON.
P. L. O. MILOT.	LOUIS RAINVILLE.
E. L. PACAUD.	J. LAVERGNE.
J. B. OUELLETTE.	E. B. BOUJEAU, M. D.
FRÈRE SYMPHORIEN, DIR. COM. T. MAHEU.	
COLLEGE.	

Note.—The following letter was sent to the convention on the 23rd January ; but the directors had decided the evening before its receipt that the invitation to Arthabaskaville should be accepted. We give also some extracts from the Sorel papers referring to the invitation given by Dr. Bruneau in the name of that town.

SOREL, JAN. 14th, 1889.

ADOLPHE BRUNEAU ESQR. M. D., SOREL.

SIR,

I have the pleasure of informing you that your letter of the 8th instant was submitted to the Town-council, at their regular meeting, and was received by them with lively satisfaction. A resolution was in consequence passed, by which the Council placed at the disposition of the gentlemen who intend to hold a meeting of the Dairymen's Association the free use of the Theatre at the Town-hall. You will have the goodness to inform me of the date of the above meeting, in order that the proper arrangements may be made, and the Theatre suitably warmed and lighted.

Thanking you for so happily introducing this idea,

I have the honour to be, Sir, your obedient servant,

JOHN G. CREBASSA, Jnr.

Sec.-Treas.

At the last se-
agree to the requ-
ciation of the Pro-
next year.

Dr. Bruneau,
tends to be presen
the Wednesday ar
his colleagues to se

We congratul
wish him success.

Nearly a thou
every year at these
their visit.

Besides, the di
great agricultural r
our principal agric
itself ; and we trust
friends of agricultu

Up to the prese
held: five at St. Hy

This year, as we
we hope, at Sorel.—

TH

Dr. Bruneau has
the next meeting of t
may be held therein.

The council has g
the meeting of this y
make an offer to the
1890 in this town.

These meetings br
visitors ; and, as the c
shall greatly benefit th

We congratulated
Sec.—*Le Sorelois*

 THE DAIRY-INDUSTRY.

At the last session of the Town council, it was unanimously decided to agree to the request of Dr. Bruneau, and to offer to the Dairymen's Association of the Province of Quebec the free use of our theatre for its meeting next year.

Dr. Bruneau, who, in his position as a member of this association, intends to be present at the meeting which takes place at L'Assomption on the Wednesday and Thursday of next week, will, in consequence, invite his colleagues to select Sorel as their place of meeting in January 1890.

We congratulate M. Bruneau on the step he has taken, and we heartily wish him success.

Nearly a thousand people, from all parts of the province, are present every year at these meetings, and Sorel cannot fail to benefit greatly by their visit.

Besides, the district of Richelieu, of which Sorel is the centre, is a great agricultural region, and deserves that this association, composed of our principal agriculturists, should study its resources on the very spot itself; and we trust that its right to the kind attention of these zealous friends of agriculture will not be overlooked.

Up to the present time, eight meetings of the association have been held: five at St. Hyacinthe, two at Quebec, and one at Three Rivers.

This year, as we said before, it meets at L'Assomption, and next year, we hope, at Sorel.—*Le Sud*.

THE DAIRYMEN'S ASSOCIATION.

Dr. Bruneau has asked the Council for the free use of the theatre, that the next meeting of the Dairymen's Association of the Province of Quebec may be held therein.

The council has granted his request. Dr. Bruneau will be present at the meeting of this year, to be held at L'Assomption, and there he will make an offer to the association of holding their meeting of the year 1890 in this town.

These meetings bring together a great number—several hundreds—of visitors; and, as the county of Richelieu is a great agricultural centre, we shall greatly benefit thereby.

We congratulated Dr. Bruneau on his idea, and we hope it may succeed.—*Le Sorelois*

QUEBEC, JAN. 23rd. 1889.

A. BRUNEAU Esqr.

MY DEAR SIR,

Having promised you to go to the Agricultural meeting at L'Assomption, I regret very much that unforeseen circumstances prevent me from being present at that reunion which is intended to further the progress of agriculture. Nevertheless, I assure you that I will do my utmost to promote everything which tends to the development of the cultivation of the soil.

Kindly offer my excuses to the originators of the meeting, and express to them my earnest wish that an assembly of the same sort may be held on the next occasion at Sorel.

Believe me, Sir, your devoted,

L. P. P. CARDIN, M. P. P.

ADDRESS OF THE TOWN OF L'ASSOMPTION

To the members of the Dairymen's Association

GENTLEMEN,

The town of L'Assomption feels highly honoured by your visit, and we, with all our hearts, bid you welcome.

Instructing the people, discussing the most interesting questions, and casting many a ray of light on an art still very little understood in many parts of our country, every year witnesses your society meeting at some point of the province. Everywhere, Gentlemen, as the indubitable result of your labours, new energy has been excited, good has been developed, and an era of prosperity has been opened before the Canadian nation.

We wished, in offering you our hospitality, to show you that we knew how to appreciate your work, and that our sympathy was all yours. We were desirous, too, of enabling our intelligent farmers to share in those precious advantages, traces of which your association leaves everywhere in its passage.

The College of L'Assomption, always forward in enterprises of this kind, had the goodness to place its Academic Hall at our disposal.

Replying with this the centre of movement in favour of benefit greatly by you our gratitude and, believe me, we instructions. Your idea, an idea which its side; and our crown its labours a

Canada needs and can supply its will spare no pains

Herein lies you to your talent, to your lectures, and this in the year 1889, and welcome to you

The Members of

L'ASSOMPTION

23RD JANUARY, 1889

REPLY OF THE

GENTLEMEN,

Not having expected am unable to reply to we are proud of the tion, it is true, is, in a few years in existence cause of agriculture; know, that the great

We were glad to somption placed at our among its members most of us come from

Replying with goodwill to our invitation, you are here, Gentlemen, in this the centre of a purely agricultural district, to direct, to encourage the movement in favour of the Dairy-industry, and L'Assomption itself will benefit greatly by your useful lectures and discussion. Allow me to express to you our gratitude in the name of the town and off the neighbouring parishes, and, believe me, we shall all be happy to put in practice your advice and your instructions. You are, if I may so speak, the soldiers, the champions of an idea, an idea which is constantly gaining ground and winning converts to its side; and our people, following out its behests, will soon see success crown its labours and efforts for their good.

Canada needs men of experience who understand the wants of a nation and can supply its requirements; it demands devoted, generous men, who will spare no pains to extend, to develop agricultural knowledge.

Herein lies your mission, gentlemen, your noble task: glory, honour to your talent, to your courage. We shall listen with great interest to your lectures, and this meeting of the Dairymen's Association in L'Assomption, in the year 1889, will be abundantly productive of good results. Thanks and welcome to you all.

The Members of the Town-Council of L'Assomption, by the Mayor.

F. X. ARCHAMBAULT.

L'ASSOMPTION, }

23RD JANUARY, 1889. }

REPLY OF THE PRESIDENT TO THE ADDRESS OF THE TOWN-COUNCIL OF L'ASSOMPTION.

GENTLEMEN,

Not having expected the presentation of your address, I regret that I am unable to reply to it in a worthier manner. Let me say, however, that we are proud of the praise you confer upon us. The Dairymen's Association, it is true, is, in reality, only just beginning its work; it has been but a few years in existence. It gives us pleasure, however, to work in the cause of agriculture; for you know well, and especially does L'Assomption know, that the greatest interest of the country is its agriculture.

We were glad to see the magnificent hall which the College of L'Assomption placed at our disposal. Well do we know that the college reckons among its members devoted men, worthy successors of its founders. If most of us come from places far from this town, we are not unacquainted

with the names of the generous founders of your college. We know well that the names of Labelle, Cazeneuve and Meilleur, are enrolled in the annals of the country.

We were very fortunate in choosing L'Assomption as the rendez-vous of our association for 1889, and I repeat to you my thanks as well as the thanks of the members of this association. Believe me, we shall always recall with pleasure the hours we have passed in your town.

OPENING ADDRESS OF THE PRESIDENT.

The Hon. P. B. de la Bruère read the following opening address, in which he gave a résumé of the transactions of the Association during the year 1888.

Gentlemen,

Last year it was decided to hold the present annual meeting of the Dairymen's Association at L'Assomption.

This place was selected for many reasons. We knew that there existed here an agricultural school which must have imbued the minds of the intelligent people of the north with an ardent desire to see the progress of agriculture take a still loftier flight.

Besides, L'Assomption is a town susceptible to the charms of improvement, possessing, as it does, one of the most renowned classical colleges of the country. The reputation of this charming spot is not restricted to the bank of the St. Lawrence and the foothills of the Laurentian mountains, but is widely spread over the seigneuries of the southern bank and over the Eastern-Townships.

Our association, whose mission is to extend the knowledge of cultivation among the farming population, was, therefore, anxious to assemble its members here, and felt highly pleased at the agreeable invitation it had received and accepted, to hold its annual meeting at L'Assomption.

Be well assured, Gentlemen, that we feel very fortunate at being once more together, and in this important centre of the north side of the St. Lawrence. The multitude of persons who have hastened to be present at our deliberations is another source of rejoicing, as it insures the success of our meeting.

This is the
tion, and I am h
the success tha
433, against 70 a
to our list, and i
many, who only
its work by the €

Our success
to increase the ar
years ago, this su
so pressing for ou

You are well
the articles manu
June 30th. 1887,
pounds, equal to \$
equal to \$979,128,

From the port
exported 1,135,750
\$8,145,000 pounds
not diminishing an
farming class. Be
this.

The summer ar
harvest was serious
was absolutely ruin
the fields; but in s
plaints from the co
dairy-industry was
rain-crop.

Twelve years ag
out this disaster, of l
counterpoise to th
the most pressing ex

Though the exp
st meeting, I stated
half since 1881. This
only exported 36,767
36,272 tubs in 1885.
Montreal has fallen o

This is, without
attention, not only of

This is the eighth convention held since the institution of the association, and I am happy to say that we cannot but congratulate ourselves on the success that has attended us. The number of our members is now 433, against 70 at our first meeting. In 1888, 139 fresh names were added to our list, and it gladdens me to think that the increase will continue, since many, who only know the association by name, will be forced to appreciate its work by the evidence of their own eyes during the meeting.

Our success would be still more marked were the Quebec Government to increase the amount of our annual grant, which is only \$1,000. A few years ago, this sum was enough, but, with the wants of the dairy-industry so pressing for our aid, it is no longer sufficient.

You are well aware, Gentlemen, how great is the amount represented by the articles manufactured yearly by this industry. For the year ending June 30th. 1887, the exportation of Canadian cheese exceeded 73,654,448 pounds, equal to \$7,108,878 ; and of butter, we sent abroad 5,485,509 pounds equal to \$979,128, being a total value of \$8,088,106.

From the port of Montreal, during the season of navigation 1888, were exported 1,135,750 boxes of cheese, which, at 60 pounds a box, represent 68,145,000 pounds ; which figures show that the manufacture of cheese is not diminishing and that the dairy-industry is indeed the life-belt of the farming class. Besides, a few months ago, we saw a very striking proof of this.

The summer and autumn of 1888 were excessively wet ; the farmers, harvest was seriously damaged by the continued rains, and, in some places, was absolutely ruined by the frost ; much grain and forage were rotted in the fields ; but in spite of all these misfortunes we hear no very bitter complaints from the county at large ! Why is this, gentlemen ? Because the dairy-industry was sufficiently profitable to make up for the ruin of the grain-crop.

Twelve years ago, the loss to the farmer would have been irreparable ; but this disaster, of last year, found in the manufacture of butter and cheese counterpoise to the loss of the harvest, and the funds necessary to meet the most pressing expenses were not wanting.

Though the export of cheese increases, that of butter decreases. At the last meeting, I stated that our exports of butter had diminished by one-half since 1881. This year the proportion is still greater. In 1888, Montreal only exported 36,767 tubs, against 97,546 in 1887, 86,287 in 1886, and 106,272 tubs in 1885. In three years, therefore, the export of butter from Montreal has fallen off two-thirds.

This is, without doubt, a very grave result, and must attract the attention, not only of our association, but of every farmer.

In our rural districts, the best methods of making and packing butter are unknown : a remedy to this ignorance must of all necessity be applied.

I have already said that, in my opinion, if the farmers' wives were invited to attend our meetings, they would greatly benefit thereby, and would, with their habitual clear-sightedness, obtain information which would aid them in obtaining a beneficial influence over their husbands, and in bringing about important improvements on their farms.

To this idea I will add that the farmers' daughters ought to learn butter-making from our inspectors. This could be, I should think, easily managed; and, in order to encourage them, a prize might be conferred upon her who, by the report of the inspector, had, in a competition at the factory, given evidence of the greatest aptitude for butter-making and for all that concerns the management of the dairy.

I cannot pass over in silence the two visits which Mr. McPherson, the well-known cheese-king, paid to our province in the interest of the dairy-industry; one to St. Hyacinthe, the other to Montmagny.

At the former spot, more than sixty cheese-makers were present, at the latter, nearly thirty. Mr. McPherson made many important observations on the best methods of cheese-making, which remarks were highly appreciated by his audience, and have been entered in the instructions to cheese-makers distributed by this association.

One proof of the growing interest taken in the improvement of cheese-making is afforded by the crowd of persons who came last summer to study at the school-factory at St. Hyacinthe, conducted with so much devotion by M. Misaël Archambault.

This school, founded in 1884, was attended by twenty pupils, each of whom passed one day there. In 1888, sixty-eight pupils spent 393 days there and five days each, on an average.

Although the school is situated at St. Hyacinthe, it is not only from that district that it draws its students, for cheesemakers attend it from all parts of the province; from St. Herménégilde de Barford, Coaticook, Weedon, Deschambault, Les Grondines, St. Paul l'Ermite, Ste. Julienne, Chicoutimi, St. Félicien, Mégantic, Baie St. Paul, St. François and St. Joseph de Beauce, &c.

The school, then, must be of great value to the trade, and I believe that if four or five like it were established in the province, the dairy-industry would reap great benefit from them.

Another sign that the public appreciates the course of improvement pursued by the association, is that our inspectors visited 310 factories against 270 last year. Out of the 310, 277 were cheese-factories, of which 243 make Cheddar-cheese; only 35 follow the old system.

In 1884, then
of which knew 1

Last year, ev
the old system.

In the distric
only found two f
done by all the
change, radical a
they saw in it an
The dealers, too,
has operated on t

It is in your i
founded. We an
ment of the cause
yourselves do not
of your good will.
trodden: the inte
mands it.

Establish agri
however young, at
a love of agricultu
their family prope
sent into your pari
from them among
neighbours; perfec
find in the annual
the different bran

BY THE REV. J

(1). The principles laid
the Civiltà Cattolica, a lea

MR. PRESIDENT

I must confess,
I stand is not very f

In 1884, there were not 5 factories in the whole province the managers of which knew how to make Cheddar and made it.

Last year, even, there were still 62 out of the 226 visited, which followed the old system.

In the district round St. Hyacinthe, Mr. Macdonald in all his visits only found two factories, out of 125, which follow the old plan now abandoned by all the best makers. This association it is that has compassed this change, radical as it is; but the makers themselves have lent their aid, for they saw in it an indisputable advantage, a real step in the path of progress. The dealers, too, bear witness to the good the change thus brought about has operated on the goods.

It is in your interest, farmers, that the Dairymen's Association was founded. We are happy to devote our time and our labour to the advancement of the cause of agriculture, but our efforts will be ineffective if you yourselves do not bring to our aid the concurrence of your intelligence and of your good will. The road to useful reforms in practice must be resolutely trodden: the interest of our families, of our parishes, of our country, demands it.

Establish agricultural clubs for your instruction; let your children, however young, attend them, that their minds may be deeply imbued with a love of agriculture, and with the knowledge of the best means of making their family property remunerative. Ask that the best lecturers may be sent into your parishes to speak on farm-matters; discuss all you hear from them among yourselves; share your acquired experience with your neighbours; perfect your modes of cultivation; and, let me add, you will find in the annual reports of this association very useful information on the different branches of agricultural practice.

PRODUCTION.

A study in Political Economy.

BY THE REV. J. C. CAISSE, PRIEST, CURÉ OF ST. SULPICE. (1)

(1). The principles laid down in the first and second parts of this lecture are chiefly taken from the *Civiltà Cattolica*, a learned review, published at Rome, by the Rev. Jesuit Fathers. J. C. C.

MR. PRESIDENT AND GENTLEMEN,

I must confess, at the outset of this lecture, that the ground on which I stand is not very familiar to me. My thoughts are accustomed to explore

other fields and to examine other horizons than those of the art of agriculture. Still, churchman as I am, I know all that the Church has done for this art, the most useful, if not the most beautiful, and, without doubt, the first and most venerable of all arts as far as its antiquity is regarded. A Canadian, I am not ignorant of the debt our country owes to agriculture, and I am, therefore, only too glad to afford it a word of love and sympathy. Voices, not less friendly and with much more authority than mine, have already given, and will continue to give, the results of their experience, and will pour forth precious words of encouragement. For me, leaving the practical part to practical men (*hommes du métier*), I will draw the attention of your honourable association to the important question of PRODUCTION, from the point of view of politico-economic science. In this essay, which must, necessarily, be very concise, I shall state what the nature of production is, what are its agents, and what are the means to be taken to increase it in a legitimate and desirable measure.

1. That production, considered as a matter of economic-science, is a vital question, we can easily convince ourselves, if we cast a glance at the state of society, and listen to its aspirations and desires. Is it not the case, that the social world, in all directions, is penetrated with an ardent wish for temporal prosperity? Into all public and private associations, this wish enters largely; it is the chief cause of all private and public movements. Let me say, at once, this desire, or rather, this need, is not bad in itself; and as long as it is retained within proper limits, and controlled by the principles of the law of nature, the Church blames it not; on the contrary, she blesses it, as does the Almighty, who has bequeathed to the research and the industry of the human race, the earth and all its riches. But what will satisfy this need? What will bestow the food necessary to appease this appetite?... Wealth, or at least a modest competence, honestly earned. Now, this honest competence springs naturally from *production*; production I may say, is the plant, riches and competence are its fruits.

How then in a politico-economic sense, shall we define *production*? To *produce* signifies, in a philosophic sense, to create, or bring something into existence. Thus we say, the vine produces the grape. In political economy, to produce means: to bring into existence some form of wealth or of its elements. Now, wealth has its *raison d'être* in the *utility* and not in the *intrinsic value* of things, as some economists erroneously assert: to produce, then, means, in economic terms, to confer utility on things, to make things useful. The act of producing is termed *production*, the agent, the *producer*, and the effect, the *product*.

The production of wealth can be effected in three different ways: either by producing something useful in itself; by making a thing useful which before was not so; or by increasing a pre-existent utility.

There are, pr
and the labour of

At the Creati
riches of incalcul
useful trees. At t
air, the depths of
met together in oi
and, king and poi
nage. But he rece
passing his time in
a noble, a pleasur
keep the terrestria
labour, while retai
laws of human exj
God, in blessing o
tiply, replenish th
of the sea, over the
the earth."

In conformity
need of divers thin
man industry beca
those inventions w
rection, and submit
the ground to yield
products. At the
herds; he brought
of his hardships and
he made them serv
Under his skilful ha
converted into steel.
in number. The wi
and, commanding e
he yoked it to a met
convey his words fr

2. All these inve
genius of mankind.
They are the fruit of
out just now: Natur
man. To what use v
you plough your lan
if the germinating po
of the sun, and the f

There are, properly speaking, two great producers of wealth : Nature, and the labour of man.

At the Creation, the Almighty concealed in the bowels of the earth riches of incalculable value ; He covered it with all kinds of plants and of useful trees. At the sound of his voice, birds peopled the fields and the air, the depths of the ocean were filled with fish, and the terrestrial animals met together in our woods and our forests ; then, man sprang into being, and, king and pontiff of creation, received all this abundance as his appanage. But he received this heritage on condition that he should labour, not passing his time in the lazy delights of idleness. Before the Fall, labour was a noble, a pleasant occupation ; still, it was labour : Adam's duty was to keep the terrestrial paradise in order and to labour therein. After the Fall, labour, while retaining its primitive nobility, became one of the three great laws of human expiation : the other two are sorrow and death. Finally, God, in blessing our first parents, said to them : " Be fruitful and multiply, replenish the earth and subdue it, and have dominion over the fish of the sea, over the birds of the air, and over all the animals that dwell on the earth."

In conformity with this command of the Almighty, in proportion as the need of divers things was felt and the population of the world increased, human industry became developed by labour, and gave us, by degrees, all those inventions which we now admire. It broke up the earth in every direction, and submitted it to an intelligent system of cultivation ; it forced the ground to yield up its hidden treasures, to multiply and improve its products. At the command of man, the beasts came together in docile herds ; he brought their races to perfection, making them the companions of his hardships and his toil. Collecting from every side the raw materials, he made them serve for the preservation and the embellishment of his life. Under his skilful hands, flax became linen, wool became cloth, and iron was converted into steel. By him, implements and machinery were increased in number. The wind and the water became his slaves, steam his horse ; and, commanding electricity to leave those bodies which imprisoned it, he yoked it to a metallic wire, and compelled it as a faithful messenger to convey his words from one end of the earth to the other.

2. All these inventions, gentlemen, are grand, and do honour to the genius of mankind. But they are not due to the industry of man alone. They are the fruit of the combination of the two agents which we pointed out just now : Nature and labour ; the gift of God and the co-operation of man. To what use would labour tend, without the gift of God ? Farmer, you plough your land, you sow it, but in vain do you look for the harvest, if the germinating power of the seed, aided by the rain of heaven, the heat of the sun, and the fertility of the soil, does not produce for you the ears

some of them I shall only touch upon, on others I shall enlarge. And among the former, are those already in existence, but deserving of particular encouragement, such as ploughing-matches, county agricultural exhibitions, and even parish-exhibitions, creameries, and cheese-factories; to which may be added: prizes given to the best farmers and the best breeders of stock. Among the others I would reckon our parochial *agricultural clubs*, agricultural teaching, and colonisation. The parochial agricultural clubs, under the presidentship of the curé, if well managed, may be of great service.

And, in truth, wherever they have been established, great results have been derived from them. Your association will have deserved well of the country, if, through its influence and its judicious management, these clubs are multiplied in our parishes.

Agricultural instruction.—Elementary instruction within the grasp of the minds of the children of our farmers, who, for the most part, have neither the time for nor the means of thoroughly studying agricultural science, and to whom an education, moral and practical, is, I believe, necessary above all other things,—is a most desirable improvement. The *alphabet*, so to speak, of this teaching might be taught, it seems to me, in our country schools. A short agricultural manual, within the apprehension of children, might well succeed the catechism, which in every catholic school, necessarily occupies the first place. In addition, schools of agriculture are needed, where thorough teaching is given, complete in theory and practice, and in accord with the economic and moral demands of the country. The need of this superior instruction flows from the principles we laid down, when speaking of the two chief agents of production, nature and labour. Indeed, it is clear that intelligent labour directed by the maxims of agricultural science, will be able to extract from the forces and the gifts of nature a greater amount of prosperity and wealth than the toil which is the fruit of a blind adherence to routine.

May I here be permitted to express, with all delicacy, but, at the same time, with perfect frankness, a conviction and a heartfelt desire? The conviction is, that the lads who have attended the agricultural school of L'Acsomption—and I can say the same of the pupils at Ste. Anne's—have received the necessary instruction, that this school, whose beginnings were so humble and beset with such difficulties, has rendered great service to the art of agriculture, not only in this county, but has also gained the entire confidence of the parents whose children attend its classes, and of all the staff of directors, both clergy and laity, of this important district. My desire is, that favoured with justice and discernment by the government, it, with its sister school at Ste. Anne's, may march rapidly along the road of true agricultural pro-

gress, under the high moral guarantee of the college of L'Assomption, and under the firm and wise management of our distinguished agriculturist, M. Marsan.

Colonisation is for us a question of life or death. This duty imposes itself upon our patriotism before all others. But I will not trespass beyond the limits I have assigned myself. For, looking at this from an economical and agricultural point, who dare deny that colonisation holds the first rank as a means of increasing production? In order to produce agricultural wealth, land fit for cultivation is above all things necessary. Our old parishes no longer suffice for the wants of the excess of their population. Well, let us direct this excess towards the uncleared lands, which are only waiting for vigorous arms and indomitable wills to return a hundred fold. And more, by colonisation, we shall keep within bounds, and end, perchance, by finally extinguishing, what has been long recognised as a social evil, emigration, in the first place to the States, and in the second, which tends more and more every day to be as great an evil as the former, the emigration of the rural population from their homes into the great cities.

These, Gentlemen, seem to me to be chief means of increasing the agricultural production of our country.

Pardon me, for having taken advantage of your patience, and accept my thanks for your kind attention.

THE SILO.

A LECTURE BY M. LOUIS BEAUBIEN.

M. President, Ladies, and Gentlemen,

One fine day last autumn, I was travelling along one of those long colonisation roads: the first encroachment on the virgin forest. We had crossed the bright Laurentians, driven along the side of many an enchanting lake, and were approaching the greatest of all, the end of our journey, the beautiful Nominingue.

We were, you see, in an absolutely new country, a part of that grand domain which the zeal and activity of Father Labelle has thrown open to our people, and to which we have given the name of the North-West of the Province of Quebec. On each side of us, the unbroken forest; the hand of man had not yet attacked its rustic loveliness. No sign, as yet, that any colonist proposed to take possession of the spot as his heritage.

All at once, w
When in the fores
post, of telegraph,
Frenchmen, must v
of passing along c
frankly but briefly
spots as it is in our
on the other side of

Our conversati
of M. Lalonde, wh
a fine young man—
face.

I asked him ab
had seen them at w
advice. "Ah! Sir,
winter just as in sun
silo, and the product

In addressing yo
to the country, I th
beginning the words
convey to you as wel
uttered. To my mind
a great popular resul

Many a time hav
form one of the pleas
ningue, last autumn.

If the silo, then,
ers of the virgin fo
and the *second-growth*

(1) May I be permitted a
mentioned M. Lalonde: a mo
erime; but he, by the blessi
requently among our people,
of his children in business, bu
whom he loved equally in his
out of the lands of the crown.
alien to his friends, bought a
then his comfortable house, b
there, under the eye of their pa
erous land-owners, and, still,
pittance for each of them, an
rotherly union, happiness, a
others of families could do the
ture with a doubtful eye. If
ly one from his embarrassme
myself fortunate in having mad
na, happy, courageous family

All at once, what was almost an event happened : we met some one ! When in the forest two men meet, then is the time to supply the want of post, of telegraph, even of the telephone. Not only, like Christians and Frenchmen, must we salute each other in a friendly way, but more, instead of passing along coldly and stiffly, we chat a little, telling and hearing, frankly but briefly, the news of the day. It is not at all in these distant spots as it is in our horrid towns, when one does not know one's neighbour on the other side of a ten-inch party-wall.

Our conversation, then, was soon started. I recognized at once the son of M. Lalonde, who had been settled for the last few years at Nominieue ; a fine young man—I hope he does not hear me—with a bright, intelligent face.

I asked him about the silo built the previous autumn on the farm. I had seen them at work on the building, and had even given them a little advice. " Ah ! Sir, " replied he, " we have been making butter all the winter just as in summer. This fall, we shall double the capacity of the silo, and the production of butter will be doubled too, and no mistake."

In addressing you, gentlemen, on experiments on ensilage, of its results to the country, I thought it would be as well to relate to you, at the very beginning the words of this youth ; to tell you where I heard them, and to convey to you as well as I could the tone of satisfaction in which they were uttered. To my mind, they include an important lesson as well as display a great popular result.

Many a time have I repeated these words, and with satisfaction they form one of the pleasantest recollections of my trip to my farms at Nominieue, last autumn. (1)

If the silo, then, is thus valued in the new farms, far away, on the borders of the virgin forests, where the tough stumps with their long roots, and the *second-growth*, hinder cultivation, what may we not expect from it

(1) May I be permitted a digression, though what I am about to say is not really one ? I have mentioned M. Lalonde : a model for many men. He was fairly successful as a shopkeeper at St. Jerome ; but he, by the blessing of Abraham, had a very large family, a thing that happens pretty frequently among our people, and consoles them in their troubles. He felt able to set up one or two of his children in business, but what to do with the rest ? To avoid creating jealousy among those whom he loved equally in his happy home, he determined to give them all the same heritage, earned out of the lands of the crown. Selling his property and realising his assets in the old village, he bid his children to his friends, bought a large property on the banks of the great and beautiful Nominieue, when his comfortable house, built on an eminence, commands a view over that immense sheet of water. There, under the eye of their parents, all the children, one after the other, will become happy and prosperous land-owners, and, still, each will remain the neighbour of the other. There would have only been bitterness for each of them, and they must have separated, had the family remained at St. Jerome. Brotherly union, happiness, abundance, will be their lot on these new farms. How many other fathers of families could do the same, who, now, seeing their increasing families, are looking at the future with a doubtful eye. If what I am saying at this moment may have the effect of extricating any one from his embarrassment, and at the same time assist our devoted colonisers, I should think myself fortunate in having made this digression, in which you have heard the history of the numerous, happy, courageous family of M. Lalonde.

in the old settlements, where corn can be cultivated, not with the hoe, but with all the care insured by the use of modern implements. This was the reflection I made to myself, as I was drawing towards the end of my colonisation road.

While I am in the country of the colonist, I may tell you that the silo is of immense assistance to him.

When, at the formidable St. Louis, (1) the buckwheat is caught by the frost, the farmer crams it into the silo, and in winter, the cattle will eat it all, grain and straw together; and in any other case, the whole crop would be lost. If the pancakes are wanting, there will be plenty of milk.

In the fall, the tops of the turnips sown on the burnt-over land (*le noir*) will be added to the contents of the silo. The colonist is greatly assisted by all this in the first hard years of his sojourn on the borders of the forest, especially if he be not rich. If, when he arrives on his lot, he brings with him naught but his axe and his two arms, be they as strong as may be, the silo becomes his savings-bank and at a very trifling cost. One man digs out his silo in the red sand of the hill-side; another, builds his, on the surface, of logs squared on three sides and stuffed in the interstices with moss; the whole covered with rough boards or with *auges forestières*. The fodder-corn is laid herein, at full length, by hand; a chaff-cutter is beyond their means at present.

Like our own silo, M. Lalonde's is placed in his spacious barn, which, by the bye, was not at all a spacious barn last season. "The silo", said he, "has enabled me to increase my stock, and I shall be obliged to extend my barn to lodge all the animals I can now feed." The mixens, too, are growing bigger, and his crops, as well, in proportion to the dung made. Thus all things are uniting, as in a chain, to insure his prosperity.

By means of the silo, the father of the family, already in years, has established on the land, bought of the Crown-lands agent, his son and his young family, giving them all at once the comfort of the home, and milk for the children from the first start. Here, in a few words, is the history of this settlement:

After choosing a fine spot in a hard-wood bush, the father, with his son and his cousin, all go there in the fall to clear up (*efferdocher*). After wintering in the village, they return to the bush in March and begin to *chop*. The snow gone, they pile the logs. The burning over, the best piece of land is chosen to be sown with corn and turnips. The remainder of the *desert* is, as usual, sown with buckwheat and oats. Then, the house is built, the stable and the oven, by degrees, and the beds for both great and small, for the men will

(1) *Fête St. Louis*. Trans.

soon go back to t
whose absence has

Behold the pe
mother, the childr
taking with them :
two pigs, and a fev
midst of a clearing.
fence of laid trees :
bush, where they f

The good old
provision necessary
maize has had its fi
properly built. W
it up with the corn
oats that could not
with stones.

From the first
cultry. He brought
they get on famous
flavoured with som
lake. Neither milk
flown from its nati
without having suff
their abode in the b

And the colonis
soon hasten to build
tion of others soon f

In the old settle
resource ensilage is i
mer, Father Jean Be
see with us to-day, s
daily to his factory :
four or five years ar
this one of mine whi
bearers admitted tha

This winter, I ha
of the chief proprieta
Barnard, the Secreta
meeting was form a c
and the results obtai

soon go back to the village to bring home the beloved daughter-in law, whose absence has caused them to feel not a little dull.

Behold the people leaving the land of Egypt! The grandfather, grandmother, the children and the grandchildren, are off to the promised land, taking with them all their little property: an ox, three cows, three sheep, two pigs, and a few hens. They arrive on the borders of the lake, in the midst of a clearing, where they find the grain up. This they protect by a fence of laid trees and bushes (*embarras*), and the cattle they turn into the bush, where they find plenty of food.

The good old grandfather, who supplies the young family with the provision necessary for the first start in their new life, departs not until the maize has had its first hoeing, and the silo to receive it in autumn has been properly built. When the time for filling it arrives, he returns, and heaps it up with the corn, laid evenly along, and with the turnip-tops and a few oats that could not ripen. The silage is then covered with planks loaded with stones.

From the first winter, the son can winter his cattle without any difficulty. He brought them in from the bush in good condition in the fall, and they get on famously with the contents of the silo and the buckwheat straw, flavoured with some hay from a beaver-meadow near the banks of the little lake. Neither milk nor butter is wanting. This is the story of the swarm flown from its native hive in the old parish, and settled in a new spot, without having suffered those privations which, especially the first year of their abode in the bush, are endured, particularly by the children.

And the colonists who have observed the advantages attending the silo, soon hasten to build themselves one. If one is built in any place, the erection of others soon follows.

In the old settlements, too, the farmers are not slow to discover what a resource ensilage is in our long winters. That excellent and energetic farmer, Father Jean Baptiste, of Notre-Dame du Lac, whom we are glad to see with us to-day, spoke thus to a group of habitans who bring their milk daily to his factory: "You, whom I see here, you will, every one, before four or five years are over, be supplied with a silo of double the capacity of this one of mine which you are as much astonished at to-day." And his hearers admitted that it was not improbable.

This winter, I had the pleasure to see at my place a meeting of some of the chief proprietors of siloes in the district of Montreal, as well as Mr. Barnard, the Secretary of the Council of Agriculture. The object of the meeting was form a club to discuss our different manners of proceeding, and the results obtained. Were present:

The Rev. Brother Charest, Messrs. Thos. Irving, James Drummond, Paul Desmarchais, Dr Desmarchais, George Buchanan, Andrew Dawes, Hugh Brodie, Milton MacDonald, Robert Benny, Frs. Dion, Wm. Stephens, Albert Garth, and Mr. Barnard.

Mr. James Drummond was chosen chairman, and Mr. Barnard, secretary, and I have no objection to that gentleman's giving us this very day a part of his report. The next meeting of our club will be at Mr. Garth's, Ste Thérèse, one of our best known butter-makers.

I need not say that our discussion was interesting and useful to each one of us. One remark, by Messrs. Drummond, Irving and Desmarchais, pleased me so much that I cannot resist the pleasure of imparting it to you. It was to the effect, that the construction of my silo and its accompaniments were most economical. I will give a concise description of it for the benefit of those who did not hear my last lecture on this subject. Silo of wood, in the barn near the thrashing-floor. Frame substantial, lined within with two thicknesses of inch-boards, tongued and grooved, with paper between the two. The bottom on the ground.

This year, I was satisfied with covering the silage with loose boards unweighted, and it answered very well. The silage was topped up with five or six inches of straw. This we found rotten, but the silage was in good order.

The chaff-cutter is fitted with an elevator. After having chopped up the corn and filled the silo, it serves, without changing its place, to cut the straw into chaff during the winter, and to carry it up into the silo, where it deposits the chaff on the boards that cover the silage. This straw-chaff is thrown down with the silage as it is wanted, and whole carried in a barrow to the cattle, at the rate of $\frac{2}{3}$ silage to $\frac{1}{3}$ straw-chaff. At this very time, my pregnant Ayrshires are eating a hundred pounds of this mixture for their sole food, unless they are giving milk. With this ration, they not only keep in good condition, but are actually getting fat. The quantity of dung, too, I observe, will be much greater than usual.

The silage is good and sound all through, and is eaten by the cattle with appetite. It gives no bad flavour to the milk, though the cows in milk are eating fifty pounds a day of it.

At the rate the consumption is going on, I see that, to the best of my judgment, I cannot winter more than $2\frac{1}{2}$ head of cattle on an arpent of fodder-corn. (1) The crop, however, seemed to be a good one! But we know that the summer of the past year was a horribly bad one.

(1) An arpent = $\frac{1}{12}$ of an imperial acre. Trans.

While we were in layers of $3\frac{1}{2}$ feet caused me to make year.

When once the attack, to clear off that none of the silo my man leaves any me notice of it as s

There is no mis consideration in thi frost penetrates ver begins, and the froz and do not affect th

The cows giving hay, and a mash, cc

I am told that I time, however, mine pretty well.

I have taken the met at my place, bec spread abroad as mu ment which answers rienced men cannot f

They were all of existence, it would h of this country of lon farming, by leading t amount of food on a rainy, weather, at a ti

The moister corn more rapidly can its e be carried, that if one s soon as one would v give it an abundant w to that degree that sec

You know what so nplement a season? G

(1) This "renouveler part surface-layer of the silage as sc

While we were filling the silo, I took care to allow the silage to heat, in layers of $3\frac{1}{2}$ feet, up to 125° F. to 150° F. You see that experience has caused me to make a change in my plan as I related it in my lecture last year.

When once the silage has been broken in upon, I take care, at each attack, to clear off as much as possible of the whole surface of the cut, so that none of the silage may be too long exposed to contact with the air. If my man leaves any part of the surface too long exposed, the smell gives me notice of it as soon as I enter the barn where the silo is placed. (1)

There is no mistake about its freezing without hesitation and without consideration in this barn, but the silage has never been injured by it. The frost penetrates very little through the sidewalls, when once the cutting begins, and the frozen parts mixed with the rest are comparatively trifling and do not affect the bulk.

The cows giving milk receive, besides the 50 lbs. of silage, 10 lbs. of hay, and a mash, composed of bran and meal, given hot and made thin.

I am told that pigs and colts can be kept on silage; up to the present time, however, mine are too dainty, except one, and he seems to take to it pretty well.

I have taken the liberty to give you the names of the gentlemen who met at my place, because we intend to do, as I am doing now, namely, to spread abroad as much as possible the advantages of this system of ensilage which answers with us so well, and the approbation of these experienced men cannot fail to aid us in attaining our object.

They were all of the same opinion: if the silo had not been already in existence, it would have been necessary to invent it for the special service of this country of long winters; that it was a very great assistance to our farming, by leading us to cultivate a plant giving the greatest possible amount of food on a given space, and which can be ensiled in any, even in rainy, weather, at a time when no other crop can be touched.

The moister corn is, the more quickly it heats, and, consequently, the more rapidly can its ensilage be finished. And to such a point may this be carried, that if one gets impatient at not being able to add another layer as soon as one would wish, as has happened to me, it is only necessary to give it an abundant watering to induce the silage to begin to heat at once to that degree that secures the production of *sweet* silage.

You know what sort of weather we had last harvest. Was there ever so inclement a season? Green fodder-corn is the very crop of all others for

(1) This "renouveler partout la surface de la coupe" means, I presume, "to clear off the entire surface-layer of the silage as soon as possible." Trans.

such years of failure and of real despair, provided always that one has a silo: it is by far the most difficult crop to be harvested in the ordinary fashion.

In spite of the difficulties of that unfavourable season, I got mine in, though, in spite of the piece being thoroughly drained, my waggon-wheels cut in deeply. We could only put on half a load, and more than one bundle of corn was carried dripping with water, from having been, no doubt, picked up out of a puddle. We could not wait; the layer already in the silo was passing 125° F.; another layer was absolutely necessary, unless we were to have the trouble of covering up the silage just as we do when the whole is full. There is no need, as you know, of tramping the silage in filling, for the layer, in heating, presses itself as firmly as an hydraulic-press could do it.

During rain, the workmen sometimes put on their waterproofs to bring in the layer that was wanted at the right moment.

These facts I related to the gentlemen who did me the honour to visit me, as they were in the act of telling me that my silage had a good colour, a good smell, and a good flavour.

I did not omit to tell them that while we were ensiling the corn, my honourable friend Mr. Ross, always ready to criticize, as you know (particularly now a days, since he is one of valiant leaders of the malcontents of the opposition), Mr. Ross, being on a visit to me, asked me what I was going to do with those bundles of wet maize all covered with dirt, adding that I should spoil my silage, and had better wait till they were a little drier. But I have not always taken his advice: I replied that we were in a semi-deluge, and I saw no prospect of a change for the better; that the corn would only heat so much the faster, and that I would watch the thermometer closely, in order to stop the fermentation in time. And this was done, as I said; the result is there before the eyes of my friends.

All of you who, last summer, saw your pease germinating on the ground without being able to approach them; you who, in the same way, lost your wheat, barley and oats, and saw your hay rotting (*rouir*—*retting*) in the field, when turning it over only injured it the more; you who gathered your potatoes, taking them first of all out of the water to carry them a little further up to an elevated place where they hardly dried any better; think of this crop, blessed in that it is so free from all demands for particular treatment: I mean Indian corn; which will suffer ensilement in rain, even in snow, as well as in the finest weather: the lifeboat of the farmer, the gift of God in these years of distress and punishment through which we are passing.

And any one can build a silo, without being rich, even without being a carpenter.

Let every o
the true mainst

I also expla

The reaper 1
corn be long and
I have cut mine
slip-knot, and la
with every retur
being¹ placed in
loaded, and are
feeder of the cha
a third is tying t
power. That is a
The next day, wl
are reaping the n

The general
should be sown, a
let the stalk ripe
the horse-hoe. W
time to cut it is v
not yield as well,

The first cu
harrow, lengthwa
inches high. The
more subject to m
tain stage of ripen

The productio
pasture.

If you salt the
but it is not more 1
silo.

If the corn is 1
fermenting.

My friends all
rapidly. The syste
in recommending it
a silo, he became a
desires thenceforth
he himself follows 1

It was in that e
been reading for mc

Let every one, then have a silo, that indispensable structure on a farm, the true mainstay against the storms of winter.

I also explained to my friends how I harvested my crop.

The reaper may be used with only two of its rakes. Invariably, if the corn be long and stout, it must be tied in sheaves. Up to the present time, I have cut mine with a sickle. The bands of the sheaves are of string, with a slip-knot, and last for an indefinite time: they are sent back to the field with every return cart. The cartage is done in tip-carts, and the sheaves, being placed in them at length, stand upright on the butts when unloaded, and are easily handled by the workman who carries them to the feeder of the chaff-cutter; another man drives the two carts by turns, and a third is tying the bundles in the field all day. Two horses on the horse power. That is all the hand employed when the ensilement is in progress. The next day, while the layer is heating, the horses rest, and the four men are reaping the maize.

The general opinion is that not more than a bushel to the arpent should be sown, and that the rows should be three feet apart, in order to let the stalk ripen as much as possible, and to give room for the passage of the horse-hoe. When corn is sown thin enough to grow ears, the proper time to cut it is when the grain is "in the milk." Corn broadcasted does not yield as well, and can be neither horse-hoed nor plastered.

The first cultivation is done with the inclined-toothed smoothing harrow, lengthways and across, from time to time, until the corn is six inches high. Then comes the turn of the horse-hoe. Thick-sown corn is more subject to make sour silage, while thin-sown, having arrived at a certain stage of ripeness, makes a sweet silage.

The production of milk may be increased by silage as much as by good pasture.

If you salt the silage, which is a mistake, cows will eat it more greedily, but it is not more nourishing, and, besides it is slower in fermenting in the silo.

If the corn is ripe or blanched by frost, it will take longer to begin fermenting.

My friends all thought that the practice of ensilement was spreading rapidly. The system gave such satisfactory results, that they took pleasure in recommending it to every one. I have always found that if a man built a silo, he became at once an apostle and propagandist of that faith. He desires thenceforth to lead his neighbours and friends along the road that he himself follows with so much pleasure.

It was in that excellent paper, *The Country Gentlemen*, which I have been reading for more than twenty-five years, that I first studied the silo;

then in French books on the subject, and lastly in practice. I became its partisan, and the little work that I read to you two years ago, I distributed all over the country, sending, among others, one to every curé. Many thousand copies, too, were distributed by our association and by the government. Others, besides myself, in the province have also written on the subject.

In many places the seed fell on good ground, for, judging from the letters I receive from people anxious to know the details of the system, and from the frequent visits I receive from farmers anxious to see with their own eyes, I am inclined to think that the process of ensilement is spreading rapidly; not so rapidly as in the States, where it is marching along with giant strides, but at a pace calculated to give satisfaction to those who are interested in the good results that are derived from it.

In the little I have been able to do for the agriculture of my country, nothing has pleased me more, on account of the immediate benefit caused by it, as my endeavour to popularise the process of ensilement. I have always been promising myself to abolish winter. This is what makes it so successful. And to think that it was for France that this grand system was discovered!

Here is a quotation which will show us how this idea is spreading in the north of the province, and the progress it has made in one or two states of the American Union. I read in *Le Nord* :

“ I cannot refrain from citing the names of M. F. X. Regimbal and Dr W. Grignon, secretary of the new agricultural society of le Nord. These two gentlemen each built a silo last fall; they are, by the very fact, the pioneers of this new idea in agriculture, in the northern part of Terrebonne. It is an immense stride this that they have taken in the way of progress; already, hundreds of farmers have visited these siloes; they were astonished at the results obtained from the ensilage, which has given entire satisfaction. This experiment will be the spark to light the fire, and I dare prophesy that, starting from next year, from eighty to a hundred siloes will be built in the eight parishes in the northern part of Terrebonne.

In fact, without the silo, breeding stock in the North is difficult, if not impossible, on account of the length of our winters. With the silo, breeding is easy, and the Northern Townships become in that respect a privileged district. In summer, the pastures never fail, the water is clear and always plentiful, the grass on the mountains is most nutritious for cattle; the farmer can command great tracts of land fit only for pasturage; but as the winter devours all the profits realised during the summer, it does not pay to devote ourself to breeding. The silo does away with this trouble; with three or four arpents of land well manured and sown with corn, the proper

winter food for the cows will be

“ For the enrich them,” of Agricultural

“ Major Al an article in an and that siloes far from dimin. Among other t consin alone, a In Massachuset 1,029: there ar

We are no: to those gentler beet-sugar ther

It is someti as it cannot be stationary siloe The whole wou active.

It only rem that I shall be a the fall to with winter to see ho will find more e

DEPUTY-

Gentlemen.

I find myse ments it deserve ing its praises w

You have b society; I am aims, that when extremely. Inde ties of the provin

winter food for ten or twelve cows is secured, and, winter as well as summer, the cows will be well fed, will cost but little, and will return a good deal.

“For the Northern-Townships, it is the silo which will save and enrich them,” exclaimed M. J. B. Bohémier, the president, at a meeting of Agricultural Society No. 2 of the county of Terrebonne: he is right.

“Major Alvord, a distinguished agriculturist of the States, in reply to an article in an agricultural paper stating that the ensilage-fever was passed, and that siloes were becoming less and less popular, proved by figures that, far from diminishing, the ensilement of green fodder was increasing daily. Among other things, he said that there were more than 1,000 siloes in Wisconsin alone, and that, next year, several hundreds more would be built. In Massachusetts, according to the census of 1885, the number of siloes was 1,029: there are now 1,300.

We are not very far from Berthier now; perhaps we might be of use to those gentlemen who have undertaken to revivify the manufacture of beet-sugar there!

It is sometimes difficult to preserve the pulp—an excellent cattle-food—as it cannot be consumed as fast as it is made. Let it be ensiled, either in stationary siloes or in siloes on wheels, for distribution along the railroads. The whole would be preserved, and could be sold when the demand was active.

It only remains for me to assure my fellow-members of this association that I shall be always glad to receive a visit from them, whether it be in the fall to witness the harvesting of the crop and its ensilement, or in winter to see how the cattle like the silage. I can promise them that they will find more eloquence in the facts than in anything I have said to-day.

SPEECH OF THE REV. M. LABELLE,

DEPUTY-COMMISSIONER OF AGRICULTURE AND COLONISATION.

Gentlemen.

I find myself in a very delicate position: I have to pay the compliments it deserves to this association, and I feel that I am incapable of singing its praises worthily!

You have been good enough to appoint me honorary president of this society; I am proud of the honour. So great is your association in its aims, that when it confers one of its dignities on a member, it honours him extremely. Indeed it honours me much, for it is one of the most useful societies of the province, one that has borne admirable fruits for the benefit of agri-

culture. - Consequently, I cannot congratulate too warmly those who began the work, who have pursued it with ardour and perseverance, and who, now see, the, one may say, extraordinary results it has secured to the agriculture of the country. We ought to do our best to extend branches of this excellent association over the whole province. You number four hundred members and more ; well, in two or three years, you must reckon two or three thousand members, each paying his dollar regularly, and receiving in return the reports of the meetings and the other documents you distribute. The province of Quebec is essentially a farming country. Our fathers were farmers, and all that is great in the country, be it in the ranks of the clergy or in the class of statesmen, all may be said to have sprung from the agricultural class. There is nothing surprising in this ; for remember that once, the Romans, the masters of the world, were nothing but soldier-farmers.

Doubtless, yours is not the mission to be conquerors ; it is not yours to take possession of all America ; but it is your mission to stand firmly by the province of Quebec, and by the Dominion of Canada. Preserve your language, your laws, your institutions, your religion, and do it, Gentlemen, by your fine moral qualities, by your devotion to agriculture.

The happiest position in life is this of the farmer ; his life is calm and peaceful ; and, at the same time, eminently moral. The farmer, indeed, needs not only his own toil to fertilise the soil, but he is also the partner of the Almighty, who sends him fruitful seasons. It may be said that, in this position of life, man walks hand in hand with the Lord.

Still, every fine picture has its shadows ; and so has this one. There are, unfortunately, among our farmers, some who follow too much the old routine of culture, and a great deal of harm is done by this routine work, as it prevents us from making our farms pay as well as they ought to do.

Of good farmers, like the hundreds I see around me this evening, there are not enough in the country. Well ! gentlemen, your association will produce them. And, how ? Because you have found out the secret of making farming pay, and an occupation that pays is always popular.

It is on the manure that accumulates at our stable-doors that agriculture reposes, and this manure is given us as a present by our cows.

But, why breed a number of cows, if there is no means of making cheese and butter to turn their milk into money with ? We will, therefore, have cheese-factories and creameries in abundance, and as the breeding of cows pays us better than ought else, we will have lots of cows, and lots of dung.

But, our manufacture of butter and cheese must be perfected, our cows must be well fed : for the whole is linked together (*solidaire*). The old rou-

tine must be ab winter, so that, aware that to g That is an axio Almighty will r when we can ma

You see, th you see how use deserve the grat Dominion.

Why is you kets ? It is due t these associatio government and of cheese-factori it is in disrepu

It is an hono prized in Englan

Now, as to c less, butter is a g how to make it :

The dealers up the creamery dairies, where bu

Good inspec be stamped, so th

The packing arrive on the ma but I hope we sh tion.

We are not g Only, we must t arrive at this resu

It appears th the government. neuter. As a forr pleasant to be a d in the council, yo was going to say, And assure you t hands, you will n

tine must be abandoned of refusing our cows enough to live upon during winter, so that, in spring, they have to be lifted up by the tail.—You are aware that to get much out of the udder, much must go into the mouth. That is an axiom; a truth as clear as that two and two make four. The Almighty will not work a miracle for the purpose of making us sharp, when we can make ourselves sharp so easily.

You see, then, what fruit this Dairymen's Association has produced; you see how useful it is to the country; and how those who founded it deserve the gratitude of the whole province, I may even say of the whole Dominion.

Why is your cheese quoted at the highest price in the European markets? It is due to the dairy-associations, to the men who were the soul of these associations, who developed them vigorously, and secured aid from government and the appointment of inspectors of factories and creameries; of cheese-factories inspectors, especially, for I cannot boast of our butter, it is in disrepute in Europe.

It is an honour to Canada to have cheese on the market that is highly prized in England and elsewhere.

Now, as to our butter, as I said just now, the price is low., Nevertheless, butter is a good thing. Why, then, is it low? Because we do not know how to make it as the Danes, the Dutch, and the Normans do.

The dealers in butter often mix bad butter with good, so that they mix up the creamery butter with that made by our little country farm-house dairies, where butter is made eight or ten days after the cream is skimmed.

Good inspectors, then, must be employed; and more, the butter must be stamped, so that it may be known from what creamery it comes.

The packing, too, must be looked after, so that our products may arrive on the market in good condition. I have not studied this question, but I hope we shall obtain its solution through your assistance and devotion.

We are not greater fools than the Danes, the Dutch, or the Normans. Only, we must take pains that the province of Quebec, that Canada, may arrive at this result: to have the best butter in the world on the market.

It appears that you are seeking for an additional grant of \$500 from the government. You know that, in the position I occupy, I must remain neuter. As a former member used to say; "I am of neither sex." It is not pleasant to be a deputy-minister. All the same, if I have a deliberative voice in the council, you may understand that I shall favour with my words (I was going to say, with my eloquence) this grand Dairymen's Association. And assure you that if the premier puts the key of the treasury into my hands, you will not be long without your \$500.

Well! gentlemen, I leave the platform to other speakers, who will acquit themselves better than I. I thank you for your kind attention, and if I have made you laugh a little, it is because there are some important truths that are best told jocularly, and they are sometimes the best.

SPEECH OF THE HON. J. J. ROSS.

Mr. President and Gentlemen,

You honour me greatly in asking me to address this important meeting. It is an honour for me, but I sadly fear that you will not find it a pleasure to listen. You have taken me unexpectedly; I have had not the advantage of being invited in advance to prepare something worth listening to.

I have only, then, a few words to say on the questions which occupy us at the present moment. In the first place, you will allow me to congratulate you most sincerely on the success of your association, and permit me to say, Mr. President, that when you first spoke to me about founding this association, and asked me for a share of the public money to aid in its proper working, I was far from believing that it would produce all the great results it has produced up to the present time. I am glad, therefore, to see that your association is flourishing, and has surpassed all the hopes that we built upon it.

You have just heard, Mr. President and Gentlemen, the addresses of lecturers of reputation: M. Labelle, deputy-minister of agriculture, who, as such, has all the graces of his position (*grâces d'état*), for the subject he treated. M. Beaubien, who, since siloes were invented, has behaved like a crazy-man, who has been seized with a species of indescribable madness on this silo-question, because he is convinced that it is destined to promote the interests of the agricultural class as well as of the whole country. Mr. McPherson, who addressed us on the important cheese-question, knowing well what he was talking about, as was probable, considering he manages seventy five factories, and makes money by them! As for me, I have had only one factory! . . . had I had two, I should have been ruined.

But you must not be allowed to suppose that if I was nearly ruined by my factory, it was therefore due to bad management. Not at all; we made good cheese at a moderate cost. But competition intervened; in one parish when up to that time there had been no factory, one was built close to mine. I had not time to look closely into things: all the capital I had put into the business, all the milk of my cows, all vanished, and I have

no longer any
McPherson is a

Much inter
He spoke at f
stand, but whic
Unfortunately,
thought into ou

Some peop
he is intelligent
that this is an e
duct his busine
to succeed in l
sions.

Let me tell
that you do a
manner, apply
profit from it.

I hope, ger
what Mr. McPh
about the care t
sary to the prod
and plenty of it

I cannot ke
and after havin
he has only one

When once
Mr. McPherson
it. And, decide
induce you to f

Gentlemen,
manufacture of
industry, and I
of every effort p

But, I am n
eggs into one ba
your hands will
ets; if one fall,
desirous that all
butter and chees
neglected.

no longer any interest in the business. In my eyes, therefore, Mr. McPherson is a veritable prodigy.

Much interesting information have we received from this gentleman. He spoke at first about things that we all know and thoroughly understand, but which for want of reflection we do not always put in practice. Unfortunately, we act too much like machinery; we do not put enough thought into our business.

Some people still think that a farmer has no need of thought; that if he is intelligent, he need not make use of his intelligence. Allow me to say that this is an error. As much intelligence is needed by a farmer to conduct his business properly, as by a merchant to avoid ruin, by an advocate, to succeed in his profession, by a judge to insure the equity of his decisions.

Let me tell you once more, and let me implore you not to forget it; all that you do as farmers, you ought to do in a well thought out, studied manner, applying to it the intelligence necessary to extract all possible profit from it.

I hope, gentlemen, you have thoroughly understood the meaning of what Mr. McPherson said, about the care of your milch-cows, and therefore about the care to be given to land in order that it may furnish the food necessary to the production of milk, which, in its turn, will turn out good cheese, and plenty of it.

I cannot keep silence; I thought Mr. McPherson's lecture of great use, and after having heard it I said to myself: This is a man of great abilities; he has only one defect: he does not speak French.

When once your cows are well-fed, and are giving plenty of good milk, Mr. McPherson showed you how to profit by this milk in making cheese of it. And, decidedly, the advantages which he enumerated are sufficient to induce you to follow his advice.

Gentlemen, I am in favour of giving all possible encouragement to the manufacture of butter and cheese. I believe in the importance of this great industry, and I am ready to do my share (I think I have already proved it) of every effort possible to develop it.

But, I am not one of those who are always inclined to put all their eggs into one basket. If your basket fall, all the eggs will be broken, and your hands will be empty. Put, on the contrary, your eggs into two baskets; if one fall, the other will remain for your consolation. While I am desirous that all possible encouragement should be given to the making of butter and cheese, I trust that the other branches of agriculture will not be neglected.

Observe ; to every calculating mind, it is evident that in agriculture there is a chain not one link of which can be broken without incurring great losses. For example, you aim at producing plenty of good milk, to that end, you improve your pastures, you sow green-crops ; you even build siloes, if you trust to M. Beaubien, whose advice is good. Thus you can feed more stock, which produce more dung, and thus you are enabled to grow more grain.

M. Beaubien told you of a certain visit I paid him ; a very pleasant excursion it was, very useful to me, and, perhaps not entirely without utility to him. About this, M. Beaubien told you the truth, but not the whole truth (not on purpose did he keep anything back, I presume ; besides, he had no interest in doing so). I will tell you at once what he forgot to tell you.

It was raining when I got to his house, and after a chat and a good dinner, we, in spite of the weather, started off to see the cowhouses, the fields, and all around.

At the barn, we saw some men cutting up Indian corn. Well ! I must confess it ; I never saw a dirtier mess in my life, and in spite of the rules of politeness, I could not conceal what I thought. The corn, one would have said, appeared to have been rolled in the mud, and the mud of that part of the country is as black as mud can be. Then the men twisted it about, cut it up, and sent it into the famous silo, where, it seemed to me, it must become a mass of rottenness. I was wrong, it seems, on that point, since they tell me that the sample of ensilage exhibited here by M. Beaubien is one of the best, if not, the very best ; I was wrong, then, and, if I admit it, it is not for the pleasure of proving the error of my opinion, but to show that no very great precautions are needed in making ensilage.

But another point on which I bothered my friend, in this : "How many arpents have you in corn," said I. "Fourteen," replied he. "And how many cows have you to winter on it?" "Seventeen" replied he. "Are you going to give them nothing but this ensilage, this rotten stuff?"—"No," he answered, "they will have maslin, hay, and bran." "There," said I, "now I see. If I remember, you stated in a lecture that with an arpent of silage seven cows could be wintered ; now, you have fourteen arpents of silage for seventeen cows, and you are going to give them extra food." My friend did not know what to reply on the spur of the moment.

A short time after, I met my friend, and he began at once about the silo. "I was mistaken," said he, "the other day, when I told you I had fourteen acres in corn ; I measured the land, and I find I had only eight." I answered : "If you can winter seventeen cows on the corn of eight acres, it is better ; I confess there is encouragement in it."

I see, by his figures still low on an arpent of can be done in :

I am in fav A trial is easy t ing yourself (th

Another th time, and which have proved at as corn, lucerne I think I have : have green-meat

Again, to p but it is also of

Unfortunate tice of farmers without troublin from a pure-bre ones which are progeny of a go

It is by the obtain the result to the prosperity

I could spea feel that I am t men who are abl give you.

I thank you assure you that i in the success of

M. BEAUBIE word in reply. I titutionally in th are their reputat That is his busin for the prime-mi my hospitality, t about regaining ;

I see, by his lecture of this evening, that my friend has reduced his figures still lower, and that he calculates he can winter two and a-half cows on an arpent of corn. Well! I think this is a success; but I believe better can be done in a favourable year, and M. Beaubien himself will find it so.

I am in favour of siloes, and I hope every farmer will give them a trial. A trial is easy to make, and for a trifling sum you may succeed in convincing yourself (the best form of conviction) of the advantages of the silo.

Another thing which has hardly been mentioned, up to the present time, and which seems to me of much value, is green-meat, in summer. I have proved at home the advantage of having green-food for the stock, such as corn, lucerne, or clover, when the pastures fail in summer or otherwise. I think I have settled the point, that it is as, or even more, important to have green-meat to give the stock at that season than later.

Again, to produce milk, it is not only necessary to feed the cows well, but it is also of some, or even of great importance to select them well.

Unfortunately, it was formerly, and is now in some degree, the practice of farmers to keep and rear a calf because it was a handsome one, without troubling themselves whether it came from a good milking dam, or from a pure-bred bull. It is of the greatest importance to select young ones which are the offspring of good milch-cows, by a bull himself the progeny of a good milker.

It is by these means, united to those already mentioned, that we shall obtain the results we aim at, and contribute to the wealth of our country, and to the prosperity of each of its inhabitants.

I could speak much more at length on these agricultural questions, but I feel that I am trespassing on your patience, and am occupying the place of men who are able to afford you much more precious information than I can give you.

I thank you, then, for the attention you have given to my words, and I assure you that in the future, as in the past, I shall always take an interest in the success of our great and important association.

M. BEAUBIEN.—I really cannot let this opportunity pass, without a word in reply. I recognise my friend by his speech, with which he is constitutionally in the habit of demolishing his opponents. No matter how solid are their reputations, he overwhelms them, he ruins them for all eternity. That is his business. Death to the Government! Why! I believe he takes me for the prime-minister of the Province of Quebec! After having enjoyed my hospitality, too, that's the way he returns it! Well! I am going to set about regaining your esteem.

In the first place, it was not fourteen acres of corn I said I had ; it was only twelve ; but I admit the exaggeration, even that was too much. It was a piece of land we had never ploughed, and, in consequence, I had never measured it. M. Ross asked how many arpents I had ; without thinking, I replied : I think I have twelve.

M. Ross.—One does not speak without knowing. (Laughter.)

M. BEAUBIEN.—Well! gentlemen, M. Ross forgets that I have been to his school, and that I have often heard him say things that he did not think. He forgets, too, that he has been a very earnest head of a party, and when the salvation of that party was in question, he made us swallow some pretty stiff ones. Well! there is my excuse for having said I had twelve arpents. (Laughter).

But, observe, how remorse affected me ; I took the measuring tape at once. I measured the piece, and when I met my honorable friend, I said: I was wrong ; I had only eight arpents and a rod.

Said my friend : “ you cannot feed seven cows on an arpent of fodder corn.” I replied : “ That is the fault of the Deity, and you, yourself, cannot thus throw the blame of all our mistakes on Him. In the States, they have succeeded, more than once, although it never has been done in Canada, in feeding seven head of stock on an arpent. I believe, too, if the season had been favourable, that I should have kept certainly five beasts on the produce of an arpent. But I wished to tell you the truth as soon as I knew it myself. I may have been wrong in my first statement, but this time I am right.

Another observation my friend made : “ Other food besides silage is necessary.” True ; for the relaxing influence of the silage needs correction. I never recommend feeding cattle entirely on silage.

My beasts are fed thus : to the dry cows, I give three-fourths of silage with one-fourth of hay ; and Messrs. Dion and Brother Charest can say if the cows are in good condition. They are even fat ; and they have had no other keep since November. To the cows in milk, I give fifty pounds of silage, hay, and hot mashes. To give silage alone would ruin their constitutions.

I beg to apologise for speaking out of order, but I felt a desire to justify myself, after the sword-thrusts, the dark attacks, the terrible blows inflicted on me by my adversary.

THE PROM

BY THE RE

Mr. President

Ecclesiasti
France, whose
life, so deeply
nity, that he h
other subject
means of direc
never mind w
celebrated. At
statement that
will and glory
wards, by the
would plunge
Easter, the res
come to life ag
The feast of th
before ascend
die. At All-Sai
like the saints,
be celebrated,
infallibly be br

All his ser
sent.

Well ; I ar
was. Every th
treat, and follo
introduce it in
circumstances
audience as dis

The subjec
guessed, gentle
ly contributed

THE AGRICULTURAL CLUBS

THE PROMOTERS OF THE ESTABLISHMENT OF BUTTER AND CHEESE FACTORIES.

BY THE REV. ABBÉ MONTMINY, CURÉ OF ST-AGAPIT DE BEAURIVAGE.

Mr. President and Gentlemen,

Ecclesiastical history tells us that a good old priest, in a town of France, whose name I forget, had, by the experience he had acquired of life, so deeply sounded the depths of the miseries and infirmities of humanity, that he had arrived at the point of not being able to preach on any other subject but death! This zealous pastor used invariably to find means of directing the leading idea of his sermon towards his pet subject, never mind who was the saint or what fête it was that was being celebrated. At Christmas, the advent of the Messiah drew from him the statement that this birth, which brought peace on earth to men of goodwill and glory in the heavens, would be followed, thirty three years afterwards, by the death of the Saviour, with his lamentable martyrdom, which would plunge the whole of nature into the most mournful desolation. At Easter, the resurrection of the Lord led him to teach his hearers that to come to life again, like the Desired of all nations, one must die like him. The feast of the Ascension naturally inspired him with the thought that before ascending into heaven, like the Lord, we must first live, and then die. At All-Saints, our preacher felt bound to proclaim, that to win heaven like the saints, man must first live and die as they did. Was a marriage to be celebrated, he exclaimed, that this union between man and wife must infallibly be broken thereafter by death.

All his sermons bore the same flavour; the idea of death always present.

Well; I am almost in the predicament in which this excellent preacher was. Every time I have to speak on farming, I have a favourite subject to treat, and following in the steps of that good priest, I am always trying to introduce it into my agricultural lectures, and especially under the same circumstances as those of the present moment, at which I am addressing an audience as distinguished as it is sympathetic.

The subject which I have so boldly undertaken to treat, you will have guessed, gentlemen, is that of the Agricultural Clubs, which have so largely contributed to the success and development of agriculture in the pa-

ishes where they have been established, and which will, before long, bring prosperity to our farmers. This thesis I have developed twice before at the meetings of our Association.

While acknowledging my want of merit, I am inclined to believe that I have not been useless in those two addresses, since I have been requested to speak here once more on Agricultural Clubs. But regarding them, this time, in the light of promoters of the formation of butter and cheese factories, I am here, to day for the purpose of developing the following proposition :

The Agricultural Clubs are powerful aids in the formation of creameries and cheese-factories, and, consequently, precious auxiliaries to our Dairymen's Association.

To establish the entire truth of this proposition, I shall have recourse to a practical proof, so to speak ; I shall show how one of my friends and fellow-priests has succeeded, by means of a club he founded in his parish, in starting a factory having for its patrons the members of the club.

On his arrival in his parish, this patriot soon found that there was a great deal to do if he wished to raise not only the moral standard, but also the temporal condition of his flock, and put a stop to their inclination for emigration. The farmers could no longer reckon on their farms to supply the means of living ; for their lands, worn out by cropping during a long series of years, no longer produced sufficient food for the family. In such a sad state of things, nothing remained for those unfortunates but to exile themselves, and seek for a living in the stranger's land. This desertion of their native land saddened the heart of our devoted curé, and induced him to ponder in his mind, what means could be found to remedy the existing evil, to restore the courage of his flock, and to induce them to farm with more care and more intelligence, in order to make their land more productive.

One day, he thinks he has found the solution, so long sought, of the problem. He enters the pulpit, invites his parishioners to meet in the sacristy, after mass, suggests to them there the establishment of a club, after having shown them its advantages. The word falls on good ground ; his flock accede to his desire, and, as if by enchantment, a flourishing association arises at once. There, once a month, the curé meets his parishioners, talks familiarly with them, shows them how their fathers reaped abundant crops on the fresh, newly cleared soil, and makes them understand how these same farms being worn out have become almost sterile, and to be restored to their original fertility, are in need of manure and more intelligent cultivation. He proves to them, in a word, that their bad farming is the cause of their not being able to live by their farms. Self-denying, truly patriotic lecturers second his noble efforts, and confirm his lessons. They,

too, show that cession, to be f of doubtful uti this one, is, to Nothing is easi produced by no great a piece of cases, the same

Having poi the question na ed in order to r

At the requ Two bad effects grain-crops and and the growth adopted which this, the produ manured and h grown, the mor can be made. L use his manure

Side by sid men, improved yield abundant previously, the tiful crops. Dra improvements, : successful first question : Wha abundant crops no longer exhan

To reply to lecturers. These that dairy-farm quence, the farr milch-cows. TI selected and w Besides, the tr essays on the su is now considere the aim of our w ing a yield of it

too, show that the rotation which consists in sowing two grain crops in succession, to be followed by two years of hay or pasture, is a system not only of doubtful utility but actually absurd, and that any rotation resembling this one, is, to the farmer who practises it, a sure step on the road to ruin. Nothing is easier than to prove to these good people that nothing can be produced by nothing, and that to cultivate land without manuring it, is as great a piece of folly as to expect a man to work without food. In both cases, the same result is infallibly reached : exhaustion.

Having pointed out the errors into which most farmers generally fall, the question naturally occurred : what mode of cultivation should be adopted in order to repair these faults, and to do better for the future ?

At the request of the curé, lecturers are sent to answer this question. Two bad effects follow the non-manuring system, and the alternation of grain-crops and pasture (*terre en friche*) : first, the land is impoverished, and the growth of weeds is encouraged. A system of cropping must be adopted which will furnish more manure, and rid the lands of weeds. For this, the production of grass and fodder-crops must be increased, and manured and hoed-crops must be planted. The more grass and fodder-crops grown, the more stock can be kept, and, consequently, the more manure can be made. Lastly, by means of manured and hoed-crops, the farmer can use his manure to advantage, and free completely his land from weeds.

Side by side with theory, goes practice. The farmers, like intelligent men, improved their farming, and put their land into a fit condition to yield abundant crops of grass by sowing freely timothy and clover, which, previously, they had never dared do. The improved land gave them plentiful crops. Drainage and weeding were the fortunate consequence of these improvements, and, one fine day, these gallant fellows, encouraged by their successful first steps, laid before their devoted pastor this important question : What kind of stock is the most useful on a farm to consume the abundant crops we have just harvested ? As may be easily seen, the land is no longer exhausted, and its productive power is almost fabulous.

To reply to this question, my worthy friend appealed once more to the lecturers. These did not hesitate to yield to his request, and proved clearly that dairy-farming is certainly the most profitable, and that, in consequence, the farmer should aim at keeping the greatest possible number of milch-cows. They showed, moreover, that the pure-bred Canadian, well selected and well kept, is the best cow for the purposes of our farmers. Besides, the truth of this demonstration has been proved in numerous essays on the subject. The Canadian cow, formerly an object of contempt, is now considered superior to all others, the production of milk has become the aim of our whole system of cultivation, and we have succeeded in obtaining a yield of it heretofore unknown.

Progress incites to further improvement, and we must not dally in so promising a journey. Thus, the farmers, seeing themselves in the possession of such huge quantities of milk, began to ask themselves this question : Do we get all the profit possible to be derived from our milk ?

New subjects of inquiry, new consultations, fresh appeals to the good offices of the lecturers. A professor from a dairy-school visits this parish, and, uniting practice to theory, he mounts the platform, having at his side a churn and some good cream.

While one of the audience turns the handle, the skilful lecturer speaks of the food of the cow ; lays stress on the necessity of cleanliness in all that regards the milk and the utensils, and then, showing that the cream in the churn has been changed into little grains, descends from the tribune, and himself finishes the manipulation of a very excellent butter.

Wonder-struck were the spectators of this metamorphosis ! Never could they have imagined that these little grains floating in the butter-milk could be transformed into good butter ; all wondered at its excellence. and the most incredulous confessed openly that better butter could not be made.

The lecturer, after having spoken at length on the home-dairy, compared its results with those of the factories where the collected milk of many patrons is manufactured in great quantities on their account. He showed that, generally speaking, the results were more satisfactory in those establishments, whether either butter or cheese was made. As to whether butter or cheese were the preferable article as concerns profit, that question was, at present, doubtful. Waiting its settlement, the members of the club voted in favour of cheese.

A cheese-factory is therefore at work in the midst of these gallant farmers. Nothing remains for them to do except to follow at their meetings the rapid developments which are taking place in the dairy industry, the improvements in the management of the milk, the variation in the market-price, the value of their products, in a word, everything that is connected with their industry. These different subjects of investigation are very easily treated in the club, and our farmers find there all the information they require. Public discussions are familiar to us all ; reply immediately follows objection, and, lastly, conviction overturns numerous prejudices nursed into existence at the domestic hearth. These public meetings never fail to excite a spirit of unity which is there, at it is everywhere, the certain promise of success.

And so, convinced by the experience of one year, the farmers of this progressive parish asked themselves how they could manage to feed a greater number of cows on the same amount of fodder. After reading and discussing at length the reports of the meetings of the Dairy-men's Association, they came to the conclusion that ensilage and fermented fodder were

excellent modes of cattle-food. My purpose to build a parish. Is not this the case in all the districts ?

There, gentlemen, is the result of pushing progress to a very middling degree.

But, perhaps you will say, these results, elsewhere, are not so good, enough, especially in the north, and having no word and by example. I hesitate not to say that I have had many of the same results of customary routine.

And then, we often end in a way which frequently have the same result as the new industry.

With the agricultural progress in the principles of the industry arrested ; and, but is the result to a

These are the results of having rapidly spread the agricultural club and cheese-factories, and Association ?

Besides, may we not say that the part in the parish is still doing, so in

Its evident in the increasing number of the beneficial in the advanced farmers improved cultivation with utmost clearness

excellent modes of increasing the quantity and nutritious quality of their cattle-food. Many of them already ferment their fodder, and some even purpose to build siloes. Last fall, eight or ten chaff-cutters arrived in this parish. Is not this an admirable example to set before other more fortunate districts ?

There, gentlemen, you have an incomplete and rapid sketch of the astonishing progress which, by aid of an agricultural club, has been realized in a very middling Canadian parish.

But, perhaps, I shall be told : We have achieved the same magnificent results, elsewhere, without the help of these clubs. That may be true enough, especially in a few parishes richly endowed with the gifts of nature, and having at their head generous agriculturists who preach both by word and by example ; but in general, if the final result has been the same, I hesitate not to say, and I can prove it, that in arriving at success, they have had many more difficulties and prejudices to conquer, and much more of customary routine to abolish.

And then, what gropings in the dark, what empty, vain discussions, often ending in quarrels, arise, without reckoning financial failures ! Frequently have these fruitless attempts delayed for many years the success of the new industry.

With the agricultural club in operation, these obstacles are seldom met with : progress is sometimes slow, but it is sure. The farmers are taught the principles of good cultivation ; the too fatal current of emigration is arrested ; and, both in a moral as well as in a material sense, great profit is the result to all.

These are the general results flowing from our agricultural clubs, and, having rapidly sketched them, have I not the right to exclaim boldly : that agricultural clubs are powerful aids in the formation of creameries and cheese-factories, and, consequently precious auxiliaries to our Dairymen's Association ?

Besides, may not the agricultural club, well managed, play the same part in the parish, that your Dairymen's Association plays in the province ? How can the marvellous progress of your association, which has done, and is still doing, so much good in our lovely province of Quebec, be explained ?

Its evident importance, after only a few years of existence ; the ever-increasing number of its members ; such success, in a word, is it not due to the beneficial influence of your meetings, to which hundreds of the most advanced farmers come to discuss the numerous subjects connected with improved cultivation, and to listen to willing lecturers describing with the utmost clearness the fruits of their studies and of their experience ?

Yes, gentlemen, our farmers' clubs do on a small scale in the parish, what you do here on a large scale. Like you, we have in view the improvement of agriculture and the prosperity of the country.

Our clubs are not always able to secure lecturers ; this is a gap that requires stopping. The Government is generally well disposed towards these useful institutions, but we will admit that it cannot always answer all the demands made upon it.

This being the case, could we not all, gentlemen, constitute ourselves apostles of agricultural progress, each in his own district ?

It used to be said to be impossible to find competent lecturers ; I shared in that opinion, but, now, things are very different.

In fact, to-day, listening to your discussions, and casting an eye over this grand audience, I am tempted to exclaim : you, gentlemen, every one, of you, are the devoted lecturers we are in search of.

While closing these short remarks, allow me to thank you sincerely for your sympathetic attention. Every time I have had the honour of addressing you on my favorite subject, I have received your warmest applause, your kindest assistance.

Thanks I give to our public men who, in both Houses, have appreciated your work, and have so gallantly aided it.

Thanks I give to the members of the press, who, without distinction of race or party, have so nobly striven to make the institution of agricultural clubs general throughout the country.

Let us labor, gentlemen, with the greatest energy at the development of our agricultural resources ; let us not be overcome by the numerous difficulties we encounter on our road. Our cause is a good one, it is patriotic, it is national.

Let us unite our forces for the common good of our beloved country, and when, arrived at the decline of our career, we shall see our land happy and prosperous, we shall be able to join in the poet's song :

Oh ! Canada, my love for thee
 Shall never fail !
 (O Canada ! sois mes amours,
 Toujours !)

Mr. President an

The soil of the wonderful fertility fore be abandoned reply to the dem generation.

Both science whatever rotation if an improved sy road of agricultu necessity, since th they perfectly pre influence of the at it, and, in return productiveness.

There two p adopted as true, t

Almost all soi necessary cultivati qualities. It is ge after a grain or pe previous fall. Sti light land, on a th

In the precedi deeply, according quantity of manur ploughing must be beneficial action of and their seeds, an lowest state of pro

When spring a vator or grubber i ment is a large, hea curved towards the ration, at a trifling

ON HOED-CROPS.

BY DR. BRUNEAU.—SOREL.

Mr. President and Gentlemen,

The soil of the greater part of our older farms has lost its original wonderful fertility; the empirical cultivation of our forefathers must therefore be abandoned, and a well-studied system be adopted, if we would reply to the demands of our epoch, and supply the wants of the present generation.

Both science and practice teach us that, on a well conducted farm, whatever rotation be followed, it is essential to have a well managed fallow, if an improved system is arrived at, and we wish to enter resolutely on the road of agricultural progress. In this case, the fallow-or hoed-crops are a necessity, since they lead surely to the end we have in view, for, in truth, they perfectly prepare the soil, they expose all its parts successively to the influence of the atmosphere, free it from the perennial weeds that occupy it, and, in return for abundant manuring, leave it in an excellent state of productiveness.

There two propositions are, to-day, so thoroughly recognized and adopted as true, that it would be futile to attempt their demonstration.

Almost all soils may bear hoed-crops, provided that they receive the necessary cultivation, and that the crops sown are in accordance with their qualities. It is generally the custom to introduce the hoed-or fallow-crop after a grain or pease-stubble, which has been, if possible, cleaned in the previous fall. Still I have successfully grown corn and turnips, on very light land, on a three-years-lay.

In the preceding autumn, the piece should be ploughed more or less deeply, according to the nature of the soil, the thickness of the top-soil, the quantity of manure we have, and the sort of plant we intend to grow. This ploughing must be crossed by numerous water-furrows, in order to aid the beneficial action of the frosts and thaws, which, in winter, destroy weeds and their seeds, and, in spring, yield us up the ground in the best and mellowest state of productiveness.

When spring arrives, as soon as the land is thoroughly dry, the cultivator or grubber is set to work along and across the ridges. Our implement is a large, heavy, iron harrow, six feet wide, with twenty-four teeth curved towards the front and flattened out at their extremities; by this operation, at a trifling expense, the mechanical condition of the land is im-

proved, and the weeds are destroyed, particularly if the grubbing is repeated after a few days of fine weather.

A short time before sowing, the last ploughing is given, which ought not to be deeper than the autumn one; then come harrowing and rolling, alternately, until the whole of the topsoil is pulverized; taking care to end with a rolling, to aid the action of the plough and the seed-barrow, according to the needs of the one or the other of these implements to be employed.

In order to economize manure, which is never too abundant on our exhausted light lands, we always sow in drills, after having spread the dung in them; this allows us to manure a greater extent of land, and, at the same time increases our crops by 250% to 500%. This dung should undergo a moderate fermentation and be in a state of decomposition sufficiently advanced for its fertilizing properties to be easily assimilable by the young plants, besides, when green manure is used, the seeds which it invariably contains never fail to germinate, and to cover the ground with injurious weeds, to the great increase of trouble and expense when the hoeing is in question.

The hoed-or fallow-crops adapted to the farm, and which succeed best in our province, are: potatoes, mangels, Belgian carrots, swedes, yellow and white turnips, beans, pease, kidney-beans, and corn cultivated for seed. As the same work is necessary for each of these crops, we shall only speak to-day on the cultivation of the potato, the mangel, carrots and turnips; unless it be necessary to interpolate any remarks on any of these roots in particular.

Potatoes and pease may be sown during the first three weeks of May; beans and kidney beans and corn from 15th May to June 1st; mangels and carrots from the 10th to the 25th of May; swedes from June 10th to 25th; and the other turnips from the 1st to the 15th of July.

THE CULTIVATION OF THE POTATO.

The advice given in another part of this essay to grow sugar-beets, or any other roots, after a well managed crop of potatoes, leads me necessarily to describe what I mean by the thorough cultivation of this valuable tuber; the following is our system:

After having prepared the land, as recommended above, we draw out with the double-mould board plough, drills 24 inches wide for the early sorts, and 30 inches wide for the late and larger kinds. These drills are 4 or 5 inches deep according to their width and the thickness of the topsoil. The dung, at the rate of 40 small loads to the arpent, is then spread, a little more being allowed if it is fresh and strawy. The potatoes or their germs are set

at 9 to 12 inches with the same the drills over

Two horse drills at first; means, and the is then put alon nation.

A week aft troy the weeds repeated in the breaking the yo hoeing levels th and so greatly e become masters

When once hoe must be use to the flowering, earthed up wit shelter from th rapidly maturin

Nothing no beetle, which m above ground. unless you are p and to see the b spring. Paris-g opinion, more ef the general meth

As to harves pletely dead, w mould-boards, to prong of which below them. A reached by the across the piece, gathered, and th harvesting potato Messrs Lunan and yards from Sorel.

at 9 to 12 inches apart, according to the sort planted, the drills are split with the same plough, which covers the potatoes and re-forms the shape of the drills over the rows of the potato-sets.

Two horses are better for this job, as well as for drawing out the drills at first ; the rows can be made more regular and straighter by this means, and they are more easily kept at the same distance apart. A roller is then put along the drills to make the ground firm, and to favour germination.

A week after planting, a light harrow is sent along the drills to destroy the weeds which begin to show themselves, and the operation is repeated in the following week, if found necessary. There is no fear of breaking the young stalks which the harrow uncovers. This rough sort of hoeing levels the ground, cleans it thoroughly from the first crop of weeds, and so greatly energizes the growth of the young plants that they soon become masters of the soil.

When once the rows of potatoes are plainly distinguishable, the horse-hoe must be used once a week, or so, but only when the ground is dry, up to the flowering time ; then, after a last horse-hoeing, the potatoes are earthed up with the double-mouldboard plough, but only sufficiently to shelter from the sun, and early frosts, the tubers which will then be rapidly maturing.

Nothing now remains but to guard against the ravages of the potato beetle, which must be fought against from the first appearance of the plant above ground. The second hatch must be destroyed as well as the first, unless you are prepared to submit to a greatly diminishing yield of the crop, and to see the beasts appear in greatly increased numbers in the following spring. Paris-green, mixed with burned plaster, well sifted, is, in our opinion, more efficacious than when applied by sprinkling, though this is the general method practised in our neighbourhood.

As to harvesting the crop, which I never do until the haulm is completely dead, we open the rows with the earthing-up plough, without its mould-boards, to the heel of which a sort of large fork is attached, the prong of which raises the tubers above ground, allowing the soil to fall below them. After gathering all the potatoes exposed to view or easily reached by the hand, the cultivator mentioned above is sent along and across the piece, the potatoes brought to the surface by this implement are gathered, and this is repeated as often as it pays to do it. This method of harvesting potatoes is practised in some parts of France, as well as by Messrs Lunan and Taylor, whose respective farms are situated a few hundred yards from Sorel. These gentlemen grow more than 2,000 bushels a year.

Almost all the work on this crop is done by horses, to save manual labor. Men are only employed to spread the dung, plant the sets, and harvest the crop. This is an immense advantage for those who, like ourselves, have only paid laborers at command.

I do not assert, Mr. President, that this mode of growing potatoes is the best; but it suits our light lands full of couch-grass, and the labor we can employ: after being cultivated in this way, the land is so mellowed, cleaned, and improved, that it is fitted for the growth of the more important crops, such as flax, tobacco, sugar-beet, wheat, &c. Besides, our profit is great from it, as it ensures us good crops and the first prizes at the exhibitions; so we continue to practise it and can recommend it with confidence.

M. Ferland, a wealthy farmer, of Berthier, and a member of this association, grows immense crops of potatoes: 7,000 bushels a year. His system of cultivation is simpler and more expeditious than the one I have described. If he would publish it for the public benefit, in print or otherwise, he would be doing a service to those of his compatriots who, like him, grow potatoes as their principal crop.

THE CULTIVATION OF SWEDES AND MANGELS.

The method of growing swedes and mangels which I am about to describe, is that practised by the Messrs. Guévremont, of Sorel, since the year 1885, and which we have followed ourselves for some years. Mr. Séraphin Guévremont ought himself to have described the several operations of the work before this important meeting, but his refusal—unavoidable indeed—has compelled me to undertake the difficult task of replacing him. I beseech you, gentlemen, kindly to forgive the defects and omissions of this description, and to look only upon the importance of the subject submitted to your consideration.

The different operations to be given to the land before sowing are the same as those given to other hoed-crops. At the beginning of May, the last ploughing is done, and this ought not to be deeper than the autumn-furrow. Then, after harrowing and rolling as in the cultivation for the potato-crop, until the land is thoroughly pulverized, the drills are drawn out, with the double-mouldboard plough, to a depth of from 3 to 5 inches, according to circumstances, and at an equal distance of from 24 to 27 inches apart, which gives an alternate succession of drills and furrows. After having applied a dose of about 40 small loads of rotted dung, the same plough, with two horses, splits the drills, which lie between the rows or furrows; the dung is thus buried at a regular depth, and the furrows disappear, to be replaced by the drills under which lies the dung deposited in the furrows. This opera-

tion finished, is sufficiently, compact and level mangels, carro

The last of a seed-barrow, species of barrages too; it is which it makes is covered with tached to the l

In this open same depth, in gels, and at least be deposited at larily, altogether the attacks of of hoeing, Mr. in root growing that by horse-h are destroyed.

selves into the the implement. two rows at one

I see in a F the fields driven riment is well v

The horse-l made their app which, may tal temperature. of more than 16 the drill where visible. After t side-knives exte of this widening their places, for sharp, cut the g

When the r come into the se —3 to 4 inches v

tion finished, a pretty heavy roller is sent along the drills to firm the land sufficiently, which flattens out the drills, and gives them a smooth, compact and level surface 9 or 10 inches wide, on which are sown the seeds of mangels, carrots or turnips, as the case may be.

The last operation can only be advantageously conducted by means of a seed-barrow, drawn by a man or by a horse. Mr. Guèvremont's sower is a species of barrow which contains the seed, and, if required, artificial manures too; it is pushed by a man on the smooth level surface of the drill, in which it makes a furrow nearly an inch deep, into which the seed falls, and is covered with earth, which is pressed down by means of a small roller attached to the barrow.

In this operation, the important point is to deposit all the seed at the same depth, in the centre of the drill, at the rate of 4 lbs. to 5 lbs. of mangels, and at least 3 lbs. of swedes to the arpent. If the swede or mangel seed be deposited at the same regular depth, and thickly, it will come up regularly, altogether, and thickly, and this will aid it in successfully resisting the attacks of the fly or beetle. In order to facilitate and cheapen the cost of hoeing, Mr. Lunan, of St. Joseph de Sorel, who has had a long experience in root growing, only sows $1\frac{1}{2}$ lbs. to 2 lbs. of seed to the arpent. He asserts that by horse-hoeing the moment the plant appears, a great number of flies are destroyed. As the horse-hoe approaches, says he, they rise, throw themselves into the spaces between the rows, and are turned over by the teeth of the implement. Mr. Lunan's sower, which is of his own construction, sows two rows at once, 30 inches apart and 2 inches deep. It is drawn by a horse.

I see in a French work that rags dipped in coal-tar and spread about the fields drive away the flies by means of its penetrating smell: the experiment is well worth trying.

The horse-hoe for this work may be used as soon as the weeds have made their appearance, without waiting for the mangels, &c., to come up, which may take a longer or a shorter time, according to the climatic temperature. This first passage of the horse-hoe ought not to cover a width of more than 16 or 18 inches, and must not interfere with the upper part of the drill where the seed is, and where the slight furrow of the barrow is still visible. After the lapse of a week, the horse-hoe is worked again, with the side-knives extended, so as to cover a width of 20 or 24 inches; and in spite of this widening of the implement, the young plants are not disturbed in their places, for the side-knives of the horse-hoe being curved and kept very sharp, cut the ground cleanly, and do not turn it over roughly.

When the mangels or turnips are from 3 to 4 inches high, and have come into the second leaf, we proceed to hand-hoe the narrow band of earth—3 to 4 inches wide—which the horse-hoe has not touched, and to set the

crop out by hand at the proper distance. For this, M. Guèvremont employs women or children. Armed with a hoe seven inches wide, a woman attacks the narrow strip of earth on which the plants are growing, and draws towards her feet, into the middle of the row between the drills, the width of the cut—7 inches—so that the young plants and the weeds find themselves placed there; then, leaving untouched a width of two or three inches, she goes on, taking at each step a length of 7 inches, and leaving untouched a length of two or three inches, so that, after having gone over an arpent, she has hoed from $\frac{2}{3}$ to $\frac{3}{4}$ of it. Another woman follows her, hand-picking the spaces as yet untouched, and singling the bunches of young plants, leaving only one of them, and that one the strongest. When she has finished her task, she will have hoed $\frac{1}{3}$ or $\frac{1}{4}$ of an arpent. Persons competent to judge tell me that, on land in ordinary condition, four women accustomed to the work, can single and hoe an arpent in a day. M. Lunan thinks he can do better, as he sows thinner, and does almost the whole singling with the hoe alone.

If this first hand-hoeing is properly done, it may be that, in a good season and on well prepared land, it need not be repeated; but more generally the piece must be run over again, and, though very rarely, a third hoeing may be requisite; but these two last operations are much easier and less costly than the first.

The first hand-hoeing being finished, and the plants left to stand by the women having recovered themselves (in about 2 or 3 days, that is), the horse hoe must be passed between the rows; this operation being repeated as often as demanded by circumstances: thus, when the soil is weedy; after abundant and repeated rains, when the soil is jammed down, or when a long drought occurs; in all these cases the land must be mellowed by the horse-hoe to admit the air into the soil and to prevent the evaporation of the moisture of the subsoil, whence serious damage to the crop might follow.

One remark I must not omit: the young plants once above ground demand continual care; the propitious moment for each operation must be looked for, whether it be the singling, hoeing, or horse-hoeing of the crop, and these must never be put off even for a day on any pretext whatever. This is the great secret of success: negligence or delay in these things never fail to create trouble and disappointment.

The different hoeings, both by hand and by horse, must be done in such a manner as completely to destroy the drills, the plants being left level with the ground so that nothing may hinder their growth; care must, however, be taken not to injure their roots.

The mangle of the ground, roots on our li, and the parsnip manured, a m creased amount

In spite of to impart to y have already 1 worked crop of the flat and by of the Berthier 8 hands were e worked between milking the cow plants, and set to plant; these Ferland says, w self, with board, each and their b \$3.90, which ma or \$2.59 for an a and with the net

If the cultiv able, it will requ affirm that, in th precarious. An which the manur \$5.00, and that a nister of Agricul considerable sum gradually dimini crop increased an ers. Otherwise, a system novel at tively unremuner advantage of butt all kinds, all of wh call the attention are members of oi

Mangels may bend down toward

The mangel, the Belgian carrot, the swede and all the turnips grow *out* of the ground, and this habit enables us, by the aid of drills, to grow these roots on our light, thin soils ; while the sugar-beet, the long-red carrot, and the parsnips, all grow *in* the ground, and require a deeper soil, heavily manured, a more careful cultivation, decidedly more costly, and an increased amount of labor up to the very harvesting of the crop.

In spite of my wish to shorten this essay, I cannot resist the temptation to impart to you some information obtained from Mr. Ferland, whom I have already mentioned. In 1880, this gentleman sowed, after a well-worked crop of potatoes, 8 arpents of sugar-beets. They were put in, on the flat and by hand, in rows of 18 inches, as recommended by the manager of the Berthier sugar-factory, and this gave 125 rows per arpent. In hoeing, 8 hands were employed, besides himself ; one, with an eleven-inch hoe, worked between the rows, and got over 2 arpents a day easily, besides milking the cows night and morning ; the eight others hoed between the plants, and set them out by hand, at a distance of 6 to 8 inches from plant to plant ; these, too, completed their 2 arpents a day. The hoeing, Mr. Ferland says, was well done. He reckons the pay of the two men and himself, with board, at \$1.00 a day each = \$3.00 ; to the lads, he paid 40 cents each and their board 25 cents, say, 65 cents, = for the six young hands to \$3.90, which makes a total of \$6.90, or \$3.45 an arpent, of 120 to 125 rows, or \$2.59 for an arpent of 90 rows. He says he was satisfied with the crop, and with the net profit, considering it was his first attempt.

If the cultivation of the sugar-beet is to be developed as appears probable, it will require assistance from extraneous sources ; for I do not fear to affirm that, in this country, the growing of this crop is not only difficult but precarious. An efficacious means, in my opinion, would be to fix the price which the manufacturer should pay to the grower for a ton of beets, say, \$5.00, and that a farmer should receive, in addition, directly from the Minister of Agriculture, \$1.00 for each ton accepted by the manufacturer. A considerable sum as a grant would be required, no doubt, but it would be gradually diminished, and abolished as soon as the feeling in favor of the crop increased and the system of cultivating it became familiar to our farmers. Otherwise, you will find it difficult to get our countrymen to adopt a system novel and unknown to them up to this hour ; a system comparatively unremunerative, since the extent of our farms allows of the sale to advantage of butter, cheese, fruit, tobacco, potatoes, turnips, wool, meat of all kinds, all of which yield fair profits without risks or great expense. I beg to call the attention of the farmer-members to this point, especially those who are members of our association.

Mangels may be harvested when the leaves are spotted with red and bend down towards the ground, and they should be got in, anyhow, before

the 15th October, to protect them from the attacks of the first frosts. Turnips to be harvested from October 15th to November 1st. Since, on an arpent of land, about 20,000 mangels or turnips, and often more, have to be handled, it is clear that to do this work rapidly will considerably lessen its cost, and it is, therefore, indispensable to learn the most expeditious method of performing it. I will, then, describe, as briefly as possible, the mode of pulling the crop practised in England and in other parts of Europe.

The workman takes the mangel, in his right hand, by the neck, and having pulled it up, seizes the bulb with his left, and, with a twist, wrenches off the leaves with his right; no knife must be used, for fear of wounding the flesh of the neck, and thus lessening the chance of the mangel's keeping. Turnips are also pulled by the neck, but with the left hand, and the roots are cut off with a knife held in the right; then, raising the turnip and giving it a half-turn to the right, a single stroke of the knife cuts off the leaves, the roots thus treated are dropped in a line at the feet of the workman. Before pulling the sugar-beet or the long-red carrot, we have to pass a common plough, without its mouldboard, on each side of the rows and even under them, and then treat them as above. All the neck of the sugar-beet must be cut off, and not a vestige of the leaves be left.

THE CULTIVATION OF THE BELGIAN CARROT.

This carrot requires 2 lbs. to 3 lbs. of seeds to the arpent, sown 1 inch deep, and, like its congeners, in drills 18 to 20 inches apart. It is hoed by hand when the leaves are 2 or 3 inches high, with a hoe $2\frac{1}{2}$ inches wide, and singled at 4 or 5 inches in the rows. Its cultivation is more difficult than that of the mangel in that it requires more care and attention. The harvesting, which may be deferred to the 1st November, is too simple to need description.

Before I finish, I advise those who, finding themselves in the same situation as M. Guèvremont, desire to undertake the growth of root-crops, to make their first essay on a piece of potato-land, well cultivated, or on a field improved by the ploughing in of one or more green-crops. M. Ferland agrees with me in this, because he knows by experience that the practice is advantageous; but, on the express condition that the potato-crop has been thoroughly well worked. He observes that this cultivation is generally negligently performed, and that the land is too often infested with the worst description of weeds; a disadvantage which cannot exist if the method of growing potatoes just described be rigorously followed. In this way, sugar-beets are grown in France, and I see no reason why, in certain cases, it should not be practised here. The land will, then, receive all the preparation recommended, and all the operations of sowing, hoeing, singl-

ing, and stirring, and, if the soil already in and, satisfied, will be only a profit.

Very necessary for the cattle-food, the soil already in and, satisfied, will be only a profit. Very inco- of beet-pulp a the crop obta- nure, the use hoed-crops and allied the one can enlighten- tions are the r which practice

I will not kindness, I the

After his le Guevremont h: sumption:

TO ADOLPHE

DEAR SIR,

In reply to was at Sorel, ai surprised to see potatoes in an what I learnt fr with ease and at who learnt the I am a market g St. Hyacinthe n not do better th

In 1888, I se sugar-beet, and c arpent—My son days each; 6 da with hardly any

ing, and stirring, as described, even where they are not absolutely necessary (*for the potato crop itself, I presume.*—Trans.). Working thus on a soil already in good tilth, clean, and manured, they cannot fail to succeed; and, satisfied with the result obtained and the experience acquired, they will be only anxious to continue the exploitation of this new source of profit.

Very incomplete, Mr. President, is this essay: the value of roots as cattle-food, the importance of the sugar-beet as a raw material, the worth of beet-pulp as a part of the economy of the farm, the cost of production, the crop obtained, the profits realized, the employment of artificial manure, the use of ploughing in green crops, the improvement of the land by hoed-crops and their importance in rotations, are all questions intimately allied the one to the others. The Messrs. Guèvremont, who are present, can enlighten you on most of these points better than I. Their explanations are the more valuable seeing they have in their favor the authority which practice and experience can alone give.

I will not take up more of your time, gentlemen, but, affected by your kindness, I thank you for your patient attention.

After his lecture, Dr Bruneau read the two following papers, Mr. Séraphin Guèvremont having been detained at Sorel just as he was leaving for l'Assomption:

Saint-Hyacinthe, 18th January, 1889.

TO ADOLPHE BRUNEAU Esq. M. D., SOREL.

DEAR SIR,

In reply to your letter, I beg to say that in the course of last summer I was at Sorel, and visited the hoed-crops of M. Séraphin Guèvremont. I was surprised to see 18 acres of land covered with swedes, mangels, carrots and potatoes in an unusual state of cleanness and promising a great yield. From what I learnt from my friends in the neighbourhood, these crops are grown with ease and at comparatively slight expense by the Messrs. Guèvremont, who learnt the method from Mr. Jenner Fust during his residence at Sorel. I am a market gardener by trade; I sell large quantities of vegetables in the St. Hyacinthe market, but, in spite of my experience in these crops, I could not do better than does M. Guèvremont at Sorel.

In 1888, I sowed 1½ arpents in Orange Tankard mangels—as sweet as the sugar-beet, and contains more nitrogen—; I harvested 60 tons—34 tons to the arpent—My son, 18 years of age, and an old man—66—hoed the piece in 3 days each; 6 days' work of one. Up to date, I have kept my 22 pigs on them, with hardly any other food.

At your request, I send you my opinion for what it is worth, and I hope it will be of use to you.

I have the honor to be

Your obedient servant,

CHS. PELOQUIN.

Mr. President, and Gentlemen,

As I am not used to public-speaking, I beg your indulgence for the few facts I have to relate to you.

Before 1885, I had never grown any roots, unless you called potatoes by that name : I had grown a good many of them. Having seen, in 1884, on the Lincoln-College farm, entire fields covered with superb crops of mangels, carrots, turnips and cabbages, which Mr. Jenner Fust was cultivating there, I made up my mind to imitate him, and to make an attempt to grow these crops, which, previously, I had imagined to be very difficult.

In 1885, I grew in accordance with his instructions and under his immediate supervision 2 arpents of swedes and carrots. I was so well satisfied with my crop that, year by year, I increased the quantity of land devoted to it, until this year I have 18 arpents in root-crops. I may say that, up to 1887, I was directed in my cultivation by Mr. Jenner Fust, who used to call me and my brother, his pupils. But this year, 1888, we have worked without any assistance, and have succeeded very well indeed.

My chief crop is swedes, for it is the best yielder on my sandy soil. Then come white-carrots and mangels, and then potatoes. I shall not speak of the cultivation of these different roots, since my friend Dr Bruneau has explained to you all the operations in an exact, complete, and precise manner.

The hoeing, which seems to be the great difficulty with all root growers, is easy, if the plan described by Dr Bruneau is followed, and if his advice, never to delay its execution and always to do it in proper weather, is strictly complied with.

The following is the cost of growing an arpent of roots, the number of bushels harvested, and the value of the crop in money ; at least, as nearly as I can reckon.

2 ploughin
2 harrowin
Drawing d
Spreading
Splitting d
Rolling...
Sowing...
4 horse-ho
Hand-hoein
2nd. hand
Pulling...
Storing...

Cost and ca
Seed.....

I harvested
6 arpents of lan
Say, 6
Re

Co

Ne

I use the m

I thank the
to reply, by lett
I am happy to l
the success of tl
many a long da

(Sign

	Mangels.	Swedes.
2 ploughings.....	\$2.00	\$2.00
2 harrowings.....	1.00	1.00
Drawing drills.....	1.00	1.00
Spreading dung.....	75	75
Splitting drills.....	75	75
Rolling.....	50	50
Sowing.....	50	50
4 horse-hoeings.....	2.00	2.00
Hand-hoeing and singling....	3.00	2.40
2nd. hand-hoeing.....	1.80	1.20
Pulling.....	5.00	7.00
Storing.....	4.00	5.00
	<hr/>	<hr/>
	\$22.30	\$24.10
Cost and cartage of dung.....	10.00	10.00
Seed.....	1.70	90
	<hr/>	<hr/>
	\$34.00	\$35.00

I harvested more than 4,200 bushels of swedes on 6 arpents of land, or 700 bushels per arpent :

Say, 600 bushels of swedes, at 20 cts..	\$120.00
Refuse swedes &c. for cattle.....	10.00
	<hr/>
	\$130.00
Cost of growing, &c.....	35.00
	<hr/>
Net profit per arpent.....;	\$95.00

I use the mangels for my milch-cows in spring, and some I sell.

I thank the meeting for their attention, and I shall esteem it my duty to reply, by letter or otherwise, to all questions which may be put to me. I am happy to be able to contribute, to the utmost of my feeble means, to the success of that great cause, of which you, gentlemen, have been for many a long day the indefatigable promoters.

(Signed)

SERAPHIN GUÈVREMONT.

is worth, and I

S. PÉLOQUIN.

gence for the few

called potatoes
ng seen, in 1884,
superb crops of
Fust was culti-
make an attempt
be very difficult.

id under his im-
was so well satis-
quantity of land
rops. I may say
enner Fust, who
t, 1888, we have
well indeed.

my sandy soil.
I shall not speak
Dr Bruneau has
ete, and precise

all root growers,
nd if his advice,
ather, is strictly

, the number of
least, as nearly

HOED-CROPS AND THEIR PLACE IN AGRICULTURE,

BY MR. ARTHUR R. JENNER FUST, EDITOR OF THE JOURNAL OF AGRICULTURE.

Many of the correspondents of the American agricultural papers assert, Mr. President and Gentlemen, that cultivation can be substituted for manure. This is a reverting to the ideas of Jethro Tull, an old English agriculturist, whose methods were abandoned a hundred years ago.

Nobody denies that if the land be stirred frequently, a great quantity of fertilizing matter will be set free and will be ready to fulfill its function as the purveyor of food to the plants we cultivate; but as to what the American writers say, I do not agree with them. Though I believe that a field well ploughed and well cultivated will produce during several years more abundant crops than a field whose cultivation after sowing has been neglected, I maintain that the fertilizing elements of such a field would be much more rapidly exhausted than those of the latter; I maintain that a field ploughed and sown, with a slight dressing of dung and no other cultivation, will produce more abundant crops than a field, however good the cultivation after sowing may have been, but to which no manure has been given; but, to make the said field yield the most prolific crops possible, I maintain that it must unite the three desired qualities, that is, that it must have been well ploughed, well cultivated, and well manured.

Now, there are two modes of ensuring the perfect cultivation of the soil: the summer-fallow, and the growing of hoed-crops. The summer fallow is almost unknown here; but in England, the heavy-land farmers, especially when their farms are distant from large towns, are *obliged* to allow their lands to lie fallow every 5 or 6 years. Let me say, in passing, that the English heavy-land is incredibly heavy: four horses—and big horses, too—can with difficulty break up $\frac{3}{4}$ of an acre—nearly an *arpent*—a day. To make a good fallow, the field must be ploughed, harrowed, rolled, grubbed, tormented in every way, and all this during a whole summer, so that the field which has borne a crop of wheat remains entirely unproductive for an entire year. Fallows are a great expense to English farmers, but when root-crops cannot be grown they must be made.

Fortunately for us, there are hardly any farms in the province of Quebec, where roots and the other hoed-crops cannot be produced. The principal aim in cultivating them is to make the land yield an abundant provision for the stock, and, at the same time, to prepare the soil for the crops of grain, grass, and leguminous plants which are to succeed the hoed-crops in the intended rotation. And this is the reason why the rota-

tion should always be done, or, as we call it

The following

The last crop, and if the soil is not in good condition, it must be eradicated by operations. Direct sowing of shocks are in the field, the piece, the horse-rake collected, burnt, or preferred for the future mixture in August and the grass and other crops of days to the advantage of the soil.

Towards the end of the land has been well made as deep as possible up from the bottom, not forget the end of the descent of some of the rootlets of the other roots, be careful

If I were to go to ploughing, I should not crop, but never get a leguminous crop

On heavy-land, mangels and sweet potatoes are done after the direct sowing in this way: weeds are destroyed apart, with the manure who practise this 12 feet will be sown per ridge, the two crops will be in rotation

CULTURE,

OF AGRICULTURE.

ricultural papers
n be substituted
, an old English
years ago.

a great quantity
fulfill its func-
tion as to what the
I believe that a
ing several years
owing has been
a field would be
maintain that a
d no other cul-
tivation ever good
the nature has been
crops possible, I
that is, that it
inured.

tion of the soil :
mer fallow is al-
ways, especially
to allow their
that the English
s, too—can with
To make a good
bed, tormented
the field which
an entire year.
ot-crops cannot

he province of
produced. The
l an abundant
ne soil for the
o succeed the
why the rota-

tion should always begin with the member containing plants sown in rows, or, as we call them : *fallow-crops*.

The following is the method of treating heavy-land :

The last crop, as was said just now, was a grain-crop, the last of the rotation, and if there be any couch-grass (*chien-dent*), or any other root-weed, it must be eradicated. In England, this is the most important of all our operations. Directly the grain is carried off and sometimes even while the shocks are in the field, the grubber or cultivator is sent along and across the piece, the harrow and roller pulverize the grubbed surface, and the horse-rake collects the grass and root-weeds into rows : this rubbish is burnt, or preferably carted to the corner of the field, to form the bottom of the future mixen. *Even in England*, the sun is sometimes very powerful in August and the early part of September, and I have often seen the couch grass and other weeds so completely dried up after their exposure for a couple of days to the air at that season, that all danger of their growing anew was dissipated.

Towards the end of October, the fall-ploughing is given. Where the land has been well farmed and is not in bad condition, the furrow may be made as deep as the horses can draw the plough. As a rule, I would not bring up from the bottom-soil too much at once—say, two inches. Still we must not forget the enormous pulverizing effect of the frost in our climate. The descent of some of the particles of former manurings into the subsoil may have mitigated its crudities, so as to render it less hostile to the penetration of the rootlets of the future crop, especially if the heavy dunging, which we must give the land if we intend to raise a paying crop of mangels or other roots, be considered.

If I were to lay down a principle so dangerous as an absolute rule, as to ploughing, I should say : always plough deeply in autumn for a root-crop, but never go below the former furrow when ploughing for a grain or a leguminous crop.

On heavy-land, not subject to spring-floods, the easiest way of growing mangels and swedes is to turn the dung down in autumn, with a ploughing done after the deep fall-furrow, and to sow in spring *on the flat*. When sowing in this way, we have only to grub, harrow, and roll, until the annual weeds are destroyed, and then sow the seed, in rows of about 24 inches apart, with the Matthews or Planet jr. seed-barrow. I recommend those, who practise this plan on heavy-land, not to make their ridges too wide ; 12 feet will be sufficient, and will allow of four rows of mangels or swedes per ridge, the two outside rows being a foot from the furrow, so that the crop will be in rows two feet apart from one side of the field to the other.

The hoed-crops are :

Potatoes,
 Indian corn or maize,
 Cabbages,
 Swedes,
 Carrots,
 Parsnips,
 Kidney-beans.

I will not weary you by describing the different modes of growing the two first crops above named—potatoes and maize.—But, I may say in passing, that the chief fault I observe in the cultivation of potatoes in this province is, that they are earthed up too high, in fact, very much too high. Plant the sets deeply—say, 4 inches,—and only earth up once, adding a very little earth to the covering of the tubers.

As to maize, to sow it broadcast is, in my opinion, to lose all chance of cultivating the land after it has grown beyond the harrows, and this takes broadcasted maize altogether out of the category of hoed-crops.

The Abbé Chartier, at your last year's meeting, expressed his ideas on the cultivation of corn, and I was very much surprised to see, in one of the agricultural papers of the States, that this gentleman had spoken in favor of sowing this grain broadcast ! He said just the opposite, for I remember his words perfectly :

“ We never sow broadcast. Some who have done so have had splendid crops, but let them beware ! Sooner or later, they are sure to be caught in a cold spell in June and in spite of every precaution as regards previous cultivation, the grass will overcome the corn, and their crop will be a failure, for no assistance can be given to broadcasted maize.”

I need not say I am of the Abbé's opinion.

THE PREPARATION OF THE LAND FOR HOED-CROPS.

The more deeply the soil is worked, the better will be the crop. This does not mean that in a clay soil you are to bring up a lot of raw soil in the spring, for this would become a source of trouble in ploughing, in grubbing, in harrowing and rolling, all through the summer. It would hinder one from sowing at the season proper to ensure a good crop. The principal aim of the root-grower should be to work the land to a proper depth, and he should never stop until he has succeeded in doing this to at least 9 inches deep. The deep furrow should invariably be executed before winter.

The follow
 seldom sufficie
 being difficult
 or grubbed. I
 it afterwards.
 and, perhaps, t
 the depth sho
 plough will go
 dangerous. Th
 escaped the aut
 of as you pleas

I always st
 thus : I tie the
 up to drip, ke
 itself, then dry
 ready for sowing
 swede-seed, and
 per acre.

The mangel
 tion of 120lbs. of
 phosphate of lim
 able. The sulpl
 Vasey's Hochela
 Lomer & Co., or
 monia to swedes c
 you have enough
 case is different v

The land is n
 ing the drills wid
 for the horse-hoe,
 air to the growing
 at 36 inches for r
 third of the groun

As soon as th
 and I will take th
 from economically

SPRING PREPARATION.

The following is the usual manner of sowing root-crops, the land being seldom sufficiently cleaned in the fall, and a sufficient quantity of manure being difficult to obtain at that season. The land may be cross-ploughed or grubbed. I myself would rather harrow it along and across, and grub it afterwards. If the land is in good order, you need only the harrows and, perhaps, the roller to fit it for being drilled up. If cross-ploughed, the depth should be the same as that of the autumn-furrow, only the plough will go more steadily if it goes half-an-inch deeper—more would be dangerous. This furrow will bring to the surface all the root-weeds that escaped the autumn-cleaning, and they can be got together to be disposed of as you please.

PREPARATION OF THE SEED.

I always steep the seeds of mangels, carrots, and parsnips, and I do it thus : I tie the seed up in a bag, let it steep about 40 hours, hang the bag up to drip, keep it in a warm place till the white germ just shows itself, then dry it up with sand, charcoal in powder, &c. : it is then ready for sowing. Six pounds of carrot and mangel-seed, three pounds of swede-seed, and eight pounds of parsnip seed, are the quantities required per *acre*.

MANURES FOR MANGELS AND SWEDES.

The mangel requires nitrogen, the swede phosphoric acid. An addition of 120lbs. of sulphate of ammonia for mangels, and of 200lbs. of superphosphate of lime for swedes, to the ordinary dunging, will be found profitable. The sulphate of ammonia is to be found at a reasonable price at Mr. Vasey's Hochelaga Ammonia Works, and the superphosphate at Messrs. Lomer & Co., or Messrs. Brodie & Harvie, Montreal. To give the ammonia to swedes or the phosphoric acid to mangels is wasteful, that is, when you have enough dung to give a moderate dose to every acre sown : the case is different when one is obliged to use artificial manure alone.

The land is now ready for drilling. There is nothing gained by making the drills wide. My distance is 24 inches ; this leaves plenty of room for the horse-hoe, and for the entrance of abundant supplies of light and air to the growing plant. Numbers of acres of land are lost by drilling up at 36 inches for roots, and even for Early-Rose potatoes ; by this error, a third of the ground is left unoccupied.

As soon as the drills are completed, the dung is to be carefully spread, and I will take the liberty of saying that this operation is conducted far from economically by many of our best farmers. It takes more time and

labor to spread a heap of dung over five rows, than over three rows. The farmer should drive the horse in the middle of the *three* drills, and drag out enough dung into the drill in which the horse is walking without stopping him for a moment. Another man divides the dung among the *three* drills, and this, it is evident, can be done with much more ease, and in much less time per acre, than if it were attempted to dung five or more drills at once.

THE SOWING OF THE SEED.

This operation varies according to the state of the seed, whether dry or steeped. In the latter case, the following is the best mode of proceeding: roll the drills, make a shallow furrow in the centre of each, with a stick or the corner of a hoe, not more than $\frac{3}{4}$ of an inch deep; sow the seed in this rut by hand, and after covering it in with a rake, pass the roller again over the drills. Rolling is a most important point in root growing; by omitting it, a distinguished agriculturist at Lachine lost 9/10 of his crop in 1888.

The seed-harrow will sow mangels, carrots, and parsnips, if the seed be dry. Every time I use an American seeder, I open the distributor two, or even, three holes more than the indicator points to. Of course, these tools sow turnip and swede-seed famously, but the roller should always be used after them, and, on light land, it should be a pretty heavy roller.

Try to sow all the seed at the same depth, that it may all come up equally. There is nothing so annoying at hoeing time, as to find the growth of mangels or turnips uneven.

The steeped seed of mangels, &c., and the dry seed of turnips, will begin to show above ground towards the fifth day—sooner or later, according to the season.—The moment the rows of the young plants are visible, start the horse-hoe. This is the reason why I have so often recommended, in the Journal of Agriculture, the drawing of drills perfectly straight, for if they have been well drawn, the horse-hoe can pass along the space between them without hurting the plants, even if, here and there, there is a yard or two of a row not up. Immediate horse-hoeing is most important, and so much do I think of it, that where parsnips, which take a long time to come up, are in question, I often mix half a pound of turnip-seed with the parsnip-seed, and this coming up rapidly, allows the horse-hoe to be set to work the seventh or eighth day after sowing.

THE HORSE-HOE.

If the horse-hoe is properly constructed, that is, if the side-blades are made with the right curve, it will cut, or rather, peel off, the sides of the drills the second time it is worked, leaving only a narrow piece of earth,

from one inc
drill-grubber
sides of the
though I nev
do the work

Mr. Step
to hoeing dri
ing the dung
for the more
will it impart
is applied in
see the roots
running acros
half-way, act
horse-hoe had
the drills, and
moisture and
ing after their
of mangels an
grown unless
young plants,
would think t

There is n
will be uprig
be converted i
completely yo
your crop.

In this pai
is in good orde
month, I had 1
parsnip: The c
red, but, in thi
yield of the fo

We now co
carrot. It is wh

from one inch and a-half to two inches wide, for the hand-hoe to do. No *drill-grubber* can work properly until the *horse-hoe* has thrown down the sides of the drills; after that is done, the former tool is useful enough, though I never could see the use of having two implements when one would do the work perfectly.

THE SINGLING OF ROOT-CROPS.

Mr. Stephens, in his excellent work, *The Book of the Farm*, objects to hoeing drilled root-crops deeply, on account of the risk run of disturbing the dung. What he thinks a mistake, I think an excellent practice; for the more the dung is intimately mixed with the soil, the more freely will it impart its fertilizing juices to the roots of the growing crop. Dung is applied in drills simply for economy's sake. In 1884, I was surprised to see the roots of white-turnips, as big as the stem of a common clay-pipe, running across 26 inch drills, and, not content with meeting their neighbors half-way, actually invading their territory. The reason was clear: the horse-hoe had pulverized the middle-space, the hand-hoe had pulled down the drills, and the turnips were floating, so to speak, on a sea of mingled moisture and fertility, which offered them every liberty possible in searching after their favourite food. If this is true of turnips, it is ten times truer of mangels and swedes. Of these two, the best attainable crop cannot be grown unless the drills be pulled down to the level of the dung, and the young plants, after singling, left so naked that an inexperienced observer would think them doomed to perish by drought.

There is no fear of this! Delicate as they may seem, in 24 hours they will be upright again, and all the part left bare of earth will, eventually, be converted into good cattle-food. The more deeply you hoe, the more completely you draw away the earth from the plants, the heavier will be your crop.

WHEN TO SOW MANGELS.

In this part of the world, mangels cannot be sown too early. If the land is in good order, the first week of May is a good time. After the 25th of that month, I had rather sow swedes. The same may be said of the carrot and parsnip: The *orange-globe* mangel is very superior in quality to the *long-red*, but, in this climate, the yield of the latter is so much greater than the yield of the former that I dare not recommend sowing the orange-globe.

THE CULTIVATION OF FIELD CARROTS.

We now come to the true "dairyman's crop," the White Belgian carrot. It is white, with a greenish-white neck, growing from 4 to 6 inches

out of the ground. This is the carrot we prefer, and a valuable root it is; easy to grow, a large yielder, good in quality, and no more trouble to pull than a swede is. It suits itself to most soils, for I have seen 1,400 bushels an acre on heavy-land. It yields better than swedes on light-land, and, in spite of analyses, it is of far higher value for milch-cows than the latter, though it must be confessed, its cultivation is a little more costly. It is the best of food for the production of milk, since to it, it gives richness and colour, to the butter it never gives any bad taste. Is not this what all dairymen want?

HOW TO SINGLE CARROTS.

This may be made a cheap or an expensive job. If the fingers only are used, it will cost a good deal to single an acre of carrots; but I can show you a cheaper plan practised at Sorel. First, let us see what will be the best distance to leave between the plants, to get the greatest possible yield from an acre. We must not be guided by the distance left between mangels or swedes, for these plants do not send their tap-roots down so deeply into the subsoil as carrots. I think 3 Belgian carrots to the foot would be a fair average, were I certain the hoers would observe that number; but, unless I did the work myself, I am sure I should be disappointed; so we will say, 3 plants to 15 inches.

To single carrots at 5 inches apart, a special tool is required. The one I use is made out of an old scythe; it is $2\frac{1}{2}$ inches wide, and as it is kept very sharp, a woman cuts out the plants with great ease, by alternate strokes of pushing from, and drawing towards, her feet. She is followed by a girl or boy, who pulls out by hand all the carrots but one from the tuft left by the hoer, and thus the operation is finished. The horse-hoe must of course be kept going as often as convenient to the farmer—it cannot be worked too frequently. As to this point, the farmer must remember that even if the crop of roots is not tangibly increased, though it will be, by this constant stirring of the soil, all hoed-crops, well done by, have a special influence on the grain and grass-crops that follow them; and although the weeds are destroyed during the process, this is only a small part of the benefit derived from the constant and seasonable use of the horse-hoe. M. Gustaf Gylling, who succeeded me in the Lincoln College farm, told me, and from what I saw during the growth of the crop I believe him, that in 1885, on the 5 acres I had cultivated the previous year in cabbages, swedes, white carrots, potatoes, and mangels, the crop of oats yielded 70 bushels and the barley-crop 48 bushels an *acre*: i. e. 60 and 40 bushels an *arpent* respectively.

The best
dear here, to
the getting of
its cultivation
oughly well
ground.

Excellent
beginning of
should be so
thinly. About
down heavy,
rows. Books
experience h
crop to the a
lose one-thir
to plant a ro
48 inches bet
prunes or dis

CAN FARMERS
GOING
]

I have be
cial manures
on our farms
things to say
speak, of bor
from the re
manure: nit
my best, and
kindly excus

At the la
the subject of
its precious e
is enough to
collecting it i

PARSNIPS.

The best of all roots for milch-cows is the parsnip, but the seed is so dear here, the plant comes up so slowly, the singling is so expensive, and the getting out of the ground so troublesome, that I dare not recommend its cultivation. Steeped parsnip-seed sown by me in 1884, on land thoroughly well prepared, was six weeks before it showed itself out of the ground.

CABBAGES.

Excellent food for all kinds of stock. Towards the end of April or the beginning of May, a pound, or so, of cabbage-seed—St. Denis or Savoy—should be sown in a seed-bed, in the open air, in rows 10 inches apart and thinly. About the 10th June, transplant into well-manured rows, *rolled down heavily*, 24 inches apart, and 12 inches from plant to plant in the rows. Books and amateur farmers recommend 3 feet each way, but long experience has taught me that the distances I advise will bring the heaviest crop to the acre, and that those who follow the directions spoken of above lose one-third of their land. To those who grow tobacco, it is advantageous to plant a row of cabbages and a row of tobacco, alternately. This leaves 48 inches between the rows of the latter: plenty of room for the man who prunes or disbuds it.

CAN FARMERS PROVIDE THEMSELVES WITH ARTIFICIAL MANURES WITHOUT GOING TO THE MANURE-MANUFACTORIES? THE UTILIZATION OF BONES, ASHES, PLASTER, THE WASTE-PRODUCTS OF FACTORIES, &c.

I have been requested to say a few words on the preparation of artificial manures from the waste-matters generally available for that purpose on our farms; they are bones, ashes, &c. Unfortunately, I have but few things to say about their employment, for except the dissolution, so to speak, of bones by means of dampened ashes, I see no means of furnishing, from the refuse of the farm, the three necessary ingredients of a good manure: nitrogen, phosphoric acid, and potash. Never mind; I will do my best, and if the audience find my essay rather poor in ideas, it will kindly excuse it.

At the last meeting of this Association, M. Marsan addressed you on the subject of the care to be given to farmyard dung to prevent the loss of its precious elements. Wherefore, I need not enlarge upon that subject. It is enough to say that, if the urine is kept from wasting itself, either by collecting it in tanks, or, preferably, by using enough litter in the stables

and cattle-sheds to absorb it completely, the solid dung will take care of itself, provided it is not too much drenched by the drip from the eaves, and is not allowed to heat too much in summer.

As I said just now, the three necessary constituents of a good manure are nitrogen, phosphoric acid, and potash; although the last is not always absolutely requisite on heavy land, especially when that land has not been exhausted by a too frequent repetition of the grain-crop.

As for nitrogen, a fair dose of it would be about 40 lbs. to the acre, and it would take from 1,000 lbs. to 1,200 lbs. of bones to yield that amount, equal to 48.56 lbs. of ammonia. Among these bones will be found about four times as much phosphoric acid as is generally wanted on an acre. Thus, as you see, bones are not a well balanced manure. To the bones add a few bushels of ashes, and beside the potash therein contained you will find in them still more phosphoric acid, for hardwood ashes, especially those from the beech, contain, on the average, 5 per cent of that compound.

What are we to do then in such a case? We must take refuge in the hope that the surplus of phosphoric acid may remain in the ground for the use of future crops.

After all said and done, it is clear we cannot afford to deal with bones in this lavish manner. One thousand pounds of them is about as much as we can hope to collect on a farm in the course of the year, and to apply such an amount as this to an acre of land would be to waste both time, labour, and money-value. Let us take 400lbs., then, and mix with them 20 bushels of ashes—this quantity being a dose for an acre:

Place the bones on a block of hardwood, or an anvil, and smash them with a sledge-hammer; mix the bones and ashes intimately, and make them into a flat-topped heap, moistening them a little, but not making them dripping-wet. As to the knee and hock-bones, they had better be burned, as they are almost unconquerable by any other means; when burned, they can be crushed by rolling a barrel, loaded with stones, over them when spread out on the barn-floor. They should be turned over after every passage of the roller.

After the damp heap of bones and ashes has reposed about 3 weeks, it will have heated considerably, and when the heat is at its height, the heap should be turned over carefully, and moistened afresh. In three months from the commencement, the bones will be so softened that they can be crushed as before described.

In almost every village in the province there is a tannery. Although the spent-bark is worth nothing as manure, the refuse bits of skin are very valuable for our purpose. They contain much nitrogen, and as tanners employ a good deal of lime in preparing their *liquors*, the nitro-

gen is converted into tanners' refuse, and is sent to one of the refueries for the purpose of being made into a heap of bone-ashes, which is used nine or ten times when it is used—

As to the manure of M. Chapais,

“We can use a manure on the results obtained, excellent absolute used in this very fertile and productive.”

As to the manure of the desirable front of factories, and of the financial expenditure of the refuse, all have to be

I forgot to mention that it may be profitable after the fermentation ammonia will

By M. F.-J

Gentlemen,

When you have no doubt, wish of my parish, testimony of me the pleasurable students, the l

gen is converted into nitrate of lime, a fixed salt. To make the best use of tanners' refuse, it should be mixed with earth at the rate of 3 loads of earth to one of refuse, and a heap made of it, which should be dealt with like the heap of bones and ashes, that is, kept moist, and turned over two or three times when it has properly heated. Three loads of refuse—it is very heavy—and nine of earth, are enough for an acre.

As to the employment of bog-earth (*terre noire*), I am wholly of M. Chapais, opinion :

“ We cannot advise you, as a profitable thing, to employ bog-earth as a manure on any soil. The expenses of cartage are not compensated by the results obtained, which are problematical. Still, bog-earth, well dried, is an excellent absorbent in our stables and cow-sheds, to retain the urine, and used in this way, if you have it handy, it is both advantageous and remunerative.

As to *composts*, I must tell you frankly that, while they are truly desirable from the *restitution* point of view, the employment of the refuse of factories, &c., should only be undertaken after a serious consideration of the financial side of the operation, at least when it is necessary to expend money on the purchase of the materials. After reckoning the cost of the refuse, the expense of cartage, loading and unloading, spreading, &c., all have to be counted in, and this in a country where labor is so dear.

I forgot to mention that the manure of the poultry and pigeon-house may be profitably mixed with the bones and ashes as described above, but after the *fermentation* of the heap is finished, otherwise great loss of ammonia will ensue.

ARTHUR R. JENNER FUST.

THE SUGAR-BEET.

By M. F.-X. THIBAULT, ADVOCATE AND FARMER, STE. THERÈSE-DE-BLAINVILLE.

Gentlemen,

When you invited me to address this great and worthy meeting, you, no doubt, wished to pay a compliment to Ste. Thérèse. Well! in the name of my parish, I thank you. I return thanks, too, in my own name: this testimony of consideration is all the more agreeable to me in that it procures me the pleasure of seeing, after 25 years, my first Alma Mater, my fellow-students, the beloved professors, and that fine, venerable figure which, in

the person of the Rev. M. Dorval, has presided for so many years over the destiny of the great College of L'Assomption.

The son of a farmer, and a farmer myself, from taste as much as from necessity, I love the society of farmers ; I feel at ease in the presence of those good, frank people who respire the free air of our rural parts, before those generous natures who make themselves the obliging and official (*officieux et-officiels*) protectors of the cause of agriculture, and whose presence alone is an encouragement. Is it not a fine sight to see here the Legislature shaking hands with the clergy, and the clergy with the farmers ; fraternizing together to the increase of prosperity, to the advancement and to the progress of humanity ?

We are here *en famille*, we may well say. We have come from the four corners of the province to converse together, to impart mutually our experience, our failures and our successes ; we have come hither to learn, to gain encouragement, to find a solution to this riddle : *How to grow rich !*

I knew a great Yankee who made his fortune by selling, for 20 cents, this coarse reply to that question :

“ Work like the devil, and never spend a copper.”

Now, this answer was false, because it was incomplete.

To work is not enough ; work must be directed by intelligence and applied to a remunerative object. Besides, then is no need to tell a Canadian to work, a farmer wants no advice to teach him the practice of economy.

If there be any one acquainted with the harshness of life, with its incessant sacrifices, its painful struggles, its weariness, its furrows ploughed by every species of bitter wave, it is certainly the farmer ; and yet farmers are not rich !

I was vividly interested by the judicious observations, the practical essays, the eloquence, even, of the distinguished lecturers to whom I have been listening.

I appreciate good butter and finely flavoured cheese ; cattle are to me the friends of my heart ; to mine I give the care of a parent ; this they know, and they repay me with a return of affection which is not to be found in all human families ; siloes possess for me an attractive perfume, so much do they soften for our poor cattle the rigours of our long winters ; but, as on a well-served table, a certain variety of dishes is required, so on a well managed farm must there be several descriptions of agricultural products.

Let me, in my turn, introduce *my* client to you : a young little emigrant, a child of the 19th century, born in the south of Europe, and

who calls herse
please, before y
their own. Bes
come from Old
you see on the
of Berthier, a l
steam have bee
my client's nan
great lady who
present you, ge
I will not detai
very young.

Margraff a
first to discover
method of extra
doxical, and the
ruinous project.

It was not u
arising from pol
those vegetables
and of industry.

Napoleon, t
and the depth of
all nations excep

The great E
in 1806, the fam
European ports e

This measur
lop themselves ir
lishment of num

Napoleon sp
is due to him tha
Belgium, small a
in the whole of E

The sugar-be
heat, it is true, a
the rays of a too
under the favorab
summers, allows
richness and purit
tries. Our soil is

who calls herself French because France adopted her. Don't hate her, please, before you know her ; all the peoples love her and claim her as their own. Besides, what other title does she require but that of having come from Old France to acquire right of adoption in New France ? Do you see on the banks of the St. Lawrence, there in that pretty little village of Berthier, a large building, whence for some time copious volumes of steam have been escaping ? Well ! It is there, that the sugar-beet, for that is my client's name, has established herself. One would say that she was a great lady who lived upon her fortune realized long ago. To her then I present you, gentlemen, that you may love her and cultivate her good graces. I will not detain you long with her history, for it is soon told, as she is very young.

Margraff and Achard, German chemists of the 18th century, were the first to discover in the beet the existence of crystallizable sugar and the method of extracting it. This discovery was, at first, looked upon as paradoxical, and the university of Berlin received it as an impractical and ruinous project.

It was not until the 19th century, that, thanks to an event entirely arising from political causes, the sugar-beet took its place in the ranks of those vegetables that were to play a part in the advancement of agriculture and of industry.

Napoleon, then at the zenith of his glory, by the power of his arms and the depth of his unsearchable political combinations, had control over all nations except one : commercial England.

The great Emperor, aiming a deadly blow at his mortal enemy, decreed, in 1806, the famous continental blockade. From that time, from all the European ports exportation to England was precluded.

This measure—absolutely prohibitive—compelled all industries to develop themselves in proportion to domestic requirements. Hence, the establishment of numerous factories throughout the Empire.

Napoleon specially encouraged the growth of the sugar-beet ; and it is due to him that France has, to-day, more than 600 factories at work, Belgium, small as she is, more than 200, and that the total number of them in the whole of Europe, exceeds 1,100.

The sugar-beet, gentlemen, is the sugar-cane of the North. It loves heat, it is true, and its thick leafage is well calculated to protect it from the rays of a too ardent sun ; but the extreme activity of our vegetation, under the favorable atmospheric influences, aids the rapid growth of our summers, allows of the ripening of this root, and makes its juice equal in richness and purity to the juice of plants grown in the most favored countries. Our soil is well suited to its growth. Wherever wheat succeeds,

beets will do well. If it has any preference, it is in favor of deep soils, either loams, or calcareous-soils. The lime that these latter contain favors the decomposition and absorption of the alkaline principles by the plant, and encourages rapid germination and growth, both being conditions essential to the quality of this root.

In all cases, the land, whatever it may be, must be deeply ploughed: at least a foot deep. I lay great stress on this point, and for this reason:

Where the land, has not been deeply broken up, I have observed that the growth has been irregular and imperfect. The extremity of the root touching the unimproved layer (*subsoil*?) becomes paralyzed in its powers; the beet then grows, becomes bifurcated, stringy, grows out of ground, and loses in quality as much as in quantity.

“In order that a root may elaborate saccharine juices, says Raspail, it must be in a perpendicular position—*pivotante*—perfectly vertical. It is a curious physiological fact that sugar is not developed except in those organs that mount upwards or hang down.

The running stubble—*chaumes tracants*—of the sugar cane contain no sugar; a bending over maple does not give the 100th part of the sugar yielded by an upright one; even the fig and other fruits only become sugary when they hang towards the ground.

Do you intend, gentlemen, to enter upon the cultivation of the sugar-beet? Then, if you desire profit, plough your land shallowly in early autumn. This furrow will destroy the dry stubble, uproot the still growing weeds, stop the germination of the seeds of weeds, and hasten the decomposition of organic matters.

Then, later in the fall, just before the frosts if possible, give the land its deep furrow; this is to mellow the soil and to make it preserve its humidity in drought; it increases the solubility of the nutritive elements in the soil, and destroys the *gray-worm*, the implacable enemy of all vegetation.

Beets require a certain amount of moisture; therefore, spring-ploughing is not to be recommended on all soils, since, under the desiccating influence of that season, it may cause the evaporation of a great deal of the moisture the land contains.

Last season, I sowed ten arpents in beets: it was an experiment. I worked three different soils: the first calcareous, stony, dry, light and thin, with an impermeable subsoil. The seed came up well, but the crop was a failure. Of the other two, the one was clayey, compact, deep, with a self-drained subsoil, the other calcareous, with a thick layer of alluvium.

These two yielded 15 tons of beets to the arpent—17½ tons to the acre—. I filled up some vacant spaces with the trowel, and in spite of the persistent

drought that en-
planted beets fr

The hoeing
of the young pla
this period. The
neither the pres
beet-plants in a
beet. Free it fro
the earth. Set tl
together.

Two hoeing:
labor on the bee

Now, gentle
a paying one to

Now, I do n
of this crop and
the improvement
will cause to be r
tion have led me
in the ordinary r
may be raised
allied to agricul
nues of the farm

An arpent of
weighing one po
again to a minim
all my work, car

I have, then,
I believe that the
I have then reali
that beets may be
if I adopt, as I o
year twenty arpe
the grain-crop

Thus, after fi
and \$3,000 in my

Should we be
sight, perceived in
That he should ha
tion? Have exem
at seeing, in less t

drought that ensued, I had great difficulty in distinguishing the transplanted beets from those grown *in situ*.

The hoeing and singling are the critical points of this crop. The success of the young plants depends entirely on the assiduous care given to them at this period. They must be attended to in at early state of the crop, and neither the presence of weeds nor the crowding of a too great number of beet-plants in a tuft must be permitted to hinder the growth of the infant beet. Free it from anything that might shade it or absorb the juices of the earth. Set the plants out about six inches apart, and never leave two together.

Two hoeings are generally enough, but if you are liberal with your labor on the beet-crop, it will repay you at harvest.

Now, gentlemen, let us enquire together into the question: Is this crop a paying one to the farmer and to the country, or is it not?

Now, I do not fear to declare boldly that there are, in the cultivation of this crop and in the exploitation of this industry, benefits which time, the improvement of agricultural implements, and the facilitation of carriage, will cause to be more appreciated than at present. For study and observation have led me to the conclusion that this crop may be profitably inserted in the ordinary rotations; that by means of it, a great number of cattle may be raised and fed; that it creates a branch of industry intimately allied to agricultural improvement, and considerably increases the revenues of the farmer.

An arpent of land gives me 120 rows of 360 beets each, or 42,000 beets, weighing one pound each, at a low average; total 21 tons, which I reduce again to a minimum of 15 tons, which, at \$4 a ton, gives me \$60.00. Now all my work, cartage included, only costs me \$30!

I have, then, \$30 of net profit per arpent, which I multiply by 20; for I believe that the greater number of our farmers can sow that many arpents: I have then realized at once the pleasant sum of \$600! Experience shows that beets may be grown many years consecutively on the same land, but if I adopt, as I ought to do, a systematic rotation, I shall have every year twenty arpents of land manured, hoed, and thoroughly prepared for the grain-crop

Thus, after five years, I shall have 100 arpents of newly manured land, and \$3,000 in my pocket.

Should we be surprised, gentlemen, that Napoleon, with his vast foresight, perceived in this industry a source of riches and prosperity for France? That he should have surrounded it with the benefits of his mighty protection? Have exempted it for twenty years from all taxation? Do we marvel at seeing, in less than half a century, erected in Europe more than 2,000

factories supplied with the produce of 100,000 acres of land devoted to this crop, and yielding annually a million tons of sugar.

When I see Germany, Austria, Italy, Russia, all the nations of the continent seizing with feverish avidity upon this discovery, as one of the most precious legacies bequeathed to the farming class by the 19th century, I begin to understand why South-America beholds, with a species of jealous amazement, this root rising up as a rival to its famous sugar-cane.

A great economist says: "Belgium has never seen her working-classes better fed, better clothed, than since the improved condition of her agriculture was brought about by the growing of the sugar-beet in that country." Indeed, it is a notorious fact in political economy that the prosperity of the working-class is invariably proportioned to the advancement and the progress of agriculture and manufactures. A solidarity both natural and necessary exists between capital and labor, and manifests itself in the social equilibrium, by the indirect division of profits, under the form of wages. Now, putting the share which belongs to each participant in the cultivation of an acre of sugar-beets; that is, 15 tons, equal to 2,500 lbs. of sugar, at 5 cents a pound; total, \$125.00, I find that \$30 go to the grower, the same amount to the manufacturer, and \$65 to the workman. We consume, every year, 80 million pounds of sugar, the produce of 32,000 acres of land; costing $4\frac{1}{2}$ million dollars, which, instead of being sent to the Indies, the United-States, to England, and to France, might be kept at home, to the great benefit of our farms, our farmers, our manufacturers, our working-class, and, I will add, to our commercial independence.

Before closing, gentlemen, permit me to call your attention to another favorable aspect of my subject. The sugar-beet, besides sugar, contains a considerable quantity of leaves and pulp. Now, if I ensile these two substances, with other drier materials, such as straw, hay, lucerne, fodder-corn, I have one of the most useful mixtures for feeding my stock in winter.

Here, I would cite the evidence of the Rev. M. Labonté, of the Seminary of Ste. Thérèse. The Abbé laid in, this autumn a great quantity of this pulp for his immense stock of cattle, and spoke very highly of it to me. I see, too, that in France and Germany it is highly appreciated, especially after it has undergone a certain amount of fermentation in the silo. As a food, it is rich, digestible, wholesome, and eaten with avidity by cattle. The pulp, so they tell me, is, from an economical point of view, one of the best foods for fattening beasts, provided it be used with proper discretion. Its merely nominal price at the factory will necessarily cause a great demand for it from those farmers who like to have their stock in good condition.

You have had the cultivation of like to see it succeed it is for a farmer's presence of knowledge of ours, to re-

France has 1 steps; there is, 1 dous. Let us add let us improve our hand in this matter Berthier be our help has risen from its

The whistle of last autumn, made townships of the its piercing sound enterprising among till the mover

The prosperity advancement of till us to rush to the

M. JOBIN.—You grow; do you increase

M. THIBAUT.—The cost is less than that of me and M. Labon that item cost of manuring, twice the hoeing, and the de-

M. JOBIN.—But speak of; they, I You say that most who can command

M. THIBAUT.—It is suited to the grower's manure, that which land, is the superior $3\frac{1}{2}$ arpents of land

You have heard, gentlemen, a description of my short experience in the cultivation of the sugar-beet. I have gladly related it to you, for I should like to see it succeed here as it has done elsewhere. I know how difficult it is for a farmer to persuade himself to venture on a new road ; but, in the presence of knowledge and experience, it is not permissible in this glorious age of ours, to remain stagnating in the backward paths of routine.

France has led the way, all the nations of Europe have followed in her steps ; there is, then, no longer any danger of the adventure being hazardous. Let us add another item to the list of our agricultural products, let us improve our farms, and increase our incomes ; let us join hand-in-hand in this meeting to preach a crusade in favour of the sugar-beet. Let Berthier be our head-quarters ; for it is there that, after having expired, it has risen from its ashes more vigorous and more full of life than ever.

The whistle of this fine and extensive factory, when waking into life last autumn, made itself heard along the great river, in the parishes and townships of the East and of the South, and our Laurentian chain re-echoed its piercing sound throughout the whole country of the North. The most enterprising among us have already answered its appeal ; others are waiting till the movement is further developed to follow : To work, then, all !

The prosperity of the working-class, the interests of the farmer, the advancement of the manufacturer, the future of our country, all command us to rush to the aid of this enterprise, as a work essentially national.

M. JOBIN.—You tell us that a crop of beets costs you \$30 an arpent to grow ; do you include the dung ?

M. THIBAUT.—Yes, I include the manure ; but I may say that the cost is less than that, as I have the manure for nothing. The factory gave me and M. Labonté a bonus of ten tons of superphosphate of lime each ; so that item cost us nothing. But, I mean to say that with \$30.00, the manuring, twice ploughing, harrowing, drawing the drills, hoeing, horse-hoeing, and the delivering, too, can be done, if the distance is not too great.

M. JOBIN.—But as to the farmers who cannot obtain the manure you speak of ; they, I suppose, would require 50 loads of manure an arpent. You say that most farmers could plant 20 acres. Are there many farmers who can command a thousand loads of dung a year ?

M. THIBAUT.—I think I can answer this question. The manure best suited to the growth of beets and other vegetables, the most favorable manure, that which acts most rapidly, and which is the most durable in the land, is the superphosphate of lime. With a ton of this you can manure $3\frac{1}{2}$ arpents of land ; and it will last for seven years in your soil. For it has

been proved by chemists that the perfect dissolution of superphosphate occupies seven years. So that the cost of manuring an arpent of land in this way is about \$10 an arpent, superphosphate being about \$30 a ton. This is far cheaper than using 50 loads of dung. There are various kinds of this manure. The best for the beet-crop is that which costs 6.00 a ton.

THE MANUFACTURE OF BEET-SUGAR VIEWED IN CONNECTION WITH THE DAIRY-INDUSTRY.

Gentlemen,

The manufacture of beet-sugar is so intimately allied with dairy-work, that they may be called sister-industries. They are naturally adapted to walk arm-in-arm, and thus united, one the complement of the other, they constitute an agent of extraordinary power in the progress of the present time.

What the beet-industry has done for Europe in the last half-century, many of you already know. This it is that has regenerated the soil of Germany and has carried the agriculture of the North of France and of a great part of Belgium to such a pitch of perfection that the traveller in those countries is never weary of admiring it.

This is unanimously confirmed by official statistics, and by the reports of the different agricultural associations of those countries. Listen to the "Agricultural Association of the District of Valenciennes," one of the richest in France, speaking as long ago as 1850, in reply to an inquiry instituted by the Government on the state of agriculture."

"The starting point of our progress was the cultivation of beets; this it is that has placed us in our present situation, and would have done it whether we liked it or not. This it is that has compelled us (*forcés*, observe the word) to double our stock of cattle, to improve it, to fatten it. . . .

"From 1822 to 1832, the period of the establishment of the sugar-business in the North of France, the farming of the North (Department of the *Nord*? Trans.) was declining; from 1832 to 1840, the progress caused by beet-growing was marked. The bulk of our manure has been doubled in that time; the production of wheat, too, has doubled itself in the last 20 years."

A short time afterward, we find the official statistics supporting, by irrefutable figures, the testimony of the Agricultural Society of Valenciennes.

The district an average of 20 produces 30 (28; feed 400 bullock of wheat; since and grows 420,0

A second ag North of France showed that the 5,841 arpents to manner on the f and the number By adding toge 92,145 head of h the matter clear ten miles from l' simple, of the ch the art, who ins arpents under ct

I could go o ciation others sti attention to the the dairy-busine of our lovely pro and improvemen ble profit out of the keep of the s quality, and eas

I will develop as narrow limits

When sugar 40% of the raw chopped up form, and while it still cattle fed on it, it the greater part c ticularly adapted used for fattening; results obtained s of the other, with by the addition o fattening of the s

The district of Valenciennes, it says, twenty years ago, used to grow an average of 20 hectolitres (19 bushels an arpent), a hectare; to-day it produces 30 (28½ bushels an arpent). Before sugar was made, it used to feed 400 bullocks, and harvested, one year with another, 250,000 hectolitres of wheat; since sugar-factories have been started, it feeds 10,784 bullocks, and grows 420,000 hectolitres of wheat.

A second agricultural inquest, held in 1866, in a single district of the North of France, over a superficies of 270,000 arpents, comprising 500 farms, showed that the extent of land devoted to the sugar-beet had increased from 5,841 arpents to 64,215, the number of cattle regularly kept in a permanent manner on the farms had risen from 25,368 head of horned-stock to 51,489, and the number of the same sort of beasts "up fattening," from 6,975 to 40,656. By adding together the two sums, 51,489 and 40,656, we have a total of 92,145 head of horned-stock kept or fattened on 270,000 arpents, or, to make the matter clearer, in a tract of land equal to the extent within a radius of ten miles from l'Assomption as a centre. This is the application, pure and simple, of the chief formula of agricultural progress by the great masters of the art, who insist upon a head of horned-stock being kept on every three arpents under cultivation.

I could go on with these quotations for hours, and submit to your appreciation others still more convincing, but these are enough to attract your attention to the importance of the beet-crop, to show how, in concert with the dairy-business, it is capable of contributing to the progress in agriculture of our lovely province. Both have considerable influence on the increase and improvement of cattle: the dairy-business, by getting the greatest possible profit out of their products, the beet crop and its manufacture, by making the keep of the stock as economical as possible by means of a food rich in quality, and easy of preservation.

I will develop this latter point; at the same time confining myself within as narrow limits as possible, so as not to waste your precious time.

When sugar has been extracted from the beets, the residue will be about 40 per cent of the raw material. This residue, which is called *pulp*, occurs in a chopped up form, almost cooked in the process of extraction now most in use, and while it still retains a proportion of sugar sufficient for the wants of the cattle fed on it, it includes it under a form more assimilable than the beet itself, the greater part of the nutritive matters of the latter. The pulp is most particularly adapted for the food of milch-cows, but in Europe, it is principally used for fattening sheep and bullocks. To whichever of these it is given, the results obtained are surprising. It mixes well, while correcting the defects of the other, with rich food, hay or straw, and if the mixture is completed by the addition of oilcake or meal, or, which is better, both at once, the fattening of the stock proceeds rapidly and under the best conditions.

This would be the moment to interpose a comparative analysis of the different sorts of fodder, with a view to showing their relative nutritive value ; but I think it better, and certainly more convincing, to give the results of practical experiments, made on a large scale, on the feeding of cattle with beet-pulp.

Two learned practical men—Germans—Drs. Stutzer and Werner, have conducted experiments on the value of beet-pulp for milch-cows. To this end, they fed 5 cows, weighing together 5,287 lbs., on 378 lbs. of beets, 42 lbs. of clover-hay, 31 lbs. of oat-chaff, and 26 lbs. of linseed oilcake. At the same time, 5 other cows received 416 lbs. of pulp, 42 lbs. of clover hay, 46 lbs. of oat-chaff, and only 21 lbs. of cake.

After a preliminary essay of ten days' duration, the definitive experiment was carried on for 20 days. The result was that the average weight of the cows did not alter sensibly during that period. As to the milk-product, there was only a trifling difference between the yield of the two groups of cows.

The beet-fed cows gave 250½ gallons of milk, containing 79lbs of butter-fat.

Those fed on pulp, gave 245½ gallons, with 75lbs. of butter-fat.

The difference of yield between the two groups was then immaterial, particularly if we consider that in the pulp-ration less cake entered than in the beet ration, and it may be stated, therefore, that 416 lbs. of pulp gave the same result as 370 lbs. of beets.

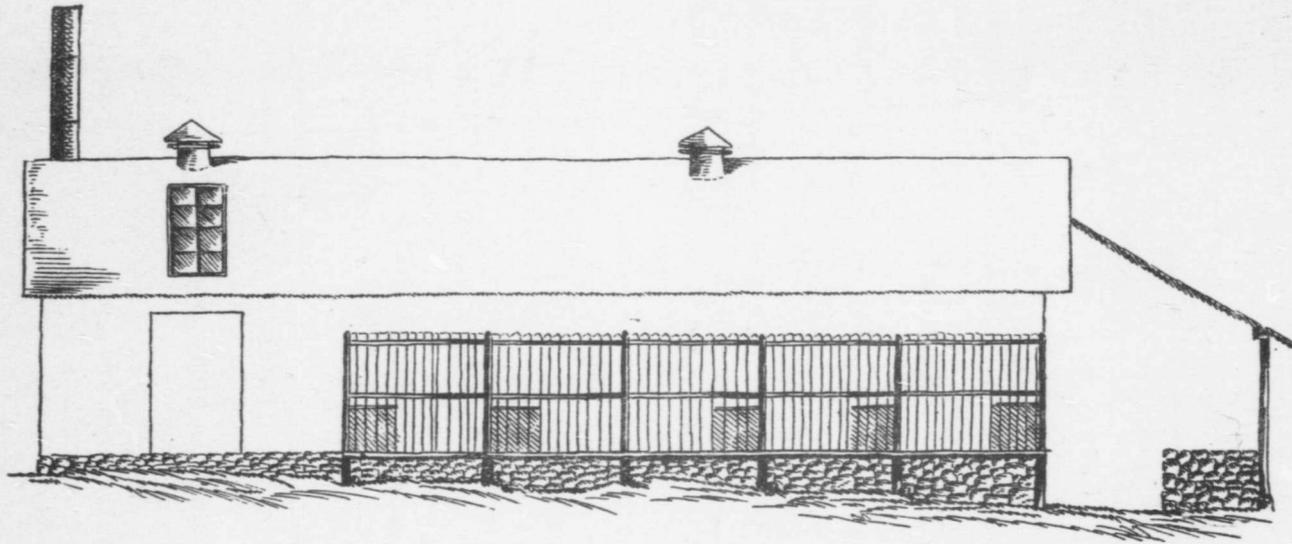
In other words, in the feeding of milch-cows, 110 lbs. of pulp are equal to 100 lbs. of beets, in their natural state. Now, gentlemen, you are well aware what a marvellous difference is produced, especially in winter, by the addition of a few good, succulent beets to the daily ration of milch-cows. If any of you are ignorant of this, the experiment is well worth trying.

Another well known German savant, Dr Marcker, has, on his part, made some experiments on the value of dried pulp for milch-cows and fattening-beasts. These trials have proved that hay may be perfectly replaced by dried pulp, and 1½ lbs. of this same pulp may be substituted for 1 lb. of good bran or of crushed barley.

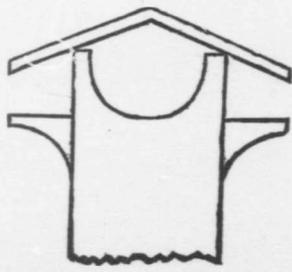
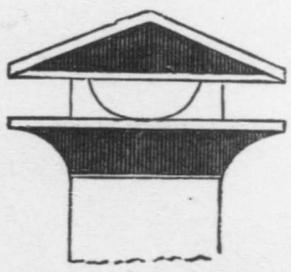
If from the domain of experiment we pass to the domain of practical agriculture, here is an example of fattening cattle on pulp ; an example that I take by hazard from a hundred others.

M. Simon Legrand, a well known agriculturist of Bersée, in the North of France, fattens every year several hundred bullocks. The feeding is continued at his place for a period 90 days, on an average. The beasts are weighed when they enter the sheds, and again when they leave them, and a strict account is kept of their rations. During the fattening, it is shown,

ive analysis of the
 r relative nutritive
 ing, to give the re-
 the feeding of cattle
 and Werner, have
 ild-cows. To this
 lbs. of beets, 42 lbs.
 1 oilcake. At the
 of clover hay, 46
 definitive experi-
 he average weight
 . As to the milk-
 yield of the two
 ing 79lbs of butter-
 utter-fat.
 then immaterial,
 ake entered than
 t 416 lbs. of pulp
 of pulp are equal
 en, you are well
 lly in winter, by
 ion of milch-cows.
 worth trying.
 on his part, made
 cows and fattening
 ectly replaced by
 tted for 1 lb. of
 main of practical
 lly; an example
 ée, in the North
 e feeding is con-
 . The beasts are
 leave them, and
 ing, it is shown,

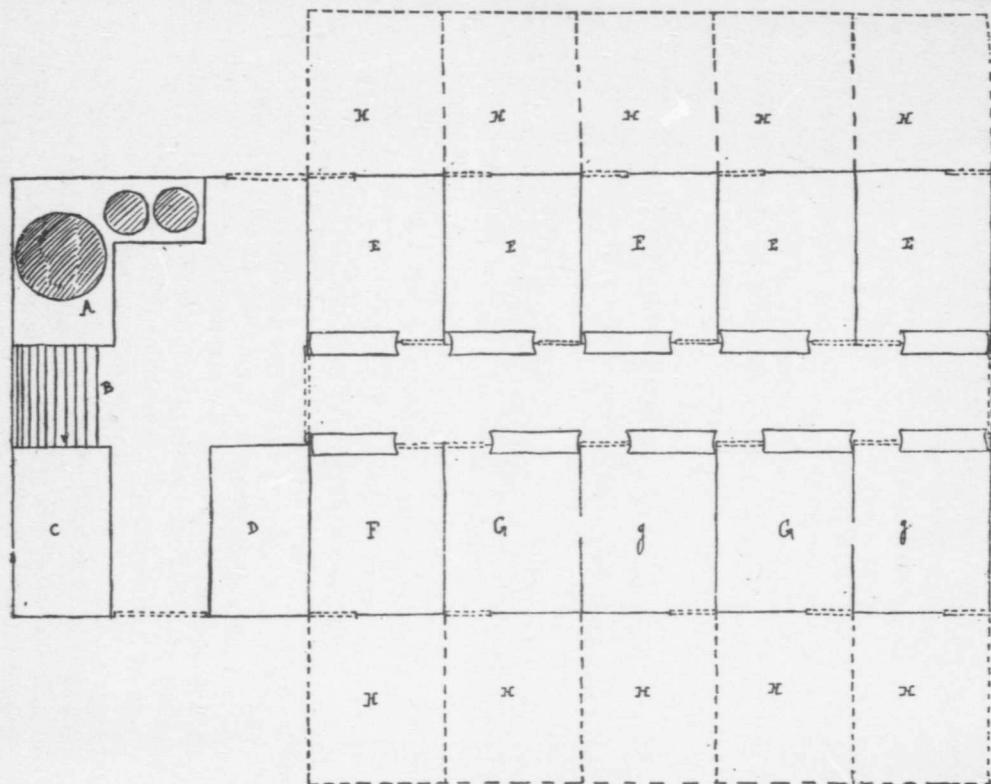


Elevation of the piggery and manure-shed.—Scale 1 line' to the foot.
 Mr. A. Casavant, St. Dominique, Bagot.—Plate I.



Ventilators mentioned in M. Casavant's lecture.





Interior of the piggery.

- | | |
|-------------------------|-------------------------|
| <i>A</i> Boiler. | <i>E</i> Manure-pit. |
| <i>B</i> Cellar-stairs. | <i>F</i> Boar's sty. |
| <i>C</i> Tub for grain. | <i>G g</i> Sows' sties. |
| <i>D</i> Root-washer. | <i>H</i> Yard. |

the average be replaced by the *beans*, I presume of hay. On this four pounds a considerable condition.

Experiment pounds of pulp or 50 pounds, but diminished toward rich in albumin vetches, bran previously added,

To fattening mixed with other

From 56 to milk-cows.

The utility

In France, it is \$3.85 a ton, but a factory sold its product probable that, with the price there very

We have, therefore, food, and that it stock, and the price of that which is

The pulp of greater part of that from it. The sugar derived from the accumulated in the sun. Mr. Claiborne in the States, who very first, an extraordinary way; with form of sugar, he This is an additional reason, which makes foods for cattle.

the average beast consumes 7 tons of pulp, 450 lbs. of cake, which may be replaced by the same weight of good meal composed of pease, beans (*horse-beans*, I presume—Trans.) Indian corn, and barley, and lastly, 21 bundles of hay. On this food the beasts increase without difficulty from three to four pounds a day, and are sent to the butcher in the best and most desirable condition.

Experiments on a large scale show that to fattening cattle from 90 to 110 pounds of pulp per head per day may be given. It is well to begin with 40 or 50 pounds, but 110 pounds may be exceeded later, and the quantity diminished towards the end of the fattening. The pulp is mixed with foods rich in albuminoids, such as leguminous seeds, pease, beans, &c., with corn, vetches, bran from wheat or rye, cake, &c. Hay, straw, and chaff are previously added, and frequently a couple of ounces of common salt.

To fattening sheep 5 to 7 pounds per head per day of pulp may be given, mixed with other matters as mentioned above for beasts.

From 56 to 75 pounds of pulp, with one ounce of salt, may be given to milch-cows.

The utility of the pulp for fattening pigs is doubtful.

In France, while the average price received by the farmer for his beet is \$3.85 a ton, he takes back the pulp at \$1.45. This year, the Berthier factory sold its pulp to the beet-growers at a dollar a ton, and it is very probable that, with a view to the popularizing of the cultivation of the beet, the price there will not be raised for several years.

We have, then, the right to say that the beet-pulp is a rich and cheap food, and that its use solves the problem of an economical mode of feeding stock, and the production, at the lowest possible price, of milk, meat, and of that which is by no means the least important, manure.

The pulp of the beet used as cattle-food restores to the ground the greater part of those fertilizing elements which the beet itself has removed from it. The sugar which the manufacturer extracts from the plant is not derived from the soil; its elements are taken from the atmosphere and are accumulated in the root by the leaves, under the influence of the rays of the sun. Mr. Clans Spreckels, surnamed, very properly, *The Sugar King*, in the States, where he has just established, with complete success from the very first, an extensive beet-sugar factory, expressed this in a very picturesque way; when speaking of his new enterprise, he said that, under the form of sugar, he was going to extract the rays of the sun from the beets. This is an additional reason; I will go so far as to say, this is the greatest reason, which makes beet-pulp par excellence the most economical of all foods for cattle.

Beet-pulp can be stored and thus kept for the future wants of the cattle-sheds. Some has been kept for 7 years, and, at the end of that long period, it was found to be in perfect condition, and was highly relished by the cattle; it only needs ensiling; the process is no longer a secret to the members of the Dairymen's Association. The rules laid down for the ensiling of green-fodder apply equally in every point to beet-pulp, and it will be sufficient if I here condense them:

Tramp the pulp down firmly and over its whole surface in siloes impenetrable to air and water. The top ought to be covered in with some perfectly staunch material, such as the strong card-board used for buildings, protected from all access of air, and weighed down by a thick layer of earth, at least 18 inches, especially when the pulp is to be kept through the summer. The temperature of the silo will rise a little during the 5 or 6 first days of ensilement, then it will remain constant, while it excites a proper degree of fermentation, very different from that commonly produced in siloes carelessly managed. The mixing of the pulp, in the silo, with hay or straw-chaff is to be recommended, and the result is a homogeneous whole which is highly profitable to the cattle.

The economical desiccation of the pulp, it seems, is now practised with success, and by this new process its usefulness is decidedly increased. The ease with which it can be transferred from place to place in this form will enlarge the circle of its beneficial influence, and its preservation will be as simple as the preservation of good hay, &c., whose nutritive qualities the dried pulp equals in value. It only remains for us to hope that the manufacture which supplies this valuable residue may make rapid progress in our province, and extend the prosperity, which invariably follows its steps, to every district in which it shall be established.

On this matter, allow me to quote some figures, and to make some rapid observations, and I shall have done.

Every year, about 100,000 tons of sugar are consumed in Canada, all of which comes from abroad. The whole of it, and much more too, might be made in the province of Quebec alone, where to the exploitation of this manufacture advantages are offered not to be found even in those countries where it has been most developed. A million tons of beets, representing the crop of 70,000 to 75,000 arpents, are required to produce this amount. After the extraction of the sugar, this quantity of beets would leave 400,000 tons of pulp, which, from mid-October to the first week in June, would keep 35,000 milch-cows well and send them to their summer pasture full of vigor and condition, with their eyes bright, their coats smooth, ready to pour forth for their industrious masters a rich and copious flow of milk.

And, at the same time, we should see on the road to the markets of our great towns and our sea-ports, whence depart those immense ocean-

steamers, an
trooping to ra
the distilleries

This wou
in the midst o
the two siste
Have I allowe
No, gentlemen
a reality: its
for it.

Mr. President

I have bee
piggery at St.

The secret
I feel this to b
truly sensible o
me to believe t

I was simp
cine hygiene.
made having pi
way to fatten
piggery.

Apropos of
agree with my
the cooking of
posed to my sy
count of everyt
a long period.
20 years,—and
to adopt my op

Not to spea
great advantage
the dairy-work
Gentlemen, to s

DESCRIP

The entire l

steamers, an equal number of fat beasts leaving our sheds and proudly trooping to range themselves, side by side, with those renowned cattle from the distilleries of Ontario.

This would be indeed the golden age of our agriculture, abundance in the midst of our country-homes, produced by the combined influence of the two sister-manufactories: sugar and milk. Is this too Utopian? Have I allowed myself to be rocked to sleep to dream things unrealizable? No, gentlemen, a thousand times no; this smiling picture will be one day a reality: its arrival will be the quicker the less time we expend in longing for it.

TÉLESPHORE BRAN.

DESCRIPTION OF A PIGGERY.

LECTURE BY MR. ANTOINE CASAVANT.

Mr. President and Gentlemen:

I have been asked to give, before this meeting, a description of my piggery at St. Dominique de Bagot.

The secretary, in his letter of invitation, call my piggery a *model* one. I feel this to be a great honor, and I beg the secretary to believe that I am truly sensible of it. But my ambition does not carry me so far as to induce me to believe that I have built a model-piggery.

I was simply guided, in the building of it, by my long practice in porcine hygiene. The numerous experiments on the feeding of pigs that I have made having proved to me, beyond all doubt, that the cheapest and quickest way to fatten pigs is to cook their food, I have attached a kitchen to my piggery.

Apropos of cookery of food, I know that many here present do not agree with my views. Nevertheless, as I cannot here argue the question of the cooking of food, I will content myself with saying to those who are opposed to my system; try it, as I have myself done, that is, keeping an account of everything expended on your experiments. Repeat the trials for a long period. I have carried on my food-experiments during more than 20 years,—and I will answer for it, that the results arrived at will force you to adopt my opinion.

Not to speak of the profits obtainable thereby, the fattening of pigs offers great advantages, not only to the general working of the farm, but also to the dairy-work in particular. After I have described my piggery, I purpose, Gentlemen, to say a few words to you about these same advantages.

DESCRIPTION OF THE PIGGERY AT ST. DOMINIQUE DE BAGOT.

The entire building is 43 feet long by 20 feet wide.

The ground-wall, of stone, is 3 feet thick and 3 feet high, serving at the same time as a support to the floors of the stalls and of the yards.

The sides are double-boarded, the interior of tongue-and-groove boards, the exterior of plain boards placed close together.

The height to the joists is 7 feet.

This building is separated by a wooden partition, starting from the ground and rising to the roof, into two parts: one, 13 feet long by 20 feet wide, is the kitchen; the other, 30 feet long and 20 wide, is the piggery proper. Above the piggery proper is a straw-store, which is filled in winter, to serve as litter. The division which separates the kitchen from the piggery has two doors in it, each $4\frac{1}{2}$ feet wide; one serves to communicate with the piggery; the other with the straw-store.

The floor of the kitchen is laid with flat stones, forming a perfect flagging, and sloping a little. This flagging has the double advantage of preventing all danger of fire and of being easily kept clean. The pitch or slope prevents the water, used for washing roots or any other purpose, from remaining in the kitchen.

The kitchen contains:

1. A root-washer.
2. Two wooden tubs, perfectly staunch, for preparing the food.
3. Two furnaces, set in mason-work, supported by a stone wall 6 feet high.

On one of these furnaces, is fixed an iron boiler holding 140 gallons, intended for the cooking of boiled food. On the other, are two iron kettles holding about 21 gallons each, and serving both for boiling food and for cooking roots by steam.

For cooking by steam, I have adopted a plan which I recommend to all of you, gentlemen, who, while desirous of obtaining results as satisfactory as possible, are, at the same time, anxious to put the thing in operation, and continue it in practice, as economically as possible.

I took two common casks and had the bottom of each pierced with a certain number of holes. The bottoms of the casks should be of such a diameter as to fit the tops of the kettles above mentioned and to close the opening exactly.

The other end of the casks is closed by a heavy wooden cover. When we wish to cook roots by steam, we proceed as follows:

The kettles are filled $\frac{3}{4}$ with water; the casks are put on the top of them a short time before the water boils. Unnecessary to say that it is the pierced bottoms of the casks that are placed directly over the kettles. These are then filled with well-washed roots, covered with a rough linen cloth, the covers put on, and well-weighted to prevent their being lifted by the force of the steam. The steam, which is formed by the water, finding

no other means, where and a-half.

The advantage, its cheapness, lastly, its security.

At the side $4\frac{1}{2}$ feet wide by dimensions: for the pigs' food.

The piggery parts. This is the kitchen, a passage, the floor of the yards the two gutters, placed liquids that for that purpose themselves sloped and so lead the

Of these 1 two sows. The small door high let the sows for mothers robbing each sty having a door on a sort of

The feeding made of wood, towards the feed entering the sty feeding passage is the partition the shutters serve as a piece. The shutters push to expose

When feed part of the trough to return to such prevent the pig from the troughs, two

no other means of exit, passes through the holes, and makes its way into the casks, where it cooks the roots in from an hour and a quarter to an hour and a-half.

The advantages of this plan are: the ease with which it is carried out, its cheapness, the power of employing at it the first man to hand, and, lastly, its security.

At the side of the kitchen, communicating with it by a covered-way $4\frac{1}{2}$ feet wide by 6 feet high, is a cellar, in mason-work, of the following dimensions: 30 feet long, by 20 wide. This is to hold the tubers and roots for the pigs' food during the winter. Above the cellar are the granaries.

The piggery proper is divided by a longitudinal passage into two equal parts. This passage gives communication at one end to the piggery with the kitchen, and at the other to the piggery with the manure-pit. Along this passage, on each side, open five sties, 7 feet 9 inches long by 6 wide. The floor of the sties is formed of closely fitted boards. This floor, as regards the two rows of sties, slopes towards the central passage, where two gutters, placed under the flooring of the passage, receive the urine and other liquids that escape from the sties, by passing through troughs placed for that purpose on wooden blocks an inch and a-half thick. The two gutters themselves slope towards that extremity of the piggery opposite the kitchen, and so lead the liquid into a tank made in the front of the dung-pit.

Of these 10 sties, five are intended, one for a boar the other four for two sows. These four sties communicate with each other, two by two, by a small door high enough to let the young pigs pass, but not high enough to let the sows follow them; so that the pigs can be fed without fear of their mothers robbing them. The sties can also be used for fattening-hogs, two in a sty, each sty having a door opening into the central passage. The litter is placed on a sort of raised platform (*lit de camp*), 3 feet high and quite level.

The feeding troughs are 4 feet long by 13 inches wide and 6 inches deep, made of wood, and the edges covered with hoop-iron. They are half-open towards the feeding passage, so that the feeder can clean them out without entering the sties. The height of the division between the sties and the feeding passage is $3\frac{1}{2}$ feet, including the cross-piece (*entretoise*) which finishes the partition from one end to the other. To this cross-piece are hung the shutters serving to close the space between the trough and the cross-piece. The shutters swing freely; it is only necessary to give them a gentle push to expose the troughs.

When feeding is going on, the shutters can be fastened to the inner part of the troughs by cleats. The sole weight of the shutters compels them to return to such a position as will enable to pigs to get at their food. To prevent the pigs having trouble in feeding, and to keep them from lying in the troughs, two wooden bars are fixed, one end to the cross-piece, and the

other to the floor; one bar inside the sty and the other in the feeding-passage. These two sloping bars, joined at the top of the trough by a third, divide the trough into two equal parts. The two bars also serve to prevent the shutters from getting out of their place whether within or without.

The piggery is supplied with air by means of the following ventilators: air is admitted by means of holes in the lower parts of the feeding-doors and of the yard-doors of each sty, which holes can be partially or entirely closed at will. In winter, the air-holes of the sties are closed, only those of the feeding doors remaining open. The pigs then breathe the air pure as it enters the piggery, before it has become heated and tainted. Now, the hot air, being lighter than cold air, finds itself driven into the upper part of the piggery the moment the cold air is admitted. As a means of exit is provided for the hot air in the upper part of the piggery, it follows that the ascent of the hot air continues indefinitely. And more, the cold air of the interior enters naturally, as it is invited by the vacuum produced by the ascending current of hot air. A continued movement of fresh air is thus produced.

The opening for the exit of the hot air is a simple wooden chimney, surmounted by a four-sided top, which is placed on four posts in such a way that, between its upper part and the upper rim of the chimney, there is an open space of about 4 inches. The lower rim of the chimney is fitted with a corner-piece (*cornière*), semi-circular below and prominent, the object of which is to prevent the outside air from penetrating into the chimney where it meets the semi-circular and prominent part of the *cornière* which sends it into the opening of the chimney.

Two ventilators like this give my piggery perfect ventilation.

The piggery is lighted by a large window placed in the gable-end and which looks into the feeding-passage. The kitchen is lighted by a snuff-box window (*chassis-tabatière*) in the roof. Pigs, especially the weaners, must have plenty of open air and exercise, so I have contrived, in front of the piggery, a series of yards answering to each sty, and each of about the same dimensions as its sty.

A door opens between sty and yard. These yards, as I said before, are floored. Behind the piggery, and leaning against the gable-end opposite the kitchen, is a shed, a simple roof on four posts, intended to cover the manure-pit. This pit not only holds the pig-dung, but the horse-dung too, part of which I mix with the former.

The description of my piggery, gentlemen, is finished. It now remains for me to prove my previous statement that pig-breeding offers great advantages both to farming in general and to the dairy-business in particular. This I will do in as few words as possible.

The principal advantage is that a large quantity of manure is produced as too watery for the use of the dressing, too

A good dressing depends on its quantity. Regarding the quantity, only the cheapness of vegetable manure looks upon the quantity. In the habit of the farmer, the more manure the richer, the more manure the more manure. The manure is piously fed, given to the food is less no

Pig-dung is a contrary, cow-bulk of other manure is an important con

We have seen that we have seen it comes to pass that it cannot succeed in plying them with farmyard dung

I have, therefore, the great service to do other the mass

Almost all the farmers are all agreed that these qualities are business. We find out the best is the manure. Try it in the way using it for the shovelful of the quantity of generally use.

THE ADVANTAGES OF PIG-BREEDING AS REGARDS FARMING IN GENERAL AND
THE DAIRY-BUSINESS IN PARTICULAR.

The principal advantage of pig-breeding is to furnish the farm with a large quantity of dung, and of very good dung, too. Some regard pig-dung as too watery, too cold, and, in consequence, look upon it as an inferior dressing, too weak to do much good to vegetation.

A good deal of pig-dung is indeed of inferior quality, but this inferiority depends on the bad quality and poverty of the food the pigs receive. Regarding the pig as an animal that can and must eat every thing, he gets only the cheapest kind of food, the refuse of everything, and the least nourishing of vegetables. The English, who have bred the finest tribes of pigs, look upon their dung as being as useful as any other kind. But they are in the habit of giving their stock very rich food; meal and cake. Now, the richer, the more nitrogenous is the food, the richer, the more fertilizing will be the manure. This is so true, that my fattening hogs, better and more copiously fed, give me an infinitely richer manure than my piglings, whose food is less nourishing.

Pig-dung is, after sheep-dung, the richest of all in nitrogen; on the contrary, cow-dung is the poorest. In mixing, then, pig-dung with the bulk of other dung, it will decompose with them and add to them a very important contingent of fertilizing principles.

We have habitually extracted from our farms all that they could give us, and have returned to them in exchange nothing, or almost nothing. Hence, it comes to pass that most of them are to-day completely exhausted. We cannot succeed in making our farms give us a better yield except by supplying them with plenty of manure, and of all manures, the best is good farmyard dung.

I have, therefore, gentlemen, the right to say that pig-breeding is of great service to agriculture in general, since it increases more than any other the mass of manure and serves to improve the land.

Almost all of us cultivate fodder-corn for our milch-cows, and we are all agreed that it is one of the best green-crops for the production of milk. These qualities make it valuable to us, especially as regards the dairy-business. Well, gentlemen, the numerous experiments I have made to find out the best manure for corn have led me to this conclusion: pig-dung is the manure of all others for corn. I am certain that all those who will try it in the way I am about to point out will find an immense advantage in using it for that plant: Into the drills or rows, throw about a quarter of a shovelful of this dung; that is, about one fourth or, at most, one third of the quantity of horse-dung, cow-dung, or of these two mixed, which we generally use.

One example in conclusion. I sowed at the same time 2 arpents of corn, on the same piece of land, and under the same conditions. One acre was manured with pig-dung in the way I have described, and it gave me 16 double loads of ears.

The other arpent, dressed with mixed cow and horse-dung, received three times as much as the other, and gave me only 9 loads of ears.

I have finished, gentlemen. Some of the details may have seemed rather long to you, but it is very difficult to avoid lengthy details in a description, especially when one heartily wishes to be thoroughly understood. As I said above, a detailed plan accompanies my lecture. This may perhaps assist some of you in erecting his buildings. That is all I can desire. I thank you, gentlemen, for the kind attention with which you have listened to me.

ANT. CASAVANT.

DISCUSSION.

M. PAQUET.—Most farmers are exempt from the necessity of building piggeries as large as those described by M. Casavant.

This question is connected with that on which I have spoken, the improvement of rural buildings. It is important that those who are interested in the question of piggeries should endeavour to combine with them the system of improved buildings, so that these piggeries may be connected with the manure-shed and with the boiler-house in which the food of the stock is cooked.

M. CASAVANT.—The reason that determined me to build my piggery in the form in which I have described it is the advantage it gives me to be able to fatten my hogs in winter, so that I may have bacon in the spring. You know how scarce bacon is in spring. If your piggery is cold, you cannot make cheap pork. Whether it be large or small, it must be warm and airy.

All those who have studied the matter a little know that if your piggery or the stall of any other beast be cold, some of the food will be used as a heating-power, instead of its being converted into fat. I, therefore, preferred building a warm piggery, and I find it cheaper than to burn pease or corn in the bodies of my hogs to warm them.

M. PAQUET.—My remarks are not opposed to your views, M. Casavant; I only wish to instil into the minds of the farmers the idea of warming the piggery by means of the kitchen in which the food of the beasts is cooked.

M. CASAVANT.—My first set of buildings, which contained under the same roof 55 head of horned-stock and 6 horses, was burnt, so I had to rebuild as well as I could on the ruins. Still, every part is utilized. The

dung is all a which was ou cover, too, for Now, thanks dung, which i mixed with tl one another. manure tank.

M. PAQUET

M. CASAVANT
hogs in the pig

M. PAQUET
which can get since they do 1

M. CASAVANT
think they fat and the heat is dark. When th a sort of half-d months old.

M. CHAPAI
In our district, the cheapest th corn for this pu

M. CASAVANT
I bought a crus or other grain.

M. CHAPAI

M. CASAVANT
(*se ouillent*) at a difference there complete one an

This is the 1

I have a lar ter. When it b has been a coup for 24 hours. I tains its warmth plenty of tubs to

M. CHAPAI
boiled: you find

time 2 arpents of
additions. One acre
, and it gave me

orse-dung, received
ids of ears.

have seemed rather
ils in a description,
lerstood. As I said
ay perhaps assist
esire. I thank you,
listened to me.

SASAVANT.

ssity of building

ave spoken, the
se who are inte-
mbine with them
may be connected
the food of the

uild my piggery
it gives me to be
the spring. You
old, you cannot
st be warm and

t if your piggery
ll be used as a
therefore, pre-
to burn pease or

s, M. Casavant;
of warming the
asts is cooked.
ned under the
urnt, so I had
utilized. The

dung is all under cover; there only remained the manure of my horses which was out of doors, and, for some years, I thought of getting that under cover, too, for I saw that the most valuable part of it, the urine was escaping. Now, thanks to the new buildings, and to the shed I mentioned, the stable-dung, which is hot and the only dung that gets fire-fanged in winter, is mixed with the cooler dung of the pigs and cows, and these three improve one another. They are moistened by the pump which I have on my liquid-manure tank.

M. PAQUET.—Can your pigs easily get into your dung-pit?

M. CASAVANT.—I keep my young pigs in my dung-pit and my fattening-hogs in the piggery.

M. PAQUET.—Very good, as long as there is a certain number of pigs which can get into the dung-pit: your hogs are, no doubt, in good order, since they do not suffer from cold.

M. CASAVANT.—They grow as fast in winter as in summer. I even think they fatten faster and more cheaply in winter, as there are no flies, and the heat is not too great. The sties, too, when the doors are shut, are dark. When they have been fed and have finished their meal, they are in a sort of half-darkness. You would take my 4 months old pigs to be six months old.

M. CHAPAIS.—As we are talking of pigs. I have a question to ask you. In our district, below Quebec, we have no grain this year, and corn being the cheapest thing to buy, we buy it for our pigs. What do you think of corn for this purpose, and what is the best way of preparing it?

M. CASAVANT.—I bought two car-loads of corn for my pigs this year. I bought a crusher, and I mixed the crushed corn with one-third of barley or other grain. I prefer mixing it to giving it alone.

M. CHAPAIS.—Why?

M. CASAVANT.—Because the pigs get tired of it; they get disgusted (*se ouillent*) at getting corn alone, and it is a bother. And besides, the more difference there is between the composition of these grains the better: they complete one another.

This is the mode of preparation:

I have a large pot, holding from 50 to 55 pails, in which I warm my water. When it boils, I throw in the crushed corn, and after the mash (*bouette*) has been a couple of hours on the fire, it is drawn off and allowed to steep for 24 hours. I then serve out this preparation, which in the hot vessel retains its warmth for many hours. It takes at least 12 hours to cool. I have plenty of tubs to hold it, so that we can make it several days in advance.

M. CHAPAIS.—You recommend, then, crushed corn mixed with barley and boiled: you find that the best?

M. CASAVANT.—Yes; ten pounds of oats are equivalent to 7 lbs. of barley. Oats do not yield so rich a manure as barley. In breeding it is different rather, for oats are of a stimulating character. Up to the age of three months, I consider oats and barley-mixed to be the best pig-food. Corn gives young pigs small limbs; and until they are 4 or 5 months old they should have very little corn. Before developing fat, the boney frame, the general structure, to the animal must be developed. As soon as that is done, then fattening may be begun; that is the whole secret of successful breeding. I do not give my young pigs grain only; up to 4 months, they get fodder, mangels, boiled potatoes, mixed with a little meal, and a few pease. A ration of roots is given every day.

An experiment I made this summer: in one sty I put two pigs fed on pease; in another, three fed on cabbage-leaves, frozen tomatoes, all the waste from the house, and a few dry pease. At the end of a few months, the three gave, each, 40 lbs more pork than those which had passed too rapidly, and without preparation, to a too fattening description of food.

A VOICE.—What difference do you find between corn and oats?

M. CASAVANT.—Corn makes fat, to the neglect of other things, such as lean-meat and bone. Oats give energy, tone, force. Vegetables build up the frame. If the frame is to be particularly well developed, milk is the food to do it.

I am in the habit of letting my sows pig before the factories open. I manage to have my piglings a few months old when the time to take milk to the factory arrives. Then, I take care that the second litter is dropped a month before the closing of the cheese factory.

M. A. COUTURE.—What is the difference between oats and corn in price?

M. CASAVANT.—They are both worth about a cent a pound, but one pound of corn is equivalent to one and a-quarter of oats. It pays, then, to sell oats and buy corn. Barley and corn are about the same as regards fattening properties. The best food for young pigs is rye, very little grown in this country, barley, and oats.

FARM BUILDINGS.

LECTURE BY M. JULES N. PAQUET.

Mr. President and Gentlemen:

We, a few members of the great Canadian family, are met together to facilitate the progress of agriculture by means of the dairy business. Most of you can already reckon long and brilliant years of service consecrated to this noble cause, and have earned the right to contemplate, with very legitimate satisfaction, the results of your labors. Thanks to your encou-

agement, to y
agriculture of
ing meadows.
are improved;
cows give more
products of ou
this vast field
fable-writer m
"Work, take
The dairy-busi
agriculture wh
about the intro
in connection v
desire of sprea
during the last
or with a view
management of
isolated, and h
plunge into the
farm-buildings,
it bear fruit eve

This, then,
consented to ad
having taken an
I might possibly
build new or to
have not been al
still, in proporti
leisure to agricu
I have always he
parish of St. Nic
be of the best qu
unfavorable sea
right to look for
think, deceive m
that the establish
my parish, then,
to you. If I can
farmer that you

Before explai
enumerate in a fe

agement, to your constant efforts, the dairy-work has regenerated the agriculture of our province, as the beneficent dews reanimate the languishing meadows. The different breeds of cattle—especially the milking breeds—are improved; the fields, better cultivated, are covered with a blush herbage; cows give more and richer milk; and, of all our agricultural exports, the products of our cheese-and butter-factories reach the highest figure. Still this vast field is not yet thoroughly worked in every part. The French fable-writer makes his ploughman address his children in these words: "Work, take pains, it is this that is the most abundant source of wealth." The dairy-business is an inexhaustible source of wealth. The problems in agriculture which, up to this time, you have been studying, have brought about the introduction of the subject of the construction of farm buildings in connection with dairying. I know that many of you, with the noble desire of spreading the light of agricultural knowledge, have put up, during the last few years, model buildings, either by way of experiment, or with a view to the introduction of our young men to the secrets of the management of the land. These fine examples have remained. I dare say it, isolated, and have not won the publicity they deserve. We must now, then, plunge into the domain of the study and discussion of this question of farm-buildings, in order to make the subject widely known, and to make it bear fruit even in the homes of the humblest of our farmers.

This, then, was the thought that triumphed over my hesitation when I consented to address a few words to you on this interesting subject. After having taken an active part in the improvement of old buildings, I thought I might possibly give some useful advice to those who were about either to build new or to remodel old buildings. Not having had good health, I have not been able to endure the heavy burden of the labor of the farm; still, in proportion to the humble measure of my powers, I have devoted my leisure to agriculture, I have been deeply interested in its development, and I have always held it an honour to call myself a farmer. For the last year, the parish of St. Nicholas has possessed a creamery; its product is considered to be of the best quality; the maker and his patrons, regard being had to the unfavorable season just past, are satisfied with the results and have a right to look forward with bright expectations to the future. I do not, I think, deceive myself, when I say that it is to the Dairymen's Association that the establishment of this valuable manufacture is due. In the name of my parish, then, I desire, gentlemen, to acquit myself of a debt of gratitude to you. If I cannot suitably discharge this duty of gratitude, I hope as a farmer that you will accept my attempt to do so with indulgence.

FIRST PART.

Before explaining the plans which I have the honor to show you, let us enumerate in a few words the reasons that should convince us, I do not say

of the importance, but of the necessity of arranging our farm-buildings in such a manner that they may afford its full development to the dairy-work :

Make the cow-sheds more comfortable ;

Give the milch-cows more digestible food ;

Make more manure and keep it better ;

Diminish manual labour and make it less hard ;

This is a condensation of the first part of this essay.

Hervé, a French writer, used to say : " Confinement to stables and sheds is indispensably requisite to increase the production of meat and milk, but the stay of cattle in low, narrow, badly ventilated sheds, is often the cause of the ruin of the farmer ; indeed, epizootics, diseases of all sorts which decimate the herds on many farms, proceed, in most cases, from the bad state of the buildings that shelter them." Making an exception in favor of some few farmers who are in advance of their neighbors as regards the steps taken on the road towards improvement, may I not say : " There ; that is a true picture of the way in which the cattle of our country are housed." Most of our stables are unfit for our cold winters and are not ventilated enough. Animals, though not endowed with reason, are sensitive enough, and require an atmospheric medium suitable to their nature. They have an interior furnace, continually fed by their daily rations, whence they derive their animal heat, develop themselves, and yield to man either their produce or their labor, according to the purpose for which they were created. If the milch-cow lives in too cold a place, the food she consumes is employed in sustaining the heat of her body, to the detriment of the milk she should yield. At the approach of autumn, when the soft dews of summer begin to give place to white frosts, observe your cattle making their way to the buildings ; listen to their lowings, loudly demanding a warm lodging. If you leave them out in the cold, you need not ask for milk in the morning. If, on the contrary, you give them a comfortable bed, they will in return, give you as abundant a flow of milk as in the softest days of summer—an evident proof that a mild temperature favors the secretion of milk.

No less necessary for the health of your stock is pure air. To preserve its normal condition, the animal is obliged to breathe pure air. It inspires oxygen which purifies the blood and strengthens the vital powers, and respire it in the state of carbonic acid, a gas unfit for respiration. After a night passed in a confined abode, all the oxygen is consumed, and what follows ? Injurious gases, unfit for respiration. Go in, with a lamp : the light diminishes sensibly ; it no longer finds a sufficiency of oxygen for its wants ; and so the milch-cow, in its now unwholesome abode, has no air fit for breathing. It is true she does not die, but like the lamp whose flame is threatened with extinction, she can do no more than half-breathe ; her blood becomes poorer, her vital power weaker, for, in accordance with the well-

known axiom, an air of discoloration is not given much evil, a good supply of cow-sheds, which give out gases which produce air by a condensation more wholesome will produce its

2. " Nature is a mother who knows nothing fresh to tell which must consume food in a picture. Hence the notion to steep for some time more succulent grain, mixed with in this way, the most surprising implement to the stables or necessary sufficient quantities richer, but having consumed more oxygen in consequence, 1

3. This question is skilfully dealt with attention it merits before Christ : " your mixture." All ours, " recommend the manure made for the land. For by avoiding the constant supply of manure making a large quantity understood, why enriched by the abundant crops for the limits of the find the firing ne

ur farm-buildings in
t to the dairy-work :

ent to stables and
on of meat and milk,
l sheds, is often the
ses of all sorts which
s, from the bad state
on in favor of some
urds the steps taken
ere ; that is a true
e housed." Most
ventilated enough.
ough, and require
y have an interior
y derive their ani-
their produce or
were created. If
umes is employed
e milk she should
of summer begin
their way to the
varm lodging. If
c in the morning.
ey will in return,
s of summer—an
t of milk.

air. To preserve
e air. It inspires
l powers, and res-
piration. After a
umed, and what
th a lamp: the
of oxygen for its
de, has no air fit
up whose flame is
reathe ; her blood
e with the well-

known axiom, the blood is the life. This is why so many farmers say, with an air of discouragement : I have fed my cows well this winter, they have not given much milk, and yet they are in very bad condition. To remedy this evil, a good system of ventilation will suffice. Place good ventilators in the cow-sheds, which will carry off the moist, hot air, and all the deleterious gases which proceed from respiration and from the numerous emanations which are given off from the stables ; at the same time introduce pure, fresh air by a conduit below, and the temperature will become more uniform, more wholesome, the health of the cattle will be secured, and their food will produce its desired effects.

2. "Nature," says one of our distinguished agriculturists, "is a good mother who knows how to vary her products so as to always offer something fresh to the animal, but, once in the stable, it is the hand of man which must continue to supply its wants." Consequently, if we wish to give food in a proper state, we must imitate the proceedings of nature. Hence the notion arose of cutting hay and straw into chaff, allowing them to steep for some time in steam or boiling water to soften them, to render them more succulent, more digestible. The glumes (*balles*) of all sorts of grain, mixed with a little bran or meal, are submitted to this process ; and, in this way, the watery food excites and maintains the secretion of milk in a most surprising manner. Hence, the importance of every farmer having an implement to cut a part of his fodder-crops, and of putting up, either in the stables or near them, a boiler of some sort, that he may always have a sufficient quantity of boiling water. Not that food prepared in this way is richer, but having been made more tender, more digestible, the milch-cow consumes more of it without increasing the work of digestion, and gives, in consequence, more milk and more manure.

3. This question of manure is not a new one, since our *agronomes* have skilfully dealt with it in several treatises ; still, here, it has never had the attention it merits bestowed upon it. Cato the Elder used to say, 200 years before Christ : "Try to gather a large heap of manure ; take great care of your mixen." A little later, Columella, living in a climate more temperate than ours, "recommends the farmer to have two manure-pits, the one to receive the manure made daily, the other to contain the riper dung which is ready for the land. For it is very important to preserve dung in all its strength by avoiding the drying up of its juices, and allowing it to steep in a constant supply of moisture." Since from time immemorial, the importance of making a large quantity of manure and keeping it in good condition has been understood, why have we ignored its value ? The fertile soil of Canada, enriched by the ashes proceeding from the clearings, seemed to promise abundant crops forever. In those parishes which were the earliest occupied, the limits of the forest have so far retrograded that the farmer can hardly find the firing necessary for his household requirements. There are no

more new lands to clear; we must go back to our starting point, and work up the soils that were first cleared, and have since been impoverished by successive grain-crops. How is this to be done? Only by restoring to these soils the fertilizing materials that have been taken from them, and this restitution is only to be made by manuring. I admit that it is impossible to make complete restitution by the farm-manure alone; but it is not within the limits assigned to me to speak of extraneous manures; what I aim at is to attract attention to the point that every farmer owes it to himself to make the greatest quantity possible of manure and to preserve it in good condition, being at liberty afterwards, if he thinks fit, to buy chemical or other manures. It is enough for me to say that manure kept under cover is worth 40o7o more than manure exposed to all the changes of the atmosphere, to show the importance of having pits or sheds for manure. "Many farmers," says again one of our *agronomes*, "cart out to their fields a corpse whose spirit has escaped." It is easy to preserve the life by which this body is animated; that is, all the fertilizing principles contained in the manure. These principles constitute a complete food appropriate to the wants of every sort of plant, since they comprise in abundance ammonia, phosphates, lime, and potash, and provided that the liquid dejections are mixed with the solid. If every farmer cannot have a dung-pit, he can easily make a shed to shelter his manure. In this case, there must necessarily be a tank to hold the urine which must afterwards be spread or poured over the solid matters. The working of hogs to mix the cold and warm manures together and to prevent their heating is recognized as being necessary in both cases. These quadrupedal laborers demand no salary, only a place where they may come for their food. Litter, generally speaking, is not wanting, but it remains without fertilizing properties in consequence of being carted to the field without having imbibed the liquid matters. To sell one's straw, says the proverb, is to sell one's manure, and whose sells his manure empties his granary. How, then, will it be if it is allowed to go to waste? In the manure-pit or shed, litter, with its porous structure, will completely absorb the urine and contribute to the richness of the manure.

These improvements intended to increase the quantity and the richness of the manure, to double the crops and the product in milk, have, besides, the advantage of saving time, and according to the saying of our wealthy neighbors of the American republic, time is money. I asked a farmer who had just completed the improvements we are considering: How much time do they save you in a day? Two hours, he replied. Thus, in a month of 28 days, 56 hours: in six months, 336 hours. At ten working hours a day, I save 33½ days. It takes me some days to cart the dung from the pit to the fields, but there will remain, all deductions made, a certain saving of a man's work during the period the cattle are in-doors.

It is a matter of importance not only to save time but also to lighten

the burden of rity and comf hardship of le hardship ind work. Let us gain more inf than by the m only our youn interested in ti virtues alone, cleanliness. A to me: It is a warm as in the willingly to the of objects of lu

Let us now ments I have l to form a comp the dairy-indu:

I could, ge thor of these pla not allow him t legal axiom: " plans are Mr. B. serious attentio lution which up all farmers. rich demands of the if only animated wholly, at least

In order to l suit them, I will

First, those

Then, those v

Thirdly, the improve their bu

Lastly, those

I will only la details, which wi cumstances in wh

the burden of labor, especially in this age of ardent search after prosperity and comfort. Who has not felt, in the coldest period of the season, the hardship of leaving his soft warm bed to go and clean out the stables: a hardship indeed, both for the man and the cart-horse employed at this work. Let us improve the lot of the farmer, for, in so doing, we shall gain more influence over the young and attach them more to the land than by the most paternal advice and the most patriotic speeches. Not only our young men, but the wives and daughters of our farmers are equally interested in these improvements. The Canadian women possess not the virtues alone, but the demi-virtues, and, among them, that of very great cleanliness. A girl, returning from milking in a newly arranged shed, said to me: It is a pleasure, now, to go and milk! It is all so clean! It is as warm as in the house! I like to believe that the young people will consent willingly to the expenditure of the money they now employ in the purchase of objects of luxury, in the erection of useful buildings.

Let us now see how we ought to proceed in the application of the improvements I have been proposing to our farm-buildings, in such a manner as to form a complete whole, an economical system adapted to the wants of the dairy-industry.

SECOND PART.

I could, gentlemen, leave you under the impression that I am the author of these plans that I lay before you: the modesty of Mr. Barnard would not allow him to assert his right of paternity; but I cannot be deaf to this legal axiom: "Res clamat Domino"; which, freely translated, means: The plans are Mr. Barnard's; and this is one reason why they should demand our serious attention. They are improvements I am proposing, and not a revolution which upsets and destroys without rebuilding. I address myself to all farmers, rich or poor, since they are equally called upon to supply the demands of the creameries and cheese-factories, convinced as I am, that all, if only animated by a little earnestness, can make these improvements, if not wholly, at least in part.

In order to be clear, to suggest to all and each of them a plan that may suit them, I will divide farmers into four classes.

First, those who are obliged to build entirely anew.

Then, those who wish to increase their buildings and to have a manure-pit.

Thirdly, those, who having a manure-pit already, want to increase and improve their buildings.

Lastly, those who can only construct a boiler-house, or a manure-shed.

I will only lay down the principal lines, leaving to each the care of the details, which will vary indefinitely, according to the conditions and circumstances in which each farmer finds himself. Before beginning, it is impor-

t also to lighten

tant to have an idea of the whole system, in order to proceed with order in accordance with the means at each man's disposal.

1. To the farmer obliged to build entirely anew I propose the *first plan*.

A building 18 feet up to the roof, 36 feet long and 38 wide. You will have a manure-pit at least 8 feet high ; a stable and cowhouse of the same dimensions ; in the south-part of the building a boiler-house and a poultry-house ; under the floor next the pit a piggery and space to build a silo, and to set a horse-power to work a threshing-machine and a chaff-cutter. If the stable and cowhouse are too narrow and do not come up to your ideas, it is easy to build, on the east-side, a lean-to, which will serve for a piggery, in the lower part, and for a boiler-house and poultry-house in the upper, so that the whole space below the floors may be reserved for the sheep, the carriages, and the implements. If the land is on a slope, you will be spared the expense of making raised approaches ; you might possibly, be able to enter with your loaded wagon, by the gable-end of the barn, and this will enable you to drive in as far as the hay-loft : an immense advantage. These plans you will modify according to your wants ; in taking them for your starting point, you will certainly have a building both simple and convenient.

2. In the second place, I produce plans belonging to an old barn which has been improved to suit a dairy-farm. The proprietor wished to preserve this building, because, though old, it was in good repair ; he wanted to enlarge it and to have a manure-pit. This plate—is the barn in its original state ; that plate—is it in its modern dress. You will perceive at a glance that it has been raised 4 feet from the ground : an operation easily performed by aid of the *jack-screw*. Being raised like this, there is a room for a manure-pit of great size under the cowhouse, a piggery under the floor next the cowhouse, and very deep bays. Aided by heightening, an annex of 14 feet wide has been built towards the south the whole length of the building ; another of the same sort, but facing the cowhouse, on the north side ; the lower part of this latter becoming a part of the manure-pit, while the upper storey serves to enlarge the cowhouse. In the annex on the south-side, there is a part retained for the horses ; another for the working-oxen ; in this last place, that is, for a width of 12 feet, only 6½ feet have been left between the two floors of the stable, so that the boiler-house can be placed in the upper part of the stable. The raised-way leading from the stable to the cowhouse is 3½ feet high by 13 feet long. By means of large bars solidly fixed like stairs, the cattle mount them with ease. Between the two great dormer-windows, there is a space of 20 feet intended for a silo. Behind the barn, there is a shed sheltering the wheel that moves the threshing-machine and the chaff-cutter. The original poultry-house has been put in communication with the stable and the manure-pit. An examination of the interior

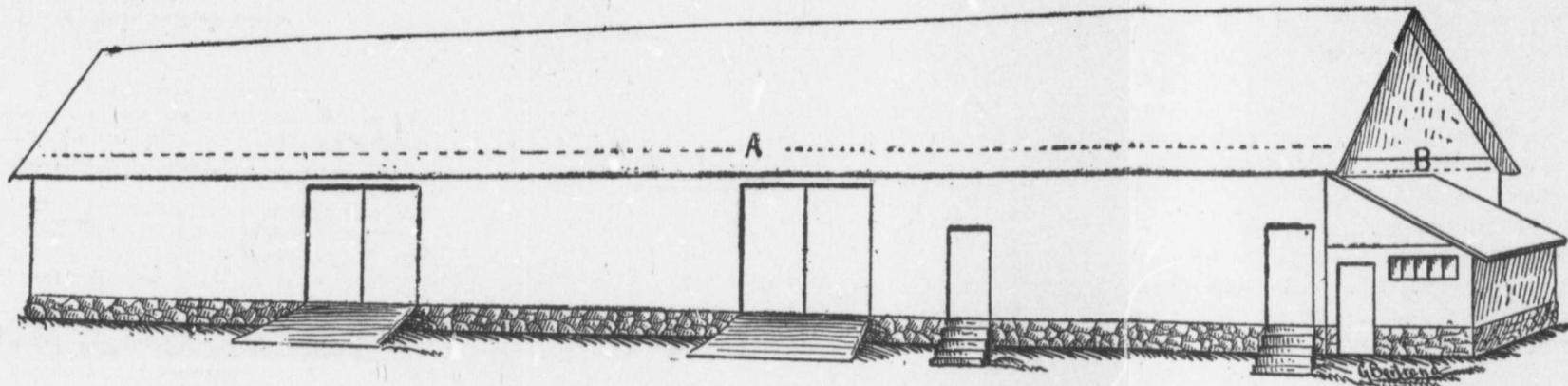


Fig. 1.—Barn and cowhouse 90 feet \times 20, with henhouse annexed.

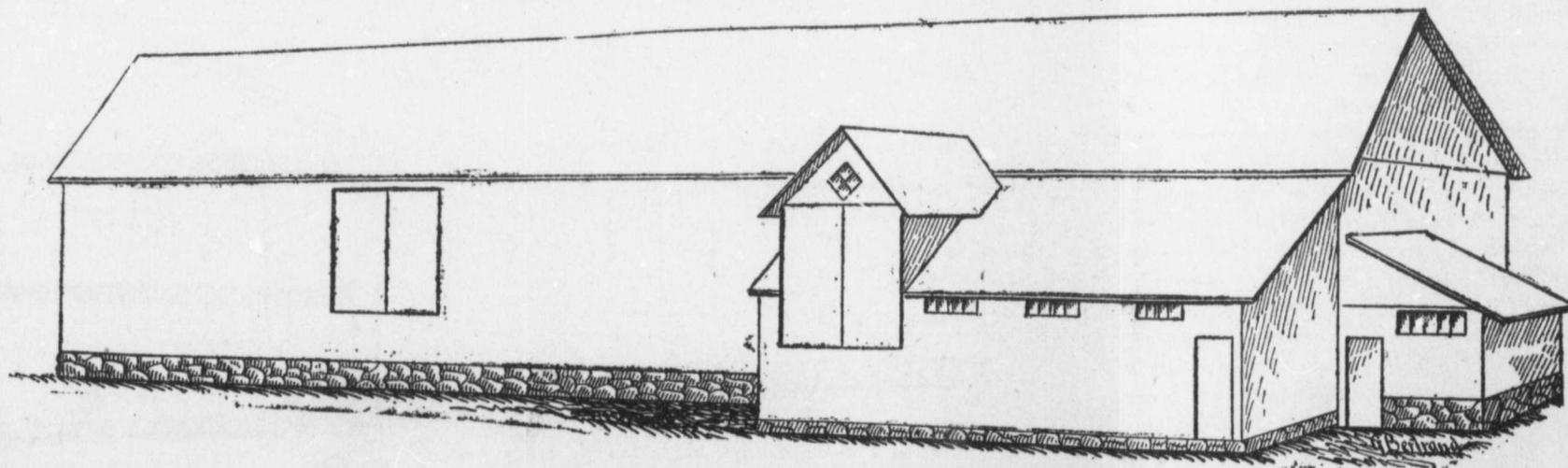


Fig. 2.—The same, but raised from 4 to 5 feet, and enlarged by the addition of stables, dung-pile, piggery, &c.

Plate I.—Plans furnished to Messrs. Ignace and Jules N. Paquet, de St. Nicolas, by the *Journal of agriculture*.



or a stable and

K Fc
L L V
M Dc
N Dc
O Pi
R R V

The
ters, a
and th
sand, t

The
cellar
gers o
workin

To th
cowhou
cowhou

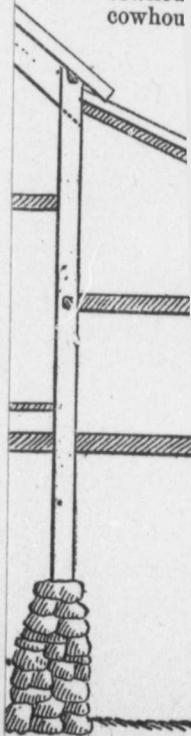


Fig. 3.—Section of the cowhouse raised 4 or 5 feet by posts lengthened and spliced; with lean-to, to the west, for a stable and dung-pit; to the north, a pigsty, &c., above the dung-pit.

- A 4 ft passage between the beasts.
 - B B Mangers with troughs, as shown at the Quebec Exhibition.
 - C Floor, 4½ feet long.
 - D Dung-gutters 10½ inches wide.
 - E Passage in rear of cows.
 - F Wider passage in rear of cows-feeding alley for horses.
 - G Trap by which manures are thrown into the cellar.
- The floor of the stalls should be laid with a space of one inch between the planks, to let the urine run freely into the cellar, the floor of which should be of beaten clay—as at H H.
- I Ecurie.
 - J An opening throughout the length, so that the fowlhouse may be warmed and lighted by the warmth and light of the stable.

- K Fowlhouse.
- L L Ventilators.
- M Dung-cellar.
- N Dung-shed.
- O Piggery or calf-house.
- R R Windows.

The stable to be boarded under the rafters, and the space between the boards and the roof filled with tan; saw-dust, or sand, to economise heat.

The horse-dung to be thrown into the cellar through two traps under the mangers of the quietest horses, or of the working oxen.

To the east, the ventilator serves for the cowhouse and stable; to the north, for the cowhouse and dung-shed.

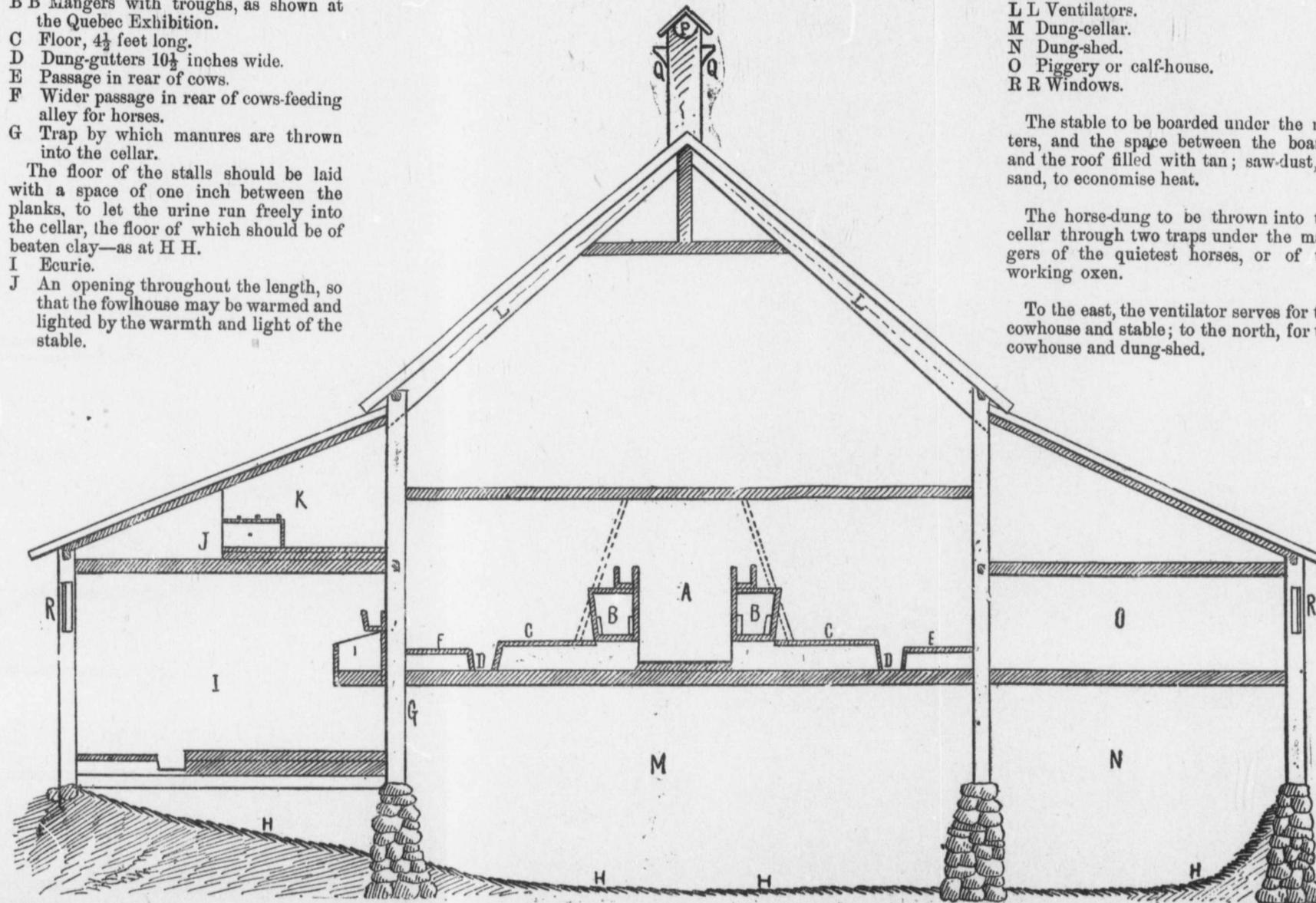
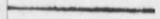
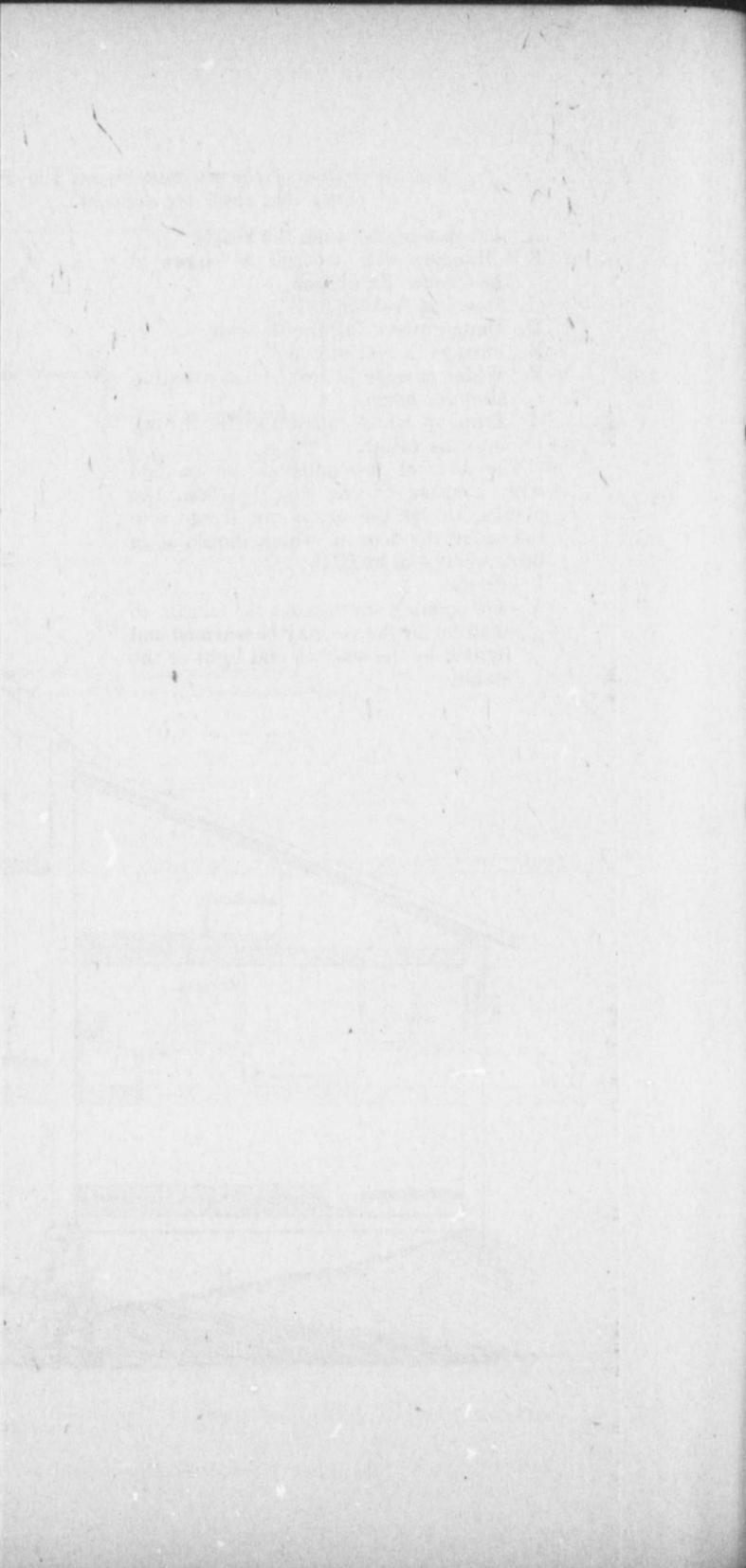
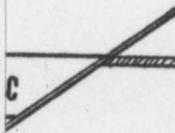


Plate II.—Plans furnished to MM. Paquet (continued).



ry, &c.
between floors.



eight.
Raised porch for l

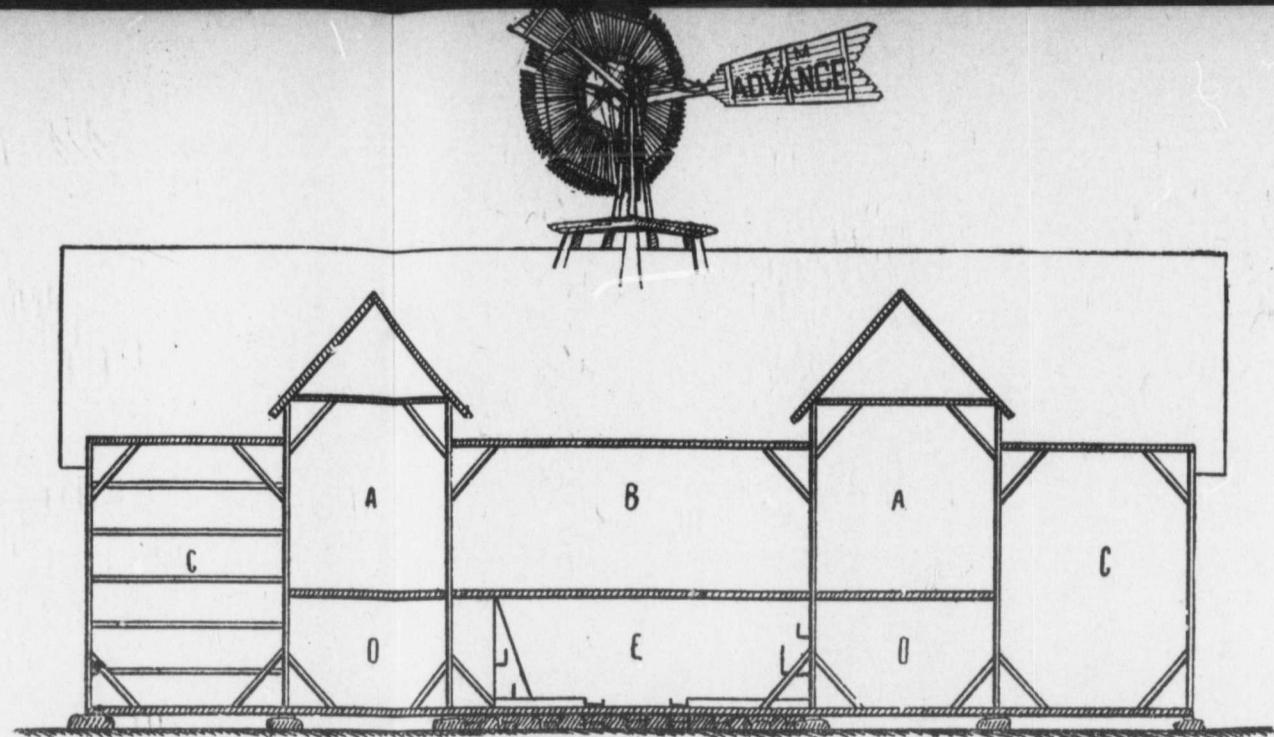


Fig. 4.—Barn, &c.—Building 18 ft high—90 x 30.

- | | | | |
|-----|-------------------------------------|-----|--|
| A A | 12 feet high and the same in width. | D D | Cart-shed, sheep-shed, piggery, &c. |
| B | Hay-barn. | E | Stable and cowhouse, 7½ feet between floors. |
| C C | Bags or siloes. | | |

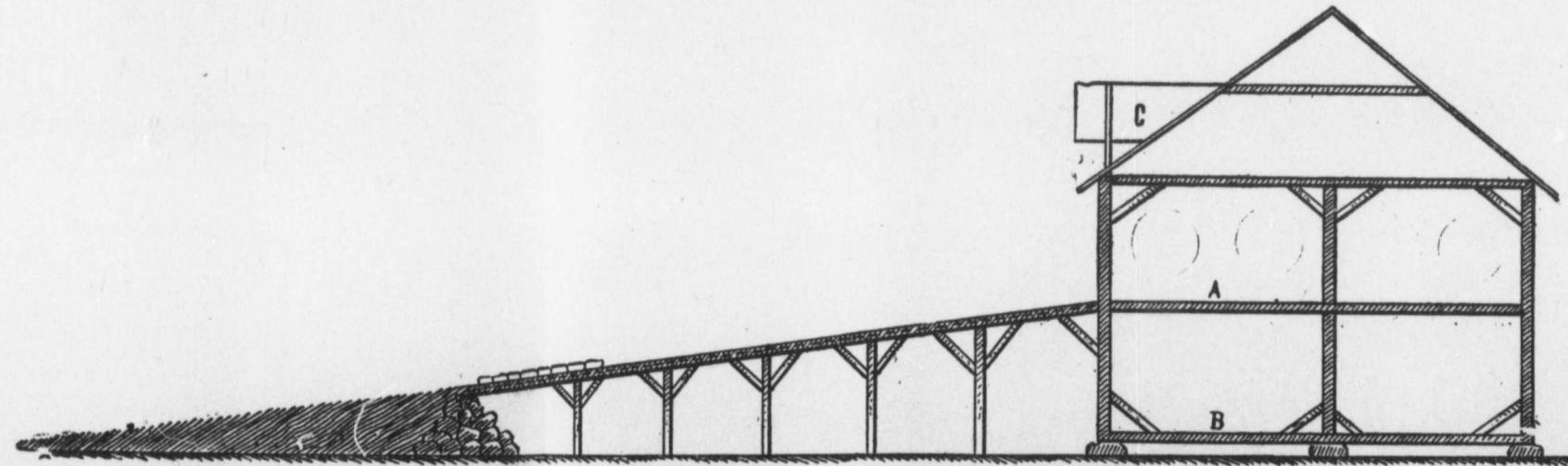
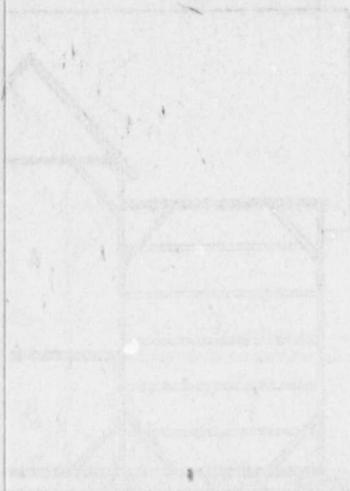


Fig. 5.—Same from the side, with raised roadway to threshing floors, one in eight.

- | | | | | | |
|---|-------------------------------|---|--------------------|---|-------------------------------|
| A | Floor 9 feet from the ground. | B | Floor of cowhouse. | C | Raised porch for large loads. |
|---|-------------------------------|---|--------------------|---|-------------------------------|



A. 11 feet high and 12 feet wide
B. 12 feet high
C. 12 feet high



ished by the Jour

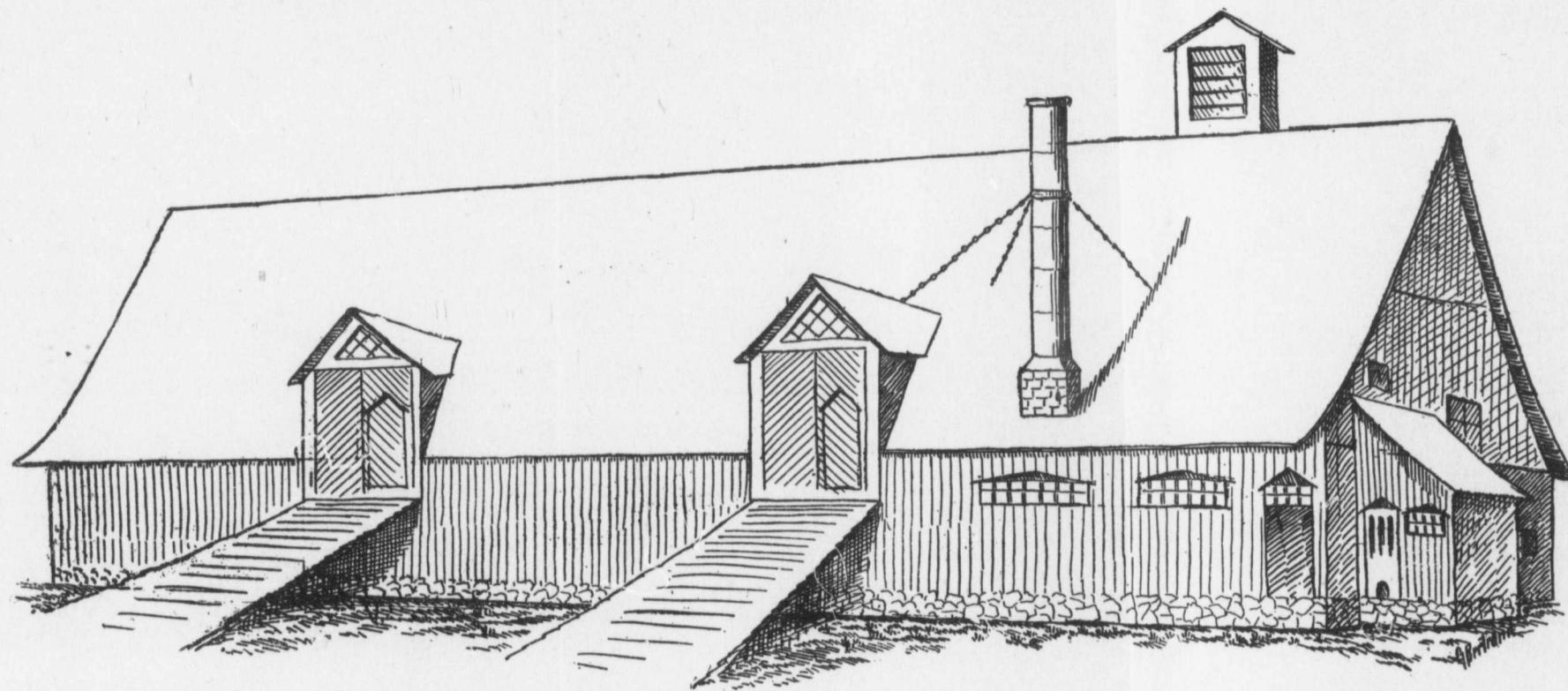
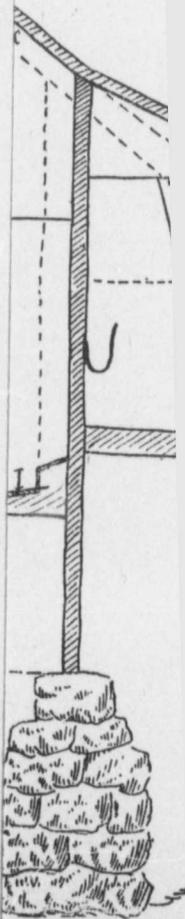


Plate IV.—Building of MM. Ignace and Jules N. Paquet, St. Nicolas, Q. ; as erected 1887, after plans furnished by the *Journal of Agriculture*.

ney, boiler-h
and cold-air en

pigs.
ges.



inued).

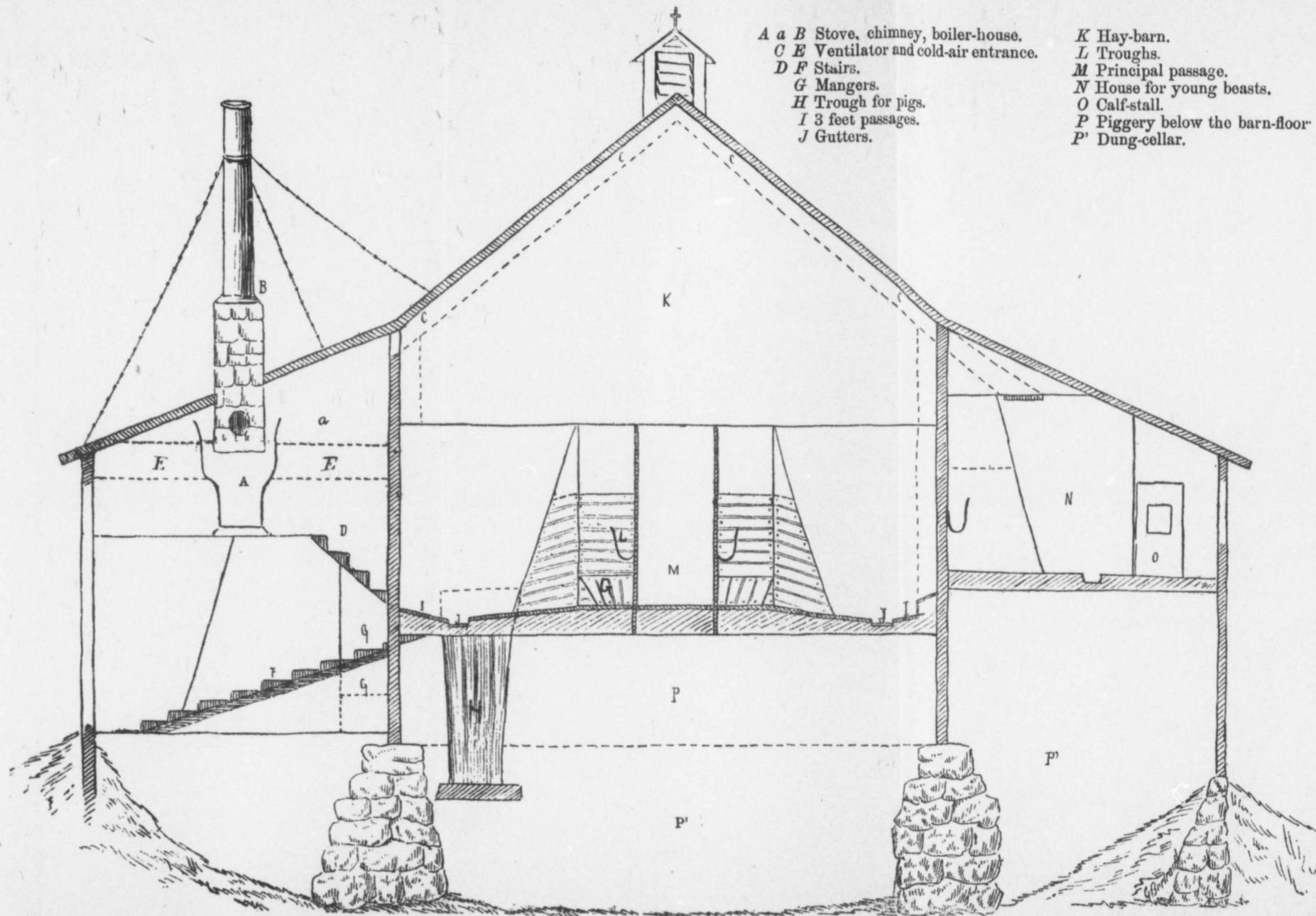
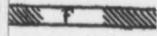
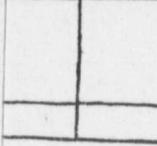


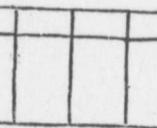
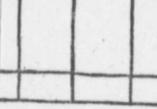
Plate V.—Building of MM. I. and J. N. Paquet, St. Nicolas, Q., (continued).



D T

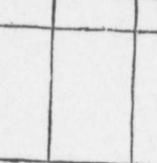


T

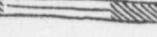


T

o



o



plan.

ing is thrown into t
oom and the pigge

, from above. See

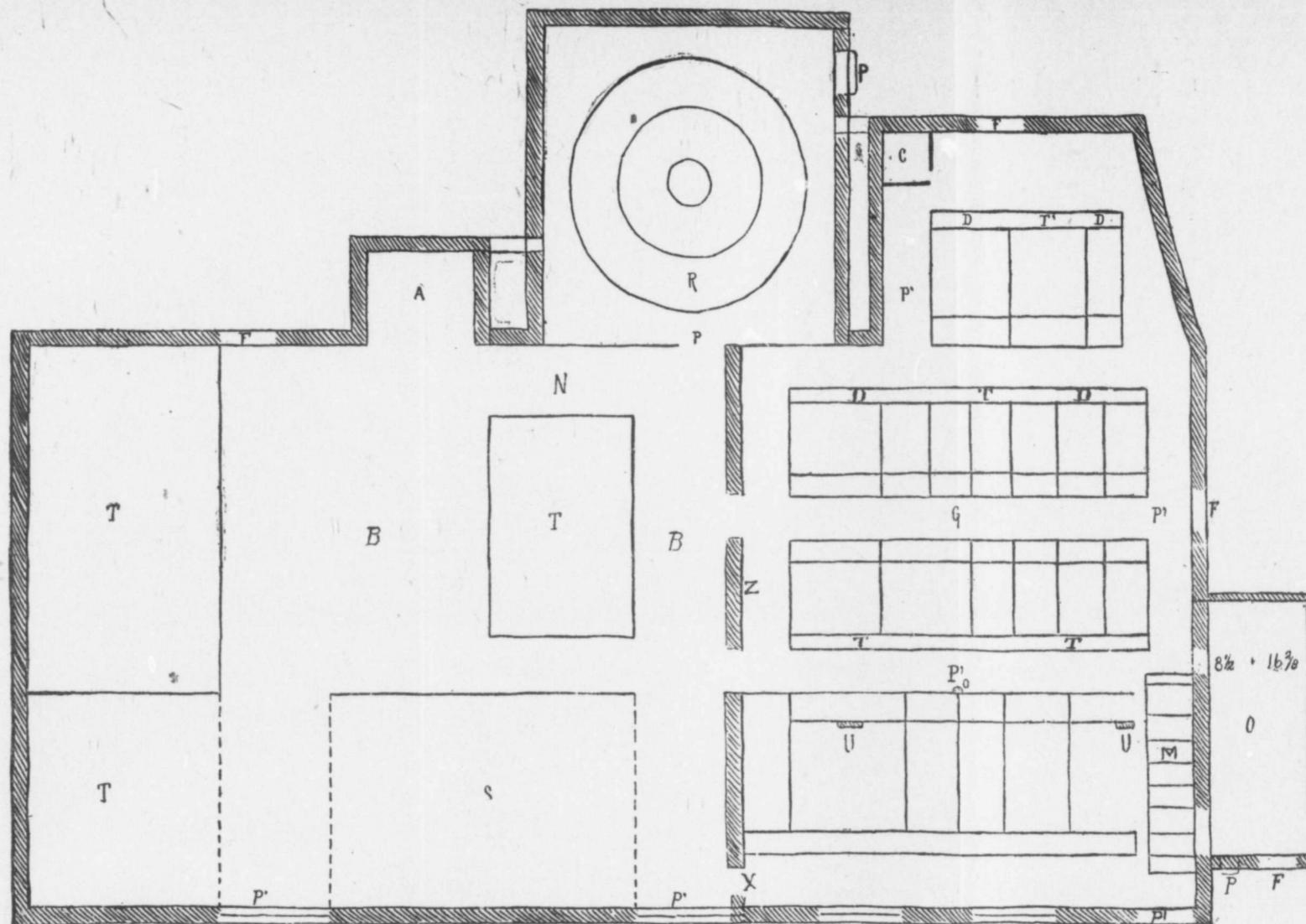
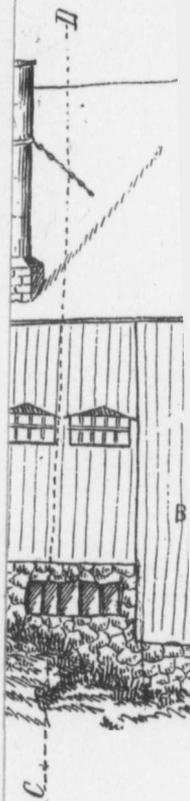


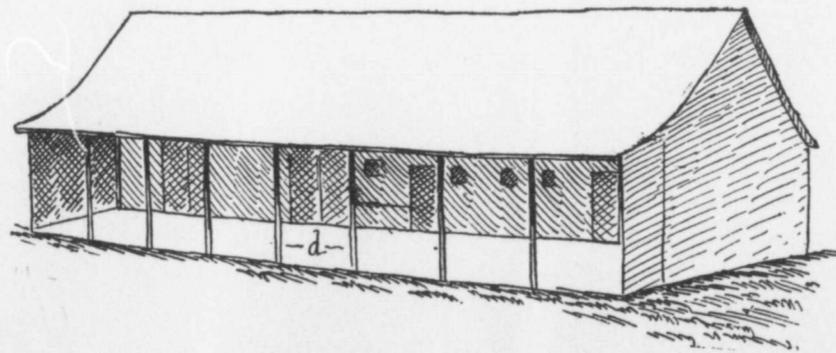
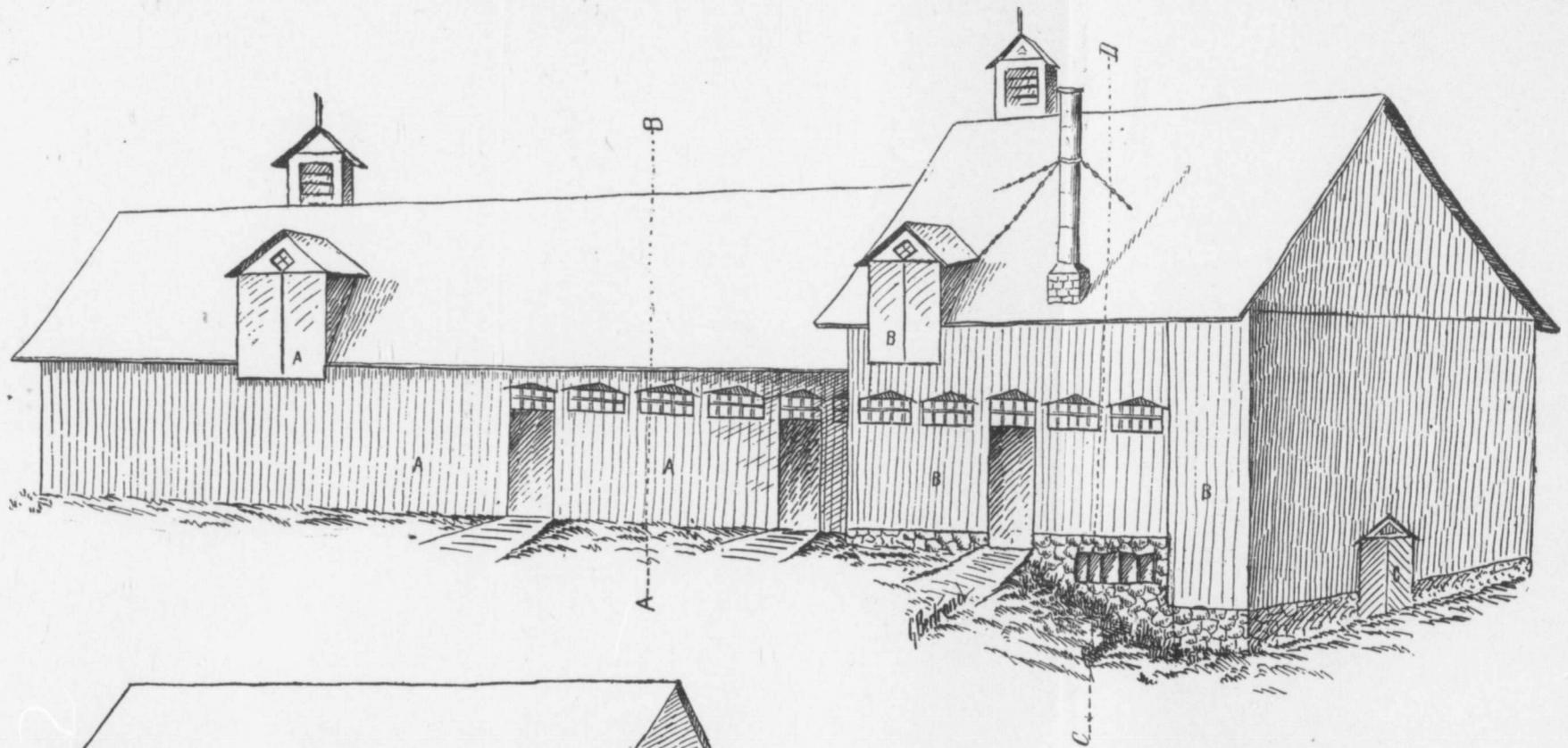
Plate VI.—Building of MM. Paquet, St. Nicolas, Q., (continued).—Ground plan.

- A Old addition 7 ft × 10 still in existence.
- B Threshing floor.
- B Large do., serving for a bay, if wanted.
- C Calf-stall 4' × 4'.
- D Dung-traps and gutters.
- F Windows.
- G 4 ft passage.
- M Ascent for stable to cowhouse.
- N Passage beneath the machines for threshing, chaff-cutting, &c.
- O Pump.

- O Henhouse.
- PP' Passages, doors.
- R Horse-power.
- S Silo.
- T Threshing-floors.
- T' Trap-doors.
- U Doors through which dung is thrown into the cellar.
- X Door leading to the oat-room and the piggery, both under the threshing-floor.
- Z Hopper, for feeding pigs, from above. See plate 7.



onging to the Rev.
c, on their farm at
mproved, 90 ft x 38
ing built, containin
manure-cellar, passi



d Building in its original form.
Barns and cowhouses 90 x 30, with lean-to 8 ft wide.

Plate VII.—Building belonging to the Rev. Ladies of the hospital of the S.-H., of Quebec, on their farm at Ancienne Lorette.

A A A Old building improved, 90 ft x 38.

B B Addition now being built, containing stable, siloes &c, 46 x 38.

C Door entering the manure-cellar, passing under the middle of the siloes.

A



-H. of Quebec at 1
ngs.

A B Lean-to, closed, so as to enlarge the cow-house &c, by 8 feet.

B Loose-box for brood-mares.

Ba Earthen floor.

C Cow-stalls 4 feet long.

D Iron grating, through which the dung drops—2 ft wide.

E Doors, closed by a chain, to prevent the cold ascending, if required.

F Mangers.

G Troughs.

H Loose-boxes of different sizes for calves, bulls, sick cows, &c.

J Manure-cellar-floor of beaten clay.

K Floor above the hay-barn, with entrance 12 feet wide, through a lofty porch.

V Ventilators (practicable) in the sides and the middle of the cowhouse, &c., throughout the whole length. By this means, the cows can remain in the house, if desired, all the summer.

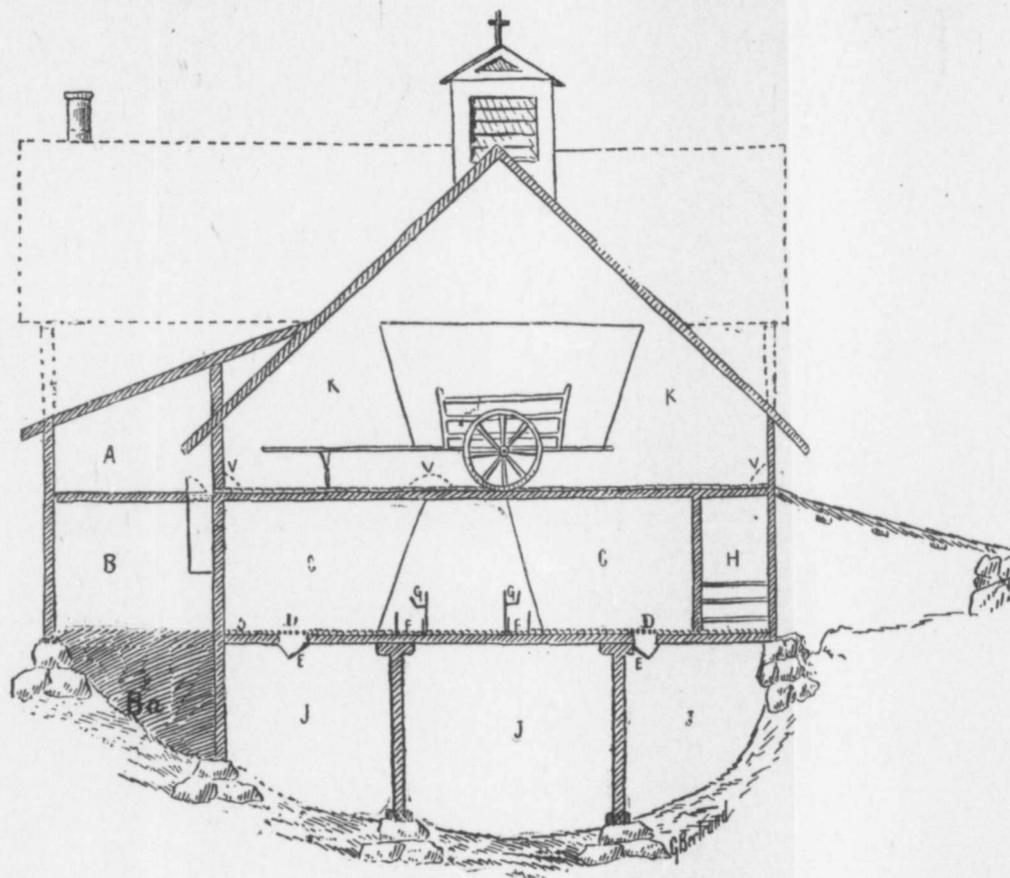
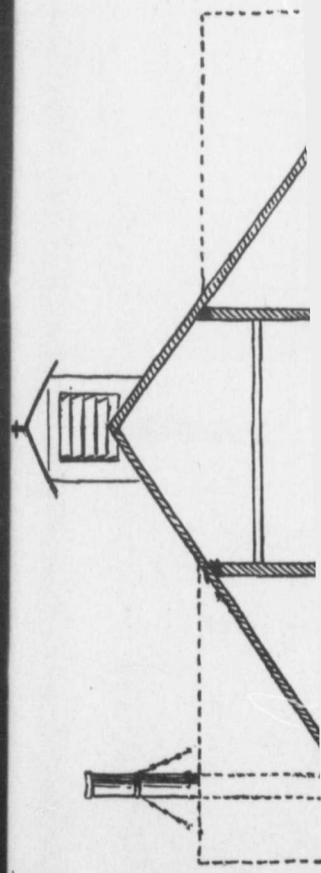


Plate VIII.—*A B* The buildings of the Rev. Ladies of the hospital of the S.H. of Quebec at their farm at *Ancienne Lorette*.—Section of the improved buildings.

Faint, illegible text, possibly bleed-through from the reverse side of the page.



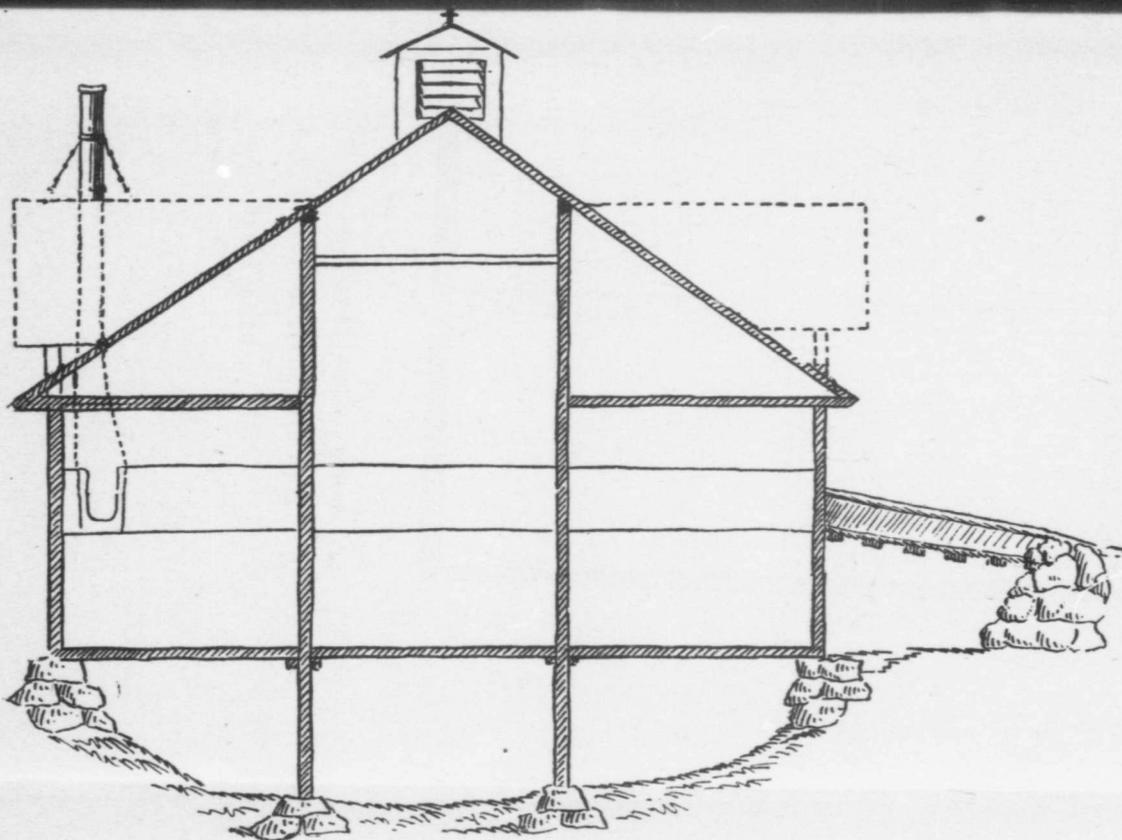
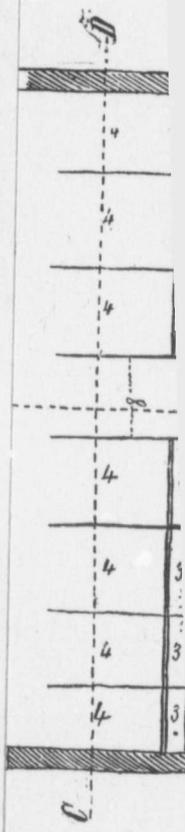
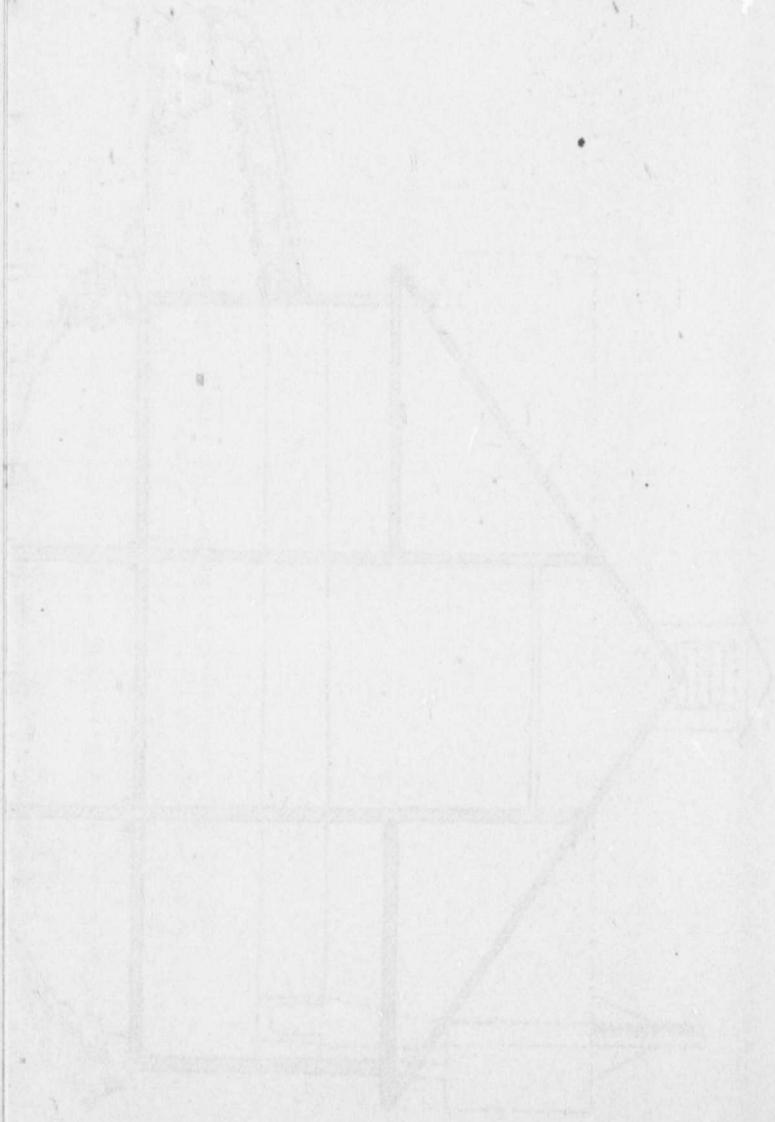


Plate IX — Section of the addition to the same building (now under construction).

The whole as above; except that the interior will be 18 ft high instead of 12, and that the threshing floor will here serve as a floor for the stable, 4 ft higher than in the other parts, for the better ventilation of the whole building, and to enable the unloading of carts, &c., into the hay-barn of the old building, into the siloes, &c., to be carried on from a higher position.



eart at Ancienne.
 h passes the solid
 -place for the barr

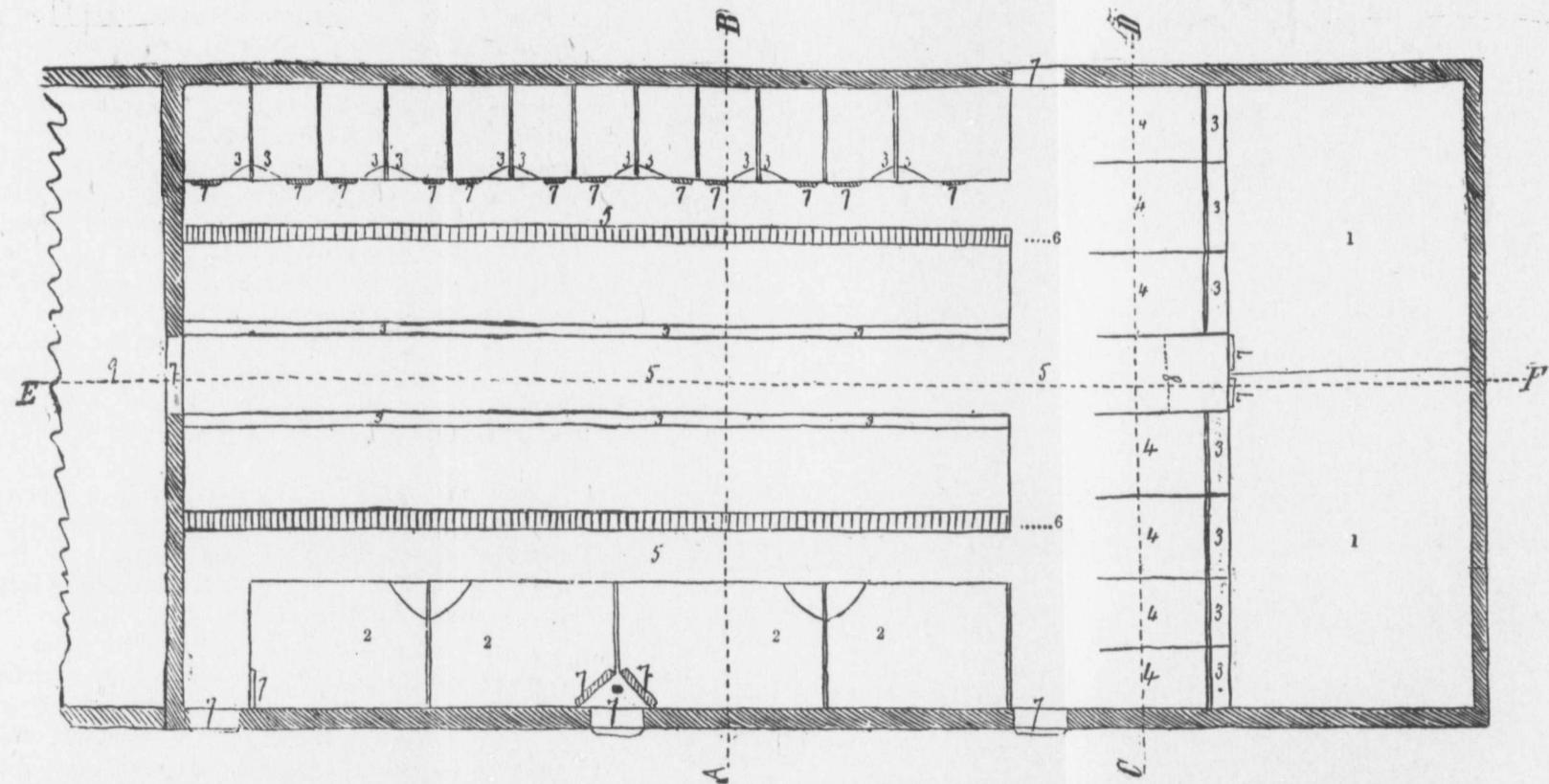


Plate X.—Improved and enlarged building belonging to the Rev. Ladies of the hospital of the Sacred-Heart at Ancienne Lorette, Q. Ground plan.

- | | | | | | |
|----|----|----------------------------------|----|----|--|
| 1. | 1. | Siloes 19 × 16 × 24 ft high. | 6. | 6. | Grating, through which passes the solid and liquid manure. |
| 2. | 2. | Loose-boxes for brood-mares, &c. | 7. | 7. | Doors. |
| 3. | 3. | Mangers and troughs. | 8. | 8. | Entrance to the siloes—place for the barrows. |
| 4. | 4. | Farm-horse stable. | 9. | 9. | The barn. |
| 5. | 5. | Passages. | | | |

plan gives us an exact id
the centre of gravity of
not injure the walls c
allowing the descent
whether of the dung-pi
with a layer of beaten c
vented from *leaching* in
situated close by, an
four ventilators termi
house, a third from the k
hole, having its orifice
stable and ends in the
the hot and unwholesom
maintains a temperature
can observe the arrangen
ease from a passage in fi
of trap-doors placed in t
stable is thrown into the
the stable and the cellar.

This, I presume, is
a more attentive examin
mensions and the other d
precaution, that is, in req
should be well panelled a
be double-boarded with a
damp. Those whose buil
dung-pit beneath their c
provided they can manag

3. Let us examine a t
Sacred-Heart of Jesus, at
rich and extensive proper
improving an old barn un
rector of the Journals of A
nure-cellar, but the cowho
made, a boiler-house, &c.
feet beyond the barn, forn
is proposed to close this sl
the cowhouses and bays, a
feet. This addition will a
roomy, containing a doubl
and horses. The reverend l

plan gives us an exact idea of the bottom of the pit, made in basin-form, that the centre of gravity of this enormous mass of liquid and solid matters may not injure the walls of the pit. Below the stable is an inclined plane, allowing the descent of the liquid matters into the pit. The bottom, whether of the dung-pit or of the manure-shed, should always be covered with a layer of beaten clay, 5 or 6 inches thick, whereby the manure is prevented from *leaching* into the cellar, and into the well, which is generally situated close by, and sometimes is in the cellar itself. You observe four ventilators terminating in one cupola; two lead from the cow-house, a third from the boiler-house, and the fourth from the cellar. An air-hole, having its orifice below the roof, passes above the floor of the stable and ends in the cowhouse. Pure, fresh air is constantly replacing the hot and unwholesome air, which departs through the ventilators, and maintains a temperature of nearly 50° F. The ground-plan shows how you can observe the arrangement of the horses and cattle, all of which are fed with ease from a passage in front of them. The cleaning is managed by means of trap-doors placed in the gutters behind the animals. The dung from the stable is thrown into the cellar by two openings in the partition between the stable and the cellar.

This, I presume, is enough to give you an idea of the whole building; a more attentive examination of all the plans will teach you the exact dimensions and the other details. All these buildings should be put up with precaution, that is, in regard to warmth. If there are rooms, (*pièces*) they should be well panelled and caulked; if in clear frame work, they should be double-boarded with a stuffing of saw-dust to keep out the cold and damp. Those whose buildings rest on a firm sloping surface can make a dung-pit beneath their cowhouses, without being obliged to raise them, provided they can manage to admit into it a little light and air.

3. Let us examine a third case: that of the Nuns of the Hospital of the Sacred-Heart of Jesus, at St-Sauveur de Québec. These ladies possess a rich and extensive property at L'Ancienne Lorette, and are now busy in improving an old barn under the direction and after the plans of the Director of the Journals of Agriculture. In this barn, there is already a manure-cellar, but the cowhouse and stable want enlarging, a silo has to be made, a boiler-house, &c. On the south-side, the roof extends about eight feet beyond the barn, forming a shelter. To utilize this part of the roof, it is proposed to close this shelter (*abri*) with a wall (*pan*), which will enlarge the cowhouses and bays, and then to lengthen the building by about 46 feet. This addition will allow of the stable and cowhouse being made roomy, containing a double row of cattle, and stalls at the side for calves and horses. The reverend ladies propose to keep about 30 cows in quasi-

permanent confinement to the cowhouse, and require several horses for the work of their estate. In the eastern part, there will be an immense silo, 38 feet long by 16 wide, for they intend growing a large quantity of green-fodder for ensilement. The land slopes so that access can only be had to the cellar by the east gable-end, so a wide passage has been reserved below the silo which freely admits of horses and carts being driven into the cellar. On a level with the floor of the barn (*carré de la grange*), a little above the upper floor of the cowhouse, there will be a threshing-floor to which loaded wagons will have access, by means of a raised-way and a great dormer-window built in the northern part of the roof. Thus, it will be possible to carry all that is necessary to the boiler-house in the southern part, above the cowhouse, and to fill the hay loft and the bay next to this threshing-floor with the greatest possible ease.

In the plan we have just been studying, you have remarked that, behind the animals, there is a gutter and traps to allow the manure to fall into the cellar. Observe here a slight difference, the existence of which implies a more perfect and more complete system of feeding. It is intended to cut into chaff a great part of the fodder; to make the cattle eat it all, so that there will be no litter to bed up the animals with. That is why the stall-floor (*pave*) is level with the passage; only, behind the cattle there are bars $2\frac{1}{2}$ or 3 inches apart, according as their are made of wood or iron, and, below these bars, a sort of oblong box made of three planks. The bottom plank is retained in place on one side by two hinges, on the other by a small chain which allows it to be let down when it is desired to make the manure descend into the cellar. There is, however, no reason why several traps should not be used in case it might be considered best to use litter.

You see no piggery or henhouse here; that is, because these ladies have at St-Sauveur a splendid set of buildings for pigs and fowls. There is no need of pigs to work in the dung-cellar, where no litter is used. Plenty of ventilation you observe. This establishment will present a perfection of details which I cannot point out here, but which may be studied with profit. Mr. Barnard desires to apply here his theoretical and practical acquirements in aid of the promotion of the progress of the dairy-industry.

4. Lastly, let us consider the case of those farmers who are not in a position to undertake costly work, but who can afford to build a boiler-house or a manure-shed. As to this latter improvement, I am bold enough to say that any farmer, however poor he may be, should try earnestly to make it. Manure—that is the farmer's treasure; a treasure that the rust never devours; that robbers do not covet; but one which assures good harvests and the prosperity of the family. If no more can be done, at least build a manure-shed. Let it be well built, that the manure may not spoil in it, and may be easily carted away at any period of the winter. The pigs should have

easy access to it, for the hard beaten clay. In the into a tank so that the the farmers who have with them.

In front of the cow can be built at a moderate called an agricultural boiler, which will come with the care generally

To condense into a improved buildings of pressure, will contain hogs kept warm in winter spring. It is precisely yielded by this valuable to die of starvation attention. On the trifling they yield.

And lastly, the final sends itself. Any one can work I have just been seen his receipts, and his expense in which he finds himself money devoted to these

Gentlemen, the plan perfect; the height of produce think that they will open industry has attracted the gigantic tree has developed our humblest parishes, the not say only of domestic its object the development wealth.

What, gentlemen, is contribute to the product furnished by our country work of mine, united to you will contribute to the development province of Quebec.

easy access to it, for their work is indispensable, and let the bottom be of hard beaten clay. In the rear of the cattle will be staunch gutters, emptying into a tank so that the urine may be turned over the dung in the shed. All the farmers who have well arranged sheds of this kind are well satisfied with them.

In front of the cowhouse, a small boiler-house, 12 or 15 feet square, can be built at a moderate expense. A boiler-stove, in cast-iron—commonly called an agricultural stove—can be placed in it; or better, a bricked-in boiler, which will concentrate the heat more. With a good chimney and with the care generally taken in our houses, there will be no danger of fire.

To condense into a few words some of the other advantages which improved buildings offer, I will observe that lofty-bays, owing to the effect of pressure, will contain a much greater quantity of hay or grain; that hogs kept warm in winter will consume less food and will come out fat in spring. It is precisely at the season when we enjoy the delicious dishes yielded by this valuable creature that we refuse him all pity and leave him to die of starvation and cold. The poultry-house equally deserves our attention. On the trifling cares we extend to our fowls depend the profits they yield.

And lastly, the financial question, the end of all our operations, presents itself. Any one can make an approximate estimate of the cost of the work I have just been speaking about. Let each, weighing well his means, his receipts, and his expenditure, as well as the particular circumstances in which he finds himself, proceed with prudence, feeling convinced that the money devoted to these operations will pay him heavy interest.

Gentlemen, the plans I have been displaying before you are not all perfect; the height of perfection is not so rapidly attained: but I like to think that they will open the way to new improvements. Since the dairy-industry has attracted to Canada the attention of foreigners, since that gigantic tree has developed itself and stretched forth its branches over even our humblest parishes, these improvements have become a question, I will not say only of domestic, but also of political economy, since it has for its object the development of the most prolific source of our national wealth.

What, gentlemen, is a drop of milk? This tiny drop, does it not contribute to the production of that enormous quantity of butter and cheese furnished by our country? So, I dare venture to hope that this humble work of mine, united to your deeper investigations, your persevering efforts, will contribute to the development of the dairy-industry of this our beloved province of Quebec.

Length of the barn—90 feet.
 Width “ “ outside—26 feet.
 Height of the cowhouse between the two floors,—7 feet.
 Height of the stable “ “ “ 9 “
 Height of the stable below the boiler-house, 6½ “
 Height between the two floors in the north-part of the cowhouse,
 6½ feet.
 Height of the cellar, 8 feet.
 Height of the raised-way for the cowhouse, 3½ feet.
 Length “ “ “ 13 feet.
 Width of the middle passage of the cowhouse, 4 feet.
 Passages in the rear of the cattle, 3 feet.
 Length of the stall-floors of the cows, 7 feet.
 Width of the gutters, 10 inches.
 Height of the mangers, 1½ feet.
 Width of the mangers, 21 inches at the bottom, outside measure-
 ment; 24 inches at the upper part.
 Height between the bottom of mangers and the under part of the
 troughs, 2½ feet.
 Width of the cowstalls, 3 feet 3 inches.
 Width of horsestalls, 4 feet and 5 feet.
 Width of horse-mangers, 2 feet 4 inches.
 Width of passage in rear of horses, 5 feet.
 Length of horse-stalls, 9 feet.

DISCUSSION.

M. BEAUBIEN.—I observe with pain that the old custom of this society of beginning a discussion after every lecture has been abandoned. If I came here to deliver my little lecture, it was because I expected, as a return, to derive useful suggestions from each of you, What happens ?

Every man hastens to recite his little composition (*boniment*), there is no discussion, and we shall be off home without communicating our experience to one another.

It would be better for us each to publish his essay in the papers, where it might be read by the fireside, and that the two or three days that we pass here be devoted to work. There are always people who are in a hurry to leave ; well, let them go, and let those who are really interested in agricultural matters remain as long as may be necessary !

Thus, we have just been listening to a lecturer who spoke about farm-

buildings, accompan-
 sion might well be for
 gentleman, just as if
 have raised a discuss
 lectures. You may p
 you like.

As for me, I am
 all day to-morrow he
 amused, but to be in

If, after a discuss
 and labour-saving ba
 engraved, and to it m
 house, not a house bu
 some degree of taste
 condensation of the i
 should be printed and
 society in the provinc

Such plans might
 up in their bedrooms,
 has been burnt out, an
 by new-ones ; all that
 plans, accepted as the
 to study the same clin

Is not this a pract
 resignation the depart
 but let us go to work i
 Agriculture for many
 discuss and but a few
 do? None at all. No
 people.

There are men pres
 let us hurry over every

I begin the discuss

I approve entirely
 The ventilators I find v
 air has no chance of cir
 they will be, with spid
 should have an interior
 first, you could use it w
 Then, if it is very cold,
 If, on the contrary, the

buildings, accompanying his address with plans and engravings. A discussion might well be founded on this subject. Why did we stop? Another gentleman, just as interesting, addressed us, and his lecture might also have raised a discussion. I mean to begin by finding fault with both these lectures. You may pass me through the winnowing-machine in my turn, if you like.

As for me, I am just as busy as any of you ; still I am ready to spend all day to-morrow here, if that be necessary. I did not come here to be amused, but to be instructed. Let us debate then !

If, after a discussion, we should adopt a plan of farm-buildings, a good and labour-saving barn, we might beg the Government to have the plan engraved, and to it might be added the plan of a good improved farmhouse, not a house built close to the road, but a little withdrawn, and with some degree of taste displayed in its construction. Then, we might add a condensation of the interesting lecture we have been listening to, which should be printed and sent to each curé, schoolmaster, and agricultural society in the province, with an explanatory description attached.

Such plans might be distributed among the farmers, who would nail them up in their bedrooms, or in any place which they most frequent. One man has been burnt out, another has old buildings which he wants to replace by new-ones ; all that they would have to do would be to consult these plans, accepted as they would have been by our own people, who have had to study the same climatic difficulties.

Is not this a practical suggestion, Gentlemen? Let us contemplate with resignation the departure of those whose business demands their presence, but let *us* go to work in sober earnest. I was a member of the Council of Agriculture for many years ; we met every year, having a heap of things to discuss and but a few days in which to discuss them. What good did that do? None at all. Nothing was digested ; nothing was laid before the people.

There are men present who know what they are talking about ; do not let us hurry over every subject.

I begin the discussion.

I approve entirely of M. Paquet's plan, with a few trifling exceptions. The ventilators I find very small. Fancy, ventilators 9 inches square ; the air has no chance of circulating in ventilators of that size, when covered, as they will be, with spiders' webs. For a cowhouse like that, the ventilator should have an interior diameter of at least 4 feet, and for this reason : first, you could use it when you want to send pease, grain, straw, &c., below. Then, if it is very cold, it can be closed. like a trapdoor, when you please. If, on the contrary, there was a mild spell, you could open the ventilator

completely, and it would not be too much. I do not like M. Paquet's air-hole either. The fresh air ought to enter from above, not from below.

An air-hole, besides, is not always necessary; it is because the ventilators of this cowhouse are only 9 inches square that an air-hole is introduced. With 4 feet ventilators, the cowhouse would be dry enough and ventilated enough without any air-hole.

But, in all these cases, the cold air, which you introduce through the air-hole, must not be allowed to pass over the cattle, or cause a current of air which strikes on them. Without a screen, the cold air will flow in a continuous jet on your beasts, and you will be obliged to dispense with its use.

I take a great deal of interest in this matter, because I am about to build a cowhouse myself. I invite you all, in, say, a couple of years' time, to come to my place and inspect a building which, if no misfortune overtakes me, will then be finished. I and my children are about to build something that may correspond with the demands of our farm; and I hope that, with the aid of my friends, like the Trappist Fathers, who have a barn that is a model, I shall succeed in making something for which we need not blush.

M. Paquet mentioned walls stuffed with saw-dust. They ought not to be thought of in this country. Vermin get into the saw-dust, and after a few years, your walls will be completely empty. Rats and mice make holes that you can never stop up. The proper thing to do is to use two ranks of boards. I intend to put a rank of paper between two ranks of board. Never, in any case, put sawdust between two ranks of boards, for that, you may be sure, is the coldest and most inconvenient wall you can possibly make.

M. PAQUET.—I beg to thank M. Beaubien for the remarks he has just made. They are in complete agreement with my views. I told you that it was intended to throw this question of farm-buildings into the domain of discussion. I added that the plans exhibited were not perfect, but that I hoped they would be the introducers of further improvements.

The ventilators may appear small; but I may tell you that there is a large door that communicates between the barn-floor and the cowhouse. Besides that, there is a single door, the lower part of which is fixed (*pleine*) and the upper part opens and shuts at will. This acts as a ventilator.

As to the air-hole, it delivers into the cowhouse very much above the bodies of the cattle, and it would be easy to keep animals away from the spot where it enters.

We thought the present air-hole necessary, because the building is well made and very warm, and it is a good thing to admit a sufficient quantity of fresh air to expel the vitiated air.

As for the saw-dust but I have always heard I am certain, it could be used it, it is perfectly but used glumes or fo as well. I told you be not big enough to fight

M. CASAVANT.—I with Mr. Beaubien. differs a little from another foot in diameter, but not the number of the cattle and go up to the roof: bien's ventilators, on the

M. BEAUBIEN.—E closed. You let down the door, which is closed down

M. CASAVANT.—The ventilators is that I find the This cools the cowhouse the ascending current, and

My ventilator, for a foot square. Were the increased.

Most ventilators when cold air enters and prevents in putting a rim (*cornice*) arrives on the summit of the escape of the hot air which strikes continuously attracts the hot out like smoke from a chimney

As to the air-hole, I ever to be allowed to improve be small, not delivering of enlargement by opening amount of air introduced of year and of the weather

M. BEAUBIEN.—Would into the cowhouse?

As for the saw-dust, we have only had an experience of a few months, but I have always heard that vermin do not get into saw-dust; and of one thing I am certain, it completely excludes damp. In the places where we have used it, it is perfectly dry. In certain spots, we could not introduce it, but used glumes or fodder in its place, and these materials do not answer as well. I told you before that I expected Mr. Barnard to be present: I am not big enough to fight any one.

M. CASAVANT.—I would like to discuss the question of ventilation with Mr. Beaubien. The system that I have employed for many years differs a little from any I have seen. My ventilators are chimneys about a foot in diameter, but numerous in proportion to the size of the building and the number of the cattle. These ventilation-chimneys start from the ceiling, and go up to the roof; they have no opening into the hay-loft. M. Beaubien's ventilators, on the contrary, communicate with that apartment.

M. BEAUBIEN.—Excuse me! The trap door in the hay-loft is always closed. You let down the hay, and shut the trap at once. It is a cupboard door, which is closed directly the hay is let down.

M. CASAVANT.—The second objection I have to M. Beaubien's ventilators is that I find them too large for the quantity of air to be admitted. This cools the cowhouse, because there is not enough hot air to maintain the ascending current, and the cold air will enter from above.

My ventilator, for a house containing from 25 to 30 head of cattle, is a foot square. Were the building larger, the number of ventilators might be increased.

Most ventilators end outside by a square top covered by a *cap*. The cold air enters and prevents the hot air from escaping. My system consists in putting a rim (*corniche*) all round the ventilator's top, so that the wind arrives on the summit of the ventilator in an eddy-like fashion, and aids the escape of the hot air. The cold air cannot enter. There is an eddy of air which strikes continuously on the rim of the ventilator, and as continuously attracts the hot air. Of a cold morning, I can see the air coming out like smoke from a chimney.

As to the air-hole, I agree with M. Beaubien; no current of air ought ever to be allowed to impinge directly on the cattle. The air-hole should be small, not delivering directly on the animals, and should be susceptible of enlargement by opening the doors and windows, so as to regulate the amount of air introduced in accordance with the requirements of the time of year and of the weather.

M. BEAUBIEN.—Would M. Casavant tell us how he lets down his hay into the cowhouse?

M. CASAVANT.—I let it down through the barn-floor, and then I carry it along the feeding-passage.

M. BEAUBIEN.—Then your hay is not kept above your cattle, is it ?

M. CASAVANT.—Yes, it is above my cowhouse.

M. BEAUBIEN.—Then you have a barn-floor ; have you not ?

M. CASAVANT.—Yes.

M. BEAUBIEN.—How would you manage if you had no barn-floor ?

M. CASAVANT.—If I could not do better, I would employ your ventilator.

M. BEAUBIEN.—M. Casavant has his answer always ready, but he has his barn-floor ready too. He throws his hay onto the barn-floor, and then, opening a door, he is in his cowhouse. But I am speaking of a case in which there is a hay-loft and no barn-floor. How, in that case, would he let down his hay ? There must be a trap-door in the floor. Would it not be better to have a door in the side of his ventilator ? It would be much warmer than a trap in the floor, and the hay would be much less subject to injury.

M. CASAVANT.—I find, too, that your ventilator is too large.

M. BEAUBIEN.—I do not find it at all too large, and I have had long experience in its use. I have 30 head of cattle in this building. The top of the ventilator is in this fashion : it is four feet square, and on each side there are Venetian blinds ; the wind passes right through the ventilator, from side to side ; it cannot eddy and descend down the ventilator as M. Casavant asserts.

When it is cold, the air of a building should not be replaced from the exterior too quickly, the chimney of introduction must not act so forcibly when it is cold as when it is mild. The cattle-man has orders, in cold weather, to close the ventilators, by means of a sliding door. When it is mild, the ventilator is left wide open ; when it is cold, the man shuts it in proportion to the cold.

M. CASAVANT.—M. Beaubien says that the wind crosses his ventilator through the Venetian blinds. Then there is some cold air which enters the ventilator ; while, in my system, the cold air is thrown back, and cannot enter.

M. BEAUBIEN.—The Venetian blinds are open on both sides ; the current of air passes from one blind to the other, from one side to the other, and carries off the hot air as it rises.

M. PAQUET.—I will give you our experience with ventilators. The cupolas are like those described by Mr. Beaubien, only ours are 9 or 10 inches square. This small size will not allow the cold air to descend ; but

the hot air ascends cannot descend when vinced of this, it is see the current of whi factory ; a certain p I think our ventilator lately, in the month of By the next morning is considered the best lator answers the want

SOME AGRICULTURE T

Mr. President, Ladies,

It is certainly unlu lecturers you heard yes ments of the farm than nor the education to ad so far as to be gracious some practical remarks lopment of our dairy-in of *certain improvement.*

The improvements i of the production of mil to say :

1. The selection and
 2. The improvement
 3. The improvement
 4. The improvement
- management of cows in v

These four great poi many volumes, if they w I will, however, limit my me, to attracting your ki for their object the produ the means to be taken to

A good herd of cow nowadays that they must

the hot air ascends continually. The cold air may enter the cupola, but it cannot descend when the ventilators are only 9 or 10 inches wide. To be convinced of this, it is only necessary to watch it on a cold morning, and see the current of white vapor escaping from the cupola: it looks like a factory; a certain proof that the current of air is in full operation. I think our ventilators act well. For we only made the openings very lately, in the month of December; and up to that time, it was much too warm. By the next morning, the temperature had descended to 50° F., which is considered the best for cattle. We have decided from this that the ventilator answers the wants of the cowhouse.

SOME AGRICULTURAL IMPROVEMENTS IN CONNECTION WITH
THE PRODUCTION OF MILK.

Mr. President, Ladies, and Gentlemen,

It is certainly unlucky for me that my turn comes after those eloquent lecturers you heard yesterday and to day. More familiar with the implements of the farm than with pen or oratory, I have neither the audacity nor the education to address you in eloquent terms. Still, if you condescend so far as to be gracious enough to listen to me, I will try to put before you some practical remarks on a subject of the highest importance to the development of our dairy-industry and our agriculture in general. I shall speak of *certain improvements in agriculture affecting the production of milk.*

The improvements in farming, which have for their object the increasing of the production of milk, are connected with four principal points, that is to say:

1. The selection and improvement of milch-cows;
2. The improvement of summer-keep, or pastures;
3. The improvement of winter-keep, or feeding in the cattle-sheds;
4. The improvement of the construction of cattle-sheds, and of the management of cows in winter.

These four great points of rural economy might form the subject of as many volumes, if they were treated in accordance with their vast extent. I will, however, limit myself, during the few moments which are granted me, to attracting your kind attention to those improvements which have for their object the production of pasture-grasses and green-crops, and on the means to be taken to produce them, since from them proceeds our milk.

A good herd of cows being given, the principle is firmly laid down nowadays that they must be properly fed during both winter and summer

if it be considered desirable to maintain the secretion of milk as thoroughly as possible during the whole period of lactation. It is proved to a certainty that cows properly fed do not fall off in their milk before September. My personal experience, which agrees with that of most farmers, has shown me that, every time the want of grass is supplied by good green-meat, the average yield of milk, or at least of butter, is maintained with uniformity from the 15th June to the 10th September, and that the money-profits even increase in the latter months from the greater richness of the milk and the extra value of its products.

It is a fact now proved by numerous instances, in the States and in Ontario, as well as in Quebec, that the improvement of pastures and the growth of green-meat as a supplement to grass, together with the practice of ensilement as a supplement to the dry-fodder and the roots of winter, are indispensable factors in the production of an abundant, economical, and profitable yield of milk.

It is by the practice of this system in connection with the possession of cows of improved race, that the yield of dairies has been increased from 2,500 lbs or 3,000 lbs of milk per cow, to 5,000 lbs and even 6,000 lbs per cow, and the weight of butter from 156 lbs or 200 lbs per cow to 256 lbs, 300 lbs, and 325 lbs per cow and per annum, and that we have succeeded in raising the money-return per cow from \$20 to \$25, figures formerly rarely attained, to \$50 and \$60; increasing thus by a-third or a-half the value of a farm. I will not speak of the yields of 8,000 lbs and 10,000 lbs of milk per cow, which, in spite of their well-proved correctness, will seem fantastic figures to many. In many farms in the West and elsewhere, three cows are now kept where one used to be kept, and the production of milk is tripled. A woman in the State of Maine made, in 1887, with the milk of six cows, 2,000 lbs of butter, which sold for \$2,000, or \$100 a cow. At a dairy-men's meeting in Ontario West, last year, the story was told that a German farmer in Jefferson county, Michigan, had, 11 years ago, nine cows and nine children, but no money, and that, to-day, he has 60 cows and \$20,000 in cash and credit.

This remarkable progress has been made more especially by means of improved pastures and the growing of crops of green-meat.

In our province, we have more than one example where a judicious selection of milch-cows of good breeds, the improvement of pastures, and the increased production of winter and summer-food have doubled the returns of the dairy and even of the farm. Here and there, we are told of returns now and then of \$30, \$40, and of even \$60 per cow per annum. But how many farmers in each parish, throughout the province, who imitate these isolated instances? How many are there still who are satisfied with a return of \$20 a cow? I leave you, farmers, to reply to this question.

Is it not true that a or the ignorance of the great sums which, assur

And these splendid men are not impossible of the same system, we should Let us keep good milch-milk, grow we grass in a green-meat crops, to repl the dried-up fields refuse

Generally speaking, pastures; the land is in sown; many sow none at

To produce a good pasture in making a good meadow a mixture of *timothy* and *meadow-poa*. Not less than arpent.

Parenthetically, I will Kentucky blue-grass; it is of all the grasses I have just heat and cold best of all, and contains a large proportion of plant has greater effect on—and it communicates to and that delicious flavour

The *poa pratensis*—I all over the province and is not grown separately, and still rather costly.

In summers favourable above-named mixture of grass is has not been grazed in the succulent, which is given calves in winter. In general pastures thus laid down, with stood three years; and the for the production of butter

On good soils, which speaking, be sufficient, but meat crops, especially fodder

Is it not true that apathy, the absence of calculation and observation, or the ignorance of the resources of agricultural art, make us annually lose great sums which, assuredly, exceed a million dollars in this province alone ?

And these splendid returns obtained by enterprising and enlightened men are not impossible of realisation by others. Were we to practise the same system, we should obtain, all things being equal, the same results. Let us keep good milch-cows, and keep them well ; and, since grass makes milk, grow we grass in abundance. Let us improve our pastures, and sow green-meat crops, to replace during the droughts of summer the grass that the dried-up fields refuse to produce.

Generally speaking, enough care is not devoted to the formation of pastures ; the land is insufficiently worked, and not enough grass-seed sown ; many sow none at all.

To produce a good pasture, the same methods should be employed as in making a good meadow. The three clovers, *red*, *white* and *Alsike*, with a mixture of *timothy* and other grasses ; among them *orchard grass*, and *meadow-poa*. Not less than 12 or 15 lbs. of timothy and the clovers per arpent.

Parenthetically, I will point out particularly June-grass, blue-grass, Kentucky blue-grass ; it is the longest lived, the earliest, and the hardiest of all the grasses I have just named. This *poa* stands the extremities of heat and cold best of all, as well as drought. It is very nutritious, and contains a large proportion of the elements of butter and cheese. No plant has greater effect on the quality of butter—provided it be well made—and it communicates to it in the highest degree that marvellous aroma and that delicious flavour of almonds.

The *poa pratensis*—June-grass, &c.—is an indigenous grass that grows all over the province and on almost every kind of soil ; unfortunately it is not grown separately, and the seed, which is imported from the West, is still rather costly.

In summers favourable to the growth of grass, the fodder from the above-named mixture of grasses may be mown in the latter part of June, if it has not been grazed in the spring. It yields a green hay, tender and succulent, which is given to the stock later on, or reserved for the calves in winter. In general, it is better to *mow* it early the first year, on pastures thus laid down, which should never be broken up before they have stood three years ; and the more so because old pastures yield better grass for the production of butter and cheese than new ones.

On good soils, which yield hay all over, this system may, strictly speaking, be sufficient, but in none can it rival in productive powers, green-meat crops, especially fodder-corn.

The best plants for green-meat in summer are rye, pease, oats, and vetches or tares, and, lastly, Indian, corn.

On sandy soils, fall-rye is sown early, which is fed off in spring, or mown green for use in cribs or racks, when the grass, on account of late frosts, is loath to come to a bite in the pastures. Later on, in June, the land is manured and fodder-corn sown, for consumption in September, or for ensilement for the winter.

On good, cool soils, we sow a mixture of pease and oats, or better, pease, oats and tares, at the rate of $2\frac{1}{4}$ to $2\frac{1}{2}$ bushels of pease to $1\frac{1}{4}$ to $1\frac{1}{2}$ of oats to the arpent. This fodder is cut when in bloom, but some prefer cutting it when the seed is in the milk, considering it then more nutritive and less relaxing. However that may be, this fodder may be used as food from July 15th, or, at the latest, from July 20th.

It is said that an arpent of this fodder, on good land well prepared, will yield half-a-score of tons.

In Ontario, only pease and oats are sown together, but as cattle prefer tares to pease, it would be better, perhaps, to mix these two pulse half and half. Tares have the advantage of giving several cuttings in the season, and yield about two tons.

Besides these fodder-crops, an early field of corn, well manured, is sown at the end of May, to afford food in August. Thus, throughout the summer, cows receive, once or twice a day, according to their needs, an additional bait of green-meat, abundant and succulent in its nature, which maintains the flow of milk at its highest level. And again, if a favorable season renders the pastures abundant and sufficient, the corn will be ensiled, the crops intended for consumption in a green state made into dry-fodder, and the whole will constitute an excellent provision for the winter.

A good approach has been made in the province towards the cultivation of corn for fodder or ensilage, but the movement in this direction must become general, and every farmer have his field of maize and his silo. The success and profits of the future are there.

This is particularly necessary in the case of farmers on dry soils, of those in mountainous and sandy districts, who, from prolonged droughts, often suffer a scarcity of fodder, which makes their cattle suffer in their turn and destroys the benefits of cultivation. All those suffer, too, whose clay-soils, naked and parched up as they often are at certain seasons, can hardly feed a cow to every 4 arpents. It is time for these men to open their eyes, and to think of profiting by the knowledge and experience others place at their disposal. Let us unite in one cry: plenty of grass and of fodder-crops. This attained, the rest will follow of itself. For, after three years of good pasturage, as well as after a heavy green-crop, after a

pea or bean-crop, the grain kind of grain. Want of this system. In many cases serious objection, and the tried and practised. The means:

1. Not a morsel of du collected by means of water tanks and drains, or black straw-chaff for litter.

2. The manure to be w applied.

3. If, in spite of this e insufficient for the proper c in addition to the potato-fie tion or the local market, th begin by the sowing of buc soils, to be interred entirely improved by this *green-ma* which recourse is never had And, before recommending sist, for the advantage of th and mixed with dung, afte house, or after having lain year. In the latter case, the 5 feet thick, and each layer o lime.

The effect of lime is t its acidity. This compost a top-dressing on meadows immediately after the carrying 20 to 50 loads an arpent. compost, would give it addi complete, more prompt, and applied as a top-dressing to g greatly aid vegetation, by ca ture. It will answer even fo succeeds the crops treated in tant.

Black-mould as it exists treatment, is a manure of litt

pea or bean-crop, the grain-crop will be fuller than if it succeeded another kind of grain. Want of manure is the great objection to the adoption of this system. In many cases, in the present state of things, this is a really serious objection, and the means of causing its disappearance must be studied and practised. The following is a compendious statement of these means :

1. Not a morsel of dung to be wasted ; and every drop of urine to be collected by means of water-tight cowhouse-floors, and either liquid-manure tanks and drains, or black-mould dried and mixed with a little plaster and straw-chaff for litter.

2. The manure to be well managed, and economically and judiciously applied.

3. If, in spite of this economy, the quantity of manure collected be still insufficient for the proper dressing of the field of green-meat or fodder-corn, in addition to the potato-field and the corn intended for domestic consumption or the local market, the preparation of the land for these crops should begin by the sowing of buckwheat on sandy, and the large pease on clay-soils, to be interred entirely at blooming-time. The land will be immensely improved by this *green-manuring* ; still it is a costly proceeding, and one to which recourse is never had except in the absence of any other cheaper one. And, before recommending this sort of amendment to every one, I must insist, for the advantage of the majority, on the use of black-mould dried and mixed with dung, after its having acted as an absorbent in the cowhouse, or after having lain in compost with quick-lime during an entire year. In the latter case, the mould is made into a four-sided pile, from 3 to 5 feet thick, and each layer of 6 or 8 inches is sprinkled with newly slaked lime.

The effect of lime is to partially decompose the mould and destroy its acidity. This compost can be most advantageously employed as a top-dressing on meadows, or on dry pastures, in early spring or immediately after the carrying off of the hay-crop ; the dose may be from 20 to 50 loads an arpent. A little plaster and some ashes, added to the compost, would give it additional value, and, especially, an action more complete, more prompt, and more efficacious. I have reason to think that, applied as a top-dressing to green-crops immediately after sowing, it would greatly aid vegetation, by causing the soil to preserve its coolness and moisture. It will answer even for potatoes on sandy land, and the grain that succeeds the crops treated in this way, will be more strawy and more abundant.

Black-mould as it exists in bogs in its natural state, without previous treatment, is a manure of little value, as much on account of the slowness

with which it acts, as of the acid principles, injurious to vegetation, it contains.

But when once these principles are dissipated or neutralized, the other elements in its composition being those which appear later in the crops it is intended to feed, contribute freely to their nourishment and development.

According to some *agronomes*, turf contains more nitrogen than farm-yard dung,—twice as much—from $1\frac{1}{2}$ to 4 ozo, and 4 to 20 ozo of ash.

The best black-mould is that found in little shallow bogs, where, either now or in past times, ash and elm grew freely, and calcareous matter abounded. This mould is less barren (*aride*) than that from the large bogs, and is worth quite as much as a good many specimens of badly managed farmyard manure.

But it is especially in the improvement of the physical condition of soils by means of the humus it contains that black-mould increases their fertility. For humus makes clay-soils more porous and more capable of imbibing moisture, heat, and air. Contrary-wise, light, dry, calcareous or silicious soils acquire consistency and retentive powers by the humus, which absorbs and retains moisture for a longer time, retards dessication, and thus greatly forwards vegetation.

How many farmers are there who can obtain black-mould within a moderate distance, and for nothing? Many have this mine of wealth on their own farms, within a few arpents from their cowhouses. It is upon these men, if they own light soils, that I would impress the advantage of making experiments in the way I have pointed out, on a small piece of pease and oats, half an arpent of maize, or fodder corn, or a piece of meadow. I have reason to believe that the results obtained from this first step will induce them soon to make further and more considerable application of the same material, and they will soon be followed by numerous imitators.

And so, good cows, well supplied in summer with good grass, or, if that fails, with good green-meat, and well lodged, well looked after, and well fed, in winter; the preservation, increase, and the judicious application of manure, to increase and maintain the plentiful production of fodder-crops, especially of corn for ensilement; these are the true methods of carrying to the highest degree the production of milk, and of increasing, by so much, public and private wealth.

But a piece of advice in parting.

In undertaking these improvements, we must not start on too large a scale, but proceed gradually, and profit, as we go on, by our own observation and experience. It is not by springing at one bound from the lowest rung of a ladder that its top is most surely gained, but by mounting each rung

in its turn. Thus, moun
is the most likely plan t
January, 1889.

Dir

M. CHAPAIS.—There
My opinion as to turf wa
his lecture, stated that, o
of Mr. Chapais, who had
recommend the use of tur
to be the reverse of what
opinions are not absolutel

Mr. Marsan states tha
principles contained in tu
much more, some much l
great chemists, who have
tain about it, and do not s
contain any thing. At pre
point—I do not believe th

Now, Mr. Marsan inst
and lime, and speaks of th
compost alone. Lime alor
laid up in small heaps thr
most useful “mendment”
and ashes, a good dressing

My opinion is corrobor
turf (*terre-noire*), I have a
that, although I have not r
and ashes alone did just
My opinion having been qu
it without some foundation
study the question, he will
the elements which are pres
his compost its value.

But, as an absorbent, ti

(1) In the south-eastern counties
etc., which are intended to affect the
plant food, are called “mendments.”

in its turn. Thus, mounting the ladder of progress in farming, by degrees, is the most likely plan to lead us to prosperity and wealth.

January, 1889.

I. J. MARSAN.

Director of the Agricultural College, L'Assomption.

DISCUSSION.

M. CHAPAIS.—There is a remark that I find myself obliged to make. My opinion as to turf was quoted yesterday, by Mr. Jenner Fust, who, in his lecture, stated that, on the subject of turf he would cite the opinion of Mr. Chapais, who had said, in the *Journal d'Agriculture*: "I do not recommend the use of turf as being serviceable to any soil." As this seems to be the reverse of what M. Marsan said, I wish to make it clear that our opinions are not absolutely opposed.

Mr. Marsan states that authors differ as to the quantity of fertilizing principles contained in turf. Some say that it contains as much as, some much more, some much less than farmyard dung. This shows that the great chemists, who have thoroughly investigated this subject, are not certain about it, and do not seem to know what turf contains, if it does really contain any thing. At present—and my conviction is very strong on this point—I do not believe that turf is of any use on any soil.

Now, Mr. Marsan instances composts made with turf mixed with ashes and lime, and speaks of the sandy soils of the States being manured with this compost alone. Lime alone produces wonderful effects; on cold soils, lime, laid up in small heaps through the winter to slake, and then spread, is a most useful "mendment" (1). In my opinion, with turf mixed with lime and ashes, a good dressing may be made, but not with turf alone.

My opinion is corroborated by certain experiments I have made. In using turf (*terre-noire*), I have applied it in different ways, and I feel convinced that, although I have not made a chemical analysis to prove it, the lime and ashes alone did just as much good as when composted with turf. My opinion having been quoted, I must not let it be supposed that I formed it without some foundation. I feel sure that if Mr. Marsan will continue to study the question, he will find that turf alone is not worth much, but that the elements which are present in the lime and ashes are those which give his compost its value.

But, as an absorbent, the thing is no longer the same. It is a good

(1) In the south-eastern counties of England, all additions, like chalk, lime, ashes, road-scrappings, &c., which are intended to affect the physical condition of the land rather than actually to convey plant food, are called "mendments:" clearly from the French "amendement."

absorbent, and may be used to advantage in that capacity, unless the cost of carriage be more than it is worth.

M. MARSAN.—I see that Mr. Chapais and I do not absolutely differ in opinion on this matter. I do not advise people to use black-mould alone. I have had some experience in it as an absorbent, and I mean to continue its use, as long as I can get it, even if I have to cart it some miles. As to its use alone as a manure, it does not seem to produce sufficient effect to pay. I will not, however, utterly deny its efficacy; but I think that it will not pay to cart it any long distance, if to be used as a manure alone. Indeed, it promotes the growth of certain acid plants; these evil effects are due to some injurious principles, like tannic acid, which it contains. The lime we mix with the turf neutralizes these deleterious principles, sets free the carbon and promotes its decomposition as well as that of the other matters it contains. These elements being numerous and chiefly those that enter into the formation of plants, the mould has an important though indirect part to play. If it is added in proper quantities to unretentive soils, I think they are physically the better for it, and no one will deny the importance of the physical properties of the soil. A soil of the very best composition may sometimes have physical properties entirely unfavorable to vegetation, whilst it contains all the elements fitted to feed plants. Besides, my opinion of this I have taken from men of science, as found in the reviews published in Canada and in the States. As to myself, I have not had great experience in the use of black-mould alone,—and I do not think it would pay. If it plays any part, it is rather by its physical than by its chemical properties, but, in any case, some part it does play. Mr. Chapais says it is good for nothing.

M. CHAPAIS.—It is possible I said so, but I admit the physical effects you speak of. I spoke of its chemical effects.

M. MARSAN.—The effects may vary according to the sort of mould used. There are several sorts. It is possible that the bogs which we find in the province of Quebec are less valuable than those of France, but, at any rate, they are worth something. I will cite a fact that, although rather vaguely, I have in recollection: a farmer having manured an arpent of land with black-mould and ploughed it in like dung, I asked him, specially, if he had found any effects from it at harvest. He replied: Yes, that piece grew better than the others, that he did see the effects of the turf at harvest. Was he right or wrong? I had no opportunity of verifying his statement. Still, this trial of my friend the farmer gives me hope that we may derive benefit from the small bogs that farmers have on their land. Even if the only use farmers made of turf was to absorb the urine, that would be a great gain.

M. CHAPAIS.—On this point I am of your opinion.

M. MARSAN.—And on the soil is not yet un their laboratories have at all events, there have another, in the States as nure, as a “mendment, ed of its humus, mould. What is this mould? I plant-food as straw, peas plants are composed of th I know that turf holds found in it.

I know of a bog that dow. The wind got up, following year from 300 formerly very little used

This proves that turf that made the hay grow; dow.

I should like experim mould, and, if they answe whenever you use it with fied constituents, you wil with it, but also the effect

M. CASAVANT.—I ha consist so much of lime ar turf to pulverize it—*désag* half-grown, dried up. B parts in question as much humus necessary. Were it ing soils that turf is usefu it only needs a trial to co

At my place, the land to make it more retentive.

This is my experience, neighbors. For vegetables,

M. BRUNEAU.—Do yo tween the results arrived a by the difference between t turfs you have employed?

M. MARSAN.—And in other ways turf will do what it can. Its effect on the soil is not yet understood. The *savans* with their instruments and their laboratories have not yet entered into all the arcana of nature. But, at all events, there have been experiments enough made, in one place and another, in the States as well as in Ontario, to lead us to hope that this manure, as a “mendment,” is worth something; and that on land exhausted of its humus, mould may take the place of dung if the latter is wanting. What is this mould? The *débris* of plants. If it does not contain as much plant-food as straw, pease haulm, &c., it does contain a good deal of it. For plants are composed of the same materials, though the proportions may vary. I know that turf holds but little potash; still, other useful matters are found in it.

I know of a bog that was burnt at a short distance from a certain meadow. The wind got up, and carried the ashes over the meadow, and the following year from 300 to nearly 400 bundles of hay were carried off where formerly very little used to be harvested.

This proves that turf is not a useless application. It was not the wind that made the hay grow; it was the ashes the wind carried over the meadow.

I should like experiments to be made, on a small scale, on the use of black mould, and, if they answer, its use should be increased. My position is that whenever you use it with a mixture of lime, and thereby destroy its acetified constituents, you will have, not only the effects of the lime it carries with it, but also the effects of the matters the turf itself contains.

M. CASAVANT.—I have a farm which is all hill-and-dale; parts of it consist so much of lime and stiff clay that I have been obliged to give them turf to pulverize it—*désagréger*. It was so impacted that hay, when about half-grown, dried up. By adding turf, I succeeded in getting from the parts in question as much hay as from those that had naturally all the humus necessary. Were it only in the case of too compact and humus-wanting soils that turf is useful that would be a gain. And, as Mr. Marsan says, it only needs a trial to convince ourselves of it.

At my place, the land containing too much lime, humus must be added to make it more retentive.

This is my experience, confirmed by the experience of many of my neighbors. For vegetables, especially, a great deal is used.

M. BRUNEAU.—Do you not think, Mr. Marsan, that the difference between the results arrived at by Mr. Chapais and yourself may be explained by the difference between the chemical and physical constitution of the turfs you have employed? For, there is no doubt that turf, the result of

the slow decomposition of matters like the wood of fir-trees, of resinous trees, must be much poorer than that produced by the decomposition of hard-wood trees.

M. MARSAN.—There is no doubt about turf from the great bogs not being so good as turf from shallower ones. Bogs derived from the rotting resinous trees, great savannas from the decomposition of mosses, do not yield as good mould as do shallower bogs. It is for this reason that I specified just now the virtues of bogs on calcareous soils, covered with hard-wood trees, with elms and ash. It is doubtless for this reason, namely, the difference in the origin of the bogs and the turf they produce, that the analyses of the moulds differ so much. And Mr. Chapais, as he says, may very well have made experiments giving exact results, and at the same time unfavorable to the use of mould.

M. CHAPAIS.—The turf I have used comes from the decomposition of red-spruce trees.

M. MARSAN.—The very worst of all turfs! We have, here, bogs covered with hard-wood. Even oaks are found in them. So that this turf is pretty well mixed. When turf is to be used, it is better to be taken from the surface of the bog, where it is almost mould—*terroir*. Now the *humus* derived from hard-wood is called black-earth—*terre-noire*—but it is not, properly speaking, *turf*: it is already converted into *earth*.

M. CHAPAIS.—It is humus aerated.

M. MARSAN.—True. And especially when it contains no acid principle.

M. CASAVANT.—I have a bog on my farm. At the surface of this occurs a layer derived from the decomposition of mosses, and dating from I know not what epoch. Under this, another layer occurs, about 3 feet thick, which proceeds from the rotting (*eremacausis*. Trans.) of rushes, mare's-tail, &c. We burn a certain thickness of this every year. Until we get down to this layer, we cannot succeed in getting fodder (*fouirage*) to grow, and there is no kernel in any grain that comes to harvest on it. But as soon as we touch this layer, composed of old plants, such as rushes, mare's-tail, distaff-thistle (*quenouille*), &c., we get crops equal to those grown on the best hard-wood lands. Wheat, even, and hay, come in abundance; and yet it is a bog on which there are still 3 feet of turf.

M. CHAPAIS.—Mr. Marsan has given as a proof that turf necessarily contains the elements of fertility, that the *ashes* of turf are fertilizing in their effect. Evidently, there is something in this. But every one knows that, by burning, the condition of every body is changed. For example, take saw-dust in its natural state, and until it is ploughed in and becomes decomposed, no benefit will be derived from it. But, if I burn saw dust before making use of it, and spread the ashes, the results will be immediate. I do not deny that fertilizing elements exist in turf, but I say that

these elements are but quote numerous autho the question is still *su*

With us, the bogs been burnt, and now a question Mr. Marsan a

Dr. Bruneau, nov turfs may differ in cor

Our bogs derive fr turf with which I have other turfs and have at the fruit of the decomp ments ought to be mad

M. MARSAN.—In c cessary. I should like t made, you composted ;

M. CHAPAIS.—I ma

M. MARSAN.—How

M. CHAPAIS.—A ye

M. MARSAN.—A wh

M. CHAPAIS.—Yes. following spring. I obt the turf. I admit the va a lightener of the soil.

M. LEMIRE.—I have one, amongst others, clo nated in a blackish moul the sand; and that soil v

THE OR

LECT

Mr. President and Gentle

I am a foreigner, who of this association, and I

The only excuse I can

these elements are but a small percentage of the bulk. On my side, I can quote numerous authorities, just as Mr. Marsan can quote them on his side; the question is still *sub-judice*.

With us, the bogs are pretty extensive; a great many of them have been burnt, and now are good land. So that I do not think that on this question Mr. Marsan and I are so far apart after all.

Dr. Bruneau, now, seems to raise a very pertinent question. The turfs may differ in composition according to their origin.

Our bogs derive from the rotting of red-spruce-trees; this is the only turf with which I have experimented. But I know that others have tried other turfs and have arrived at the same conclusions. Were these latter the fruit of the decomposition of resinous trees? I know not. But experiments ought to be made to set this at rest.

M. MARSAN.—In composting turf with lime, a good deal of work is necessary. I should like to know, Mr. Chapais, if, in the experiments you have made, you composted your turf.

M. CHAPAIS.—I made a compost of turf.

M. MARSAN.—How long did you leave it before spreading?

M. CHAPAIS.—A year.

M. MARSAN.—A whole winter?

M. CHAPAIS.—Yes. I made the compost in July, and it was used in the following spring. I obtained the same effect by using lime and ashes without the turf. I admit the value of turf as I admit the value of saw-dust, i. e., as a lightener of the soil.

M. LEMIRE.—I have farmed land on which there were bogs. There was one, amongst others, close to a sand-hill. Near the bog, the sand-hill terminated in a blackish mould; that is, the humus only darkened the colour of the sand; and that soil was very productive.

THE ORIGIN OF CANADIAN CATTLE.

LECTURE BY M. MAX. HOUELBEQ.

Mr. President and Gentlemen,

I am a foreigner, whose name, at most, is only known to a few members of this association, and I am honoured by a request to address you.

The only excuse I can make for this sort of usurpation is, that I have

not selected myself for this honour: it is M. Casavant's friendship for me that has imposed it upon me.

I hope he will not have to be sorry for it,

I have read, gentlemen, in some forgotten book, this sentence: France has not a single race of animals of which it can be proud. Then, considering doubtless that to derive the origin of the Canadian cattle from a French stock would be far too humiliating, the writer declares that, in his opinion, the Canadian cow descends from the Alderney.

I confess that I should not have been more surprised had the writer said that the hogs landed in 1418 (1538? Trans.) by the Baron de Léry, on Sable island, were pure Chinese!

That the Canadian cow resembles the Alderney is not surprising; but to argue from this that the Alderney is the parent of the Canadian is, perhaps, going a little too far.

As for me, I do not believe a word of it. I assert that the Canadian cattle descend from two French stocks: the Breton and the Norman; and I maintain that they can have no other origin.

Permit me, gentlemen, before proving the origin of the Canadian race, to say a few words on the Alderney. (1)

Perhaps in this way we shall succeed in explaining in the simplest fashion the resemblance said to exist between the two breeds.

Alderneys people the islands of the Channel near that part of Normandy called the Cotentin.

The chief islands are: Alderney, north of the peninsula of the Cotentin, and to the west of this peninsula, Jersey (2), Guernsey, and Chausey.

In Jersey, the cows are called Jerseys; in Guernsey, they are called Guernseys, and lastly in Alderney, they call them Alderneys.

It is difficult, gentlemen to go over the different changes that the sea has brought about on this part of the coast of Normandy and Brittany. How many islands, how many ancient habitations have disappeared, the existence of which it is impossible to recall. Chausey was formerly larger than Guernsey, and to-day hardly a spot of cultivable land can be found!

From Alderney, as far as to opposite Cape Fréhel, above St. Malo, the sea is full of rocks, proving clearly thereby that this shore, now covered by the sea, was, once upon a time, inhabited; for, the encroachments of the

NOTE.—This lecture was most gracefully offered to the Association by M. Casavant in the name of M. Max. Houelbecq, a retired captain, and a former pupil of an agricultural school in France. M. Houelbecq is at M. Casavant's, studying our agriculture; we beg him to accept the thanks of the association for his essay. (THE SECRETARY).

(1) *Alder* trees, and *ey* = 'an island. To say then the isle of Alderney is tautological. Trans.

(2) *Jersey* = *Cæsar's insula*. Trans.

sea are invariably mad sailor to be met with v of this coast. All that St. Michel, and the m once the site of an in exists on this part of th forest to Jersey by me route between this isla

What conclusion n facts, except that Jerse epoch, part of the cont these isles were peopled islands, two hypotheses third.

First hypothesis: ' isles and took up their been left there by some

Second hypothesis islands, and so went to few miles even from the

These two hypothes The Alderneys, Jerseys, cent. This being so, let the Canadian cow derive simple enough that cert nadians and Alderneys, mon origin of the breed

Let us now consider

What should you tl it the French who first c

You would smile at some distinguished farm Was it the French who bovine race? Or, if the way, the sense of it is brought here, were they Canadian race.

Do you not find you

But whence do you t French, coming to Canad any other country than t

sea are invariably made by successive attacks, and there is hardly an old sailor to be met with who does not know of some alteration, in his own day, of this coast. All that vast basin, which is presented by the sands of Mont St. Michel, and the marshes of Dol and of Châteauneuf in Brittany, was once the site of an immense forest, the forest of Cissy. The legend still exists on this part of the Breton coast that formerly people passed from the forest to Jersey by means of a single plank. To day, gentlemen, the shortest route between this island and France is 10 miles.

What conclusion must we draw from all these absolutely historical facts, except that Jersey, Guernsey, and Alderney formed, at a certain epoch, part of the continent. And from this, does it not clearly follow that these isles were peopled by Bretons and Normans. As to the cattle of these islands, two hypotheses offer themselves, and, I protest, there cannot be a third.

First hypothesis: The Bretons and Normans, who passed over to these isles and took up their abode there, found the animals there, they having been left there by some of the marine disturbances of which I have spoken.

Second hypothesis: The new inhabitants found no cattle in these islands, and so went to fetch some from their former country—hardly a few miles even from the islands—that is from Brittany and Normandy.

These two hypotheses lead us then forcibly to the same conclusion: The Alderneys, Jerseys, and Guernseys are Bretons and Normans by descent. This being so, let us suppose for an instant, before proving it, that the Canadian cow derives from Breton and Norman stock; is it not then simple enough that certain persons should see a resemblance between Canadians and Alderneys, and this likeness itself is it not a proof of the common origin of the breed?

Let us now consider the Canadian race:

What should you think, gentlemen, if any one were to ask you: Was it the French who first colonized Canada?

You would smile at the question, would you not? And yet there are some distinguished farmers who do not hesitate to ask this other question: Was it the French who imported into Canada the first individuals of the bovine race? Or, if they do not formulate their question exactly in this way, the sense of it is the same: The cows which the French colonists brought here, were they French? Were these cows the fore-mothers of the Canadian race.

Do you not find yourselves tempted—I am tempted—to cry out:

But whence do you think they came? Why do you imagine that the French, coming to Canada to found a colony there, collected cattle from any other country than their own; what interest could they have had in

doing so? The cattle of other countries were not they then, like the French races, in a, so to speak, wild state, that is, utterly unimproved?

And besides, how can you conceive that sailing-ships, leaving the ports of Brittany or Normandy, went out of their way only to look for cattle to ship. If these emigration-ports were situated on a coast utterly devoid of cattle, the doubt might be strictly admitted; but Honfleur and Dieppe are right in the Norman country, and St. Malo is in Brittany. It is very much more reasonable to admit that the leaders of the emigration loaded their vessels from the productions of the place where lay their ports of equipment.

Again, gentlemen, the history of Canada, so well written by M. Garneau and M. l'abbé Ferland, proves my thesis.

The first positive knowledge we have of any importation of cattle is of that made by M. le Baron de Léry, about 1538. Now this expedition left Honfleur, in Normandy, and history in no wise relates that it went out of its route to embark cattle. The animals imported then were Normans.

It may be objected to this, that the cattle landed by M. de Léry were landed on Sable Island (*Île de Sable*), and that, later, the men landed on this isle by the Marquis de la Roche ate them. This may be, but there is no proof that they were all eaten, and not one of them left.

Besides, here I quote from the abbé Ferland, another landing, equally historical, made by Jacques-Cartier himself, in 1541: "...They, in their long passage, had suffered much for want of water; they were even obliged to give the cattle, goats, and pigs, which they had brought to stock the country, cider to drink." You see, again, that history makes no mention of any port at which the colonists stopped for the purpose of embarking cattle. Now, Jacques-Cartier sailed from St. Malo, in Brittany; the cattle, then, which he distributed throughout the country were Bretons.

Over the numerous importations made from 1541 to 1617 I pass in silence. At this latter date, Champlain made his third voyage to Canada, bringing with him numerous colonists and considerable supplies. Among the colonists figures Louis Hébert, the first Canadian farmer, according to history, who ploughed Canadian soil with oxen. Champlain, too, as history relates, sailed direct from Honfleur to Canada. Now Honfleur is in Normandy, therefore, the cattle imported by Champlain were Normans.

Observe, gentlemen, I only quote these passages of Canadian history in which the word *cattle* (*bestiaux*) is written in full. I might, by going on in this way, heap Breton importations on Norman importations, without end. It would be useless; would it not? I think I have sufficiently proved that the horned-stock imported into Canada were all of Breton or Norman origin.

These animals bred in t
birth to the Canadian r:

Those, then, are gre
qualities of the Alderne
the latter is the descend

Besides, I speak ser
Canadian cow, now so
haughty Alderney,

To what ascribe the
ney? To its milking ca
admirably developed and
by the progress of agricu
existed in the Alderney f
least in its earliest begir
whom is this predispositi
Normans and the Breton

But, then, the little
her ancestors are the san

Are, then, the Breto

The statistics I am al
true of to-day, and time l

When you ask a Bret

Such a cow gives 6½ l
means that his cows give,

Butter-making is, in
no means of selling milk
lued according to their yi

If we compare this yi
have an idea of the richne
6½ lbs. from 18½ *pots* a we
2½ *pots* give, we see, all b
and, besides, the Breton c
what cows they must be!
true country of the real Br
dian arpents. (1,775,653 ac
heath; another third, wit
is composed of schistose
fertile. And yet in 1868,
of horned-stock, and more
Figures like these show

These animals bred in the country made crosses with each other and gave birth to the Canadian race.

Those, then, are greatly mistaken who, in hopes of making some of the qualities of the Alderney reflect themselves on the Canadian cow, assert that the latter is the descendant of the former.

Besides, I speak seriously ; if you choose, gentlemen, in a few years, the Canadian cow, now so little esteemed, will have nothing to envy in the haughty Alderney,

To what ascribe the reputation—well merited, no doubt—of the Alderney? To its milking capacity, is it not? Truly, these qualities have been admirably developed and improved by skilful breeders, aided in their work by the progress of agriculture. But this predisposition to milk-production existed in the Alderney from her very origin, for only that which exists, at least in its earliest beginnings, can be developed and improved. Now, to whom is this predisposition of the Alderney due, unless to her ancestors the Normans and the Bretons?

But, then, the little Canadian possesses the same predisposition, since her ancestors are the same as those of the Alderney.

Are, then, the Bretons and Normans good milkers?

The statistics I am about to quote are rather old, but they are equally true of to-day, and time has failed me materially to get more recent ones.

When you ask a Breton farmer if his cows are good, he generally replies :

Such a cow gives $6\frac{1}{2}$ lbs., another gives 8 lbs., and that one 9 lbs. He means that his cows give, respectively, so many pounds of butter a week.

Butter-making is, in fact, the sole dairy-business of that country, where no means of selling milk occurs. It is not then surprising that cows are valued according to their yield of butter.

If we compare this yield of butter with the yield of milk, we shall soon have an idea of the richness of that liquid. The minimum yield of butter is $6\frac{1}{2}$ lbs. from $18\frac{1}{2}$ pots a week. This only gives about $2\frac{2}{3}$ pots a day, but these $2\frac{2}{3}$ pots give, we see, all but a pound of butter. Now this is a minimum! and, besides, the Breton cow is usually badly fed. Judge, then, gentlemen, what cows they must be! A single department of Brittany, Morbihan, the true country of the real Breton cow, contains about 2,098,500 square Canadian arpents. (1,775,653 acres). The third of this is almost covered with heath; another third, with downs, sands, or rocks, and the remaining third is composed of schistose or granite soils, and consequently is not very fertile. And yet in 1868, this corner of Brittany possessed 354,536 head of horned-stock, and more than 357,141 head of horses, sheep, and pigs. Figures like these show us, gentlemen, to what a point the temperance

(*sobriété*) of the Breton cow is carried, and with how little she contents herself when producing so much.

The five departments formed out of the former province of Normandy are peopled by the Norman cow. But it is on that part of the sea-side, known as the Cotentin and the Bessin, that this race displays its most remarkable qualities. Thence, it derives the designation most commonly assigned to it: the Cotentin breed. (1)

In Normandy, there are cows that give 9 pots of milk a day, but they are exceptions to the rule. According to recent calculations, the average yield per cow per annum is 770 pots. About $6\frac{1}{2}$ pots are required to make rather more than 2 lbs. of butter. An idea of the milk-production of Normandy may be formed if we consider that the little district of Isigny so renowned for its butter, and the population of which is only 3,000, exports annually 6,194,260 lbs. of butter.

These figures speak loudly enough, so there is no need of exaggerating the milk-giving qualities of the Norman cow, any more than the butter richness of her milk. A few figures more: some may believe, perhaps, that it is only the French who appreciate the dairy-products of the Bretons and Norman cows. In 1862, from the ports of Brittany and Normandy, 14,484,171 francs' worth of butter were exported.

In 1864, the foreign export rose to 21 million francs.

In 1865, to 30 million francs.

In 1866, to 37 million, and in 1869, to 40 million francs.

The greater part of this butter went to England by the steamboats of the S. Western Railway Co. The rest went to Brazil and Buenos Ayres.

You have no need to blush, then, gentlemen, for the Breton-Norman origin of your little Canadian.

What the English have done for their races, do you now for yours.

In your stock flows the blood of the richest milch-cows. Lay aside all those troublesome crosses which can in no wise improve our cows.

It is the gravest of errors to admit that a race can be improved by crossing. Those, who support such a principle in breeding, furnish, the very first, the proof of its weakness.

However strong their partisanship may be, they never fail to insist on the necessity of fresh importations of new stallions to, as they call it, refresh the blood. They do not seem to see that the necessity of doing this destroys *funditus* the very principle for which they contend. If the influence of blood, of prepotency, (*génération*) had the value they attribute

(1) *Race* denotes a pure, aboriginal stock, like the Devon, the Sussex; *breed* denotes a made up stock like the shorthorns, and the Dishley longhorns. Trans.

to it, these improvements
pear, and any fresh i
From the moment it l
satisfactorily that cro
characteristics transmissi
the combinations in a
lutely incapable of im
of improved individu

In France, too, w
Anglomania; every l
Thank God! people s
they not, I am sure o
worth talking about t

What Canada wa
milk to supply the da
men, a little cow whic

In exchange for t
you, this little cow tel

I am hardier tha
rigor of our winters.
then, as you feed my
them; breed from me
the same chances of st
still have, and you wil
so good a milker that
expenditure you will l

This little cow, ge

to it, these improvements, once acquired, by its means, would never disappear, and any fresh intervention of the improving type would be useless. From the moment it becomes clear that this is not the case, it is proved satisfactorily that crossing does not transmit characteristics of race or characteristics transmissible in their turn. However well conceived may be the combinations in accordance with which it is pursued, crossing is absolutely incapable of improving a race ; it can only assist in the production of improved individuals.

In France, too, we have been attacked with, allow me to use the word, Anglomania ; every body dreamed of crosses with the English breeds. Thank God ! people soon saw what a mistake they were committing. Had they not, I am sure our Breton and Norman cows would not have been worth talking about to-day.

What Canada wants now is not bullocks but milk, the richest possible milk to supply the dairy-industry. You have in your possession, gentlemen, a little cow which only asks leave to give it to us.

In exchange for the quantity and richness of the milk she promises you, this little cow tells you :

I am hardier than my English opponents ; more accustomed to the rigor of our winters. In the dead season, I want but little. Feed me, then, as you feed my rivals. Take the same care of me that you take of them ; breed from me on the " in and in " principle. In a word, give me the same chances of success as those whom you prefer to me have had and still have, and you will see that, in a very few years, I shall have become so good a milker that you will find yourself repaid a hundred-fold for the expenditure you will have made on me.

This little cow, gentlemen, is the Canadian cow.

MAX. HOUELBEQC.

MILK.

SUMMARY.—Introduction. — Normal milk. — Its density. — Composition. — Fat-globules. — Nutritious value of milk. — Its elements. — Compared with meat and eggs. — Milk a perfect food. — Comparative value of milk in its different conditions. — Variations and deterioration of milk. — Their causes. — Diversity of races. — Ages of cows. — Their habits. — Health of animals. — Medium in which they live. — Food of milch-cows. — Their fitness for milk-production. — Effect of milking. — Time of calving. — Age of milk. — Ferments or microbes in milk. — Medium in which milk is placed. — Accidents to which milk is subject. — Poisonous milk. — Poor milk. — Galactorha. — Bitter milk. — Salt milk. — Milk with rotten-egg flavour. — Milk that sours or coagulates on leaving the udder. — Purgative milk. — Viscous milk. — Milk that will not curdle. — Milk, the butter of which will not “come.” — Clotty or grumous milk. — Milk which curdles in boiling. — Blue milk. — Yellow milk. — Green milk.

LECTURE BY M. J. C. CHAPAIS.

Mr. President and Gentlemen,

The work our society is pursuing is of a complex nature. Its principal object is the development of the dairy-industry. To succeed in this development, it must endeavour to give to its members a complete theoretical course of instruction bearing upon all the branches of the industry, and place within their reach that practical information, without which all theory is inapplicable and useless.

The practical part of its work is carried on by our society by means of dairy-schools, of a well planned system of inspection, and of practical lectures in the making of cheese and butter. As to theoretical science, it labors for its dissemination by these annual meetings, by the lectures that are here given, by the memoranda of the inspectors which it lays before the public every year, and specially by its published reports, in which are to be found all the lectures and essays which are submitted to it at its meetings or elsewhere,

From any point of view, the printed reports of our society, which I have just mentioned, are the most powerful agents for the propagation of the theoretical science of the dairy-industry which we have in hand. It is therefore necessary that they include the *data* on all the numerous questions allied to that industry, so that whoever desires to consult them may find there all the information he may want to help him to dive into the *arcana* of the science he desires to study.

It is in virtue of the to-day “MILK” as they are before you. Indeed, as subjects allied to the corner, except the one our society makes, or of its work.

Here and there, if by chance. The was shown. But nothing composition, nutritive the accidents it incur say *nothing*, and that that these points have which relates to the in milk is the raw materi-

I am here then for in the reports of the so than I have not undert

To throw more light my essay into three dis *normal state*, in the se in the third, of the *acc*

Normal milk is mi undergone any changes existence, it is made up great number of analys prising the *maximum* o giving the *minimum*.

The analyses of Do

Water
Fat
Casein and album
Milk-sugar
Salts

Under the head of c

INTRODUCTION.

It is in virtue of the principle I have just laid down, that I have selected to-day "MILK" as the subject of the lecture I have been invited to give before you. Indeed, as, some time ago, I was running over the series of reports of our society, for the purpose of reference, I observed that, almost all the subjects allied to the dairy-industry had been then treated in a special manner, except the one I consider the base of all the investigations which our society makes, or causes to be made, in pursuit of the accomplishment of its work.

Here and there, indeed, a word or two about milk has been dropped as if by chance. The way of treating it in making butter and cheese has been shown. But nothing special has been said on the subject of its nature, composition, nutritive value, the variations and changes it undergoes, of the accidents it incurs, before it enters the butter- or cheese-factory. I say *nothing*, and that is rather a strong expression, but it will be allowed that these points have only been summarily touched upon, beyond that which relates to the immediate connection with butter and cheese of which milk is the raw material.

I am here then for the purpose of filling up what I conceive to be a void in the reports of the society, regretting all the same that others more expert than I have not undertaken to do it before.

To throw more light upon the points I am about to treat, I have divided my essay into three distinct parts: in the first I shall speak of *milk in its normal state*, in the second, on the *variations and changes of milk*, and, in the third, of the *accidents that befall milk*.

MILK IN ITS NORMAL STATE.

Normal milk is milk as it comes out of the cow's udder, before it has undergone any changes by contact with the air. At this first phase of its existence, it is made up of the following elements, whose proof is due to a great number of analyses. I give three series of these elements; one comprising the *maximum* of solid matters, another the *medium*, and the third giving the *minimum*.

The analyses of Doyère give the following result:

	Max.	Med.	Min.
Water.....	82.67	87.60	91.01
Fat.....	5.40	3.20	1.90
Casein and albumen	5.80	4.20	2.99
Milk-sugar.....	5.25	4.30	3.90
Salts.....	0.88	0.70	0.65

Under the head of density, compared with water as 1,000, milk gives

the extreme figures of 1,026, to 1,036. To make it plainer, let us say that a vessel, which would hold 1,000 ounces of water, would hold, if the same bulk of milk were put into it, from 1,026 to 1,036 ounces of the latter, according to the richness of the sample.

As regards bulk, *water* is the base of milk, and it would seem to hold enough of this without the dealers adding an excess of the base, a thing they have the reputation of doing.

The fat is contained in milk in the form of globules. Certain chemists have asserted that these globules are enclosed in a sac or membrane, but nowadays, the conclusion seems to be that there is no such thing as this membrane. Such is the decision (*opinion formelle*) of Duclaux, professor in the faculty of science, and in the institut agronomique, of Paris, published in 1887.

Casein is present in milk in two forms : in suspension, and in solution.

Albumen is present in solution ; but here comes this same Mr. Duclaux, declaring that all the chemists who have written before him have mistaken casein in solution for albumen. And it must be allowed that the demonstration is plausible.

Lactine or milk-sugar, is the substance that gives milk that sweet taste we all know.

Follow, the salts contained in milk :

- Phosphate of lime ;
- “ “ magnesia ;
- “ “ iron ;
- “ “ soda ;
- Chloride of sodium ;
- Carbonate of do.

Of the six salts mentioned, phosphate of lime and chloride of sodium, are the two dominant ones.

Now that we know the composition of milk, let us see what is its nutritive value.

Milk dried at 230° F. contains, according to Boussingault :

Carbon.....	54.9
Hydrogen.....	8.6
Oxygen.....	27.9
Nitrogen	4.0
Salts.....	4.9

It compares with

- Boneless meat.....
- Eggs.....
- Milk.....

Milk is called a pe
nitrogen it forms the ti
assisted in that office by
of the system, while th
alkaline salts of the bl

Another calculatio
comparative value of n

For 100 parts of pu		
300 “ “		
450 “ “		

ON THE

If the normal milk i
is nevertheless very cha
this average, and makes
The causes of these vari
sity of breeds, the age o
their lodgings, their foo
time of calving, the age
in which milk is kept :

The difference of ra
tity of milk given by ea
Herefords, Devons, Ang
There are, however, race
good milch-cows as well
come the dairy-cows, the
ans, Dutch, &c. These g
each other both as to the
a general rule, the Dutcl
more milk than the Jerse
solids. The Ayrshires mil
Holsteins. The Jersey a
but very rich in butter.
known to take 35lbs. of r
while only 13lbs. of Jerse
variation is great.

It compares with meat and eggs thus : 100 parts contain of

	Albuminoids,	Fat.
Boneless meat	19.5	2.0
Eggs	12.3	1.0
Milk	4.3	3.2

Milk is called a perfect food, and it well deserves the title, for by its nitrogen it forms the tissues or muscles, its sugar aids heat and respiration, assisted in that office by the fat, which in addition composes the fatty matters of the system, while the salts serve partly to form the bones and furnish the alkaline salts of the blood, the urine, and the sweat.

Another calculation, made from the food point of view, proves that the comparative value of milk in its different states is as follows :

For 100 parts of pure milk, an equivalent is
 300 " " " of skimmed,
 450 " " " of butter-milk.

ON THE VARIATIONS AND CHANGES OF MILK.

If the normal milk is on the average such as I have described, its nature is nevertheless very changeable, and this mutability often lowers or raises this average, and makes it change its quality according to circumstances. The causes of these variations are numerous ; the most common are : diversity of breeds, the age of the animals, their habits, the health of the cows, their lodgings, their food, their character as milkers, the effect of milking, time of calving, the age of the milk, ferments or microbes in milk, the place in which milk is kept : we shall proceed now to study each of these points.

The difference of race is one cause of the great difference in the quantity of milk given by each of them. The butchers' breeds, such as the Herefords, Devons, Angus, Sussex, &c., generally give but little milk. There are, however, races which however well suited for beef, still furnish good milch-cows as well ; the Durham or Shorthorn is one of them. Then come the dairy-cows, the Ayrshires, Jerseys, Guernseys, Holsteins, Canadians, Dutch, &c. These give great quantities of milk, but they differ from each other both as to the quantity and quality of their produce. Thus, as a general rule, the Dutch and Holstein cows give more, even very much more milk than the Jerseys and Canadians, but their milk is less rich in solids. The Ayrshires milk is rich in casein ; so is the milk of the Dutch and Holsteins. The Jersey and Canadian cows yield milk in smaller quantities, but very rich in butter. And these differences are very great. It has been known to take 35lbs. of milk from a Holstein to make a pound of butter, while only 13lbs. of Jersey milk has made the same weight. So you see the variation is great.

The age of the cow has a good deal to do with the quantity and quality of the milk. No cow comes to her best as a milker, to whatever race she may belong, before her third calf. The milk-secreting organs are not fully developed before that time, and the milk produced is not so rich. When the cow attains her tenth year, both quality and quantity of milk begin to fall off.

Every change in the habits, or in the mode of keeping cows, produces a variation in and even a deterioration of their milk. Thus, a cow sold by the owner as a good milker has been known to suffer a great loss of solids in her milk after changing hands. Her milk, taken from her on her arrival at her new home, when she was weary from her journey, and when she had been worried and bullied by her new companions, and another sample taken after she have rested a few day, were both analyzed :

The former gave :

Solids per cent.....	11.28
Of which, butter-fat....	2.16

The second gave :

Solids per cent.....	15.08
Of which, butter-fat....	5.54

Every cow that is ill-treated, frightened, disturbed in its habits of life, though it may not show such a notable variation as the above, still suffers considerably in the quality of its milk.

It has been stated that cows, which are obliged to travel about a good deal in grazing, give a milk richer in cheese, but poorer in butter than those cows that are *soiled* in the cowhouse.

The health of the animals is the thing that has most effect on the secretion and the quality of milk. A little further on, I shall have occasion to mention instances of complaints, of wounds that deteriorate milk in such a way that either eye or palate can detect the fault. At present, I will only speak of those cases in which milk, though still well-flavored, is infested by germs, *bacteria* or *microbes*, invisible but certain vehicles of diseases, often mortal, to those who drink it. It is now admitted by physicians that the milk of cows affected by *tuberculosis* conveys that disease to certain persons who drink it, and whose constitution is such as to be fit for the propagation of the germs of this terrible complaint. Diphtheria, scarlatina, typhoid fever are also said to be transferable to man through infected milk. One observation : every time a cow that gives a large quantity of milk falls off in spite of good feeding, you may be quite sure that she is attacked by tuberculosis or, in other words, consumption.

As a general rule, if a cow is unwell, her milk immediately becomes deteriorated. The same thing occurs when she is seeking the bull.

The lodgings (milch) undergone by milk. Diseases that are common germs may exist in a cow communicated to the milk by decomposing materials water, are so many sources thus make it the means cholera infantum, &c ,

In the Western States, which is caused by *brucella*, very serious and as it is difficult to believe that the cows in which they live, from

We know, too, that in well-ventilated, where the well-developed flavor and performance of milking.

The food of milch-cows influence on the condition of everything that has a strong odour to the milk. Of the substances that give a tart, turnips, rotten oil-cake, mildewed, sea-weed, too tender succulent grass or *dreg* of the distillery previously irrigated with drainage water became putrid in twelve hours of poor quality, as do we have plentiful but coarse past

As I said just now, they are given too profusely retted hydrogen.—Pump effect of the latter, as a disinfectant impoverish it.

Rich, dry fodder diminishes the milk.

As we shall see, some plants which exert an action on the milk, sop, hemlock, wormwood

The lodgings (milieu) of the animals have great effect on the changes undergone by milk. I spoke in the last paragraph of the germs of certain diseases that are communicated to man through milk. Now, some of these germs may exist in a cow's milk without her being ill. They are communicated to the milk by external causes, which do not affect the cow. Thus, decomposing materials, mixens too near the cow-house, putrid puddles of water, are so many sources of infecting germs which attack the milk, and thus make it the means of propagating many complaints, such as diarrhæa, cholera infantum, &c , &c.

In the Western States, there is a special complaint called the *milk-disease*, which is caused by *bacteria* which the milk contains. This disease is often very serious and as it does not always rage in the same places, one is free to believe that the cows, or the milk, receive these germs from the medium in which they live, from the plants, from the soil, or from the air.

We know, too, that cows kept in stables too low for them, too hot, unventilated, where the manure is seldom carted away, yield milk with a well-developed flavor of manure, however cleanly may be the actual performance of milking.

The food of milch-cows is probably the thing that has the greatest influence on the condition and composition of their milk: we know that everything that has a strong and characteristic odour, good or bad, communicates that odour to the milk, as soon as the cow has eaten it. In the class of the substances that give a bad flavor to the milk are onions, garlic, mustard, turnips, rotten oilcake; grains (*brewers'*) that have heated or become mildewed, sea-weed, too many potatoes as food. On the other hand, the tender succulent grass of spring gives an exquisite aroma to the milk. The *dreg* of the distillery produces thin and watery milk. The grass of a farm irrigated with drainage from a town has been known to produce milk that became putrid in twelve hours. Green-meet, tares, &c. give plenty of milk of poor quality, as do wet food, slops, &c. Poor pastures give poor milk; plentiful but coarse pastures yield inferior milk.

As I said just now, potatoes, which increase the secretion of milk, if they are given too profusely, make the milk taste like rotten eggs—sulphuretted hydrogen.—Pumpkins, if too much of their seed be given, act, by the effect of the latter, as a diuretic, and, while increasing the quantity of milk, impoverish it.

Rich, dry fodder diminishes the quantity but augments the richness of the milk.

As we shall see, some other substances colour the milk. Here is a list of plants which exert an action of some sort or other on milk: sponge-wort, hys-sop, hemlock, wormwood, sow-thistle, chicory, mare's-tail, butter-wort,

sainfoin, bugloss, cleavers, marigold, pea-pods, St. John's-wort, and sedge. These have not always an inevitable effect, but, under certain special circumstances, they cause a deterioration of the milk which they alone are capable of effecting.

Other plants, such as the nettle, which yellows the butter, spurrey, which makes the milk rich in butter, cow-cheat (*mélampyre*) which gives it a good flavour, have only a good effect on milk. In the article on the accidents that occur to milk we shall see what are the effects caused by each of the other plants above named.

Lastly, certain-plants or substances diminish the secretion of milk without deterioration of quality: tares (*the seed of,*) mare's-tail, sedge, oak leaves, knot-grass.

The fitness (aptitude) of each cow for her proper business as a milk producer exercises an unconquerable power over the milk-secretion of that cow. Every one knows that there are good and bad milkers. Let us take one of each sort and put them both on the same keep. However good the keep may be, the good milker will always give more milk than the bad one. However bad the keep may be, the cows will both fall off in their yield, but the good one will still give more than the bad one. It is therefore a wrong idea to believe that good food will convert a bad milker into a good one. The former will get fat, that is all. And this is true not only of the good and bad races of milch-cows, but also of the good and bad cows of the same race. The conclusion to be drawn from these data is: send every naturally bad milker to the butcher.

Milking, as regards the manner in which it is done, the time at which it is practised, and its frequency, has much to do with the secretion of the milk. As to the manner, it should be done gently, regularly, with cleanliness. A cow, milked roughly, keeps back her milk: milked irregularly, she soon dries up; milked without cleanliness being attended to, she gives dirty, impure, ill-tasted milk. As to time, milking ought to be done at regular hours, morning and evening, and it is stated that a third or noon-milking, particularly in the case of a young cow, is likely to increase the flow of milk, and, if we are to trust certain experimentalists, its richness as well.

I will mention one fact, before leaving this subject, a fact too well known to certain patrons of creameries, who retain for their own use the strippings (*égouts*) of their cows; this is the fact: the last-drawn milk is the richest in butter. The truth of this is undeniable. Differences as great as the following have been noted:

First drawn milk.	Last drawn milk.
Solids, 9.62; of which butter, 1.2.	Solids, 19.07; of which butter, 11.02.
	(Reiset.)

The time since the average of many months, the first for then presumed proportions:

10 quarts a da	
8	"
6	"
4	"
3	"

As we get further quantity, but become

At 2 months fr	
At 4	"
At 8	"

If the milking pe milk is often found to

It has been found always inferior to the lately served, and the of the cow's food for

Lastly, the calvi milk, in the sense that her third calf.

The age of the m the udder, brings about it leaves the cow, the rises to the surface, the the casein coagulates: coagulation more rapid quickens the coagulation its aid. In fact, milk, which are named aërob development, and other the air; the whole growth which are aërobes and it is exposed to the ordinary rennet, but, upon themselves also in

The time since calving has an influence on milk. A cow, according to the average of many experiments, that gives 1920 quarts of milk in 9½ months, the first fortnight after calving being omitted, on account of the then presumed presence of *colostrum*, would secrete milk in the following proportions :

10	quarts a day	for the 1st and 2nd month.
8	“	“ 3rd, 4th and 5th month,
6	“	“ 6th and 7th month.
4	“	“ 8th month.
3	“	“ 9th month and 10 days.

As we get further from the time of calving, the milk diminishes in quantity, but becomes richer. According to Heuzé :

At 2 months	from calving	milk gives	1 oz. of butter	from 2 lbs;
At 4	“	“	1¼ oz.	“
At 8	“	“	1½ oz.	“

If the milking period be prolonged nearly up the time of calving, the milk is often found to be bitter or salt.

It has been found that butter from a cow 6 months gone with calf is always inferior to that from a cow that is barren or that has only been lately served, and these facts are explained by the fetus requiring a part of the cow's food for its own support.

Lastly, the calving has this additional influence on the secretion of milk, in the sense that no cow comes to her best as a milker until she drops her third calf.

The age of the milk, that is, the time elapsed since it was drawn from the udder, brings about important changes in its condition. The moment it leaves the cow, the milk, acted upon by the air, begins to work. The fat rises to the surface, the sugar ferments in the milk and makes it acid, and the casein coagulates and forms itself into a mass in the whey. To gain this coagulation more rapidly when cheese is made, rennet is used, but this only quickens the coagulation which would be sooner or later produced without its aid. In fact, milk, according to M. Duclaux, contains microbes, some of which are named aërobes, because they need the action of the air for their development, and other, anaërobes, because they can do without the aid of the air ; the whole group bearing the generic appellation of Tyrotrix, 7 of which are aërobes and 3 anaërobes. These microbes attack milk immediately it is exposed to the air, developing a sort of ferment differing from the ordinary rennet, but, like it, producing coagulation. These microbes develop themselves also in broth or in a solution of gelatine. Other chemists

call the agent that causes acetification by its action on milk-sugar, *bacterium lactis*. (1)

The transformations which milk undergoes, to whatever agent or microbe they are due, are: 1, the rising or separation of the fat in the form of cream; 2, acidulation; and 3, coagulation. It is these phenomena which are taken advantage of in the making of butter and cheese.

The situation (milieu) in which milk is placed is the cause of many of the transformations it undergoes. Manure, rags, putrescent water, convey a bad taste and smell to milk, even after it is drawn from the udder. This explains why milk, in winter, which here is always kept in close rooms where plenty of bad smells are present, for want of ventilation, produces butter of inferior quality.

Badly washed vessels, foul utensils, the dirty clothes worn by the dairy-people, shoes soaked in stinking oil, tobacco-smoke, all these are sources of infection for milk within their reach and for the butter made from it.

MISCHANCES THAT MAY HAPPEN TO MILK.

Now that we have investigated the diverse causes of the variation and deterioration of milk, we will consider what are the mischances to which it is subject, that is, under what forms its deteriorations manifest themselves. In the practical pursuit of the dairy-industry, we meet with poisoned milk, poor, watery milk, bitter and salt milk, milk tasting of rotten eggs, milk that sours or coagulates as it leaves the udder, purgative milk, vicious milk, milk that will not coagulate, milk the butter of which will not "come", milk that curdles in heating, blue, red, yellow, and green milk. Let us attend for a moment to each of these accidents:

Poisoned milk is that which contains the germs of tuberculosis, or apoplegic fever. Milk kept in zinc or copper vessels may become poisoned, if it is in contact with them. The milk of cows that have eaten hemlock or hyssop at pasture has been found to become poisonous.

Dr. Vaughan, professor Vaughan, of the University of Michigan, asserts that he has discovered in cream, in ice-cream and in milk, an eminently poisonous principle which he has named *tyrotoxin*, which seems to claim some alliance with M. Duclaux's *Tyrothrix*, (2). The development of this poison must be caused by want of attention to cleanliness. Milk of containing the germs of disease should be boiled; if it cannot be thrown away!

All milk suspected of containing the germs of disease should be boiled; if it cannot be thrown away!

(1) *Tyrothrix* = cheese-hair. Bac. Trans.
 like an infinitesimally small stick.
 (2) *Tyrotoxin* = cheese-poison. Trans.

Poor, watery milk is due to the long-weaned Heifers and cows of this kind. Cows which often give poor milk.

Bitter milk is produced when cows drink putrid water, or a long time, or are fed with worm-wood, St. John's milk to be bitter.

Salt milk comes from the stress of calving of the

Milk with the taste entirely on potatoes. The characteristic odour of which is that of a boiled egg, supposed to produce a child

Milk that turns sour almost invariably points to the presence of fever in a sunstroke, the appearance of the eating of bitter-wood. If it shows itself as soon as the vessels being made of iron, kept clean and perhaps

Purgative milk, is produced by the clostrum. That is as much as to say. Spurge-wort and

Viscous milk, has a (tisane), appears to be produced in the cow-dung chiefly in the air, but is, generally speaking, develops itself freely, and is quite distinct, according to the ordinary forms of milk that drink nothing but

Viscous milk is so named from it is usually little produced in the case of cows

(1) *Galactorrhœa* = milk-gleet

Poor, watery milk, of a bluish white containing but little cream ; this is due to the long-weakened constitution of the cow, or to too dilute a ration. Heifers and cows suffering from indigestion too often give milk of this kind. Cows which drip milk, or in other words, suffer from *galactorrhœa* often give poor milk like this. (1)

Bitter milk is produced by badly kept cows, which eat spoiled fodder, drink putrid water, are ready to calve, have eaten nothing but oat straw for a long time, or are suffering from bilious fever. The leaves of trees in autumn worm-wood, St. John's wort, and chicory, eaten by cows, will cause their milk to be bitter.

Salt milk comes from two different causes. It may be from the nearness to calving of the cow, or from her eating sea-weed.

Milk with the taste or smell of rotten eggs is yielded by cows fed entirely on potatoes. These tubers develop sulphuretted hydrogen, the characteristic odour of which is well known to all who have broken the shell of a boiled egg, supposed to be fresh, but which instead of being so is far on the road to produce a chicken.

Milk that turns sour or coagulates as soon as it leaves the udder almost invariably points to inflammation of that organ, to indigestion or the presence of fever in the cow that has given the milk. Being raced about, a sunstroke, the approach of a thunder-storm, milking too long deferred, the eating of bitter-wort at pasture ; all these are causes of this accident. If it shows itself as soon as the milk is in the pans, it may be due to these vessels being made of wood, or to the vessels in general not having been kept clean and perhaps having sour milk in them.

Purgative milk, if closely examined, will frequently show traces of colostrum. That is as much as to say, you have begun to use it before it was fit. Spurge-wort and hyssop, eaten by cows, are said to impart this effect to milk.

Viscous milk, having about the same consistency as linseed-drink (*tisane*), appears to be the product of a *fungus* called *Oidium lactis*, which inhabits cow-dung chiefly. It is always present in milk that is exposed to the air, but is, generally, innoxious. When the air is damp and warm, it develops itself freely, particularly if there is much cow-dung about. It is quite distinct, according to Rees, from the *penicillium*, the *mucor*, which are ordinary forms of mildew. The diarrhœa in calves, and in infants that drink nothing but milk, is ascribed to this fungus.

Viscous milk is sometimes caused, too, by indigestion. Butter made from it is usually little abundant, oily and of bad flavour. It is often found in the case of cows bulling and not served for some time, and, lastly, it is

(1) *Galactorrhœa* = milk-gleet. Trans.

attributed to too rich food during hot weather, to the presence among the grass of St. John's-wort, lobelia, spurge-wort, and tansey.

Milk that will not curdle is pretty seldom met with. Still it is a mischance that has happened, and it is said to be due to the cows eating lots of green pea-shells or mint.

Milk the butter of which will not "come" without great trouble is common especially in autumn and winter. There is nothing determined as to the cause of this mischance. Some attribute it to a disease of the udder, to the absence of acids in the milk, to the giving of salt in the food. The milk of cows that have not had a calf in the season, or of those which are on the point of calving, are subject to it. Others say it is due to letting the milk stand too long before skimming, churning below 60° F., letting the cows drink foul water, or racing them about. Generally a little vinegar or sour cream is added to the bulk of the cream to entice (*provoquer*) the butter to come. Others advise freezing the cream and afterwards raising it to 60° F. before churning.

Grumous or clotty (1) *milk* is, it appears, a certain sign of the malady called the *cocotte*, or aphthous fever, among the cows that yield it.

Milk coagulating when boiled may indicate four distinct things. It may be old milk, or colostrum used too soon after calving; what is called *urouille* in France, and *vriou* here, (*vriou* no doubt is a corruption of *urouille*.), or it may be milk given by cows suffering from aphthous fever, or, lastly, milk from a cow attacked by *mammitis* or disease of the udder.

Blue milk, which must not be confounded with the poor watery milk spoken of above, presents a singular appearance. When drawn, it seems all right, but, after from 24 to 48 hours, it is covered with blue spots, which increase in size until they cover the entire surface. Fuchs attributes this to the presence of a vibrio, *vibris cyanogenus*, and others to a mildew. It appears more frequently in great heats with a damp air, and in thundery weather. Its occurrence is also laid to the charge of the grass eaten by the cows, containing mare's-tail, bugloss, sainfoin, knot-grass, which herbs do not always produce blue-milk, only when the cows have a predisposition of special direction.

Its appearance is prevented, or it is arrested if in progress, by giving the cow salt; with some acid, as vinegar, butter-milk, &c., added to the milk. The dairy should, it is said, be fumigated with sulphur.

Red milk appears in two forms, sometimes it is blood-red, at other times the red is of a different shade. If the former, the red deposit will be

(1) *Clotty milk* must not be confounded with the *clotted cream* of Devon and Cornwall; "which is an excellent thing." Trans.

found on the bottle. Bloody milk comes from blows from boys. The other such as the anemone buds of the pine, the of the cows and a to cause this bad effect

Yellow-milk is *vibrio xanthogenus*, say it comes from a *cheat-cow*, or *souci* with it.

Green-milk, which is a vibriation of a vibriation, produce such a beast!

My task is ended that I am only a common English, and American all. Many years have science, for the benefit. Not being able to be chosen, I devote myself which we owe to thei

LECTURE B

In this country, before we can succeed milk and this cheese

Cheese, a solid making cheese, only thing is taken away, by this addition of the

But before attack that the production of quality of the cheese so far as to say that tl

found on the bottom of the pan ; if the latter, on the surface of the milk. Bloody milk comes from an inflamed udder, from milking done harshly, from blows from branches, from the cows having been raced about by dogs or boys. The other form of red-milk is due to cows eating certain plants such as the anemone, the ranunculus, the spurge-wort, together with the buds of the pine, the elm or the poplar, and cleavers. Too good condition of the cows and a too copious exhibition of cotton-seed-cake are said to cause this bad effect.

Yellow-milk is said by Fuchs to be due to the presence of the *vibrio xanthogenus*, which colours the milk like the yolk of an egg. Others say it comes from apthous fever, congestion of the udder. The presence of *cheat-cow*, or *souci des marais*, in the pasture may have something to do with it.

Green-milk, which is rarely met with, must of course be the production of a vibron, probably of the *vibrio chlorogenus*, if there happens to be such a beast !

My task is ended, gentlemen, but before leaving I should like to say that I am only a compiler, an humble fellow-worker with the French, English, and American chemists, whose names are, no doubt, known to you all. Many years have they been working to elucidate the obscurer paths of science, for the benefit of their contemporaries and of future generations. Not being able to emulate their progress in the noble path they have chosen, I devote myself to the humble office of spreading abroad that light which we owe to their labors.

CHEESE-MAKING.

LECTURE BY D. M. McPHERSON, OF LANCASTER, ONT.,

In this country, cheese is made principally from the milk of the cow ; before we can succeed in making good cheese, we must know of what this milk and this cheese are composed, and what are their qualities,

Cheese, a solid substance, is extracted from milk, a liquid substance. In making cheese, only one thing is added to the milk, rennet, and only one thing is taken away, whey. The quality of the cheese is chiefly determined by this addition of the rennet, and by this removing of the whey.

But before attacking the question of cheese-making, allow me to say that the production of the milk has more influence on the quantity and quality of the cheese than farmers and makers generally believe. I will go so far as to say that the *making* of the cheese is only one end of the cheese-

industry. In order to make sure of all the conditions of success, we must not stop at the management of the milk in the vat, but go back as far as to the very food the milch-cow receives.

First, our cows must be well looked after, must receive appropriate food, if they are to produce good milk and plenty of it. Then, this milk must be suitably treated, if the cheese produced from it is to be uniformly plentiful in quantity and good in quality; for it is on these two conditions, quantity and quality, that success in farming depends.

To get plenty of milk from your herd you must, in the first place, feed the soil or the plants. The produce thus extracted from the land may be used either directly, by selling grain and hay, or indirectly, by turning the grain, hay, and straw into food for animals, to make them yield either meat or milk, or those articles manufactured from the milk. The first principle then is to feed the plant so as to arrive at feeding the animal.

The second principle is to feed the animal so as to arrive at feeding the plant. This is the grand point that should be studied by all farmers. All of you are feeding your cattle this winter for the purpose of being able to feed your plants next summer. If you waste your manure, if you allow it to run down the ditches, sink into the wells, generating malaria, the doctor and the undertaker will be the only ones who will benefit. For this manure, which, neglected, develops fevers and often causes death, becomes, if taken care of, the food of the plant, and, in its turn, the plant becomes the food of man and of beast.

Now, in order that farming may be profitable, we must make the consumption of a cheap food produce a thing that will sell for a high price. Wheat, barley, oats, are costly food; on the contrary, bran, clover-hay, linseed, cotton-seed, are cheap foods. It pays, therefore, to sell grain and buy these cheap foods. Manufactures only answer on the condition of buying raw-materials cheap, which we subsequently convert into articles of high value. Well, farmers are manufacturers; they must buy cheap and sell dear. I know some of them who sell hay in the fall for 8 and 9 dollars a ton, and, in spring, buy again for 11 and 12 dollars to feed their cattle on it. I know some of them who sell their grain in autumn, and, in spring, pay 50 *o*/₁₀ more for seed-grain. That is selling cheap and buying dear.

The food of animals gives two profits: profit direct, the production of milk or meat; indirect profit, the production of manure, plant-food. We must know then how to feed the animal for the plant, and the plant for the animal. Learned men tell us that plants of a vigorous, robust habit contain more nourishment than plants of feeble growth. So, an animal full of life and strength is more profitable to feed than a delicate one.

All that a beast yields comes from the food he receives; and all that

a plant contains comes from the nature. Consequently, for the animal's sake, a good result: the product.

Part of the food must be kept up, at least, to lose weight. The system.

The production of the food. The grasses. Farmers in general cannot sow too much heat of beasts; it is heat.

Bran is another process or *brown-br* entering into the formation.

Cotton-seed is a source of albuminoids, and is of large value, &c.

Linseed-meal is good for milk-making.

Now, the quality of the quantity and quality of the muddier water; water would learn this truth towards the manufacturer should induce us to the preservation of the sale.

When the milk has been under two conditions must be being must be conducted washed in boiling water better to strain twice than thrice. A strainer.

The aëration of the from it. This acid thus rennet in causing the butter-fat. Without a

This aëration can

a plant contains comes from what the soil has received from you or from nature. Consequently, we must learn how to feed both soil and plant, for the animal's sake, and to feed the animal so as to have a right to expect good results : the production of milk and meat.

Part of the food the beast eats is converted into heat. The animal heat must be kept up, at any cost, in every part of the body, else the beast will lose weight. The system must be maintained at 98° F.

The production of milk is in a great measure determined by the quality of the food. The best food, in my opinion, is clover-hay and mixed grasses. Farmers in general do not appreciate clover. Clover is good ; you cannot sow too much of it. It has all the elements necessary for the support of beasts ; it is at the same time a meat-former and a purveyor of heat.

Bran is another good food : I prefer the modern *roller-bran* to the old process or *brown-bran*. Bran contains phosphates, and other elements entering into the formation of the bones and muscles.

Cotton-seed is a good food for milk-making. It contains an excess of albuminoids, and is one of the best things to mix with straw, hay, ensilage, &c.

Linseed-meal is good, too, but better suited to feed calves than for milk-making.

Now, the quality of the water drunk by the cow influences greatly the quantity and quality of the milk she gives. No beast ought to drink dirty, muddy water ; water that the farmer himself would not drink. If farmers would learn this truth, and act accordingly, it would be a great step towards the manufacture of a better article than we make to-day. Two motives should induce us to give our cattle nothing but pure water to drink : the preservation of their health, and the production of a good article for sale.

When the milk has once been produced, if good cheese is our object, two conditions must be realized before its delivery at the factory : the milking must be conducted with the greatest cleanliness, in proper vessels, well washed in boiling water, and the milk must be strained and aerated. It is better to strain twice than once, three times than twice, and four times than thrice. A strainer, made of several folds of calico, is the best.

The aëration of the milk acts upon the milk-sugar and forms an acid from it. This acid thus developed in the milk will act in concert with the rennet in causing the coagulation of the curd and helping it to retain the butter-fat. Without aëration, no man can make good cheese.

This aëration can be done with the dipper, or by passing the milk over

some metallic surface. In general, this question of aëration is not understood by farmers; they do not pay enough attention to it.

The cheeseman must, every day, look at the state of the milk he receives, attend to the temperature of the past night, and the temperature of the milk and of the morning, before he determines how he is to set to work. If the milk, from the low temperature of the past night, comes to the factory in too sweet a state, he has to keep it in the vat for some time, warming it up to 82°, 85°, and even to 88° F., and stirring it to acetify it by the heat. This will help the rennet to act powerfully on the curd, and will aid in retaining the cream in it, giving that fine flavor so highly prized by the trade.

The rennet ought to be used in sufficient quantity to bring the curd in 15 minutes in spring, and 20 minutes in summer. The curd ought to be ready to cut in from 40 to 45 minutes in spring, and from 55 minutes to 60 or even 70 minutes in summer.

The rennet should be dissolved in a pail of water for each vat of milk, properly mixed, poured into the milk, and well stirred for 5 minutes, gradually slackening the pace of the stirring.

After 7 or 8 minutes, perfect repose. The vat must be covered, to keep the temperature uniform.

When the curd is firm enough, which may be known by its breaking clean under the finger, it is to be cut in pieces, taking great care to slice the pieces of equal size

Then, the curd is to be stirred gently for 10 or 15 minutes. This is done to make a crust (*écorce*) form on the curd.

The heating is commenced 5 minutes after the stirring, if the milk was ripe; 10 or 15 minutes, if it was sweet.

The rennet was added at 84°; the heating should be carried up to 98°. If a softer cheese is wanted, in spring, the heat should not exceed 96° to 97°. But for a young hand, it is better always to go as high as 98°. This heat should be kept up all the time as much as possible; when acidity begins to show itself, with the hot iron-test, is the time to draw off the whey. The difficult point in cheese-making is to preserve all the slices of curd that remain in the vat at the same temperature. To allow any part to cool is to spoil the flavor and color of the cheese.

When the whey has been drawn off and the curd is dry, it is worked over with the hand, so as to break all the lumps that may be found in it. Thus working, a uniform curd is produced, equally firm in all its parts. This is the great secret of all.

Next, the curd is piled, heaped up in the vat, and allowed to remain in that state for 3 or 4 hours, to undergo the action of the rennet; it should be turned from time to time. After 3 or 4 hours the temperature of the curd

should have fallen from
may be retained in the
More cream is retained l
curd breaks, and there i

A full half-hour aft
2½ in summer, 3 and eve

Half an hour after,
upright in the press, and
than a quarter of an ho
the mould. This precau
clear.

A quarter or half an
sure. For two or three l
on why cheese, and the r
a pressure is applied at f

The cheese ought to
ing; this makes the chee
shape, by turning them i
form of your cheese will

Great care must be l
mould till it is put into b
outside view, have the ap

Now, let us look at t
These *eyes* are caused by
pressing, in the cheese-roo
rather longer between the
stead of 3 or 4 hours, 4 or
operations.

Open cheese (*fromag*
water, or by the exposure
or of pigsties. Sometimes

THE ABBÉ MONTMINY.
color cheese uniformly?

MR. MCPHERSON.—Th
is that sufficient care is not
through, and of *regular*, *es*

should have fallen from 96° to 90°. It is allowed to cool thus that the cream may be retained in the curd while the latter is being ground in the mill. More cream is retained by this treatment. Sent hot through the mill, the curd breaks, and there is more loss.

A full half-hour after grinding, the cheese is salted with 2 lbs. in spring, $2\frac{1}{2}$ in summer, 3 and even $3\frac{1}{2}$ in autumn.

Half an hour after, the cheese is put into the moulds, which are left upright in the press, and well covered; it ought not to be pressed for more than a quarter of an hour, or a little longer, after it has been put into the mould. This precaution prevents loss, and the whey will run off more clear.

A quarter or half an hour after, you may gradually increase the pressure. For two or three hours, the pressure should be moderate. One reason why cheese, and the moulds too, are sometimes burst, is that too heavy a pressure is applied at first.

The cheese ought to be turned in the evening, and again in the morning; this makes the cheese firmer and better. If some cheeses are out of shape, by turning them in the morning, that fault will be corrected, and the form of your cheese will be pleasant to the eye.

Great care must be bestowed on the cheese from the time it leaves the mould till it is put into boxes, so that the work of the maker may not, on an outside view, have the appearance of having been badly conducted.

Now, let us look at the question of cheese with *eyes* or holes in it. These *eyes* are caused by gases which are developed in the cheese, after pressing, in the cheese-room. They are obviated by letting the curd remain rather longer between the draining off of the whey and the grinding. Instead of 3 or 4 hours, 4 or 5 hours ought to intervene between these two operations.

Open cheese (*fromage ouvert*) is caused by the cows drinking bad water, or by the exposure of the milk in the neighborhood of the cowhouse or of pigsties. Sometimes it comes from the bad food given to the cows.

DISCUSSION.

THE ABBÉ MONTMINY.—Would Mr. McPherson kindly show us how to color cheese uniformly?

MR. MCPHERSON.—The reason why cheese often looks badly colored is that sufficient care is not taken to have *in the vat* curd equally solid all through, and of *regular, equal-sized pieces*. Hence, there are in the curd

pieces that are soft, from being too moist, and hard pieces, from being too dry. When the curd is cut of unequal sizes, this always happens; the larger pieces retain more water, more whey, than the smaller ones, and, in consequence, are softer; just so is it with the pieces that have been kept less hot than the rest. And what follows is this; the softer parts become acid, are dissolved, and ruin the color by some chemical action. If the curd be uniform, the color will be uniform. Hence, the importance of cutting the curd very equally, of always having the temperature well under command, and of maintaining it equal over the whole of the curd.

A VOICE.—What temperature ought to be kept in the cheese-room?

MR. MCPHERSON.—Seventy degrees. It is a mistake to think that a defect in the color of cheese is due to the coloring matter. This is usually well made; but the fault is generally in the maker, and not in the color. Every one knows that cheese become sour, becomes also white; this proves that the cause of the decolorization of cheese is—acidity. And apropos to this point, I must tell you that it is a very bad plan to keep curd from one day to the next; this ought never to be done. Far better to make it into small cheeses and keep them for the patrons.

M. PAUL CÔTÉ. Would Mr. McPherson repeat what he said about the temperature, the putting the rennet in to the milk, &c.?

MR. MCPHERSON.—As to the rennet the heat is the same at all seasons—84° F. The milk, in spring, ought to take ten or fifteen minutes after the rennet is added, and be fit to cut 40 or 45 minutes afterwards. In summer, with *sweet* milk, rennet should be added so that the milk may begin to curdle in 20 minutes, and be fit to cut in 60 or 70 minutes.

A VOICE.—Why should milk coagulate sooner in spring than in summer?

MR. MCPHERSON.—In spring, on account of the fresh, cool state of the air which then obtains, milk wants a great deal of rennet to hasten its ripening. If the quantity of rennet is not increased, the cheese would take too long to ripen.

HON. J. J. ROSS.—Must cheese necessarily be colored?

MR. MCPHERSON.—Some markets ask for colored, others for white cheese. Each must be guided by his own judgment; and the same for the best time to sell. If you think colored cheese will pay best, color it; if not, do not color it. Colored cheese is not in such request as formerly; white has the call over it. There are only a few markets, such as London, Liverpool and Glasgow, that seek for colored cheese. Bristol and Manchester take white.

M. CHAPUIS.—What do you think of the effect of ensilage on milk?

MR. MCPHERSON.— is not a complete ration itself a heat-producer. facts of ensilage.

A milch-cow requires heat-producers; or, if former and 12 to 14 lbs. contains only one part of

Wheat-bran contains cers. Therefore it must

Timothy-hay has al to twelve of heat.

Clover-hay in itself of heat; it is a perfectly

Cotton-seed is excess 1½ of heat. This seed, in complement of those food

Of bran 4 lbs., 5 lbs. appear to me to form a p time, it is the least costly lance one another, they a an excellent ration for the

Clover-hay and ensilage

M. DION.—Has ensilage

M. MCPHERSON.—Pe was at the Vermont Dairy met several butter-makers cents a pound for their b nished the Windsor Hotel and his cows are ensilage-given alone, but with grain

Many thanks, gentlemen to me. I am happy hope the few remarks I ha told you is founded on p fully; and you can all pu

M. TACHÉ.—Last year Mr. McPherson paid two g to Montmagny. M. l'abbé vantage of receiving a visit

Mr. MCPHERSON.—I hold ensilage, properly used, to be a good food. It is not a complete ration; it wants, as a complement, a flesh-former; being itself a heat-producer. Clover-hay and bran are foods fit to supply the defects of ensilage.

A milch-cow requires one part of flesh-forming food and five parts of heat-producers; or, if you like it better put in this way: $1\frac{1}{4}$ lbs. of flesh-formers and 12 to 14 lbs. of heat-producers. Corn produces only heat; it contains only one part of flesh-formers against 12 of heat.

Wheat-bran contains one lb. of flesh-formers to $4\frac{1}{2}$ lbs. of heat producers. Therefore it must be a good aid to ensilage.

Timothy-hay has about the same proportions as ensilage: one of flesh to twelve of heat.

Clover-hay in itself is much more perfect. It holds one of flesh to six of heat; it is a perfectly balanced ration in itself.

Cotton-seed is excessively rich in flesh-formers. It contains 1 of flesh to $1\frac{1}{2}$ of heat. This seed, in cake or in meal, should be used especially as a complement of those foods in which the heat-producers predominate.

Of bran 4 lbs., 5 lbs. of cotton-seed, and from 60 to 70 lbs. of ensilage appear to me to form a perfectly well-balanced ration; and, at the same time, it is the least costly food to be found. These different foods all balance one another, they are well assimilated by the animal, and they form an excellent ration for the production of milk.

Clover-hay and ensilage together make an excellent mixture.

M. DION.—Has ensilage any effect on the quality of the milk?

M. MCPHERSON.—Personally, I have no experience on this point, but I was at the Vermont Dairymen's meeting, at Burlington, last week, where I met several butter-makers who fed their cows on ensilage, and who got 75 cents a pound for their butter in Boston. Mr. Dawes, too, of Lachine, furnished the Windsor Hotel, at Montreal, with cream at a dollar a gallon, and his cows are ensilage-fed. But, as I said before, ensilage must not be given alone, but with grain, bran, or clover-hay.

Many thanks, gentlemen, for the attention with which you have listened to me. I am happy to have been amongst you here to day, and I hope the few remarks I have made will be of service to you. What I have told you is founded on practice; it is what I have done myself successfully; and you can all put it in practice without fear of the results.

M. TACHÉ.—Last year, at the invitation of the Dairymen's Association, Mr. McPherson paid two gratuitous visits: one to St. Hyacinthe; the other to Montmagny. M. l'abbé Gérin, whose district has not yet had the advantage of receiving a visit from Mr. McPherson, has begged me to ask him

to visit the North next spring. Mr. McPherson accepts M. Gérin's invitation with pleasure, and will go to Louiseville, to give a lesson to the cheesemen who will meet there on some day to be announced before hand.

The Association is indebted to Mr. McPherson, and thanks him for the kindness with which he has always granted it the services of his vast experience.

ADVICE ON VETERINARY MEDICINE.

BY DR COUTURE.

Mr. President and Gentlemen,

I have been requested to give advice on veterinary medicine. You will easily understand that the task is not an easy one, seeing how short a time I have at my disposal; still, I will try to employ the half-hour allowed me to the best of my ability.

THE USE OF THE BARKS AND LEAVES OF OUR TREES AS MEDICINES.

Those who are acquainted with the properties of the barks and leaves of our trees may make great use of them in the treatment of the diseases of their stock.

ASTRINGENT TREES.

Oak-bark is one of the most active astringent agents known to medical science; it is employed both externally and internally.

For internal use, the dose is from $\frac{1}{2}$ an ounce to an ounce, two or three times a day. It should be dried and pulverized, and treated by infusion or decoction in a quart of water. The same preparation may be used externally.

USES OF OAK-BARK.

Oak-bark is very useful in diarrhœa, dysenteries, &c., mixed with a little alcohol and about $\frac{1}{2}$ gallon of flour-paste. Very good in diarrhœa of calves, doses, in proportion to age, every 4 hours.

Oak bark is especially useful in cases of external complaints. Against swelling of the limbs, wounds, contusions, &c., a decoction of oak-bark is very useful.

The chesnut, the ash, beech, birch, alder, &c., act like the oak, only they are much less active, and, consequently, better suited to internal application.

The leaves of the v infusions are made, for

As regards interna the glands, obstinate sl in these cases an infusi

Useful, too, in the

Walnut leaves are young are weaned.

For external use ag

In France, a decoct animals against flies du

The leaves of the c same properties as, but walnut.

Spruce-bark, dried a for the treatment of wou two or three times a day

White-willow-bark is before the flowering of th most, than three or four; of the reach of damp and three times a day; exhib with beer, whisky, or gru

This bark is indicated of weakness from over-wo and in all cases where a bi

Ash.—The leaves of t senna. A half-pound of a drench for an ox: a little

Elder-flowers act as su to $\frac{1}{2}$ oz. of flowers forms th alcohol are given in cases o

WALNUT-LEAVES.

The leaves of the walnut are very astringent. Of them decoctions and infusions are made, for both interior and exterior application.

As regards internal complaints, against scrofulous diseases, swelling of the glands, obstinate skin-diseases, chronic nasal gleet in the horse or ox; in these cases an infusion of walnut leaves is given night and morning.

Useful, too, in the *rot*, in sheep, $\frac{1}{4}$ oz. dose, with a little common salt.

Walnut leaves are good to stop the flow of milk in dams when their young are weaned.

For external use against fleas and lice they are very useful.

In France, a decoction of walnut leaves is generally used to protect animals against flies during the summer.

The leaves of the oak, plantain, alder, ash, and poplar, contain the same properties as, but they are much less active than, the leaves of the walnut.

SPRUCE-BARK.

Spruce-bark, dried and used in a decoction, is an excellent preparation for the treatment of wounds; it heals them rapidly. The place is washed two or three times a day with the decoction, and a cure is quickly effected.

TONICS.

White-willow-bark is one of the best vegetable tonics. It is gathered before the flowering of the tree, from the healthiest branches, not more, at most, than three or four years old. Dried, it is kept in close vessels out of the reach of damp and dust. For a horse or ox, the dose is 3 oz., two or three times a day; exhibited sometimes in powder alone, but better mixed with beer, whisky, or gruel.

This bark is indicated in diarrhœa, dysentery, loss of appetite, in cases of weakness from over-work and bad food, and of worms, bad digestion, and in all cases where a bitter tonic is required.

PURGATIVES.

Ash.—The leaves of the ash dried and preserved with care act like senna. A half-pound of ash-leaves boiled in $\frac{1}{2}$ gallon of water forms a good drench for an ox: a little less for a horse.

SUDORIFICS.

Elder-flowers act as sudorifics: produce perspiration. A quart of water to $\frac{1}{2}$ oz. of flowers forms the infusion. Doses of 4 to 8 ounces with a little alcohol are given in cases of chills, and in skin-diseases, to soften that mem-

brane. Exteriorly, elder leaves are used against chapped teats in cows, or ewes, against different sorts of swellings, &c.

DIURETICS.

Pine-buds are diuretic: produce the secretion and expulsion of urine. The dose is one oz. reduced to powder and mixed with the food; or, better, in decoction in a quart of water.

They are indicated in cases of stoppage of the urine, dropsy, cold swellings of the limbs, of the belly, and of the sheath.

In addition to these products of our trees, the farmer has at his disposal well-known plants which are of service as medicine in certain complaints. For instance:

ANGELICA ROOT

Is a capital stimulant of the digestive organs. Two to four ounces in fused form a dose for a horse or an ox.

Good against indigestion, borborygmus of the intestines, gaseous swellings of the belly. As a tonic, in half-doses only.

Parsley-root acts in the same way, but less actively.

POPPY HEADS,

Freed from the seed and lightly boiled to extract their active principles, form a good soothing draught. Two heads in a quart of water, reduced by boiling to $\frac{2}{3}$, is a useful medicine against bronchial inflammation, diarrhoea, colic, &c. In the two latter cases, the remedy may be applied as an injection. As an exterior application, poppy-heads may be used against inflammation of the eyes, teats, &c., to soften the pain.

TOBACCO

Is preferentially employed in the shape of the leaves dried and powdered, or a decoction made of them. Only for exterior application.

Good against lice and mange in horses, cattle, and sheep.

Take a pound of tobacco-stems, boil them for half-an-hour in a little water, take out the tobacco, and add enough water to make up from 1 to 1 $\frac{1}{2}$ gallons of liquid.

To use for mange and lice on horses and the great ruminants: wash the beast all over with soap and water, and apply the decoction with a brush. Keep the animal from licking himself.

CARROTS.

Boiled and pulped are the best emollient poultice for horses' feet. They are indicated in boils (*clous de rue*), founder, sprains, corns.

Thus I have enumerated, in as few words as possible, the various substances within reach of all our farmers, which can be used as cattle-medicines.

J. A. COUTURE.

INS

TO THE HON. THE

SIR,

I have the honor and cheese-face

In the course of creameries, and 9

I ought to have I was laid up with in the number of f were the cause of s visited 38 new ones the increase is cons

Everywhere I in the making of cl not of the first qual called saleable qual One thing I remark is much more unifo which is a vast imp made, a great deal 1 ture, before everyth

I will mention t

The buildings a them is visible.

Out of 38 factori they are not proof should be panelled (to be—so as to have : would allow a much sequence, do away w tant to obviate in a c tain in this store-hou

INSPECTORS' REPORTS.

REPORT OF INSPECTOR PAINCHAUD.

TO THE HON. THE COMMISSIONER OF

Agriculture and Colonization,

Quebec.

SIR,

I have the honor to submit to you my report of inspection of the butter-and cheese-factories I visited last summer.

In the course of the season of manufacture, I visited 56 cheeseries, 14 creameries, and 9 combined factories.

I ought to have made more visits, but towards the end of the summer I was laid up with illness for nearly four weeks. The considerable increase, in the number of factories to be visited, and the rest I was obliged to take, were the cause of several of those in my district not being visited at all. I visited 38 new ones in the same district I had last year, which shows that the increase is considerable.

Everywhere I find a great improvement in the manufacture, but more in the making of cheese than in butter-making. The cheese of to-day is not of the first quality, is, with few exceptions, of fair quality—what may be called saleable quality. It is as good as our *best* cheese was four years ago. One thing I remarked, this year, that in general, in each factory, the cheese is much more uniform in character; all the makings are like one another, which is a vast improvement. Still, in spite of the progress that has been made, a great deal remains to be done in all that belongs to the manufacture, before everything is without reproach.

I will mention the more common faults I observed in my visits.

The buildings are still generally deficient. Very little improvement in them is visible.

Out of 38 factories erected this year, $\frac{2}{3}$ are badly built, in the sense that they are not proof against the changes of temperature. All cheeseries should be panelled (*lambrissées*) inside—at any rate the cheese-room ought to be—so as to have an isolating layer of air between the boardings, which would allow a much more uniform temperature to be kept up, and, in consequence, do away with those changes of temperature which it is so important to obviate in a cheese-room. The temperature we ought to try to maintain in this store-house is about 70° F., this being the most favorable to

the ripening of cheese. This room should always, if possible, be on the lowest floor, as it is far easier to preserve an equable temperature there than above.

Speaking of cheese-rooms, reminds me of a great fault I remarked last fall. Very few of these rooms can be warmed. Cheeses are kept a fortnight, three weeks, and even months, at a very low temperature—as low sometimes as 50° F. and lower. The consequence is that this cheese does not ferment, loses a good deal of its quality and sells low. It should be thoroughly understood that it is of importance that the fermentation of cheese be not arrested from the making to the marketing or consumption, especially during the first weeks of its existence. A temperature of 65° to 66° is the lowest permissible in autumn.

The reception of milk is badly managed by many makers; they are not particular enough about this; they take in too much sour, forward milk, and often receive dirty milk, full of impurities. Bad milk should invariably be refused, and the sinning patrons be made to feel that it is to do justice to all and to consult the interest of all that it is sent back.

In several factories, I have observed that some of the milk is sent in too late in the day. Its reception is sometimes more than three and a-half hours before it is finished, and that is a great deal too long: two hours ought to be the longest time between the first and last delivery. If, during the warm weather, milk is longer about than that, it will certainly be too stale, and probably become sour, which is opposed to good cheese-making. With too stale milk, the curd cannot be got firm before the drawing off of the whey, which compels us to 'stir dry' much longer than usual to harden the curd, and this lessens the yield, and turns out cheese not of the first quality.

Many makers follow too mechanically the rules laid down in the tables sent about by the Dairymen's Association. Thus, as an instance, the heating of the milk, before adding rennet, to hasten its work, may be done in summer as well as in the fall, when the condition of the milk demands it. The differences entered in the rules of the Association for different seasons depend upon the temperature; consequently, the rule for autumn may be applied in summer, just as the summer rule may be applied in the fall. There are certain places, the Eastern-Townships to wit, where the nights are usually cool, and where the milk arrives at the factory, in mid-summer, as sound as it does in autumn in other places. In most of these places, it would be better to work in summer as it is advised to work in autumn in other places.

One ordinary defect I will mention, that any one can correct easily, that is not having the steam ready soon enough to warm the milk for

adding the rennet until all the milk is getting stale and always be ready in all weather, or when it is a little early, so that it may be at the point of sale.

The tools are not so good as they ought to be.

The employment of men is a defect that needs to be remedied. The mode of working is everywhere, the same, the end of the operation is necessary to stir the curd almost impossible to do with the syphon at work; for the end of the work; for this remains too long, having been "stirred" in the vat, with a strainer.

In some factories, the tools used; the vat wanted is strong, and ought to be nailed down, spread, keep it steady, and be easy to remove.

In many factories, the taps do not close tight in the vat. I have frequently seen the vat. When any thing is manufactured almost everywhere.

I see very little difference in the quality of the cheese seems to be almost everywhere. This is because the butter-makers do not know in certain cases the best method of making that the best maker.

In building, it

adding the rennet. The fire is not lighted early enough—some wait to do this until all the milk has arrived—and this is often the cause of the milk getting stale and even sour. The steam necessary to warm the milk should always be ready when the milk has all arrived, and even before. In hot weather, or when milk ages quickly, it is a good plan to begin to warm a little early, so that when the last has arrived, the contents of the vat may be at the point of the desired temperature.

The tools and machinery of the factories are improved, but not yet perfect.

The employment of the syphon for drawing off the whey is one of the defects that need correction. This is not by any means suited to the present mode of working. In this, the Cheddar system, practised now almost everywhere, the whey must be drawn off quickly, particularly towards the end of the operation, when the curd is beginning to show itself and it is necessary to stir it to prevent it from sticking together (*se prendre*). It is almost impossible to do this in the time and in the manner intended with the syphon at work, because, in the first place, it takes a man to take care of the work; for, when there is only one, there is no one to stir the curd; this remains too long uncovered, it cools, and masses itself together without having been "stirred dry" (*brassé à sec*). A tap placed in the end of the vat, with a strainer fitted with a socket into the neck of the tap, is indispensable.

In some factories, there is either no covering for the vats, or very bad ones are used; too light, and they do not cover the whole vat. What is wanted is strong calico covers, cut so as to cover the whole vat. This cover ought to be nailed on bars 15 or 18 inches apart, so that it will, when once spread, keep itself *taut*, instead of dipping into the contents of the vat, and be easy to remove by rolling it up on one of the ends of that vessel.

In many factories, I have seen taps that were not steam-tight. When taps do not close tightly, they should be changed, especially the one in the vat. I have frequently seen curd burnt because the tap let in steam under the vat. When anything does not act well, it should be repaired at once, for the manufacture almost invariably suffers if it is neglected.

I see very little improvement in butter-making. The same routine seems to be almost always the rule; the same faults are to be found almost everywhere. This is generally due to the fact that the greater number of butter-makers do not understand their business. Still I must say that in certain cases the construction and fitting up of the factory are so defective, that the best makers could not turn out good butter there.

In building, it is the butter-rooms that are generally in fault. They are

not built to keep out the heat, whereas they should be built about as tightly as an ice-house. These rooms should be cool enough to keep butter firm at all times. The arrangement for the supply of water is one of the principal faulty pieces of work in factories. Much butter is spoilt from want of good cold water to cool the cream and to wash the butter with. Butter of the best quality cannot be made without plenty of good cold water. Where river-water is used, there should be plenty of ice to cool it, as it is always too warm in summer.

In some factories, a lever or piece of wood almost square, with sharp edges, is used to press the butter: some are made in the shape of a currier's knife. This is not at all the proper form of a butter-worker; they break the grain by the friction they cause. The best is an eight side (octagonal) roller, which presses without friction.

The principal faults in butter-making lie in the churning and in the pressing of the butter. The fault in churning is that the cream is generally put too warm into the churn, and the butter, in consequence, is too much lumped together when it comes. Most makers churn at a temperature exceeding 60° F.; which is much too high. At such a temperature, it is almost impossible to get the butter "to come in small grains." After the experience I have had, I conclude that 54° to 57° is the best churning heat, in summer, and 58° to 60° in winter. At these temperatures and with a little care the butter can be gathered in any way we wish. It is of greater importance than people seem to think that butter should be washed in the granular form if it is to be kept.

The pressing or malaxage (1) is done in various ways; but the greatest defects lie in unequal pressing, keeping the pressing up too long or not long enough, and in pressing the butter when it is too soft. To be well pressed, the butter should be firm enough to resist the passage of the roller a little. About 58° is the best temperature of the butter for pressing. When the butter is so soft that it hardly holds itself together, pressing does more harm than good. Pressing must be done equally, the butter must be shifted from place to place and turned, so that every part of it should feel the same amount of pressure. When the salt seems to be very equally incorporated with the butter, and the latter is sufficiently dried, the working ought to stop, and the butter should be packed.

Very often the butter is still packed badly. The tub is generally filled too high; hence, there is not space enough left between the upper layer of butter and the tub-cover for the layer of salt intended to protect the butter from the air. A space of three lines should be left between the butter and the top of the tub, which space must be filled with salt.

(1) From the Greek *malasso*, to supple, to make tender. Trans.

The combin
I find that this s
makers of this
much to be done
generally employ
the part of the m
and these maker
bined system.

Lastly, I beg
adopting any cha
is often with a de
not be surprised i
constantly being
not to be passed i
of all these impro
cal teachings we r

TO THE HONORABLE

Premier, and Co

SIR,

I have the hono
mit to you the repo

I have labored
to the 11th October
creameries.

Although my ci
season, I found with
great, I will even sa
ments in some plac
than in good qualitie
the advantages there
there is need of. Stil
ibly better made, and
we shall before long

The combined factories have increased again in number this year; but I find that this system is but little improved. In the first place, most of the makers of this style do not know their business; and, again, there is too much to be done at once in this sort of factory for the number of hands generally employed. This style of manufacture demands greater skill on the part of the maker than where full-cream-cheese or butter alone is made; and these makers, though very ignorant, still venture to work on the combined system.

Lastly, I beg to inform you that the makers are generally too slow in adopting any changes in the mode of working which may come up, and it is often with a degree of nervousness that they do adopt them. We must not be surprised if, every year, some novelty appears. Improvements are constantly being introduced, and if we wish to keep in the front rank and not to be passed in the race towards perfection, we must march alongside of all these improvements and ameliorations, following closely the practical teachings we receive from the Dairymen's Association.

Respectfully submitted,

J. L. PAINCHAUD.

REPORT OF INSPECTOR COTÉ.

St. Flavien, November 20th, 1888.

TO THE HONORABLE H. MERCIER,

Premier, and Commissioner of Agriculture and Colonization, Quebec.

SIR,

I have the honour, as inspector of cheese-and butter-factories, to submit to you the report of my operations for the past year.

I have labored in the interest of the dairy-industry from the 4th May to the 11th October, during which time I visited 97 cheese-factories and 8 creameries.

Although my circuit this year was less in extent than that of last season, I found within its limits 31 cheese-factories more. This shows a great, I will even say a too great, increase in the number of these establishments in some places, seeing that these factories shine more in numbers than in good qualities. It is evident that in certain spots people seem to abuse the advantages there are in starting these factories, by building more than there is need of. Still, I can say with pleasure, that our cheese is perceptibly better made, and if we continue to advance along the road of progress, we shall before long arrive at such perfection that our reputation in foreign

markets will be indisputable. To that end, we must not slacken our stride, but march still in front, adopting all possible means of persuading the farming class that not only is it to their advantage to produce plenty of milk, but also that this milk should be of the best quality. As it is very easy to make bad cheese out of good milk, this must be avoided by having appropriate buildings, furnished with good apparatus; and if, as a complement of this, makers possessing the knowledge and qualities required are employed, we shall soon arrive at the desired end.

The making of butter in the province of Quebec still leaves much to be desired, even in the majority of our creameries, which, while generally equipped as they should be, err in their construction, principally in the rooms intended for the keeping of the butter after it is made up. This, though well made, cannot remain good after being packed in the tub, if it be not placed in an airy room having a low temperature. This point is of grave importance and cannot be too much insisted upon. One thing that is also frequently wanting in creameries is such a quantity of ice as will allow of the best butter being made during the hot weather. It is true that a well-made ice-house costs something, but it is indispensable, unless the water is exceptionally cold, and, even then, I insist upon its being necessary. It is very well for people to say: Oh! such and such a factory has no ice, and yet their butter sells as high as any one's. This only proves one thing, well understood, that, as in many things in this world, it is not always the best workman who gets the best pay, for it is wonderful how little difference there is between the prices obtained for some butter and cheese, and for other makes very much their superior. So it is clear there is a chance in favor of him who does badly, to the detriment of him who does well; for there is no option but that either inferior goods fetch more than they are worth, or fine goods sell for less than their value. I do not aim this at the dairy-buyers, but I am stating a fact which I request those who are interested in the dairy-interest to ponder deeply.

In comparing my notes of this season with those of last year, I find that, taking a certain number of cows, much less milk was produced this season. The cold weather we had explains this, for the grass, especially in the meadows after haying, could not grow, as it ought to grow, abundantly. What happened this year may recur in some future year, and this shows how useful it would be to our farmers if they would grow crops of green-meats, not only as a supplement to the failing pastures in summer, but for ensilage, that our cows might yield milk in winter, and thus prolong the milk season, which now only lasts five months, instead of eight at least; for it is evident that we now only produce cheese and butter during those months in which their prices are at the lowest. One of the best means of doing this is frequently to instil into our farmers' minds, by practical lectures, the great

advantages that at the same time that which would be erecting butter already; since, the province of factories we have lectures are not in the interest in been called upon visits, as well as

What we want the dairy-industrial superior school, which we already studied, to learn how to enable us to cater we could study the manufacture of butter

MR. PRESIDENT A

Having been of the province of 1888, I had the pleasure of visiting Arthabaska, Richelieu, Yamassee, Napierville, and

My tour began in the factories I visited in the fall class. From May in one or other of the reception of the milk

After the end of the year passed away, the result was as I was of less use

advantages that are to be derived from the dairy-business, showing at the same time that in this, as in other things, a crazy ambition must be avoided, which would lead men to do as certain persons are sometimes doing, namely, erecting butter and cheese-factories where they are numerous enough already ; since, it is evident the quantity of butter and cheese produced in the province of Quebec is not at all large enough, considering the number of factories we have in existence. In spite of what is sometimes said, these lectures are not useless ; we possess more than ever proofs of their utility in the interesting discussions that have arisen from a few *causeries* we have been called upon to give in those places where we have been on inspectorial visits, as well as elsewhere.

What we want, too, if we would gain the topmost rung of the ladder of the dairy-industry is, I do not say, new schools, but, at least, one new superior school, where we could not only finish ourselves off in the art we have already studied, the manufacture of *Cheddar-cheese*, but also be enabled to learn how to make the other different sorts of foreign cheese. This would enable us to cater to the taste of all sorts of buyers. In such a school, too, we could study to the bottom a crowd of questions connected with the manufacture of butter, which questions are at present awaiting answers.

The whole humbly submitted,

SAUL COTE,

Inspector.

REPORT OF MR. J. A. McDONALD.

MR. PRESIDENT AND GENTLEMEN,

Having been engaged by the Directors of the Dairymen's Association of the province of Quebec as inspector of cheese-factories for the season of 1888, I had the pleasure of visiting 125 factories, in the 16 following counties : Arthabaska, Richmond, Wolfe, Drummond, Shefford, Bagot, St. Hyacinthe, Richelieu, Yamaska, Verchères, Brome, Rouville, Iberville, Champlain, Napierville, and Missisquoi.

My tour began on May 28th, and ended October 17th. In the 125 factories I visited I found 15,889 cheeses, of which 1,500 were of the second class. From May 28th to the end of August, I made cheese almost daily in one or other of the factories. On 75 days, I made cheese, from the reception of the milk to the putting of the curd to press.

After the end of August, I did very little. The great heats having passed away, the makers thought their difficulties were at an end ; thus, as I was of less use to them, I divided my time among the factories that

remained, for there were still many to visit and but little time to do it in. The fact is, the factories were closed this year, on account of the bad weather, much sooner than usual. Some ceased working as early as the second week in August, and this movement continued up to the end of September, when all the factories were closed except a few of the larger ones, which worked even into October. Of the 125 factories I inspected, 108 follow the *Cheddar-system*, three the old system, twelve made cheese for local consumption, and two made butter. As I am not a judge of butter, I can say nothing about it: I cannot even classify the quality. Still, I must say that I consider these factories to be of the first class, particularly the one managed by M. Chicoine, at St. Marc, which is fitted up for both butter and cheese-making, and is supplied with every modern improvement. I can say that very great progress has been made, this season, in the mode of making cheese. The buyers are unanimous on this point: the cheese, they say, is more uniform, and the quality is better.

The makers work nearly all on the same system; they follow Mr. McPherson, who has adopted the *Cheddar-system* as far as possible, and with excellent results. Although there have been great alterations for the better introduced, it is certain there is a great deal more to be done, and nothing but reiterated efforts will bring us to a successful issue. I found the makers in very good spirits, and desirous of improving their fittings in such a manner as may facilitate the manufacture of better cheese, after the system called "Cheddar."

The tap in the vat is the greatest improvement. It is used to draw off the whey, in place of the syphon. The use of the latter is highly inconvenient, when the *Cheddar-system* is followed. The syphon acts well when there is a supplementary vat, called the "curd-sink" or drainer, and when cheese for local consumption is made. It is impossible to make firm cheese of the best quality with the syphon, and it takes more men to do the work. No man can manage a full vat of milk alone and make a first class cheese, if he has to use the syphon. Nine times out of ten he will bungle his work; but I hope the time is at hand when the syphon will be a thing of the past, and I am sure that the maker, who has once used the tap, will never care to return to the old plan.

As I said before, a vast field is open to improvements.

The fitting up of the factories is not complete, and some are so badly provided that I asked myself: how can good cheese ever be sent out from such factories? In spite of these disadvantages, there is always some maker ready to undertake the duty, as long as the proprietor will guarantee the salary. But it is not surprising that, at the end of the season, the said proprietor has less money than when he started.

By such own invention time before of negligence broken or lost duction of per

On this necessary to t must be a goo milk. When for work; stea raised to 84°, Enough rennet When ready t to let the curd thrice: this m

As a rule, should be only are sufficient. turning on the which allows the curd from this, the curd stirring more or 98°, the stea cheese will be to ten minutes, an peated every ten to give it firme test the quantity sunk to the leve for this part of the curd, on the at once, and the Continue stirring teeth. It must covered up and turning it three the vat before gr in order to allow the proper ferme acidity will take

By such factories, the inspector is put in a false position. Each has its own inventions, which work more or less badly, and there is a great loss of time before one can be sure that all will go well. Then there is a great deal of negligence in the work; the maker does not trouble himself to replace broken or lost tools, and this causes delays, which are inimical to the production of perfect cheese.

On this subject, I will make a few remarks on the attention and skill necessary to the making of a first rate Cheddar-cheese. First, the maker must be a good judge of milk, and be able to decide between good and bad milk. When the last can of milk has come, everything ought to be ready for work; steam well up, and the rennet prepared. The milk should be raised to 84°, the rennet added and stirred in gently for three minutes. Enough rennet should be used to allow of cutting the curd in 40 or 45 minutes. When ready to cut, the maker must "make haste slowly," so as not to let the curd drive before the knife; it should be cut four times instead of thrice: this makes the slices more equal in size.

As a rule, the blades are too far apart. Instead of half-an-inch, there should be only three-eighths between them. With a $\frac{3}{8}$ inch knife, three cuts are sufficient. When the curd is cut, stir gently for ten minutes before turning on the steam, in order to cause a thin coat to form on the curd, which allows a sufficient quantity of the whey to rise, and thus hinders the curd from massing together after the heating has begun. If, in spite of this, the curd seems determined to mass together, it must be prevented by stirring more rapidly. When the heat of the curd has been raised to 96° or 98°, the steam must be turned off. Never exceed 98°; if you do your cheese will be too dry. When the desired heat has been obtained, stir for ten minutes, and then let the whole rest for a while. This must be repeated every ten minutes of the first hour during which the curd is in the whey, to give it firmness. As soon as the heating is finished, the maker should test the quantity of acidity developed: if there is any, the whey will have sunk to the level of the curd. To find out this, he must use his judgment, for this part of the working does not always behave in the same way. If the curd, on the hot iron, shows $\frac{1}{8}$ inch of acidity, the whey must be let off at once, and the stirring continued during the whole time of its running off. Continue stirring until the curd is firm and creaks (*crie bien*) under the teeth. It must then be piled at the side of the vat as thickly as possible, covered up and kept warm, for, say, half-an-hour, then cut in pieces, turning it three or four times during the three hours the cheese remains in the vat before grinding. The curd is left at rest three hours before grinding in order to allow an amount of acidity to form in it sufficient to cause the proper fermentation. If you draw off the whey when too sweet, the acidity will take longer to declare itself, and this slower action must be

compensated by a greater length of time. When you test the curd, make sure of the desired degree of acidity being present before you draw off the whey. I am sure that the majority of makers draw off the whey in too sweet a state; some, even before there is any appearance of acidity. If, by chance, the curd clings to the hot iron, then let off the whey at once, and the consequence is that there is no acidity in the curd, at the end of a week the cheese becomes shapeless, has a hideous appearance, and in the end you have an inferior cheese that will not keep. Buyers would prefer a slightly sour cheese to a bloated one of this sort, especially if it is full of holes: it would pass for one of the second quality. To see if the curd is ready for the mill, we must know if there is acidity sufficient in it, and this we do by taking a small piece and breaking it: if it tears freely from one end to the other, it is very acid; but if it breaks abruptly, and as if dry, the acidity is certainly absent. If your curd is salted in this state, the cheese is sure to swell

Great care must be taken to keep the curd warm. If it once cools there is no possibility of getting it to acetify, for it will not work. It must be kept as warm as possible by sending steam in under the cover from time to time. While the curd is in the vat, it must be kept at from 94° to 96° until it is ready to be cut at 90°. At 88° to 90° it is salted. If the curd is good, it ought to be stirred after cutting for ten minutes before salting; if full of eyes, stir till they disappear, then salt, and put to press, at 86° or 88°, 20 minutes afterwards. By following these rules, there will be no difficulty in working up the worst curd into the best cheese.

In cheese-making in spring, a little different process must be followed to that used in the heat of summer. If the season is cold, the milk must be warmed up to 90° or 94°, and allowed to cool. It must then lie three or four hours before the rennet is added to allow the milk to age. This is done when the milk is very sweet and works slowly; but here the judgment of the maker is required, for the whole depends upon the condition of the milk. The curd must never be allowed to remain more than three hours in the whey; if it is allowed to stay four or five hours in it, the whey that has coagulated, returns and impregnates it afresh, and thus the cheese becomes *whey-soaked* and is unsaleable.

More rennet must be used in spring and fall, to make the cheese ferment more rapidly. For sour or stale milk, such as we often receive, more rennet must be used, for it is the rennet that causes the curd to discharge the whey. This kind of milk must be warmed more rapidly but to two degrees lower than good milk; the whey must be run off down to the level of the curd and the latter must be stirred a good deal with the hands, in order to get the curd firm before acidity supervenes; for, if the acid form before the curd be firm, you run a chance of having sour cheese.

After pres-
time to time f
cheese. Hot wa
surface. The
cheese. Then,
25 or 30 minut
one greasing i
in too cool a s
cracking. For
mented. If it i
of mildew. Th
Two lots of che
being cleaned.
the factory, wh
neglect the int
factory and dir
tories, cheese c
flavor. I have
90° to 95°! Thi
fermenting-roo
be on the groun
the boiler and c

One reason
ies are better fit
ments to make i
more convenient
in almost every
which enters the
off, for about 3
is all in one piece
curd burning to t
one can remove a
to fear from the s
be applied: to al
the curd during t
dislike makers ha
Many of them see
better; as if stirr
much milk to ma
tity to quality.
latter will be soft
my visits as inspe

After pressing the curd gently at first, and continuing the pressure from time to time for two hours, the calico should be fastened to each end of the cheese. Hot water should be applied to each end to make a crust and a smooth surface. The cloth should be wrung out in hot water, and put on the cheese. Then, when the cheese is out of press, it should be greased, after 25 or 30 minutes, with hot grease. If calico is used, grease is not used; one greasing is enough; grease is generally used in too great quantity and in too cool a state; but, used as above, there is no danger of the cheese cracking. For a month, the cheese must be turned daily, until it has fermented. If it is left unturned for some time, it will be subject to the attacks of mildew. The shelves are to be washed down after every sale of cheese. Two lots of cheese should never succeed each other without the shelves being cleaned. Most cheese-makers are very particular about the outside of the factory, where everything is in perfect order; but there are many who neglect the interior. There is nothing more disgusting than a badly kept factory and dirty cheese: nothing more deters purchasers. In some factories, cheese cannot be kept more than three weeks without becoming *off-flavor*. I have met with makers who keep their cheese in a temperature of 90° to 95°! This ought not to be, for the highest proper temperature of the fermenting-room ought not to exceed 70° to 75°. The cheese-room should be on the ground floor, and not above, where it would receive all the heat of the boiler and of the sun.

One reason why Western cheese is better than ours is that their factories are better fitted up and better kept than ours. We have many improvements to make in this respect, and we ought to try and make our factories more convenient: it would be money well laid out. Two faults that exist in almost every factory I must not omit. The former respects the steam-pipe which enters the vat to warm the milk and the curd. This ought to be cut off, for about 3 feet, and an india-rubber tube attached to it. When this pipe is all in one piece, the steam will sometimes escape and you run the risk of the curd burning to the bottom of the vat; while, with an india-rubber tube, which one can remove at pleasure, that is, when the heating is over, there is nothing to fear from the steam. There is, too, another purpose to which this tube may be applied: to allow heat to circulate under the cover of the vat, to warm the curd during the three hours it remains there. The second defect is the dislike makers have to stir the curd in the whey and after the whey is let off. Many of them seem to fear lest in doing this they should make the cheese better; as if stirring lessened the quantity: they say that it would take too much milk to make a pound of cheese, and they evidently prefer quantity to quality. If the whey is let off without the curd being stirred, the latter will be soft and tough, and the cheese will have the same defects. In my visits as inspector, I met with a good deal of inferior cheese, and when

I asked for the reason, I was told that the pressing had been badly done, or other reasons, good or bad, were assigned. The real, chief cause was that the curd had not acquired the requisite firmness before the whey was run off. If your curd be soft, you may press for a week, if you please, but your cheese will be soft, too. Buyers generally complain that cheese is too soft. The only cure for this is to stir your curd well till it is firm before you leave it to mass; you will then have a fine, firm cheese.

Another trouble is, the makers go too slowly in the morning and too quickly in the afternoon: they ought to do just the contrary. Many makers, too, persist in making a certain number of pounds of cheese from a certain quantity of milk received: say, one pound of cheese from nine pounds of milk, when ten or so are really required. In doing so, they aim at pleasing the patrons, but the idea is erroneous, ruinous to the reputation of their own factory, and of inconceivable damage to the good name of the country. This middling kind of cheese is refused by the buyers, and even local consumers disdain it. Many of our factories could advantageously compete with those of the West. Why are their cheeses always quoted at the top-price? Because they are known to sell only a first-class cheese, while our good makers suffer from the inferior cheese some of our factories send to market, which the exporters will have nothing to do with.

It should be well understood that a cheese of the best quality costs hardly anything more to make than a bad one. Be a little more active in the morning; that is, get the steam, the milk and the rennet ready in time; then, in the afternoon, hurry a little less, so as to let the curd remain quiet that the desired acidity may develop itself and the whey be exuded, and thus get your curd firm and dry: the result will be complete success. For, what these makers gain in weight is far from being equal to the loss in price, a loss which, unfortunately, affects the *good* makers as well as the bad ones.

I hope, however, that these evils will have no long duration. There is already a sensible improvement, and it will not be long before the province of Quebec will send across the ocean nothing but the very best kinds of cheese.

Last spring, and again in the autumn, I spent two or three weeks in the factories of Mr. McPherson. I met makers from Brockville, Belleville, Ingersoll, and from different places in the West, and asked them all their opinion on Mr. McPherson's mode of manufacturing. They were all unanimous in preferring his system to that in vogue in the West. After my inspection, I was very proud of our cheese, especially after I had tested the renowned cheese of the makers of the above places. I told them we had plenty of cheese quite as good as theirs: nevertheless, replied they, our cheese is received in Montreal as being of the highest class.

My only
same good fo
of the remari
us on our wa
will comman

I thank
tion. for the

M. CÔTÉ.-
without raisin
presence to as

We have
his manner of
Archambault,
We should lik

According
be used. Acco
the milk. I as
Archambault, c

Another qu
McPherson adv
on the contrary
the buyers prese
that of Mr. Ar
McPherson's, h
if Mr. McPhers

M. PAINCH.
wanted, because
must be so man
is Mr. McPhers

M. ARCHAM
much and add to
burnt. I hold th

M. CÔTÉ.—I

My only regret, in conclusion, is that all our factories are not on the same good footing. Still, we are on the road to improvement, and if some of the remarks I have made in this report are attended to, they will help us on our way and enable us to send out a superior make of cheese that will command the highest price in the market.

I thank you, Mr. President, as well as all the members of the Association, for the kind attention you have afforded me.

I am, gentlemen, with the profoundest respect,

Very faithfully yours,
J. A. McDONALD.

DISCUSSION ON CHEESE-MAKING.

M. CÔTÉ.—I should not like our discussion on these lectures to close without raising an important point; and I will profit by M. Painchaud's presence to ask him his opinion on it.

We have had the pleasure of hearing Mr. McPherson, who related to us his manner of working. To day, we listened to no less an authority, Mr. Archambault, who gave us his method, which differs much from the other. We should like to know which of the two is the better?

According to Mr. McPherson, the staler the milk, the more rennet must be used. According to M. Archambault, less rennet is required the staler the milk. I ask for the opinion of those present, and particularly of Mr. Archambault, on this matter.

Another question: In the case of curd with holes—porous curd,—Mr. McPherson advises it to be left in blocks four or five hours. Mr. Archambault, on the contrary, when curd is porous, hastens to grind it and stir it. Will the buyers present tell me which cheese they prefer, that of Mr. McPherson or that of Mr. Archambault? If Mr. Archambault's cheese is as good as Mr. McPherson's, his mode of making must be equally good. On the contrary, if Mr. McPherson's cheese is better, then, let us adopt his system.

M. PAINCHAUD.—If the milk is stale, an extra dose of rennet is not wanted, because that sort of milk is more ready to coagulate; but the milk must be so managed that it coagulate in 15 or 20 minutes. That, I believe, is Mr. McPherson position.

M. ARCHAMBAULT.—When you have a stalish milk, if you heat it too much and add too much rennet, you will not get a sweet curd, but it will be burnt. I hold that, if milk is beginning to sour, it wants less rennet.

M. CÔTÉ.—I regret that you did not say so to Mr. McPherson yesterday.

I do not say that he is right, but you differ greatly on this question and it is an important one.

M. ARCHAMBAULT.—Compared with Mr. McPherson, I am only a school-boy. I have a great deal to learn yet; much more than I have learnt, But every one has his own ideas. For me, the more rennet I put to stablish milk, the worse would be my cheese. I have found this out by constant experimenting.

M. VIGNEAU.—When I receive milk a little stale in condition, my practice is to heat less and to add extra rennet.

M. PAINCHAUD.—Suppose you had a quantity of good milk, good, that is, for stale milk, (*pour un lait avancé*), would you add the same quantity of rennet as for really good milk?

M. VIGNEAU.—I should add more rennet, but at a lower temperature: 70° for instance. The staler the milk, the lower the heat, but the more rennet. The reason for this is that the staler the milk is, if you heat it, the sooner commences its decomposition.

M. ARCHAMBAULT.—A cheese-maker should not wait to receive all his milk before he begins to heat. In summer, the season when the milk is sour, it does not arrive at a temperature of 70°, but rather at 80° or 82°. The moment you begin to work on sour milk, if you add the usual quantity of rennet, you burn your curd and your cheese will be dry.

M. VIGNEAU.—You say we ought not to wait till all the milk has arrived before we begin to heat. That is just what I do not do. When the milk is stale, I do not begin to heat it in advance of the rest: for the more you heat it, the sooner will it begin to decompose. I heat it as fast as necessary, but I wait till all, or nearly all, the milk is delivered before I begin, and I heat it more or less, according as the milk is more or less stale.

M. CÔTÉ.—At what temperature was your milk: not far from 80°?

M. VIGNEAU.—Just so.

M. CÔTÉ.—Then it is not necessary to heat it; it is nearly hot enough. The only difference between you and Mr. Archambault is that you put more rennet.

M. ARCHAMBAULT.—I think we can easily understand one another. I am not talking of acid, sour milk. I do not accept milk in that condition.

M. VIGNEAU.—One is often obliged to receive milk a little stale. No maker is stricter than I about the reception of milk; but very often milk is not altogether in a proper condition, and yet in spite of that it is received.

M. CÔTÉ.—Now, another question.—Mr. McPherson, when the curd is

porous, leaves same case, gri

M. ARCHAGases that dev can without lo the curd encl lumps, the gas a bad smell. smell. As to your cheese (usual, and you in this case, th

M. PAINCI

M. ARCHA

M. PAINCI

M. ARCHA

makers who hu or otherwise?

M. PAINCI to hurry their or salting it to

HON. J. J. please. I breed that of any othe making?

M. PAINCH cheese it is wort Jersey milk is d

M. ROSS.— that my milk is to make cheese, cheese as the san

(1) NOTE.—We fan make it retain more m As to porous cheese, v no pre-existence in the whether during the pe McPherson's plan,—or the heat applied. By curd cools, the pores, o the curd will not be pc is far worse. J. de L.

porous, leaves it in mass four or five hours ; you, M. Archambault, in the same case, grind it at once.

M. ARCHAMBAULT.—What is it that makes cheese porous ? It is the gases that develop in the curd. Well, if you grind the curd as soon as you can without losing any in the whey, you will by that means expel the gases the curd encloses. If, on the contrary, you allow your curd to remain in lumps, the gases remain in it, and when the cheese is ready to press it has a bad smell. That is why cheese of the first quality has sometimes a bad smell. As to the quantity of rennet, the more you use the drier will be your cheese (1). You take an acid milk, you add more rennet than usual, and you put enough water to reduce your rennet : I am sure that, in this case, the whey will rise over your curd.

M. PAINCHAUD.—I have had the same experience by an accident.

M. ARCHAMBAULT.—Well ?

M. PAINCHAUD.—With absolutely the same results that you met with.

M. ARCHAMBAULT.—In your trips, Mr. Painchaud, have you met many makers who hurried themselves too much, in pressing the cheese too soon, or otherwise ?

M. PAINCHAUD.—It is, unfortunately, a great fault among the makers to hurry their work too much, either as regards cutting their curd too soon, or salting it too soon.

HON. J. J. ROSS.—I will ask you a question, Mr. Painchaud, if you please. I breed Jerseys ; you know very well that their milk is richer than that of any other cows. Is it worth more than common milk for cheese-making ?

M. PAINCHAUD.—No, Sir. It is worth much more for butter, but for cheese it is worth less, and the reason is that the surplus of cream in the Jersey milk is divided among all your neighbors.

M. ROSS.—I am to understand, then, that the loss is purely my own ; that my milk is not valued as its proper worth. But I want to know this : to make cheese, is the same weight of Jersey milk able to make as much cheese as the same weight of a Canadian cow's milk ?

(1) NOTE.—We fancy there is some mistake here. When a cheese is wanted to ripen soon, one tries to make it retain more *moisture*, or *water* ; and this is *always* arrived at by increasing the dose of rennet. As to *porous* cheese, we agree with Mr. McPherson. The gases that cause the pores, or holes, have no pre-existence in the curd ; the curd is only in such a condition that the gases will develop themselves, whether during the period of manufacture, if the curd is kept at a high temperature according to Mr. McPherson's plan,—or later, if *they are not compelled to form and to disperse* immediately by means of the heat applied. By passing the curd more quickly to the mill, after Mr. Archambault's process, the curd cools, the pores, or eyes, do not all form : in other words, the formation of the eyes is only deferred ; the curd will not be porous as long as it is in the vat, but the finished cheese will be full of eyes, which is far worse. J. de L. T.

M. PAINCHAUD.—I am not positively sure, but I incline to think that the milk of a Jersey would make less cheese.

M. ROSS.—On what do you found this opinion?

M. PAINCHAUD.—It appears to me, after certain experiments we have made, that the milk of the Jersey contains less *casein* than the milk of other cows.

M. ROSS.—At all events, I think this is a point that ought to be thoroughly cleared up.

M. PRÉFONTAINE.—It is acknowledged that Jerseys give the most butter. I, myself, even, would not use their milk for cheese: it would be throwing it away.

M. CÔTE.—I differ in opinion from Mr. Préfontaine. I would use it for cheese-making; it would make good cheese.

M. ROSS.—I do not only want it used for cheese-making, but I want to be paid its real value for it.

A VOICE.—Does rich milk weigh more than poor milk?

M. ROSS.—It weighs less.

M. CÔTE.—True. The great objection to the *combined method* is that, in skimming off the cream, the value of the cheese is diminished. My idea is that the milk of the Jersey being richer, more cheese must necessarily be made out of it.

M. ROSS.—At all events, it seems to me to be nearly evident that we have not yet arrived at a complete answer to the question. Every one gives his opinion, which he supports by a process of ratiocination sufficiently convincing, as it seems to me; but as there are no particular experiments to back the reasoning up, I must be allowed to ask that an experiment to test this be made. It is worth while; for the Jersey is the cow most nearly resembling our Canadian cow in other respects; she is kept as easily, is of the same size, and possesses the same habits. There is this one difference between them; that, although the Canadian gives very rich milk, the milk of the Jersey is still richer. If, then, the conclusion be reached that the milk of a Jersey is as profitable as, or more profitable than, a Canadian's milk, that would be a reason for directing one's effects to that quarter. If the opposite conclusion is reached, then we must stick to the Canadian. As to butter, I know there is a great difference between the two; I have tried the experiment myself; there is a difference of 20 per cent, and even more.

A VOICE.—It seems to me that the rich milk should contain more cheese. In autumn, for instances, the milk is richer in cream and gives more cheese.

M. CÔTÉ.—If rich milk did not give more cheese, why should skimming be opposed?

M. ROSS.—
convince people

You feel that
the factory should
milk, and treat
should receive
we have got to

I asked you
you again to do
But, even if I told
that, next year,

M. SAUL
McPherson's
cheese, under the
before grinding.

This piece of
that I met with
following too far
The means indicate

Another point
for the steam-pipe
tube, which could
the steam-tap us
when the tap was
summer, and I told

Book-keeping
book-keeping people
know that our
for book-keeping
Everything has its
books so that you
you are in your

Cheese-making
Nevertheless it is
one day to another
the cause. In this
this entry. The
with these books,
being more satisfactory
or a set like them

As to factories

M. Ross.—Your argument seems to me conclusive. Still, it will not convince people as an experiment would.

You feel that, to do justice to the patrons, the milk each one brings to the factory should be analyzed. It is not reasonable that he who brings good milk, and treats his cows in such a manner as to get good milk from them, should receive only the same price as the patron that brings bad milk. Until we have got to this point, science and practice will not be in perfect accord.

I asked you to try an experiment on a point I indicated just now, I ask you again to do it, and if you will not, I give you notice I will do it myself. But, even if I try it, there is no reason why others should not try it, too, so that, next year, we shall come here each of us with his opinion formed.

M. SAUL CÔTÉ.—One thing, among others, that I remarked in Mr. McPherson's lecture is that to prevent the butter from exuding from the cheese, under the press, he advises cooling the curd down to 90° from 96°, before grinding.

This piece of instruction gave me pleasure, for I must confess frankly that I met with a great deal of difficulty last summer, on this point, because of following too faithfully a table of advice with which you are all acquainted. The means indicated by Mr. McPherson are very valuable.

Another point—Mr. McDonald, last year, said that it would be better for the steam-pipe near its junction with the vat to be fitted with a rubber-tube, which could be removed every time the steam was to be cut off; for the steam-tap usually employed might leak, and the steam pass along it even when the tap was shut. This is perfectly true; I observed it happen last summer, and I think every one should make this alteration.

Book-keeping.—It is truly discouraging to see how careless about book-keeping people managing butter-and cheese-factories really are. You know that our Secretary, Mr. Taché, is the compiler of a perfect set of forms for book-keeping of this kind. The cost of his books is a mere trifle. Everything has its place in them. Why do you not all get a set of these books so that you may keep yourselves constantly informed as to where you are in your manufacturing transactions.

Cheese-makers who weigh their fresh cheese daily are rarely met with. Nevertheless it is a very useful practice. By doing so, you can tell from one day to another if there is any diminution in the yield, and find out, the cause. In the set of books I mentioned just now, there is a place for this entry. The proprietor has a right to know what is done with his milk; with these books, the maker can tell him at once; to say nothing of its being more satisfactory to the maker himself. Get Mr. Taché's books, then, or a set like them.

As to factories, Mr. McPherson has traced the broad outlines; I am

going to offer you some simple pieces of advice, but they will not be without value, simple as they are.

Cleanliness in cheese-and butter-factories.—Well, you will say, are we not cleanly? No, not everywhere. It is sad to see how factories of both kinds fail in this. A factory is, like a dairy, an adjunct to a house, and where the cheese-maker has a wife imbued with a proper sense of the value of cleanliness, the factory will be the cleanest of all the appendages of the house. But what do we see most frequently in the butter-or the cheese-factory, which is, after all, the dairy of the parish? The floor is never washed; the strainer, from the first time of using, becomes yellow, and goes on from bad to worse. How, then, can a cheese-maker say to his patrons: "Take care of your milk, wash your cans carefully," if his own place is kept in such a filthy state? The very clothes of the maker are sometimes foul. Some there are who wear the same suit from the beginning of spring to the end of summer; without an *over-all*, too! By the middle of the summer this dress is so covered with grease that it fairly shines again!

Now for the patrons' turn. I have travelled a good deal in my office of inspector, and I have often observed that the milk-cans are left by the road-side. You need not go and look to see if the whey is left in the can; you may be sure of it. In the evening, the milking is done at a racing-pace; the whey is removed hurriedly from the can; the can, if washed at all, is washed hastily, and the warm milk is poured into it!

Quite needless to say that practices like these are to be condemned.

DISCUSSION ON THE MANUFACTURE OF BUTTER.

M. SAUL CÔTÉ.—When I inspect the creameries, there is one thing that strikes me: the great number of them that still use the old-fashioned plan of cooling the milk in pails. I hope the partisans of the pail-system will give reasons for their preference; I will give mine for preferring vats.

First, I find that vats, while costing less, or at least not more than pails, are easier to clean, the cream cools in them more rapidly, and, by means of steam-pipes, the cream can be warmed, when it is too cold for churning.

Cream ripens much more uniformly in vats than in pails. The last pailful is not the same cream as the first; the cream is not uniform. But, you will reply, we mix the cream in the churn; and I answer: that is not the proper time.

In using p churn, and add by this proced taking into acc of pails: that

Now then creameries have using ice. This of ice are taken lively work. J a few inches fur Above your ch make butter, I t I placed the tub turned on the w on melting. W it takes a great before you succe

Another que observed just no once worked is t been proved that the best, let us a work, but I have that he spread hi once, and it turn point is to thorou

This morning nan's report, I m pans to be abused pans were used, I Mr. Magnan, he r the centrifugal cr

Now, Mr. Ma of milk to make creamery at Cap \$ average, which tel

With pans, a : milk.

As an argume

they will not be

you will say, are
 ee how factories of
 junct to a house,
 oper sense of the
 the appendages of
 utter-or the cheese-
 he floor is never
 omes yellow, and
 naker say to his
 fully," if his own
 of the maker are
 t from the begin-
 -all, too! By the
 hat it fairly shines

deal in my office
 s are left by the
 is left in the can ;
 lone at a racing-
 if washed at all,

e condemned.

UTTER.

ere is one thing
 re old-fashioned
 the pail-system
 preferring vats.

not more than
 ipidly, and, by
 is too cold for

pails. The last
 uniform. But,
 ver : that is not

In using pails, when you want to warm up cream, you pour it into the churn, and add boiling water, or introduce a steam-pipe into the churn; by this proceeding you run the risk of making greasy butter; without taking into account that it takes less time to clean one vat than a number of pails: that is clear.

Now then, for the butter in the churn, just "come". Very few creameries have water cold enough to cool the cream sufficiently, without using ice. This is how the thing is generally managed: two or three pieces of ice are taken and put into the churn with some water. That is not very lively work. Just round each piece of ice the cream gets pretty cold, but a few inches further off, it cools but little. It is iced-water that is wanted. Above your churn, keep a small vat expressly for this. When I used to make butter, I took a tub, in the bottom of which I bored several holes, and I placed the tub on the opening of the churn; ice was put into it and I then turned on the water; as fast as the water ran into the churn, the ice kept on melting. Working thus, you have iced-water, whilst in any other way it takes a great deal of time to get it, and you will have much difficulty before you succeed.

Another question: as to salting. Butter must be salted uniformly. I observed just now in Mr. Chicoine's report that butter that has only been once worked is the best. I have always opposed that idea; but since it has been proved that, all other things being equal, butter only once worked is the best, let us act accordingly. I have not seen Mr. Chicoine the elder at work, but I have seen his son at work, at Mr. Fortin's, at St. Prime. I saw that he spread his salt equally everywhere over his butter, only worked it once, and it turned out well. Why, then, work butter twice? The great point is to thoroughly mix the butter with the salt.

This morning, a report was read that surprised me very much: Mr. Magnan's report, I mean. Mr. Magnan does not like creameries that work with pans to be abused. As I never had the advantage of butter-making where pans were used, I do not intend to discuss the question; but, if I understood Mr. Magnan, he not only championed the pans, but rather sneered, too, at the centrifugal cream-separator.

Now, Mr. Magnan states that, by his mode of working, it takes 24½ lbs. of milk to make a pound of butter; while the report of the centrifugal creamery at Cap Santé, just read to us by Mr. Taché, gives a much lower average, which tells in favour of the centrifuge.

With pans, a much larger dairy is required, and more ice to cool the milk.

As an argument in favour of pans, Mr. Magnan stated that when the

centrifuge is used, the milk is so *mashed*, so over-heated, that no good results can be arrived at. Now, observe that the milk skimmed by the centrifuge is cooler than when it left the cow's udder. According to Mr. Magnan, no good butter can be made with any milk. But you know that the temperature of the milk, as it is leaving the udder, is the best temperature for butter-making.

I do not wish to get those who use pans to give them up; but, perhaps, Mr. Magnan will answer my concluding question: Do the Danes, who make the best butter in the market, use pans or centrifuges?

M. OCTAVE MAGNAN.—I do not wish to depreciate the value of the centrifuge. On the contrary, I am willing to recommend it, as I would recommend the pan-system. I meant to say in my report that, with a good maker and plenty of ice, good butter could be made on either system. What I said in my report was said because people seemed to be running down the pans in favour of the centrifuges.

Since we are now discussing the relative merits of the pan and the centrifuge, I will ask you one question: How is it that seven or eight years ago, when pans were principally used, our butter had a better reputation in Europe than it has to-day, when the creameries work for the most part with centrifuges? You see that Mr. Lynch, in his letters, says that our butter is in disrepute in Europe, that it is not thought much of there. How comes it that under the reign of the centrifuge, our butter is not more patronized.

M. CÔTÉ.—Does Mr. Lynch really say that our butter is less good? I think he only says that our butter is not worth so much as the butter made by the competing countries.

M. MAGNAN.—I understand him to say that our butter is less liked in the European markets.

M. CÔTÉ.—That is because other countries have made greater progress than we in this respect.

M. TACHÉ.—Mr. Magnan will have the goodness to notice that the creameries and the cheese-factories are not in the same position. Canadian cheese is made entirely in the factories, and the reputation won by Canadian cheese is the reputation of the Canadian cheese-factories alone. But it is very different with butter. In Quebec there are only 75 or 80 creameries; still fewer in Ontario; let us say 150 together. And of the butter produced in these 150 creameries, $\frac{2}{3}$ is, at present, consumed in this country. So that, a great part of the butter exported is dairy-butter, and the low reputation of our butter is in very truth due to that made in private dairies; and this is so indisputably the case that, on the English market, there are always

two quotations for butter made

Again, Mr. of keeping butter often not sold

M. MAGNAN well as to those

M. TACHÉ. our butter has you attribute to

M. CÔTÉ.— be made by the

M. VAILLANTE fuge-creameries ment. Still, on workman.

M. MAGNAN like to ask him

M. VAILLANTE What I regret, Mr. eries for their health. It is not only Mr. keepers, are neglected. They been taken by Mr. should have had the two dealers v said. When we r in three or four c a month previous have more bother

The Danes se proprietors are brought to leave sp

M. CÔTÉ.—A

M. VAILLANTE season of exportation of export work go

M. CÔTÉ.—I receive them?

two quotations: the one for butter made in the creameries, and the other for butter made in private dairies.

Again, Mr. Lynch says that people complain greatly of our practice of keeping butter some time before sending it to market. July butter is often not sold till November. The Danes send off theirs as soon as it is made.

M. MAGNAN.—What you say applies to the pan-system creameries as well as to those which use the centrifuge.

M. TACHÉ.—True; but I only wished to give you the real reason why our butter has depreciated in value, and still is depreciating; a result that you attribute to the use of the centrifuge.

M. CÔTÉ.—Would Mr. Vaillancourt kindly tell us if as good butter can be made by the centrifuge-creameries as by the pan-creameries?

M. VAILLANCOURT.—Decidedly. As good butter *is* made in the centrifuge-creameries. I admire the system myself and find it a great improvement. Still, on the other hand, I think the centrifuge-system wants a better workman.

M. MAGNAN.—Mr. Vaillancourt has often bought my goods; I should like to ask him if they gave him satisfaction,

M. VAILLANCOURT.—Oh, yes, good butter can be made with the pans. What I regret, Mr. Côté, is that in your report you did not blame the creameries for their habit of keeping their butter for some time before selling it. It is not only Mr. Lynch who complains of that. We, the Montreal store-keepers, are dissatisfied with it. Montreal is by no means a market to be neglected. Two-thirds of the butter made this year in the province have been taken by Montreal. Had we not that city to consume our butter, we should have had a whole year's make on our hands. Mr. Langlois and I are the two dealers who sell the most, and he will support me in what I have said. When we receive creamery butter *fresh*, we can sell it, with a profit, in three or four days. But when we get a tub of butter made a fortnight or a month previous to delivery, it gives us much more trouble to sell; we have more bother and less profit.

The Danes sell their butter as soon as it is made, but, here, the creamery proprietors are both butter-makers and speculators. It seems to me they ought to leave speculation to the dealers.

M. CÔTÉ.—At what time of year does exportation really begin.

M. VAILLANCOURT.—The moment we have grass-butter. The greatest season of exportation is the month of June; but there would always be plenty of export work going on if we could get the butter fresh.

M. CÔTÉ.—I would ask if you dealers export the goods as soon as you receive them?

M. VAILLANCOURT.—Yes, we can always sell, if we can get the butter and send it off at once fresh. But it often happens that we do not receive it till it has been made a month. We have to keep it in that case, because we cannot sell it.

M. CÔTÉ.—I fancied that the dealers often kept butter in their cellars with a view to speculation; and we must not blame others for the fault committed, in reality, by the dealers.

M. VAILLANCOURT.—The error of the one does not justify the other. Observe, besides, that if we sometimes buy butter in large quantities in the country, we have generally better storage than there is in the country. We have refrigerators; while, in the country, the butter is often kept in the cellar alongside of the potatoes.

M. CÔTÉ.—I am of your opinion; the makers ought to sell their butter when fresh; only, you cannot reproach me with not having mentioned this in my report.

M. CHAPAIS.—You said, Mr. Côté, that you were surprised to see, by the report of the committee appointed to examine the samples of butter, that the best lot, lot 1, had only been worked once. It is singular enough that, looking at last year's report, we see that the best lot of that year had only been worked once. That's two years running.

Here, then, are two judgments of two experts of this year, two years running, they having no knowledge of the details of the manufacture of these samples, and yet they both, each time, select, as the best, butter worked in the same way.

At present, no practical conclusion can be drawn from this, but I beg every one present to register the fact in his mind, and if the experts' choice should again fall upon a butter made in the same way, I think we may safely say that butter is sometimes too much worked.

M. PREFONTAINE.—Will you allow me, Mr. President, to say a few words.

It will not be long, I perceive, before this meeting of 1889 will be closed. We have listened to many lecturers of eminence who have scientifically treated subjects of various kinds, whose words must, before long, be greatly beneficial to the country. Unfortunately for me, I feel that one subject has been too much neglected during this meeting, and yet it is one that ought to interest very greatly our theoretical and our practical farmers. I speak of the way of making butter here, and of the means of re-establishing our reputation in the foreign market.

In your brilliant speech yesterday evening on the work of our association, you said that our export of butter had diminished by two thirds. Since the evil is acknowledged, why not take measures to erase it at once?

It is at meetin
we listened to
the cheese-ma
have been ver
Pherson giver
the exception
one speaker, o
way to regain
to be on the d
ference to our
during these
remedy for the
dent, and I an
butter-making

Yet, the fi
it seems to me

1. A more
2. The Fed
export butter,
might take as i

3. A butte
Archambault's
that great servi
butter-makers,
a table of advic
a thing.

4. Leave to
panies, to have
week—Monday,
fresh, and satisfi

Allow me to
mine, the only e
cialists, so man
inquiries, if dire
ters in question,
tion, without ha
depending upon

RELATIONS

M. ARCHAM
many cows; the

It is at meetings like this that the remedy should be hunted up. Yesterday, we listened to Mr. McPherson. This speech must have been of great use to the cheese-makers present. I am sure that for us, butter-makers, it would have been very useful had so distinguished a practical man as Mr. McPherson given an address on the making of butter. Unfortunately, with the exception of the reports and of some remarks from our inspectors, no one speaker, out of all this intelligent meeting, rose to show us the real way to regain our lost reputation. And yet, our commerce in butter is said to be on the decrease; Englishmen are reported as eating margarine in preference to our Canadian butter. In spite of all this, we have not sought during these two days—days dedicated expressly to this purpose—the remedy for the evil that besets us, and I confess this frankly, Mr. President, and I am convinced beforehand that all those who are engaged in butter-making will with me deplore the present state of affairs.

Yet, the field is a large one; we should have many subjects to discuss, it seems to me. Allow me to name some of them to you:

1. A more minute inspection of our factories.
2. The Federal Government should name an inspector to examine our export butter, and to mark it with a special brand which the association might take as its trade-mark (*faire incorporer*).
3. A butter-school established on pretty much the same footing as Mr. Archambault's cheese-school at St. Hyacinthe. It is acknowledged now that great service has been rendered by this school; why should not we, butter-makers, reap the same fruits from our school? There should be, too, a table of advice or rules on butter-making; but I hear no mention of such a thing.
4. Leave to be obtained from Government, or from the railroad companies, to have a refrigerator-car attached to an express train once a week—Monday, for instance. By this means, we could send our butter in fresh, and satisfy the demands of our markets.

Allow me to say, however, that in mentioning these few notions of mine, the only end I have had in view was to attract the attention of specialists, so many of whom are present, to these points. I know that their inquiries, if directed to these subjects, will throw much light on the matters in question, matters that I have only pointed out as worthy of attention, without having had the audacity to pretend to resolve the questions depending upon them.

RELATIONS BETWEEN THE PATRONS AND THE MAKERS.

M. ARCHAMBAULT.—I send my milk to the factory; I have a good many cows; these are milked carelessly; and when the milk gets to the

factory, it is covered with filth. What effect has that on the manufacture, M. Painchaud ?

M. PAINCHAUD.—The cheese will not have so fine a flavour.

M. ARCHAMBAULT.—But, there is another factory close by, and I say : “ If you will not take my milk, I shall take it to the neighboring factory.” In such a case, must the cheese-man take it.

M. PAINCHAUD.—By no means, should he take your milk, if you persist in delivering it in a filthy state. That would be to encourage dirtiness. Some rule should be passed to prevent this occurring.

M. ARCHAMBAULT.—It is a case that too often happens. Now, another thing : I take a little cream out of one of the cans ; what harm can that do ? No one can find it out.

M. PAINCHAUD.—It is enough that your milk has actually been skimmed.

M. ARCHAMBAULT.—If you tell me that I skim my milk, I will at once carry my milk to the next factory : the maker there is always after me for it.

M. PAINCHAUD.—I say what I have already said in connection with your supposed dirty milk : a rule must be made to prevent this.

A VOICE.—How can you prove that cream has been skimmed from the milk ?

M. PAINCHAUD.—By the *lactometer* and the *creamometer* ; though it is true their use is unknown to the greater number of makers.

M. DUBEAU.—I think this instrument is very difficult to apply with certainty, even for those who are skilled in its use.

M. ARCHAMBAULT.—In my opinion, the great point is that there is too much rivalry between neighboring factories. The maker can no longer get the patrons to listen to him ; and it happens, too, very often, that he makes a lying report, to persuade the people that he is a better cheese-maker than another man.

For example : last year, a pupil came to our school, saying : “ I am here for the sole purpose of meeting my friends. I sold my cheese for 12½ cents a pound, and it only took 9 lbs. of milk to make a pound of cheese. I can show some of it to Archambault.”

As for me, I am not so clever as that. I consider that I know nothing, that I have more to learn than I know now. But, since then, the dealers have let me into the secret about this individual. They tell me that the maker who asserted that he had sold his cheese at 12½ cents a pound, had, in reality sold two pounds for 12½ cents.

I cannot complain of my patrons, but I hear plenty of complaints from other quarters.

M. DUBEAU
law, since then
the milk.

M. PRÉFON
lished an exce
ings therein c
cessful. The
wish to unders
that number o
appeared.

M. ARCHAM
test milk.

M. PRÉFON
the method. I
before we accu

M. DUBEAU
bench of magis

M. ARCHAM
bench ; but the
by virtue of wh
condemned to r
he should be ex

This, I thin
who take the cr

In one plac
less than thirt
well, but could
by which no on
ing if the milk

M. PRÉFON
factory ?

M. ARCHAM

M. PRÉFON
it has or has not
ceal it.

M. TACHÉ.—
tainly very wel
skimming (or th
lently. You ma
a fraud has been

M. DUBEAU.—The fraudulent patrons should be punished according to law, since there are instruments which show if cream has been taken from the milk.

M. PRÉFONTAINE.—I remember that Mr. Taché, a few years ago, published an excellent essay on the subject we are now discussing. The teachings therein contained, I have put in practice, and they have proved successful. The roguish patrons have been easily detected. I advise all who wish to understand this subject to consult the reports of our association or that number of *Le Journal d'Agriculture* in which Mr. Taché's lecture appeared.

M. ARCHAMBAULT.—Out of a hundred cheese-makers, eighty cannot test milk.

M. PRÉFONTAINE.—The greater part of the makers do not understand the method. Besides it is a delicate matter; we must be sure of our facts before we accuse patrons of fraud.

M. DUBEAU.—People of this sort ought to be dragged before the bench of magistrates.

M. ARCHAMBAULT.—I do not think they ought to be taken before the bench; but they ought to be made to pay a fine. A rule should be passed by virtue of which the *skimming patron* should, for the first offence, be condemned to replace the cream taken off the milk, and, if he sin again, he should be expelled the factory.

This, I think, is the only way of getting rid of these robbers; for those who take the cream are nothing but robbers.

In one place whither I was called, this summer, a maker accused no less than thirty-five patrons of skimming their milk. His proof began well, but could not be completed. We must all combine to establish a rule by which no one can deal with a can of milk without previously ascertaining if the milk has been skimmed or not.

M. PRÉFONTAINE.—Is it you or the patrons that cart the milk to the factory?

M. ARCHAMBAULT.—My patrons do it.

M. PRÉFONTAINE.—Then, it would be very difficult to find out whether it has or has not been skimmed. The patrons might agree together to conceal it.

M. TACHÉ.—Mr. Préfontaine's objection as to the magistrates is certainly very well taken; since the law insists that it be proved that the skimming (or the addition of water) has been done knowingly and fraudulently. You may appear before the bench, having a perfect conviction that a fraud has been committed, and yet not be able to offer a legal proof of it.

The best tribunal would be a board of arbitrators, appointed with the consent of the patrons. The disgrace inflicted by the board of directors' verdict would be as great as if pronounced from the bench. The advantage would be, that, if thought advisable, the enquiry might be kept quiet.

If a maker suspect a patron of skimming or of lowering his milk with water, he can follow him up for a week or so with his tests; and by the variations that occur from day to day in the quality of the milk, he will be able to prove to the satisfaction of the board that the patron in question is guilty of fraud.

Or, he might proceed to proof by comparison: let him take, in the same district, the milk of a patron whose honesty is beyond all doubt, and examining this patron's milk with the suspected one's milk, the maker could easily show that the one has been interfered with, while the quality of the other is determined by the cows themselves, and not by the people who "handle" the milk. And as the board can have no interest in supporting false accusations, as much discretion may be expected from such a board as from the magistrates, who frequently are not more competent to deal with these matters. It is generally the *juges de paix* who are empowered to deal with these causes.

When the board is thoroughly convinced that a patron has been guilty of fraud, it may condemn him to pay a fine, the amount of which shall have been fixed upon by the previously established rules of the factory.

From the beginning of the season, the factory might pass these rules and get the patrons to sign them. Thenceforth, the signers would be bound by these rules. It would be sufficient to prove *neglect* on the part of the proprietor to render him subject to the payment of a fine.

For instance; if in rainy weather he leaves his milk-can out of doors and it gets full of water. He does not perhaps mean to act dishonestly, but, as regards the interests of the factory, it comes to the same thing. In this case, then, a fine should be laid upon him, to make up for the injury he has done to the factory.

I had intended, during the last two years, to construct a table of tests for milk, like the one we already have for the manufacture of cheese. This table will certainly be ready by the spring, and shall be distributed at the same time as the table for cheese-making.

M. JOBIN.—I am one of the patrons of a cheese-factory; I feed my cows well; my neighbour's cows, on the contrary, are badly fed, and their milk is not so rich as mine; this I find out, and therefore I take some cream from my milk. If I take but little cream, how on earth are you going to find me out?

M. ARCH
ness in cream
to my factory
I only find 12
tests being ex

M. JOBIN
than the secon
the first half c

M. TACHE

M. JOBIN.

M TACHE
you are not lil
ple fact that y
the cheese-mal
expose the frai
that the milk c
of the same ric
he will soon se

M. CASAV
this quèstion.
pected a patron
Not wishing to
cows in questio
just the same a
Without this te

Another ha
cows, instead of
plentiful but ve
of the factory.

I bought hi
of the watery pl
grew fat again, :

The creamor
found an accusa

M. ALLARD.
orders him to ac

M. PAINCHA
the directorate.

M. TACHE,—
possible for the c

M. ARCHAMBAULT.—This is what I should do. I should test the richness in cream, by the creamometer, of the first can of milk you brought to my factory. Let us say, it contains 15o7o of cream. If a week afterwards I only find 12o7o of cream, how can you account for the decrease, both tests being executed at the same temperature ?

M. JOBIN.—Every one knows that the first drawn milk is much poorer than the second. Suppose I say to my men : Milk the cows, but only take the first half of the contents of the udders ?

M. TACHE.—Do you think that honest ?

M. JOBIN.—By no means ; but how are you going to find me out ?

M. TACHE.—You allow the dishonesty of the proceedings at once, so you are not likely to tell your men to do this every morning, and the simple fact that you now and then take good milk to the factory will enable the cheese-maker to find out the variations in quality of your milk and to expose the fraud. For, if there is one thing universally acknowledged it is that the milk of a herd of cows kept regularly on the same food is always of the same richness. If the maker sees that your milk varies in richness, he will soon set you to rights.

M. CASAVANT.—I should like to quote two cases which might elucidate this question. A cheese-maker at a factory of which I was a director suspected a patron of skimming ; the milk this man brought being very poor. Not wishing to make a fuss about it, the maker asked me to go and see the cows in question milked. I went ; the milk was tested, and found to be just the same as what this patron was in the habit of sending to the factory. Without this test he might have been suspected of skimming.

Another had his cows in a pasture full of sub-aquatic plants, and his cows, instead of his pigs, drank the whey, their milk being, in consequence, plentiful but very poor. Accused of watering his milk, he was turned out of the factory.

I bought his cows, which, placed in a pasture wherein there were fewer of the watery plants, not being obliged to drink the whey, and properly fed, grew fat again, and gave pretty rich milk.

The creamometer, I therefore conclude, is hardly sufficient evidence to found an accusation on.

M. ALLARD.—What is the duty of a cheeseman when the proprietor orders him to accept milk that has been skimmed ?

M. PAINCHAUD.—On no account, should he obey. He should inform the directorate.

M. TACHE.—The maker ought to be *master* in his factory. He is responsible for the quality of the cheese he makes, and when he refuses a lot

of milk, the proprietor ought not to find fault. The maker is generally engaged by the season, and ought not to be blamed for refusing skimmed-milk; neither does the refusal give the proprietor a right to break his contract.

M. ALLARD.—The maker does not always gain his ends. This year we have had a contest about it.

M. TACHE.—We have had a table printed, showing the care and precautions the patrons should bestow on the milk.

M. AYOTTE.—I distributed the tables about my neighbourhood, but the patrons do not heed them much.

M. TACHE.—The good done the first year may, possibly, not be general, but you are sure to find in every district a certain number of patrons who will become more careful; and, in time, the others will improve.

M. PREFONTAINE.—After the creamometer-test, can you hesitate about imputing fraud?

M. PAINCHAUD.—Any milk in which the instrument does not indicate 100% of cream ought to be considered fraudulent.

M. PREFONTAINE.—This summer, I met with milk that did not contain 50% of cream, I tested the milk at the patron's, and I was convinced of his perfect fair-dealing.

M. ARCHAMBAULT.—I tested a patron's milk. I saw the cows milked, and took four tubes full of milk away with me. This I weighed; it showed 100 at the usual temperature. The next morning there was 30% of cream, at noon, 50%, the day after, 80%, the evening of that day, 140%. I assert that if the test is made at too high a temperature, the test will not be half correct.

M. PREFONTAINE.—At what temperature did you keep your milk?

M. ARCHAMBAULT.—In ice.

M. PREFONTAINE.—That is too cold, and for that reason the cream took too long to rise. Now, with Mr. Taché's table of tests, the proof is perfectly arrived at in 24 hours.

M. ARCHAMBAULT.—But how can you, before the bench, prove a test? For the second test, with the lactometer, the milk must be sweet, and that is why I kept it so long in ice. The ignorance of the maker caused this man to be accused of skimming his milk.

M. PAINCHAUD.—There is milk that looks adulterated, and yet is not; for example; milk that is on the point of souring: it cannot throw up its cream, on account of its being too far advanced in acetification.

M. PREFONTAINE.—A cool day should be chosen for testing; but in no case are the lactometer and the creamometer perfect instruments. We

intend to follow according to its

Is it right contains 180% and shall need their milk: the

M. ARCHAM

M. PREFONTAINE, can adapt

M. TACHE

M. ARCHAMBAULT there is more c

M. PAINCHAUD make up for it

Resolutions of

M. CHAPARON a view to the advancement of inferior makers, in business and art

This is contrary to the makers who falsify the percentage of cream in a patron, who he weighs. He will seem as if he received. The cheese, it will appear

And, so, the than those of the the honest maker false report of him who is often disgraced this evil.

intend to follow Mr. Chicoine's plan: to pay every for patron's milk according to its richness.

Is it right, in any sense, to pay as much for 50% milk, as for milk that contains 180%? By this means, too, we shall be beyond the risk of fraud, and shall need no subsequent test. So much the worse for those who water their milk: they will be paid just what it is worth.

M. ARCHAMBAULT.—I agree with your plan.

M. PREFONTAINE.—Our plan is as regards butter, but you, Mr. Archambault, can adapt it to your cheese-factory.

M. TACHE.—No, not for cheese.

M. ARCHAMBAULT.—As to cheese, if there is less cream in the milk, there is more casein.

M. PAINCHAUD.—Cows that give milk less rich in cream generally make up for it by the casein it contains.

Resolutions of the Board of Directors concerning Falsified Reports.

M. CHAPAIS.—Resolutions have been adopted by the directorate with a view to the abolition of an evil which infects our district and retards the development of our factories, I speak of the falsified reports, made by inferior makers, in order to delude people into the belief that they know their business and are even superior to other makers.

This is continually done in all parts of the country. I find everywhere makers who falsify the reports of their operations, in order to show a high percentage of cheese for 100 lbs. of milk, and one of their tricks is to credit a patron, who has delivered a hundred pounds of milk with only ninety pounds. He will receive cheese for his hundred pounds of milk, but it will seem as if he received more cheese in proportion to his milk than he really did receive. Thus, instead of its having taken 10 lbs. of milk for 1 lb. of cheese, it will appear to have taken only 9 lbs.

And, so, the man in question will make himself out to be a better maker than those of the neighbouring parishes. When the reports are published, the honest maker may have a good report, but not so good a one as the *false* report of his neighbour. This irritates the employers of the former, who is often dismissed the next spring, and loses a good deal of credit by this evil.

The resolution aims at enabling makers to protect themselves mutually against this evil, which is becoming more and more general. It is a matter of real importance. I have seen, in certain places, factories ruined by such falsified reports. It is clearly a robbery: a robbery as clearly as taking a man's purse from his pocket is a robbery. For, in sober earnest, in one case with which I am well acquainted, the proprietor lost all his fittings; and was absolutely ruined by a falsehood printed and scattered broadcast among the people.

By this motion, it is sought to insure that butter- and cheese-makers, by the fact that they become members of the Dairymen's Association, bind themselves to make no reports except in the form given in the statute, that is, by a solemn affirmation.

This "solemn affirmation" subjects the man who, after making it, falsifies the truth, to the payment of a fine. No maker is compelled to make a report; but, if he does make one, the resolution binds him to make it in every case under a solemn affirmation,

It seems to me that it is a very equitable plan for all those who are interested in the development of our industry.

REPORT OF THE SCHOOL-FACTORY.

Mr. President and Gentlemen,

I have the honour to submit my report of the school-factory for the year 1888.

During the season, 68 pupils took lessons in the factory, passing there, altogether, 393 days.

The number of letters of information written was nearly 150.

The following is the increase of attendance from 1884 to 1888, at the school-factory:

1884	20	pupils	passed	there	20	days
1885	52	"	"	"	108	"
1886	38	"	"	"	83	"
1887	57	"	"	"	148	"
1888	68	"	"	"	382	"

Among these pupils, there were some who could test milk. I think it would be a good thing if the Inspectors would, on their tours, test the milk of each patron, in order to show the condition in which milk is delivered at the factories, and, at the same time, to show the makers how to employ the test.

This the v
Every ma
quality.

ADDING TI
the temperatur
ed to 818°. If
in 30 or 35 min
each other with

HEATING-U
I warm up to 9
then cover. W
whey, stirring
drained off. I c
firm, I pile it at
half-hour.

When the c
I stir and salt, a
provided it has
right smell. A s
by curd when fi
smell even if it

Here are so

When curd
the *grains* of cu

When the c
or two hours, an
completely disa
the proper smell

In cool weat
acidity, at the ra
enough in three
arrived, and I ne

On Saturda
milk I used to ke
I again make use
arriving, to driv
of good milk.

When all the
is then usually at

(1) As to this, see
milk.

This the way in which I taught cheese-making during the past year :

Every maker must receive the milk himself, that he may know its quality.

ADDING THE RENNET.—I warm the milk to from 86° to 88°, according to the temperature and the acidity of the milk. Very sound milk should be raised to 818°. If acid, less heat and less rennet (1) will make it fit to cut-down in 30 or 35 minutes after the rennet is added. The three cuttings follow each other without interval.

HEATING-UP.—I stir for 10 or 15 minutes before letting on the steam ; I warm up to 98° in 20 minutes ; I stir for ten minutes after heating, and then cover. When the curd gives threads a line in length, I discharge the whey, stirring the curd lest it should mass together after the whey has drained off. I continue stirring until the curd is quite firm ; when it becomes firm, I pile it at the sides of the vat, cut it into blocks, and re-pile it every half-hour.

When the curd is good and fine, I grind at the end of the third hour ; I stir and salt, and half an hour afterwards, I put the curd into moulds, provided it has the proper smell ; I never mould the curd before it has the right smell. A strong smell, as of fermented cheese, is generally afforded by curd when fit for the moulds ; and that is why I wait for this strong smell even if it does not develop for an hour after salting.

Here are some experiments I have made :

When curd is only heated up to 96°, it wants more stirring ; we crush the *grains* of curd, and the cheese, in consequence, is moist and heavy.

When the curd is full of little holes, I grind it after an hour and a-half or two hours, and stir it, after grinding, every 15 minutes, until the holes completely disappear. I then salt it, and put in press in half an hour if the proper smell appears.

In cool weather.—I use whey, kept over from the previous day, to give acidity, at the rate of 20% of the milk, so that the curd may become acid enough in three hours. I put in this whey when all the day's milk has arrived, and I never use it except the milk is perfectly sound.

On Saturday evenings, and the vigils of festivals.—To replace the milk I used to keep, and instead of heating or cooling the milk in the vat, I again make use of whey : I stir the milk almost all the time it keeps on arriving, to drive off the animal odor, and I use 5 lbs. of whey to 100 lbs. of good milk.

When all the milk has arrived, I add the rennet at once, for the milk is then usually at the proper temperature. After heating up, I do as on

(1) As to this, see above, p. the discussion which took place about adding the rennet to forward milk.

ordinary days ; I let off the whey when the curd gives line-threads ; I pile the curd on only one side of the vat ; I put several pailfulls of boiling water under the vat, to keep the heat up to 92° or 94°. In this state I leave the curd for 5 hours ; I then grind it, and if it is full of holes, I stir it from time to time to get rid of them before salting ; then it is salted, and, half-an-hour after, put into moulds.

PRESSING.—In hot weather, I put my curd to press at 80° to 82° ; in cool weather, at 84° to 86°.

I used to be always against using whey ; the reason was that bad rennet was then employed, but now that the extract, which is never bad, is used, I think it wise to use whey if necessary. I like that plan better than warming milk or letting it grow older.

The whole respectfully submitted,

J. M. ARCHAMBAULT,

Instructor.

ST. HYACINTHE, 1st DECEMBER, 1888.

LIST OF PUPILS.

		DAYS.
Arthur Godin.....	Saint Damase.....	3
J. Adam.....	Barford.....	5
G. Boulay.....	Clifton.....	1
Roy and Boucher.....	Coaticook.....	1
A. Fontaine.....	Weedon.....	6
J. B. Paquet.....	Deschambault.....	3
D. Delâge.....	St. Césaire.....	4
Joseph Maynard.....	Channay, Lake Megantic.....	5
Michel Desnoyers.....	Rouville.....	6
Hormidas Paquet.....	Milton.....	5
Charles Rainville.....	Rouville.....	2
François Forand.....	Roxton.....	6
L. Authier.....	Halifax.....	16
Joseph Brillon.....	St. Hyacinthe.....	6
Louis Lacaillade.....	Eastman.....	6
Jean-Bte. Payette.....	Saint Denis, Riv. Richelieu.....	5
Delphis Lessard.....	Ste. Ursule.....	6
Adélarde Bouchard.....	Baie St. Paul.....	7
Antoine Perron.....	Saint Fidèle, Charlevoix.....	4
Magloire Fleurant.....	Melbourne Ridge.....	6
Félix Blain.....	Belœil.....	7

Théodore Giau
D. Turgeon..
J. Bernard...
A. Adam....
Pierre Bouche
Joseph Bourq
Vital Roy....
Pierre Lamou
Pierre Lapoin
Joseph Lambe
Louis Archamb
Elie Gaudette.
J. B. Dépot...
Rev. F. P. Côté
Aldéric Quinta
Cléophas More
Joseph Blanch
Hormidas Dum
George Maltais
Onésime Mercie
Arthur Daigle.
Paul Gemme...
Madame Pierre
W. C. Simoneau
Hormidas Lapla
Chas. J. B. For
Arthur Martel, f
Edmond Lalibe
D. Adam.....
Alexandre Toup
Vital Champagn
Pierre Baril (anc
Auguste Guérin
Alexis Perrault.
J. B. Desmarais
George Chabot..
Ludger St. Pierr
F. Racicot.....
Alfred Archamb
J. Chabot.....
Victor Beauregar
Charles Martel..

line-threads; I pile
pailfulls of boiling
In this state I leave
holes, I stir it from
s salted, and, half-

s at 80° to 82°; in

was that bad ren-
ch is never bad, is
hat plan better than

LAMBAULT,

Instructor.

DAYS.

..... 3
..... 5
..... 1
..... 1
..... 6
..... 3
..... 4
gantic..... 5
..... 6
..... 5
..... 2
..... 6
..... 16
..... 6
..... 6
ichelieu..... 5
..... 6
..... 7
evoix..... 4
..... 6
..... 7

Théodore Giasson.....	L'Anse-à-Gilles.....	8
D. Turgeon.....	Robertson Station.....	8
J. Bernard.....	St. François de Beauce.....	10
A. Adam.....	Hereford.....	6
Pierre Boucher.....	Saint Paulin.....	8
Joseph Bourque.....	Saint Denis, Riv. Richelieu.....	6
Vital Roy.....	Saint Joseph de Beauce.....	12
Pierre Lamoureux.....	Contrecoeur.....	6
Pierre Lapointe.....	La Malbaie.....	10
Joseph Lambert.....	Rouville.....	6
Louis Archambault.....	Grondines.....	5
Elie Gaudette.....	Verchères.....	2
J. B. Dépot.....	Shefford.....	6
Rev. F. P. Côté.....	".....	—
Aldéric Quintal.....	".....	—
Cléophas Moreau.....	".....	1
Joseph Blanchard.....	Bagot.....	2
Hormidas Dumoulin.....	N.-D. des Bois, Compton.....	12
George Maltais.....	Chicoutimi.....	12
Onésime Mercier.....	St. Paul l'Ermite.....	3
Arthur Daigle.....	Saint Hugues.....	2
Paul Gemme.....	Ste. Marie de Monnoir.....	1
Madame Pierre Beaudry.....	St. Jean-Baptiste.....	1
W. C. Simoneau.....	St. Hugues.....	6
Hormidas Laplante.....	St. Dominique de Bagot.....	6
Chas. J. B. Fortin.....	St. Dominique de Chicoutimi.....	10
Arthur Martel, fils.....	Ste. Marie de Monnoir.....	6
Edmond Laliberté.....	St. Valérien.....	6
D. Adam.....	" ".....	5
Alexandre Toupin.....	St. Hugues.....	6
Vital Champagne.....	Broughton.....	10
Pierre Baril (and his hired man).....	St. Justin.....	7
Auguste Guérin.....	Montreal.....	8
Alexis Perrault.....	Belœil.....	1
J. B. Desmarais.....	Clifton.....	15
George Chabot.....	Ste. Hélène de Bagot.....	1
Ludger St. Pierre.....	St. Marc.....	6
F. Racicot.....	Saint Damase.....	6
Alfred Archambault.....	Saint Guillaume.....	3
J. Chabot.....	Sainte Madeleine.....	3
Victor Beauregard.....	Saint Hyacinthe.....	2
Charles Martel.....	Baie Saint Paul.....	6

Henri Vadnais.....	Saint Cuthbert, Berthier.....	3
F. X. Proulx.....	Saint Raymond.....	8
D. C. Emile Roy.....	St. Félicien, Lake St. John.....	15
J. Alfred Guertin.....	Saint Casimir, Portneuf.....	5
J. B. Lapalme.....	Saint Dominique.....	1
Days passed at the factory.....		382

Many makers, whose names do not appear in the list, came on short visits of less than a day, particularly on the day when Mr. McPherson was with us.

We gave :
Côté. Here is
The inspectors
tory visited.

J. A. McDonald
Jos. Painchaud
Paul Côté.....

Total 1888....

" 1887.....

INSPECTION.

We gave above the reports of Inspectors McDonald, Painchaud and Côté. Here is a table, condensed, of the work of inspection they carried on. The inspectors were this year instructed to pass an entire day at each factory visited.

	Factories.		Creameries.		Combined Factories.	Total factories visited.
	Cheddar method.	Old method.	Separators.	Pans.		
J. A. McDonald.	123	2	2	
Jos. Painchaud..	46	10	15	9	
Paul Côté.....	73	23	9	
Total 1888.....	242	35	26	9	312
" 1887.....	164	62	25	10	9	270

Berthier..... 3
 8
 St. John..... 15
 rtneuf..... 5
 1
 382

list, came on short
 Mr. McPherson was

EXPERIMENTS IN BUTTER-MAKING.

Mr. Alexis Chicoine, of St. Marc, Verchères, submitted, at the L'Assomption meeting, twelve samples of butter, consisting of twelve tubs of butter, of 25 lbs. each, made under conditions differing, in part, from those of his specimens, of 1887.

Messrs. Vaillancourt, Chs. Langlois, and W. W. Pickett were named as experts to decide upon the relative quality of these samples.

We give the following table, showing the details of the method of manufacture pursued, with the judgment of the experts in the margin. The remarks of Mr. Chicoine follow, together with the opinions expressed on the subject by the members of the meeting.

The samples are divided into 6 lots of 2 samples each. In each lot, the two samples only differ from each other in one point: one sample has been *worked only once*, the other a second time 24 hours after the first working, which was done in the same way for both samples.

DETAILS OF THE MANUFACTURE. CLASSIFICATION.

	Pounds of Cream used.	Age of the cream, when churned, in hours.	Pounds of cream to the pound of butter.	Pounds of milk per pound of butter (calculated from the cream) uncertain.	Treatment of the cream.	Revolutions of the churn per minute.	Temperature of churning.	Time of churning in minutes.	Worked once or twice.	The experts classified the samples by numbers which show the range of quality between them.	
1st. Series.			lbs. oz.	lbs.							
Cream of July 2nd.	1	192	3-2	23½	Cooled to 42° warmed 5 hrs. after to 56°.	50	56	30	1	Class 1	
	2										2
	3	231	48	3-8					26	kept at 56°	
4	2										
5		260	96	4-2	30¾	kept at 56°	36	56	45 to 60	1	4
6	2										
2nd Series.											
Cream of July 3rd.	7	214	5	3-5½	25⅓	kept at 55°	50	55	40	1	2
	8										
	9	229	24	3-6¾	27½	kept at 55°	36 to 40	55	45 to 60	1	10
	10										
	11	228	72	3-11¾	28¼	kept at 55°	36 to 40	57	45 to 60	1	9
12	2										

TO THE PRES

Mr. President a

Once more
keeping-butter.
time.

The report here, shows that for I kept cream samples, only the Danish plan, from the separate acetify it a little, could not get it be we can cool the n this refrigerator :

While I was notes as I went al I saw that those butter than those move at. Not ha other samples we subject to-day ; bu deal to be learned the manufacture o

The samples w of day was churned bers from 1 to 6 we gave 190½ lbs. of b 7 to 12 were mad 192½ lbs. of butter ; the pound of butter

Let us take eac h, churned at 56° minutes, and it took churning of the seco at 55° and 50 turns t lbs. of milk to the p the pound of butter.

Numbers 3 and 4 milk were here requi

TO THE PRESIDENT OF THE DAIRYMEN'S ASSOCIATION OF THE PROVINCE OF QUEBEC.

Mr. President and Gentlemen,

Once more I come before you to address you on the manufacture of *keeping-butter*. I do not intend to detain you for any great length of time.

The report of the judges, who examined the samples that I brought here, shows that I have carried my experiments further than I did last year; for I kept cream up to the fourth day, and this I treated as in the other samples, only that it was warmed up to 56 degrees. In one case, I followed the Danish plan, that is, I cooled the cream as low as possible, as it came from the separator, and warmed it up again in the evening, in order to acetify it a little, churning it the next morning. As to this last essay, I could not get it below 42°; but, with a good refrigerator like Mr. McPherson's, we can cool the milk down to 35°, almost instantaneously. Unfortunately, this refrigerator arrived too late to assist me in preparing my samples.

While I was making these samples, I was too busy to examine my notes as I went along; but when I found time to examine them attentively, I saw that those churned at the rate of 50 turns a minute yielded more butter than those churned at 36 turns, the pace my churns are calculated to move at. Not having taken notes to ascertain the pace at which certain other samples were churned, I cannot report with any certitude on the subject to-day; but this will show you, gentlemen, that there is still a good deal to be learned about the yield given by different modes of conducting the manufacture of butter.

The samples were made from the milk of two separate days. The cream of day was churned on three distinct days; two numbers a day; the numbers from 1 to 6 were made from the milk of July 2nd; 5070 lbs. of milk gave 190½ lbs. of butter—26.61 lbs. of milk to the pound of butter. From 7 to 12 were made from the milk of July 3rd; 5069 lbs. of milk gave 192½ lbs. of butter; 2 lbs. more than the former day—26.33 lbs. of milk to the pound of butter.

Let us take each of these churnings: numbers 1 and 2 are cream 24 hours old, churned at 56° and at 50 turns to the minute; the butter came in 30 minutes, and it took 23½ lbs. of milk to make a pound. Next, for the first churning of the second day, Nos. 7 and 8 are of cream 5 hours old, churned at 55° and 50 turns to the minute—butter came in 40 minutes. It took 25½ lbs. of milk to the pound of butter, a difference of nearly 2 lbs. of milk to the pound of butter.

Numbers 3 and 4 are of cream 48 hours old, churned at 55°; 26 lbs. of milk were here required for a pound of butter; but, as to the pace of

ING.

nitted, at the L'As-
ig of twelve tubs of
g, in part, from those

Pickett were named
samples.

f the method of ma-
in the margin. The
inions expressed on

ch. In each lot, the
one sample has been
er the first working.

SIFICATION.

minutes.	Worked once or twice.	The experts classified the samples by numbers which show the range of quality between them.
60	{ 1 2	Class 1 " 5
	{ 1 2	" 9 " 7
60	{ 1 2	" 4 " 3
	{ 1 2	" 2 " 6
60	{ 1 2	" 10 " 10
	{ 1 2	" 9 " 8

churning and the time it took, there is nothing, in this case, very certain. My churns move generally at the rate 36 turns a minute, and the butter is usually 45 to 60 minutes in coming.

Numbers 9 and 10 are of 24 hours' cream, and made nearly in the same way as the preceding ones. It took $27\frac{3}{8}$ lbs. of milk to make a pound of butter, a difference of $1\frac{1}{2}$ pounds. Numbers 5 and 6 are of cream 96 hours old, churned at 56° , and in the same manner as the preceding: they took $30\frac{3}{8}$ lbs. to the pound of butter.

Numbers 11 and 12 are of 72 hours' cream, churned at 57° ; the rest of the work done in the same way as in the former numbers. It took $28\frac{1}{4}$ lbs. of milk to give a pound of butter; a difference of more than 2 lbs. to the pound of butter.

Before going any further I should tell you that the figures in these statements are only approximate; for as the cream of every day was kept in the same vessel, it may have happened that in drawing off the cream through the same tap, some of it may have been either thicker, or more fluid, than the rest, and this may have led to erroneous conclusions.

And now, gentlemen, what is the cause, or rather what are the causes that have led to these results? My opinion is that the pace of the churning has a great deal to do with them, but there is something more which, if we try with attention and perseverance, we shall discover.

What would greatly aid the advancement of our industry is a school, or rather two schools, of instruction in butter-making, assisted with Government funds, where the maker might make experiments in the art of making as much butter as possible suitable in quality to the market for which it is intended. It is certain that several thousand dollars worth of butter are lost every year because the butter does not fulfill the above conditions. If you make export-butter and sell it in the local market, you will not get so high a price as if you made it for the local market and sent it in every week.

I believe, gentlemen, that it is time our association took steps to agree if possible with some dealers in Montreal and Liverpool and with a Transatlantic Steamboat Company to afford proper opportunities to all the creameries and factories who wish to send off their goods every week. In this way we shall be able in a few years to compete on equal terms with all the foreign butter that is sent to the English market. Our butter arriving on the market within a fortnight after being made would not lose its aroma and could vie advantageously with those butters which remain in the creamery some times for a month and afterwards another month in Montreal; when this put on the market it is very sure it cannot compete with butter which almost invariably gets there within a week of its manufacture. I do not mean

say that we can with pains, we just now is school cheese-schools, you will soon see

Nobody can caused the agric had been larger good; for, if we inspectors to ea progress. In s cannot be in ev factory has to w visit it, and dur made and the y Government mu enable us to con vain.

And so, gen are about to add ested, I am sure

M. J. DE L. with pans or basi soon found out, a ment is required when pans or bas Mr. Chicoine, in dition in which n ing milkings are finished in the co basins where it c remains until chu cream was not fi did not churn c experience having creased, and the c

say that we can make butter of equal quality with the Danish goods ; but, with pains, we too shall arrive at perfection. What we want, as I said just now is schools, Let the Government endow two or three butter-and cheese-schools, choosing practical and earnest men to be at their head, and you will soon see us competing successfully with other countries.

Nobody can say that our association, small as are its means, has not, caused the agriculture of the country to make great progress. If our means had been larger, there is no doubt we should have done twice as much good ; for, if we had two cheese-and two butter-schools, with one or two inspectors to each school, we could advance much faster along the path of progress. In spite of the three inspectors doing all in their power, they cannot be in every place where there is need of them : a creamery or a factory has to wait weeks, and even months, before the inspector is able to visit it, and during that time butter and cheese of inferior quality is being made and the yield is often as bad as the quality. To remedy these evils, Government must help us ; it is our part to ask for what is necessary to enable us to continue our forward march, and I trust we shall not ask in vain.

And so, gentlemen, I will not detain you any longer, as other lecturers are about to address you, in whose words you will be far more deeply interested, I am sure, than you have been in anything I have said.

Thanks, gentlemen, for your kind attention.

ALEXIS CHICOINE.

DISCUSSION.

M. J. DE L. TACHE.—The factory of Mr. Chicoine was formerly worked with pans or basins. In 1884, Mr. Chicoine bought cream-separators, and soon found out, as all butter-makers do find out, that another style of treatment is required for cream derived from separators than that pursued when pans or basins are used. After two years of practical experience, Mr. Chicoine, in 1886, arrived at these conclusions : Under the ordinary condition in which milk is delivered at our factories—both morning and evening milkings are delivered in the morning—the skimming being done and finished in the course of the forenoon, and the cream being put into the basins where it cools itself down to 50° to 55° ; at which temperatures it remains until churning time arrives ; Mr. Chicoine found, I say, that *this cream was not fit to churn on the morning of the next day*. Mr. Chicoine did not churn cream treated in this way until 48 hours after skimming, experience having taught him that, by so doing, the yield of butter was increased, and the qualities of keeping and *body* were more surely secured.

In support of his practice Mr. Chicoine presented before our association, in 1887, eight samples of butter made as follows : all from the same vessel of cream ; divided into four lots, of two samples each, churned, respectively, 4, 24, 48, and 66 hours after being skimmed by means of the separator ; the cream kept all the time at about 55° ; in each lot, a sample worked only once and packed immediately, the other worked once, at the same time and in the manner as the former, and worked over again lightly the next day ; glass-jars used to contain the butter, which was kept in an ordinary cellar, at 60° up to January, 1888, when it was submitted to the judgment of experts at the Association meeting at St. Hyacinthe. The following is the result of the experts' investigation :

	Made.	Age of the cream.		Classification by the experts.	
1st lot.	{ 1	15th June	4	Worked once	5
	{ 2	15th "	4	Re-worked	4
2nd lot.	{ 3	16th "	24 "	Worked once	4
	{ 4	16th "	24 "	Re-worked	5
3rd lot.	{ 5	17th "	48	Worked once	2
	{ 6	17th "	48	Re-worked	3
4th lot.	{ 7	18th "	66	Worked once	1
	{ 8	18th "	66	Re-worked	6

The figures of the experts show the relative quality of the samples considered by themselves ; all were of good quality except number 8, which was flat or vapid (*eventé*).

Mr. Chicoine, after this decision, which thoroughly confirmed him in his views (see last year's report, p. 432), described the process he recommended in these words : " The skimming is done with the separator, and the cream having been cooled, as rapidly as possible, down to 50° or 55°, is maintained at that temperature till the next day. In the evening of the second day, I allow it to rise to 56° or 57° to be ready for churning the next day, i. e., the third day (*surlendemain*) from skimming."

And he added : " Although the best of the samples was made from four days' old cream, I think it would be hazardous invariably to wait till the fourth day, unless the cream were kept at a lower temperature than 55°."

The conclusions drawn from this experiment were thus expressed in the same report : The experts, who were evidently good judges, decided, without knowing anything about the derivation of the samples, that the older the cream was and the less the butter was worked, the better was the product. To this, there are only two exceptions ; the *old* sample, that of the last day worked the second time, is the worst of all the samples ; while the *youngest*, worked twice over, is the best of its series, though not

the best of the though it is cl butter of the l the last of the of the whole l

But under coine was adv to observe the

The Danis ing of the crea before being co 75° or 80° . Tl

at a greater pa observed by Ml details of whic

Six sample former lot bein; from 75°, the t 33 degrees. Ten that temperatur a minute, instea churns. The otl of the 1887 exp and 96 hours af

July 3rd, al samples each), i 5, 24, and 72 ho churned at 50 tu

The 12 sam; mon cellar till t -two of whom v have heard the j cream with but c have been submi nents. With th old) of the other s 24 and 5 hours-c follow, as they c

And, now, h contradiction bet on their face the

before our association: all from the same series each, churned, resked by means of the separator in each lot, a sample worked once, at the end of 24 hours, and sked over again lightly which was kept in an ice-chest as submitted to the Hyacinthe. The fol-

Classification by the experts.

5
4
4
5
2
3
1
6

of the samples contained in number 8, which

confirmed him in his decision. He recommended the separator, and the cream at 55°, is maintained at the second day, I think the next day, i. e.,

was made from cream invariably to wait till the temperature than 55°." Thus expressed in the judges, decided, that the best samples, that the best, the better was the old sample, that all the samples; series, though not

the best of the lot. This experiment confirms Mr. Chicoine in his method, though it is clear there is a definite limit to its practical working: the first butter of the last day, worked only once, is the best of the eight samples; the last of the same day, worked over twice, is, on the contrary, the worst of the whole lot."

But under different conditions, different results may follow. Mr. Chicoine was advised, in 1888, to change certain points in his procedure, and to observe the results.

The Danish experts invariably practice and recommend the rapid cooling of the cream to a very low temperature when it leaves the separator, before being committed to which instrument the milk had been raised to 75° or 80°. They advise churning sweet or only slightly acidulated milk at a greater pace than usual, and at a lower temperature. These rules were observed by Mr. Chicoine in the preparation of his experiments in 1888, the details of which follow:

Six samples of butter, in 3 lots, were made July 2nd. The cream of the former lot being passed over the refrigerator was instantaneously reduced from 75°, the temperature at which it left the separator, to 42°; a fall of 33 degrees. Ten hours afterwards, it was slowly heated to 56°; churned, at that temperature, the next morning (24 hours after skimming), at 50 turns a minute, instead of from 36 to 40, the ordinary pace of Mr. Chicoine's churns. The other two lots were treated in exactly the same way as those of the 1887 experiments: cooled to 55°; churned with 36 to 40 turns, 46 and 96 hours after skimming.

July 3rd, another lot of cream was made into 6 samples (3 lots of 2 samples each), in just the same way as those of 1887, churning being done 5, 24, and 72 hours after skimming. The 5 hour-old cream, however, was churned at 50 turns, instead 36 as the others were treated.

The 12 samples were all packed in the common tubs, and kept in a common cellar till to-day (Jan. 23rd, 1889). These are they that the experts—two of whom were on the jury last year—have just decided upon. You have heard the judgment: The best samples are those made from the fresher cream with but one working of the butter; they are exactly those which have been submitted to conditions different from those of last year's experiments. With the exception of one single lot (that made from cream 96 hours old) of the other samples, the second sample, twice worked, from these creams 24 and 5 hours-old, is still better than of all the other samples. These last follow, as they did last year, the rule that age produces quality of flavor.

And, now, how can we possibly reconcile these differences? Is there a contradiction between the decisions of 1888 and 1889? The decisions bear on their face the mark of exactness; to classify with so much correctness

the order of a set of samples whose derivation was unknown to the judges, shows that they were well up in their duties: nothing can be clearer than that.

In my opinion, the changes introduced into the method of working explain the whole affair.

In what condition in the milk was the butter or were the globules of fatty matter? The scientists of to-day who study the milk-question, such as Soxhlet, Duclaux, Fleischman, agree in saying that these globules subsist in the milk in a liquid state when they leave the udder, at 98°, and that they remain in that state, even at a low temperature, although the point of solidification (*or of congelation*) of butter is about 92°. This phenomenon is called *surfusion*, and is due to the fact that the fatty matter, in milk, is in a very finely divided state. Each globule is, according to the same savans, surrounded by a liquid ring, the composition of which is different from, and the density greater than, the skimmed milk from which it is, nevertheless, formed. These rings or sacks, in virtue of that other phenomenon of nature—capillary attraction—prevents the little drops of butter from glueing themselves together. Cream, then, is a collection of drops or globules of liquid butter, massed together as closely as their condition will allow, but which do not touch one another. This collection is formed by the separation of the butter-globules—that is, the lighter matters—from the skimmed milk—the heavier matter.

This cream will remain *cream* as long as neither churning nor any other cause creates a change of condition in it by which the globules become soldered together and their conversion into *butter* ensues. Even the thickest cream that the separator can extract is not butter.

How then is the formation of butter brought about? In the investigation of this point, chemists have made some very curious experiments with an emulsion of water and oily matters, having about the same density as water. This water, divided into globules or droplets, has endured cooling down to—6° F. (6 degrees below zero) without freezing, that is, provided it is kept perfectly still; but the slightest movement that brings two of the globules into contact causes them to form crystals of ice at once. In other experiments also made with water, the solidification of the globules was brought about in a very different manner, depending upon the temperature at which it was promoted; when this was low, well defined crystals were obtained, almost invariably distinct or separate from one another; when the temperature was a little higher, the globules were solid, more or less round, and adhered to each other by a single point on their surfaces, as two balls glued to each other might do; at a still higher temperature, some of the drops retained their spherical form, while others became solid, by

either crush
surface of th

There is,
to obtain bu
will certainly
can skim of
"gathered"

Starting
explained in

The diffe
churning at
grains are fin
washing out o
all the sample
explain the fa
gave the best

M. Chicoi
ing, other thi
of *casein* left
sists in a dissc
state. Hence,
of the *casein* f
stale cream-bu
finely divided l
ing or pressur
more mucilagi
globules of bu
has made more
cream that was
cooled down fr
this fall of tem
ter-grains were
the frost. The
spite of the fre
in the churning
perature much l
proportionally
butter, in such
buttermilk, run
of this mass of
of butter, made

either crushing themselves together, or by spending themselves over the surface of the former and partly enveloping them.

There is, on the other hand, an experiment any one can make; that is, to obtain butter by freezing the cream. Freeze it in sharp frost, and you will certainly get butter ready-made, which, when the mass is thawed, you can skim off the surface of the cream. The butter will be more or less "gathered" (*assemblé*), but the grains will be fine and well shaped.

Starting from these facts, the results arrived at by M. Chicoine may be explained in a fairly rational manner.

The difference in the formation of the grains shows the importance of churning at the lowest temperature that operation will admit: the butter-grains are finer in proportion to the lowness of the temperature, and the washing out of the buttermilk with water is most successfully done. But, as all the samples of 1888 were churned at the same temperature, how can we explain the fact that, contrary to the results of 1887, the youngest cream gave the best butter? Thus:

M. Chicoine made *keeping* not *fresh* butter. Now, the quality of *keeping*, other things being equal, depends in great measure upon the quantity of *casein* left in the butter. In fresh milk or fresh cream, the casein subsists in a dissolved state; in staler milk or cream it may be in a *curdled* state. Hence, it follows as a principle, that it is easier to extract the whole of the casein from fresh-cream-butter, by pressure or by washing, than from stale cream-butter. In fact, when once *curd* is shut up in the butter, in pieces finely divided by the action of the churn, it is not within the power of washing or pressure (*malaxage*) to extract it. On the other hand, fresh milk is more mucilaginous or gummy than staler milk; the adhesion of this to the globules of butter is more forcible than in the case of buttermilk which age has made more liquid (in water). But, in 1888, in the sample classed No. 1, the cream that was churned fresh had been, at its exit from the separator, suddenly cooled down from 75° to 42°. The cream having been thus seized upon by this fall of temperature, we may conclude that a considerable number of butter-grains were formed, just as in the case of cream subjected to the action of the frost. The ease with which the butter was "brought" in churning, *in spite of the freshness of the cream*, proves that the cooling had had its share in the churning. But these droplets of butter, thus formed at 42°, a temperature much lower than the churning temperature—55°, must have been proportionally more crystallized, of a better grain. The washing of the butter, in such a state of things, was easier; the casein, all dissolved in the buttermilk, running out easily with the washing-water from the interstices of this mass of fine crystals of butter; and the result was that this sample of butter, made from fresh cream indeed, but that cream cooled down to 42°,

was pronounced to be the best of the twelve samples submitted to the experts for their decision.

The cream of sample classed No. 2 (5 hours' old cream), had not been cooled, but, as in the case of No. 1, the pace of the churning was faster than usual ; which greater disturbance may, perhaps, promote a more sudden formation and a more perfect crystallization : in this case there is no other solution of the question. As the experiment was in duplicate, and as the second samples of the 24 hours' and 5 hours' old cream, worked a second time, occupy a corresponding relative position (classified 5 and 6), we may be allowed to retain this solution unless further experiments prove it to be erroneous.

Hence, we conclude :

That with the changes of process introduced into the 1888 experiments, Mr. Chicoine obtained better samples of butter than with his ordinary process, from the same cream and at the same time. This was not unforeseen, since the Danish practice had suggested the idea of these changes to Mr. Chicoine. Let all our butter-makers make a trial of this method, on a small scale : it may be thus condensed : The cream, on leaving the separator, should be cooled down to 35° or 40° at which temperature it should be kept for at least 4 or 5 hours ; towards evening, the cream should be warmed up to 55° or 57°, and kept there all night ; churning to be done 24 hours after skimming, at the greatest pace the churn can, practically, be worked ; careful washing, in grains as small as possible ; just so much working as may make a butter thoroughly free from unnecessary moisture.

This last point brings up another question which arises from the experiments of 1888. One working produced, with fresh cream, the best butter. This shows that the lesson of 1887 is completed : the less butter is worked, provided that it is worked enough, the better it is. The best samples of 1887, and, again, of 1888, were only worked once. It is rather difficult to say exactly where one should stop, but it may be laid down as a general rule, from that point of view, that the best of all methods is that which reduces the number of times the butter has to be worked.

In conclusion, let us observe that what we have practically learnt by ocular inspection is that the *granular* way of making butter is by far the best, and that it is impossible to carry this out to perfection, *under the conditions we have noticed in these remarks, without the use of ice.*

M. BEAU

You have whom have culture as w been able, a

I have, the Dairym ships the Bi priest from cial manner,

No doubt were official taking officia it assured of agricultural

M. FORT

M. BEAU that I made c consisting of in the fishing wind, you be a fishery.

We ought fish-manure-f to make them then, to grant devote itself to

I wish to vince of Quebe those of Franc of superphosph Ontario or Ge

Some time which I must c That is : the fa States ! At Poi stockyards, and here where this

REMARKS BY M. LOUIS BEAUBIEN.

M. BEAUBIEN.—You will allow me to make a motion.

You have witnessed the support we receive from the clergy, four of whom have taken part in this convention. This proves that, as regards agriculture as well as the superior education of our people, the country has never been able, and is still unable, to do without the aid of its clergy.

I have, therefore, to propose to strengthen our alliance with that body : the Dairymen's Association will benefit by this. I propose that their Lordships the Bishops of the province be requested to select, each of them, a priest from their dioceses whose duty shall be to interest himself, in an especial manner, in the labours of our association.

No doubt, all the dioceses are even now represented, but if their mission were official it would be more effectual. We have many very active, painstaking officials ; but our association would have a still higher standing were it assured of the co-operation in our parishes of these devoted apostles of agricultural progress.

M. FORTIN supported this motion.

M. BEAUBIEN.—Another motion which needs no discussion : in a trip that I made down the Lower St. Lawrence, I saw a vast quantity of manure, consisting of the entrails and waste-pieces of fish, absolutely thrown away in the fishing-establishments ; so much so, that when you are meeting the wind, you become aware, even at a great distance, that you are approaching a fishery.

We ought to request the Government to aid in the establishment of a fish-manure-factory. It is only necessary to dry the waste-products so as to make them fit to be distributed over the country. I ask the Government, then, to grant a reward as an encouragement to any company that shall devote itself to this industry.

I wish to draw your attention to another point. We possess in the province of Quebec very rich deposits of phosphate of lime : richer by far than those of France or Russia. Is not it shameful that we have no manufactory of superphosphate in the province, but are obliged to buy that manure in Ontario or Germany ?

Some time ago, I read, in the "Country Gentleman," an advertisement which I must call a disgrace to this country : "*Canadian ashes for sale*". That is : the fat of our land is exported to enrich the farms of the United-States ! At Point St. Charles, I saw them loading cars with dung from the stockyards, and this, too, was for the States ! There are many poore farms here where this manure might be employed, and yet it is sent off to enrich

the Americans. Not only do our people emigrate to the States, but we send our very manure thither! Ought we not to put a stop to this, and make an end of the enormous loss we incur every year?

I ask, then, the board of directors to address the Government once more begging it to make a grant for the promotion of a manufactory of those materials which Providence has endowed us with, for the manufacture too, in the province of Quebec of the superphosphate of which are so much in need. I do not ask Government itself to embark in this manufacture, but I invite it to appeal to capitalists, and to give a bonus for every ton made. Let us imitate France on this point; and, if, finding ourselves in Germany, we see placarded on every wall: "Canadian phosphates for sale," we shall at least be able to say: "Even if his Pactolus does empty itself into a sea within the confines of our neighbours, still a few grains of the gold its sands conceal remain within our borders." (1)

THANKS OFFERED TO THE INHABITANTS OF L'ASSOMPTION.

M. L'ABBÉ MONTMINY

You are too kind, gentlemen. Allow me, in the names of the members of the association, to thank you for your obliging reception and your friendly hospitality. Our Secretary has offered to Mr. Marsan the amount necessary to reimburse the expenses he and the inhabitants of your town have been at, and lo, they refuse to accept our money! We thank the directors of the Seminary of L'Assomption, the inhabitants of the place, and Mr. Marsan.

May the Almighty prolong our lives, so that we may next year meet again at Arthabaska, once more to labor in behalf of the prosperity of our beloved Canada!

And so, gentlemen, I will not say good-bye, but only wish that you may fare well till next year. Doubt not but that we shall all remember with pleasure our sojourn at L'Assomption; and, should a favorable breeze waft our sails to your harbor once more, it will be with pleasure that we shall see you and your pleasant town again. Once more: au revoir. (2)

(1) Pactolus—the o of which is *very long*—was a river of Lydia, the sands of which were auriferous. *Trans.*

(2) *Au revoir*—"Till we meet again,"—is as purely English, nowadays, as *gentleman*, *stock*, and *turnips*, are purely French. *Trans.*

Only fo
1. Mr.
2. Mr.
3. Mr.
4. Mr.
MM. P
petition as l
M. Rouleau
the first tria
was thus pu
we give the
The fol
trials:

Date
when trial

Weight of each day's milk.	}	1
		2
		3
		4
		5
		6
		7

Total . . .

Total cre

Total bu

Witnesses

Mr. Bes
for that day,
numbers, 18
his cow dese

COMPETITION OF CANADIAN COWS.

Only four cows were entered for competition this year :

1. Mr. Ignace Plamondon, Portneuf, for his cow, " Féconde " ;
2. Mr. Damase Paradis, Aylmer, for his cow, " Rougette " ;
3. Mr. Zotique Bessette, Richelieu, for his (unnamed) cow ;
4. Mr. F. E. Rouleau, St. Barthélémi, for his cow, " Canadienne " .

MM. Plamondon and Bessette alone carried out the terms of the competition as laid down by the association. Mr. Paradis sent in no report ; and M. Rouleau forwarded an incomplete report of a *second* trial of his cow, the first trial having been interrupted by an accident. Mr. Rouleau's cow was thus put out of the competition, but, for the information of our readers, we give the report sent in.

The following is a condensed table of the results obtained in the three trials :

	Mr. Bessette's Cow.	Mr. Plamondon's Cow.	Mr. Rouleau's Cow.
Date when trial began.			No date.
Weight of each day's milk.	lbs.	lbs. oz.	lbs.
{ 1st day..	56½	34-10¼	38
{ 2nd " "	47½	33-8½	39
{ 3rd " "	55½	35-3¼	38
{ 4th " "	59	26-12½	38½
{ 5th " "	58½	32-10½	38
{ 6th " "	59½	38-12½	38
{ 7th " "	...	35-11¾	36
Total.....	336½	237-5½	265½
Total cream....	Not weighed.	25-8¼	4-3
Total butter....	lbs. oz. 15 - 6	lbs. oz. 13-4¼	lbs. oz. 11-14
Witnesses' names	Isaac Ashby. Théodore Lussier.	J. B. Martel. J. Plamondon.	H. Bacon. Oct. Sévigny.

Mr. Bessette omitted one day of his trial-week, so that, by adding 56 lbs. for that day, the proportional yield of butter by his cow would be, in round numbers, 18 lbs. A remarkable result, and it may be said with truth, that his cow deserves to be..... a Canadian! Unfortunately, however, the

Association's expert, Dr. Couture, cannot accept her as a Canadian. This is his report :

Quebec, Feb. 1st, 1889.

To M. J. DE L. TACHE,
Sec. D. Ass. P. Q.

DEAR SIR,

I have the honour to inform you that I have seen M. Zotique Bessette's cow, at Richelieu, which took part in the competition of milch-cows instituted by your association.

This cow has no Canadian blood in her, being, as far as I can judge, a half-bred Ayrshire and shorthorn (Durham). I cannot understand how any one can have dreamt of entering her as a Canadian.

On this point, permit me to offer a suggestion. Would it not be better to throw open the competition to all breeds and races? You would have more competitors, and the aim of your association, would be more completely gained : the increase of the production of milk by every possible means.

I have the honor to be, &c.

J. A. COUTURE,
M. V.

In consequence, Mr. Ignace Plamondon won the association's first prize : \$40.00. His cow had already won the second prize in a previous competition, but the result of her trial this year exceeded that of the preceding year.

FACTORY REPORTS.

TO THE HON. P. B. DE LABRUÈRE, PRESIDENT,
AND THE MEMBERS OF THE DAIRYMEN'S ASSOCIATION
OF THE PROVINCE OF QUEBEC.

Gentlemen,

I have the honour to submit to you the report for the current year of the operations carried on at my creameries.

On comparing the quantity of butter made therein this year with the quantity made in preceding seasons, I find that it does not equal the half of that made in the worst of those years, and this falling off I attribute to the great drought that we have experienced.

Eighty-s
303,607 lbs. c
to the pound

Thirty (3
creamery. T
to the pound
district, for t
houses of the
manner, so th

Our St. A
milk, from 20
24½ lbs. to the
Ambroise, and

I submit t
production of
of the heads o
on account of

The super
pan is used ov
of the milk du
will cite the fo
usual ; it will
made will not i
higher, the but
pied in churni
seem to me unc
is, that the hea
rator must proc
perhaps, be obj
between the sep
to this I reply
form by itself,
whatever, as in
lity. I do not
the good system
say that a good
will make butte
of the associati
will hinder the
in the path of t
them : they will
without our add

Eighty-seven (87) patrons delivered at my creamery in St. Alexis 303,607 lbs. of milk which gave 12,393 lbs. of butter; about $24\frac{1}{2}$ lbs. of milk to the pound of butter.

Thirty (30) patrons delivered 82,532 lbs. of milk at my St. Julienne creamery. This yielded 3,396 lbs. of butter; that is, it took $24\frac{1}{2}$ lbs. of milk to the pound of butter. I shall never receive a great deal of milk from this district, for the municipality is in great part formed of townships, and the houses of the farmers are dotted about here and there in a most irregular manner, so that the milk-cart has to much ground to travel over.

Our St. Ambroise creamery (Lalime & Magnan) received 131,373 lbs. of milk, from 20 patrons, whence were extracted 5,417 lbs. of butter: about $24\frac{1}{4}$ lbs. to the pound of butter. This is the first year of the creamery at St. Ambroise, and it only began work on the 25th. June.

I submit to your consideration that the cause of the lessening of the production of butter and of its exportation depends on the interested motives of the heads of manufactories, who prefer cheese-making to butter-making, on account of the larger profits drawn from the former.

The superiority of flavor of aroma in butter made in dairies when the *pan* is used over separator-made butter depends on the heating and stirring of the milk during the operation of the centrifuge. To support my opinion I will cite the following fact: let good cream be churned a little warmer than usual; it will be longer in being converted into butter, and the butter when made will not have the same fine flavor; if the heat of the cream be carried higher, the butter will be proportionately inferior the longer the time occupied in churning. Hence, we must conclude from the facts cited, which seem to me undeniable, that equal causes must produce equal effects; that is, that the heating and stirring of the milk during the working of the separator must produce the same effects as a too lengthy churning. It may, perhaps, be objected that the acetification of the cream which takes place between the separator and the churn remedies the evil caused by the former; to this I reply that, when a material is once tainted and it is destined to form by itself, without any admixture with other matters, any product whatever, as in the present case, that product will not be of a superior quality. I do not mean by these remarks to vilify the separator, but to defend the good system of *pan raising* which certain persons are crying down. I say that a good butter-maker, working in a creamery fitted up with pans, will make butter of the first quality. If, upon consideration, the members of the association declare that one of those two systems is not correct, they will hinder the progress of the dairy-industry. Let us not raise difficulties in the path of the proprietors, but leave the choice of the two systems to them: they will always find plenty of difficulties in dealing with the patrons without our adding to them.

The whole respectfully submitted to the consideration of the President and members of the Dairymen's Association of the Province of Quebec by their very humble and devoted servant,

A. MAGNAN.

ST. ALEXIS, DEC. 31, 1888.

TO THE HON. P. B. DE LABRUÈRE,

PRESIDENT OF THE DAIRYMEN'S ASSOCIATION,

ST. HYACINTHE.

Sir,

Having been admitted as a member of the Dairymen's Association of this province, may I hope to have the honor of addressing it at its next meeting, in order to submit for its consideration the question: would it not be opportune to beseech our Legislature to amend the law by compelling our agricultural societies to expend the greater part of their grant in the purchase of clover-seed, and to give a good number of prizes to such of their members as shall show the best pastures and the finest meadows and fodder-crops. A competition of this kind might be substituted for the competition of the best cultivated farms, and be held alternately with our exhibitions. I believe, trusting to practical evidence, that this alteration would have the effect of tripling the profits of our farmers.

Though I cannot, in a letter, adduce all the arguments that tell in my favor, still, I may be permitted to submit a few of them to your notice; but, before doing so, it may be as well to remind you that all the friends of the farmer agree on one point, that is: that all nutritious matters that have been carried off by the annual grain-crops must be restored to the soil, if agriculture, the nursing mother of the nations, is to assist its (1) functions, and prevent the expatriation of our population. Do the prizes given for the best managed farms restore to the soil the nutriment it has been deprived of? Do they hinder emigration? If the answer is in the affirmative, I submit that it is only in part that they fulfill these conditions. These prizes are won by wealthy members who can afford the necessary outlay—their children never emigrate—, while the great majority dare not thus expend their means. It is true enough that this competition, as it is managed, has the effect of causing these few competitors to grow larger crops, but this proceeds much more from the good drainage and the good working of their farms, than from the plant-food they have returned to their land.

(1) *Lui subvenir.* Does *lui* refer to *la terre*? Trans.

The propo
by the rich. I
which, taking
great roots, w
thus preserve i
iferous plant w
which, in its tu
it possessed be

I trust, sir,
ments, will ind
serves. I have
I am therefore
own choice of t

The whole

TO THE HON. P

Sir,

In the cours
with Mr. Côté,
President you an
a creamery, I pr
him was, what I

Mr. Côté ha
notes taken duri
that they may at
the pastures on t
Rivers.

The proposed change would be put in practice by the poor as well as by the rich. In a short time, every farm would be covered with clover which, taking its nutriment in great measure from the subsoil through its great roots, would conceal the ground with its fine leaves and flowers, and thus preserve it from the desiccating effects of the sun and wind. This odoriferous plant would necessitate a great increase in the stock of the farm, which, in its turn, would restore to the soil those nutritious matters which it possessed before its rescue from a state of nature.

I trust, sir, that these considerations, united to your scientific acquirements, will induce you to preside at a discussion as full as the question deserves. I have never had the honour of being present at your meetings, and I am therefore ignorant whether the speakers address the audience at their own choice of time, or whether their speeches are arranged in order.

The whole submitted to your judicious consideration.

O. MAGNAN.

CAP-SANTE, Nov, 1888.

TO THE HON. P. B. DE LE LABRUÈRE,

PRESIDENT OF THE DAIRYMEN'S ASSOCIATION,

ST. HYACINTHE.

Sir,

In the course of last summer, I had the pleasure of becoming acquainted with Mr. Côté, inspector of the Dairymen's Association, whose worthy President you are, when he was visiting our factories. As I had just opened a creamery, I pressed him to inspect it. What seems to have most struck him was, what I call, "The book of statistics."

Mr. Côté having requested me to place before your Association certain notes taken during the summer, I beg to forward them with this, trusting that they may at least impart to your Association some idea of the value of the pastures on the north of the St. Lawrence, between Quebec and Three-Rivers.

I remain, Sir,

Your obedient servant,

L. P. BERNARD.

CAP-SANTÉ CREAMERY.

STATISTICS FOR THE SUMMER 1888—FROM JUNE 1ST. TO OCTOBER 31ST.

- Lowest price of butter 20 cents.
- Highest “ “ 23 $\frac{1}{4}$ “
- (1) Average price for the season 21 $\frac{3}{8}$ cents.
- Smallest weight of milk for a pound of butter 19. 18 lbs.
- Greatest “ “ “ “ “ 22. 54 “
- (1) Average “ “ “ “ “ 20. 86 “
- Least butter from 100 lbs. of milk 4 lbs. 7 oz.
- Most “ “ “ “ “ 5 lbs. 3 oz. 8 dras.
- (1) Average “ “ “ “ “ 4 lbs. 13 oz. 4 dras.
- Lowest payment to patrons per 100 lbs. milk 71 $\frac{1}{8}$ cents.
- Highest “ “ “ “ “ 97 “
- (1) Average “ “ “ “ “ 84 $\frac{1}{8}$ “
- The whole calculated on the weight of the butter sold.

L. P. BERNARD.

To the Dairymen’s Association,

At the request of

Mr. Saül Côté, Inspector.

(1) NOTE.—Our readers should observe that the averages submitted by M. Bernard were obtained by adding together the maximum and minimum and dividing the sum by two. Thus:

Minimum paid to patrons.....	\$ 0.71 $\frac{3}{8}$
Maximum “ “	0.97
Total.....	\$ 1.68 $\frac{3}{8}$
Divided by two, gives an average of.....	0.84 $\frac{1}{8}$

Now, the true average, that obtained by the whole money received by the whole of the patrons divided by the entire quantity of the milk delivered by them, cannot correspond with these figures, except by chance; because the quantities delivered each month or at each sale are very irregular and so are the prices paid.

The same remark applies to all the other averages given in this report

J. DE L. TACHÉ.

REPORT OF
DE LOTBIN

Monthly receipts of
milk.

April.....	117,3
May.....	227,6
June.....	351,9
July.....	373,9
August.....	301,0
Sept.....	175,6
Oct.....	47,2

Totals.....1,594,8

Last year,
160 patrons
and 56 to the 51

I calculate
dairy-butter, “
would have give

For the che
Butter wou

Balance in t
Patron, No.
would have give
I paid him 1

Balance in f
The whole re

REPORT OF THE TWO FACTORIES OF F. X. BERTRAND, STE-CROIX DE LOTBINIÈRE, FOR THE SEASON OF 1888—APRIL 1ST TO OCT. 31ST.

Monthly receipts of milk.	Monthly cheese-made	Monthly cash receipts for cheese.	Monthly deductions of percentage.	Monthly payments to patrons.	Monthly rate of dividends.	
April..... 117,329	11,043½	\$ 1,101.45	\$ 165.20	\$ 936.23	p. % lbs. 80	Average weight of milk to the pound of cheese, 8½ lbs. Average price of the pound of cheese, 8½ cents
May..... 227,645	22,112	1,875.00	281.25	1,593.75	" 70	
June..... 351,980	36,290	3,180.83	477.15	2,703.68	" 77	
July..... 373,968	38,551	3,185.05	477.75	2,707.30	" 72½	
August..... 301,030	31,649	2,690.91	403.62	2,287.29	" 76	
Sept..... 175,650	19,067	1,906.70	286.00	1,620.70	" 92	
Oct..... 47,247	5,549	562.96	84.46	478.51	" 2	
Totals..... 1,594,849	164,261½	\$14,502.90	\$2,175.42	\$12,327.46	Average cts. 78	

Last year, our average was 90 cents per 100 lbs. of milk.
 160 patrons delivered milk at the two cheeseries: 104 to the village, and 56 to the 5th range.

I calculate that, if the same quantity of milk had been turned into dairy-butter, "on a basis" of 3½ lbs. of butter to the 100 lbs. of milk, it would have given 56,958 lbs. of butter, at an average of 15 cents—\$8,543.82.

For the cheese I paid.....\$12,327.46
 Butter would have fetched.. 8,543.64

Balance in favor of cheese. \$3,783.82

Patron, No. 48, delivered 29,977 lbs. of milk, which in butter, as above, would have given \$160.50.

I paid him for the cheese from the above milk..\$238.62
 Value of butter as above..... 160.50

Balance in favour of cheese..... \$78.12
 The whole respectfully submitted to the Directors by

F. X. BERTRAND,
 Proprietor.

TO OCTOBER 31ST.

19. 18 lbs.
 22. 54 "
 20. 86 "

8 dras.
 z. 4 dras.
 71½ cents.
 97 "
 84½ "
 ter sold.

L. P. BERNARD.

ector.

y M. Bernard were obtained
 wo. Thus:

\$ 0.71½
 0.97
 \$ 1.68½
 0.84½

by the whole of the patrons
 rrespond with these figures,
 ch sale are very irregular

e L. TACHÉ.

LIST OF MEMBERS, YEAR 1888

A

Angers, Isidore.....	Belœil
Archambault, Alfred.....	St-Guillaume d'Upton.
Archambault, J. Misaël.....	St-Hyacinthe.
Allard, Pierre.....	St-Alphonse de Granby.
Allard, J. Napoléon.....	St-Agapit.
Ayotte, Ludger.....	Pont de Maskinongé.
Archambault, Sergius.....	Ste-Théodosie.
Asselin, Charles.....	South Durham.
Alix, Joseph.....	St-Césaire.
Arseneault, David.....	St-Gervais, Bellchasse.
Adam, L. S.....	St-Hyacinthe.
Aganière, Albert.....	St-Malo d'Auckland.
Archambault, Osias.....	St-Jean-Baptiste.
Adam, Joseph.....	St-Valérien.
Adam, Salomon.....	Cap St. Ignace.
Allaire, Rév. M.....	Lanoraie.
Adam, J.....	St-Herménégilde de Barford.
Authier, Louis.....	Ste-Sophie.
Adam, N.....	St-Zéphirin de Courval.
Allard, Joseph.....	Sherbrook-East.
Adam, A.....	St-Venant de Hereford.
Archambault, Louis.....	Grondines.
Anctil, Louis.....	St-Philippe de Nery.

B

Bernard, E. A.....	Three Rivers.
Belisle, Achille.....	La Baie du Febvre.
Brodeur, L. Timothée.....	St-Hugues.
Blanchette, Cléophas.....	LaPrésentation.
Brousseau, J. B.....	St-Hyacinthe.
Beauregard, Hector.....	Granby,
Benoît, Damien.....	Roxton Pond.
Bernard, D. Ulric.....	St-Flavien, Lotbinière.
Bernatchez, N., M. P. P.....	Montmagny.
Blondin, F. X.....	St-Maurice.
Blain, Félix.....	Belœil.
Beliveau, Rév. E.....	Ste Ursule.
Bazinet, Delphis.....	St Hugues.

Bernatchez, N
 Bilodeau, Jea
 Baril, Pierre.
 Bourque, Noi
 Bourbeau, S.
 Bergeron, O.,
 Bélanger, Boni
 Brodie, R....
 Bourbeau, Eli
 Bachand, Lud
 Berthiaume, J.
 Bourque, Désir
 Blanchard, Jos
 Boucher, Jose
 Bergeron, Heni
 Bernier, Alpho
 Bessette, Ludg
 Beauregard, Jo
 Boily, Roger...
 Bouchard, Jose
 Bécigneul, Eug
 Beauchamp, B.,
 Beauchemin, A.
 Bertrand, F. X.
 Bergeron, Alph
 Bécigneul, Adol
 Blackburn, Heni
 Brassard, Ephre
 Boulay, L.....
 Brillon, Joseph.
 Boucher, Bénoni
 Boucher, Euclide
 Boucher, Jérémie
 Bouchard, Adéla
 Bernard, J.....
 Boucher, Pierre.
 Béliveau, Pierre.
 Bessette, Zotique
 Boulais, Frédéric
 Boucher, Louis..
 Boucher & Lecler
 Bourque, Joseph.

	Bernatchez, Numa.....	St-Thomas-Montmagny.
	Bilodeau, Jean.....	St-Elzéar de Beauce.
	Baril, Pierre.....	St-Justin.
	Bourque, Norbert.....	Sherbrooke-Est.
	Bourbeau, S.....	Arthabaska,
	Bergeron, O., père.....	St-Athanase.
Upton.	Bélangier, Boniface.....	St-Jean Port Joli.
	Brodie, R.....	Montréal, 10 and 12 Bleury.
Granby.	Bourbeau, Elie.....	St-Césaire.
	Bachand, Ludger.....	Roxton Pond.
ongé.	Berthiaume, J. Bte.....	Rivière Gagnon,
	Bourque, Désiré.....	St-Barnabé.
	Blanchard, Joseph	Ste-Madeleine.
	Boucher, Joseph.....	St-Damien (Berthier.)
hasse.	Bergeron, Henri.....	St-Didace de Maskinongé.
	Bernier, Alphonse.....	Ste-Claire (Dorchester.)
and.	Bessette, Ludger.....	Ste-Angèle de Monnoir.
	Beauregard, Joseph.....	St-Jean-Baptiste.
	Boily, Roger.....	St-Alexis, Chicoutimi.
	Bouchard, Joseph.....	La Malbaie.
	Bécigneul, Eugène.....	Moulin-Nantais.
de Barford.	Beauchamp, B., M. P. P.....	St-Hermas.
	Beauchemin, A. O. T.....	St-Hyacinthe,
ourval.	Bertrand, F. X.....	Ste-Croix, Labinière.
	Bergeron, Alphonse.....	St-Antoine de Tilly.
reford.	Bécigneul, Adolphe.....	Channay, Lac Mégantic.
	Blackburn, Henry.....	St-Raymond, Portneuf.
ery.	Brassard, Ephrem.....	Roberval, Chicoutimi.
	Boulay, L.....	Ste-Edwidge de Clifton.
	Brillon, Joseph.....	St-Hyacinthe.
	Boucher, Bénonie.....	St-Jean de Matha.
re.	Boucher, Euclide.....	St-Damien.
	Boucher, Jérémie.....	Ste-Emélie de l'Energie.
	Bouchard, Adélard.....	Baie St-Paul.
	Bernard, J.....	St-François, Beauce.
	Boucher, Pierre.....	St-Paulin, Maskinongé.
	Béliveau, Pierre.....	Ste-Sophie, Mégantic.
nière.	Bessette, Zotique.....	Richelieu.
	Boulais, Frédéric.....	Marieville.
	Boucher, Louis.....	Ste-Anne de Chicoutimi.
	Boucher & Leclere.....	L'Islet.
	Bourque, Joseph.....	St-Denis de Richelieu,

Boulangier, Octave.....	Ste-Agathe, Lotbinière
Boucher, Jos.....	St-Gervais, Bellechasse.
Boucher, Eugène.....	“ “
Beaudry, Jos.....	St-Gabriel, Brandon.
Belisle, Jacob.....	Ste-Elizabeth, Benton.
Breton, Auguste.....	St-Marc de Verchères.
Buteau, Joseph.....	St-Alphonse, Chicoutimi.
Boisvert, Evariste.....	Isle du Pads.
Brassard, Donat.....	Rivière-au-Sable.
Boivin, Joseph.....	St-Alphonse de Chicoutimi.
Brodeur, Pierre.....	St-Charles.
Brasseur, Xavier.....	Roxton-East.

C

Chicoine, Alexis.....	St-Marc.
Côté, Saul.....	St-Flavien, Lotbinière.
Caron, Gabriel.....	Louiseville.
Chagnon, Antoine.....	St-Dominique.
Casavant, Antoine.....	“ “
Choquet, Alfred.....	St-Hyacinthe.
Chartier, Rév. J. B.....	“ “
Collette, Israël.....	St-Joseph du Lac Deux-Montagnes.
Couture, J. A.....	Québec.
Chenevert, Joseph.....	St-Cuthbert Station.
Côté, Louis P.....	L'Avenir.
Cloutier, Sauveur.....	St-Sophie d'Halifax.
Charron, Adhemar.....	St-Sébastien d'Iberville.
Chapais, J. C.....	Québec.
Choquette, Rév. M.....	Séminaire de St-Hyacinthe.
Coulombe Dr J. C.....	St-Justin
Chouinard, Joseph.....	Ste-Flavie.
Champagne, Joseph.....	St-Guillaume.
Côté, Cléophe.....	Les Eboulements.
Caron, George.....	St Léon.
Carignan, Thos.....	St-Pie.
Chandonnais, Elzéar.....	Gentilly.
Camiré, Olivier.....	St-Michel d'Yamaska.
Clément, N. E.....	Champlain.
Chicoine, Delphis.....	St-Marc ; St-Albert, Ont.
Charpentier, Ephrem.....	L'Avenir.
Chabot, Emile.....	Ste-Magdeleine.
Cardin, Pierre.....	Berthier Ville.

Chabot, Geo
Côté, Henri.
Côté, Wilfri
Côté, Joseph
Couture, Frs
Côté, Joseph
Chapdelaine,
Chicoine, A.
Chicoine, Art
Caron, J. Ad
Clermont, Ho
Choinière, Mo
Caisse, Rév.
Cartier, L. Jo
Côté, J. Bapt.
Côté, Rév. F.
Caron, Nazair
Coulombe, Fe
Chapedelaine,
Côté, Emile...
Couturier, Go
Cloutier Louis
Cloutier David
Courchène, On

Dumaine, Aim
Desautels, Mic
Dufault, Eusèl
Durocher, Tref
Dubeault, Geo
Duguay, J. N.
Dion, Joseph...
Dumaine, Alfre
Denis, Diendon
Dépôt, J. Bte...
Dion, François.
Desjardins, An
Desnoyers, Mic
Daigneault, Pie
Drouin, Philipp
Dufault, T. E..

inière	Chabot, George.....	Ste-Hélène.
chasse.	Côté, Henri.....	Ste-Anne de Chicoutimi.
"	Côté, Wilfrid.....	Baie St-Paul.
don.	Côté, Joseph.....	St-Sébastien.
nton.	Couture, Frs.....	St-Aug. de Portneuf.
nières.	Côté, Joseph.....	St-Hyacinthe.
coutimi.	Chapdelaine, Frs.....	La Présentation.
	Chicoine, A.....	Notre-Dame de Montford.
	Chicoine, Arthur.....	St-Marc.
Chicoutimi.	Caron, J. Adélarde.....	Richard, Ville Még.
	Clermont, Honoré.....	St-Jean de Matha
	Choinière, Modeste.....	Valcourt d'Ely.
	Caisse, Rév. M.....	Three-Rivers.
	Cartier, L. Jos.....	St-Antoine, Verchères.
	Côté, J. Bapt.....	St-Apollinaires.
ière.	Côté, Rév. F. P.....	St-Valérien, Sheford.
	Caron, Nazaire.....	Ste-Louise de L'Islet.
	Coulombe, Ferdinand.....	St-Ed. de Lotbinière.
	Chapedelaine, Antoine.....	St. David.
	Côté, Emile.....	St-Alph., Chicoutimi.
Deux-Montagnes.	Couturier, Gonz.....	La Malbaie.
	Cloutier Louis.....	Louiseville.
	Cloutier David.....	Ham South.
n.	Courchène, Onésime.....	* St-Cuthbert.

D

x.	Dumaine, Aimé.....	Pointe-aux-Trembles.
rville.	Desautels, Michel.....	Ste-Rosalie.
yacinthe.	Dufault, Eusèbe.....	Ste-Hélène.
	Durocher, Trefflé.....	St-Damase.
	Dubeault, Georges.....	St-Gabriel de Brandon.
	Duguay, J. N.....	La Baie du Febvre.
	Dion, Joseph.....	Acton-Vale.
	Dumaine, Alfred.....	St-Liboire.
	Denis, Dieudonné.....	Clairvaux.
ka.	Dépôt, J. Bte.....	St-Valérien.
	Dion, François.....	Ste-Thérèse
	Desjardins, Antoine.....	" "
Ont.	Desnoyers, Michel.....	St-Jean-Baptiste.
	Daigneault, Pierre.....	" " "
	Drouin, Philippe... ..	Somerset.
	Dufault, T. E.....	Ste-Hélène.

Daoust, Antoine.....	St-Benoit.
Desrochers, Alphonse.....	St-Flavien.
Deslages, Damase.....	St-Césaire.
Duhaime, L. N.....	Montmagny.
DeLongchamps, Emile.....	323 Commissioners' Street Montréal.
Duguay, Paul.....	L'Avenir.
Dionne, Charles.....	St-Roch des Aulnaies.
Desrochers & De Villers.....	St-Nicolas.
Demers & Co.....	St-Norbert, Arth.
Dion, Benjamin.....	St-Rémi de Tingwick.
Dumoulin, Almindor.....	N. D. des Bois, Compton.
Dubeault, Jos.....	St-Damien de Brandon.
Debien, Elie.....	La Malbaie.
Duquette, Maximin.....	St-Rémi de Napierville.
Désilets, J. Bte.....	Nicolet.
Desmarais, J. B.....	St-Edwidge de Clifton.

F'

Fortin & Co.....	Chicoutimi.
Fradet, Norbert.....	St-Dominique.
Fafard, Antoine.....	St-Hugues.
Fontaine, Alphonse.....	" "
Fontaine, Alphée.....	Weedon.
Fournier, Onésime.....	Gentilly.
Fortin, Charles.....	St-Dominique.
Fleurant, Magloire.....	Melbourne.
Franceur, D.....	St-Roch des Aulnaies.
Forand, Frs.....	Roxton-Falls.
Fiset, Delphis.....	St-Prosper, Champlain.
Fontaine, Louis.....	St-Germain de Gratham.

G

Gendron, Frs.....	Ste-Anne de la Pocatière.
Gareau, Victor.....	St-Denis, Rivière Richelieu.
Gingras, Hubert.....	Ste-Marie de Monnoir.
Gemme, Paul.....	" " "
Giard, J. A.....	Montréal, Bonsecours Street.
Gaudette, Elie.....	St-Antoine de Verchères.
Guertin, J. Alfred.....	St-Casimir, Portneuf.
Gérin, Rév. M. D.....	St-Justin.
Guertin, Rév. M. J.....	St-Casimir, Portneuf.
Gouin, Chs. H.....	Batiscan, Qué.

Gingras, Oza
 Gagné, Théo
 Garon, M. l'a
 Gaudette, Jo
 Grenier, Jos.
 Gauthier, Mi
 Gagnon, Lou
 Gagnon, Alfr
 Gérin, M. Lé
 Gagnon, Rév.
 Girouard, Al
 Giasson, Gor
 Garneau, Naj
 Gaumont, V
 Gagner, Edou
 Godin, Arthu
 Grenier, Edou
 Gouin, Alexi
 Giasson, Théo
 Gendron, Am
 Ginest, Augus
 Girard, Jos...
 Girard, Jos...
 Girard, Luc...
 Gagnon, Epiph
 Girard, Elie..
 Gagnon, Jos..
 Grégoire, Joael

Houlde, Eusèbe
 Hébert, Euclide
 Hardy, Philéas.
 Hudon, Phil. E
 Hamel, Elisée..
 Hudon, Remy..
 Houle, M. E...
 Harvey, Elzéar.
 Hébert, Pierre..
 Harvey, Thimot
 Hudon, T. E....

	Gingras, Oza	South Stukeley.
	Gagné, Théophile	St-Edouard, Lotbinière.
	Garon, M. l'abbé S.	St-Giles.
	Gaudette, Jos. Ernest	St-Jacques de Montcalm.
rs' Street Montréal.	Grenier, Jos. B., fils	Ste-Rosalie.
iaies.	Gauthier, Michel	St-Germain de Grantham.
	Gagnon, Louis	St-Urbain.
	Gagnon, Alfred	Baie St-Paul.
	Gérin, M. Léon	Montréal, 82 Berry.
vick.	Gagnon, Rév. Mons.	Québec.
ompton.	Girouard, Alfred	St-Hyacinthe.
ndon.	Giasson, Gonzague	LaPrésentation.
	Garneau, Napoléon	Ste-Croix, Lotbinière.
erville.	Gaumont, Valton	Piopolis, Mégantic.
	Gagner, Edouard	St-Eugène de Grantham.
ifton.	Godin, Arthur	St-Damase.
	Grenier, Edouard	La Baie du Febvre.
	Gouin, Alexis	St-Félix de Kingsey.
	Giasson, Théodore	L'Anse à-Gilles.
	Gendron, Ambroise	North-Stukeley.
	Ginest, Augustin	St-Georges de Windsor.
	Girard, Jos.	N.-D. de Laterrière.
	Girard, Jos.	Chambord, St. Gédéon.
	Girard, Luc	Ste-Perpétue, Nicolet.
	Gagnon, Epiphane	Ste-Anne, Chicoutimi.
	Girard, Elie	N.-D. de Laterrière.
ies.	Gagnon, Jos.	Yamachiche.
	Grégoire, Joachim	St-Cuthbert.

H

	Houlde, Eusèbe	Gentilly.
	Hébert, Euclide	St-Flavien de Rimouski.
atière.	Hardy, Philéas	Pointe-aux-Trembles, Portneuf.
ichelieu.	Hudon, Phil. E.	Hébertville.
oir.	Hamel, Elisée	Ste-Edouard, Lotbinière.
	Hudon, Remy	Hébertville.
rs Street.	Houle, M. E.	Ste-Hélène de Bagot.
hères.	Harvey, Elzéar	St-Fulgence, Chicoutimi.
f.	Hébert, Pierre	Champlain.
	Harvey, Thimothé	St-Fulgence, Chicoutimi.
f.	Hudon, T. E.	Hébertville.

J

Johnson, C. E.	Warwick.
Jérôme, Philéas.	Ste-Thérèse.
Jalbert, Damase.	St Jérôme, Lake St-John.
Jodoin, Jos.	St-Damase.
Jeannotte, Alphonse.	Belœil.
Jetté, Jos.	St-Athanase.
Jacob, Joseph.	St-Stanislaus, Champlain.
Jean, Ernest.	Chicoutimi.

K

Kirouac, F. X.	Warwick, Arth.
Kirouac, Calixte.	“ “
Kirouac, Hubert fils, Xavier.	Rivière aux Sables, Chicoutimi.

L

Lambert, Joseph.	St-Joseph, Beauce.
Lesage, S.	Québec.
La Bruère, Honorable.	St.Hyacinthe.
Lynch, W. H.	Danville.
Lessard, Delphis.	Ste-Ursule.
Lemire, Louis, J.	La Baie du Febvre.
Lord, Aimé.	St-Edouard, Lotbinière.
Lafontaine, E.	St-Hugues.
Legris, J. H.	Louiseville.
Laplante, Willie, H.	Ste-Hélène,
Lafontaine, Charles.	St-Simon,
Lemonde, François.	Ste-Rosalie,
Lacoursière, Philippe.	Batiscan.
Lavigne, C. B.	Arthabaskaville.
Leclerc, Hector, L.	Ste-Thérèse, Blainville.
Laçoursière, Ovide.	St-Laurent, Lake Manitoba.
Laurendeau, Hormisdas.	St-Barthélemy.
Lemonde, Joseph.	Ste-Rosalie,
Lamoureux, Pierre.	Contreccœur.
Lefrançois, Samuel.	St-Léon de Maskinongé.
Lajoie and Son.	St-Liboire.
Lindsay, Chs. P.	Ste-Marie de Beauce.
Lambert, Félix.	Ste-Croix, Lotbinière.
Laguerre, Joseph.	Batiscan.
Lord, Edmond.	St-François, Beauce.

Lapointe, P.
Langlois, Ch.
Lussier, N. .
Lussier, E. S.
Lambert, J.
Lapalme, J.
Lafontaine, J.
Lambert, Pie.
Letendre, Jo.
Larivière, P.
Lappan, Jam.
Lambert, Jos.
Larose, Brun.
Lemaire, Oliv.
Lavoie, Ls. P.
Lamy, Euchar.
Leclerc, Oliv.
Laplante, Hor.
Larivière, C. .
Lacaille, La.

Marcoux, F. J.
Marsan, Arthu.
Montmigny, R.
Maynard, Jose.
Marsan, Cléopl.
Maynard, Phil.
MacDonald, M.
Monahan, Pet.
Mireault, Azar.
Marsan, I. J. A.
Milot, Léonard.
Marion, Edmon.
Maynard, Cami.
Morin, Joseph.
Mercier, Onésim.
McCallum, A. .
Martel, Charles.
Maheu, Trefflé. .
Marchand, Oné.
Massicotte, Roci.

Lapointe, Pierre.....	La Malbaie.
Langlois, Charles.....	212 St-Hubert, Street Montréal.
Lussier, N.....	St-Damase,
Lussier, E. S.....	St-Aimé, Richelieu,
Lambert, J. B.....	St-Apollinaire,
Lapalme, J B.....	St-Dominique, Bagot.
Lafontaine, Jos.....	Upton.
Lambert, Pierre.....	Ste-Ursule.
Letendre, Joseph.....	Larochelle.
Larivière, P. D.....	Troutbrook.
Lappan, James.....	St-Patrick.
Lambert, Joseph.....	St-Jean-Baptiste deRouville.
Larose, Bruno.....	St-Théodosie, Verchères.
Lemaire, Olivier.....	Drummondville.
Lavoie, Ls. P.....	L'Anse-à-Gilles.
Lamy, Euchariste.....	St-Sévère, St-Maurice.
Leclerc, Olivier.....	Trois Saumons.
Laplante, Hormisdas.....	St-Dominique.
Larivière, C.....	St-Grégoire d'Henryville.
Lacaillade, Louis.....	Eastman.

M

Marcoux, F. X.....	Marieville.
Marsan, Arthur.....	St-Valérien.
Montmigny, Revd. Mons.....	St-Agapit de Beaurivage.
Maynard, Joseph.....	LaPrésentation.
Marsan, Cléophas.....	St-Valérien.
Maynard, Philias.....	St-Dominique.
MacDonald, Milton.....	Acton-Vale.
Monahan, Peter.....	St-Marthe.
Mireault, Azarie.....	St-Jacques de L'Achigan,
Marsan, I. J. A.....	L'Assomption.
Milot, Léonard.....	St-Léon, Maskinongé.
Marion, Edmond.....	St-Gabriel de Brandon.
Maynard, Camille.....	St-Simon.
Morin, Joseph.....	St-Paul d'Abbotsford.
Mercier, Onésime.....	St-Paul L'Hermite.
McCallum, A.....	Danville.
Martel, Charles.....	Baie St-Paul.
Maheu, Trefflé.....	Arthabaskaville.
Marchand, Onésime.....	Ste-Geneviève, Batiscan.
Massicotte, Roch.....	Ste-Geneviève, Batiscan

Mackie, John.	Laurenceville.
McPherson, John.	Danville.
Maltais, Geo.	Chicoutimi.
Maltais, Joseph.	Chicoutimi.
Massé, Joseph, son of Barthélemy.	St-Apollinaire.

N

Normand, Stanislaus.	St-Julie de Somerset.
Normandin, Toussaint.	St-Pie.

O

Ostiguy, Alfred.	St-Jean de Rouville.
O'Haviland, Thos.	Ste Catherine de Hatley.
Olivier, Ephrem.	St-Nicholas, Lévis.

P

Préfontaine, Fulgence.	South-Durham.
Painchaud, Jos.	Tingwick.
Pickett, W. W.	Montréal.
Pilon, Joseph.	Upton.
Pellerin, Uld.	Ste-Sophie d'Halifax.
Parent, William.	St-Elphège, Nicolet.
Pelletier, Dosithée.	Ste-Agathe, Manitoba.
Poirier, H.	Roxton-Falls.
Plante, F. X.	St-Frédéric de Beauce.
Pelletier, Edouard.	Cap St-Ignace.
Paradis, Damase.	Valletort, P. O.
Paré, Camille, Elie.	St-Vincent de Paul.
Péloquin, Charles.	St-Hyacinthe.
Prince, Rév. Mons.	St Maurice.
Pelletier, J-A.	Rivière Ouelle.
Plamondon, Ignace.	St-Raymond de Portneuf.
Poisson, Adolphe.	St-Paul de Chester.
Pelletier, Marius.	Berthier, en bas.
Proulx, Eusèbe.	La Baie du Febvre.
Poulin, Etienne.	St-Germain de Grantham.
Perron, Jean.	St-Alphonse de Chicoutimi.
Pâquet, J. B.	Deschambault.
Préfontaine, J. B. I.	South Durham.
Pelletier, Charles.	St-Roch des Aulnets.
Provancher, l'abbè.	Cap Rouge.

Pépin, Jos.
Pépin, L. C.
Provost, N.
Pelletier, E.
Pelletier, A.
Paquette, F.
Péloquin, J.
Payette, J.
Pratte, Ben.
Perron, Ant.
Pelletier & J.
Pelletier, X.
Paradis, Ale.
Perron, Adé.
Paré, Moïse.
Pagé, J. D. . .
Préfontaine,

Quintal, Ald

Renouf, Gon.
Racine, Char.
Rouleau, Clé.
Rainville, Eu.
Roy, Charles.
Robillard, Fé.
Rainville, Ch.
Rivard, Eugè.
Roger, Télesp.
Roy, Emile. .
Russell, E. A.
Roy & Bouch.
Rainville, Ch.
Roy, Emile D.
Roy, Vital. . .
Richard, Geor.
Richard, J. U.
Rochette, Phi.
Rouleau, F. X.

Pépin, Jos. Noé.....	St-Joachim.
Pépin, L. O.....	Arthabaska.
Provost, Narcisse... ..	LaPrésentation.
Pelletier, Ed.	St-Mathieu.
Pelletier, Alphonse.....	St Roch des Aulnets.
Paquette, Hormisdas.....	Ste-Cécile de Milton.
Péloquin, Alfred.....	Ste-Claire. Dorchester.
Payette, J. B.....	St-Denis, Richelieu.
Pratte, Benjamin.....	Wotton.
Perron, Antoine.....	St-Fidèle.
Pelletier & Belanger.....	St-Ferd. d'Halifax.
Pelletier, Xavier.....	Ste-Anne, Lapocatière.
Paradis, Alexandre.....	Scott Station, Q. C. R.
Perron, Adélaré.....	St-Alphonse.
Paré, Moïse.	St-Rémy de Napierreville.
Pagé, J. D.....	South-Stukeley.
Préfontaine, Chs.....	Isle-Verte.

Q

Quintal, Aldérie.....	St-Valérien.
-----------------------	--------------

R

Renouf, Gonzague.....	Trois Pistoles.
Racine, Charles.....	St-Pie.
Rouleau, Clément.....	St-Hyacinthe.
Rainville, Eusèbe.....	Richelieu.
Roy, Charles.....	Ile-aux-Grues.
Robillard, Félix.....	St-Ours.
Rainville, Charles.....	St-Jean-Baptiste.
Rivard, Eugène.....	St-Casimir.
Roger, Téléspore.....	St-Agapit.
Roy, Emile.....	St-Pie.
Russell, E. A.....	South Stanbridge.
Roy & Boucher.....	Coaticook.
Rainville, Charles.....	Village Richelieu.
Roy, Emile D. C.....	St Félicien.
Roy, Vital.....	St-Jos. Beauce.
Richard, Georges.....	Anse à Gilles.
Richard, J. U.....	Drummondville
Rochette, Phidime.....	St-Augustin, Portneuf.
Rouleau, F. X... ..	St-Barthélemi.

S

Sansoucy, Wilfrid.....	St-Hyacinthe.
St-Onge, Théodule.....	Roxton-Falls.
Sicard, Antoine.....	Ste-Hélène.
St-Pierre, Ludger.....	Laprésentation.
Simard, B. A. Roch.....	L'Assomption.
Salois, Edmond.....	St-Dominique.
Smith, Edouard.....	St-Zéphirin de Courval.
Simard, Frédeguine.....	St-Alp., Chicoutimi.
Simard, Evariste.....	“ “ “
Sylvestre, Elie.....	Ste-Hélène de Bagot.
Saint-Laurent, Cyrille.....	St-Valère Bolstrode (Artha.)
Simard, Arthur.....	St-Alph., Chicoutimi.
Simoneau, Cyprien.....	St-Hugues.
Savard, Odilon.....	G. des Bergeronnes.

T

Taché, Henri.....	St-Hyacinthe.
Taché, J. de L.....	“ “
Tessier, Godfroid.	Ste-Brigitte.
Trudeau, Avila.....	St-Basile le Grand.
Turcotte, J. E. Dr.....	St-Hyacinthe.
Trudel, Alfred.....	St-Prosper, Champlain.
Tremblay, Thomas.....	Notre-Dame de Laterrière.
Toupin, Louis....	St-Hugues.
Therrien, Isidore.....	Ste-Anne des Plaines.
Trappist, R.R. Fathers.....	Oka, Deux Montagnes.
Thibault, Louis....	St-Ferdinand d'Halifax.
Toupin, Louis.....	Fecteau's Mills.
Trudel, Philippe....	Ste-Geneviève de Batiscan.
Tremblay, Albert.....	Notre-Dame de Laterrière.
Tremblay, Charles.....	Chicoutimi.
Tétreault, Ambroise.....	St-Athanase.
Tranchemontagne, Louis.....	Berthier.
Tylee, Chs. D.....	Ste-Thérèse, Blainville.
Tanguay, Dr. G. Ph.....	St-Gervais, Bellechasse.
Turgeon, F. D.....	Robertson Station, East Broughton.
Tremblay, David.....	St-Joseph d'Alma.
Thibodeau, J. B.....	Québec, 21 St-Peter Street.
Tétreau, Arthur.....	St-Athanase.
Thibault, Stanislaus.....	Matane.

Tremblay, I
Trottier, Jos
Trudel, Tref

Vigneau, J.
Vadnais, He
Venne, Salo
Vigeant, Fr
Vaillancourt
Vincelette, M
Villeneuve, T

Wilson, Wn
Watson, Dav

Tremblay, Frs.....La Malbaie.
 Trottier, Joseph.....St-Norbert d'Arthabaska.
 Trudel, Trefflé.....St-Narcisse.

V

Vigneau, J. B.....St-Marcel.
 Vadnais, Henri.....St-Cuthbert.
 Venne, Salomon.....St-Jacques, Montcalm.
 Vigeant, Fred.....Notre-Dame de Stanbridge.
 Vaillancourt, Jos. A.....Montréal
 Vincelette, Michel.....Valcourt d'Ely.
 Villeneuve, Thomas.....St-Fulgence, Chicoutimi.

W

Wilson, Wm.....Montréal.
 Watson, David.....Kingsbury.

urval.
 ni.
 got.
 le (Artha.)
 mi.

s.

dain.
 terrière.

es.
 nes.
 lifax.

atiscan.
 errière.

ille.
 isse.
 East Broughton.

Street.

RECEIPTS AND EXPENDITURE

OF THE ASSOCIATION FOR THE YEAR 1888.

RECEIPTS.

Grant to the Association	\$1000.00
Grant to the school-factory	300.00
Members, subscriptions	432.00
Sales of reports	29.50
Recd. from factories visited	10.00
Various sums received	56.00
In hand 1887	176.51
	\$2004.01

EXPENDITURE.

Printing	\$281.00
Stationery, postage, &c.	67.33
Travelling expenses of directors	0.00
Expenses of annual meeting	137.55
Secretary's salary	200.00
Inspectors' do	400.00
Grant to Archambault's school-factory	300.00
Travelling expenses-teaching department....	310.77
Prizes for competitions—Canadian cows....	40.00
Purchase of books, subscriptions, &c.	40.00
Extraordinary expenses	104.84
	1881.49
Total	1881.49
Balance	122.52
	2004.01

AUDITORS' REPORT

Having examined the above accounts, in detail, we pronounce them correct.

L'Assomption, January 22nd, 1889.

(Signed) J. C. CHAPAIS.

“ ANT. CASAVANT.

Presentatio
 Officers and
 Legislation
 Constitutio
 Rules and
 Minutes of
 Letters rea
 Address of
 PRODUCTIO
 THE SILO, I
 Address of
 ture an
 Address of
 AGRICULTU
 HOED-CROPS
 HOED-CROPS
 CIAL MA
 THE SUGAR-
 THE MANUF
 DUSTRY,
 DESCRIPTION
 FARM-BUILD
 SOME AGRICU
 TION OF
 ORIGIN OF C
 MILK, by MI
 CHEESE MAK
 ADVICE ON V
 REPORT OF I
 “
 “
 Discussion on
 “ “
 Relations bet
 Resolution co
 Report from t
 IN-PECTION, c
 EXPERIMENTS
 REMARKS ON I
 REMARKS, by
 COMPETITION
 Reports of Fa
 List of Membe
 Receipts and E
 Table of Conte

TABLE OF CONTENTS

	PAGES.
Presentation of the Report.....	2
Officers and Directors of the Association.....	3
Legislation.....	4
Constitution of the Association.....	6
Rules and Regulations.....	7
Minutes of the annual Meeting.....	9
Letters read.....	14
Address of the Town of l'Assomption.....	18
PRODUCTION, by the Rev. Abbé Caisse.....	23
THE SILO, by the Hon. Louis Beaubien.....	28
Address of The Rev. Abbé Labelle, Assistant-Commissioner of Agriculture and Colonisation.....	37
Address of the Hon. J. J. Ross.....	40
AGRICULTURAL CLUBS, by The Rev. Abbé Montminy.....	45
HOED-CROPS, by Dr. Ad. Bruneau.....	51
HOED-CROPS, AND THEIR PLACE IN AGRICULTURE; HOME-MADE ARTIFICIAL MANURES, by Arthur R. Jenner Fust.....	62
THE SUGAR-BEET, by Mr. F. X. Thibault.....	71
THE MANUFACTURE OF BEET-SUGAR IN ITS RELATION TO THE DAIRY-INDUSTRY, by Mr. Téléphore Bran.....	78
DESCRIPTION OF A PIGGERY, by Mr. Ant. Casavant, with two engravings.....	83
FARM-BUILDINGS, by M. Jules N. Paquet, with ten engravings.....	90
SOME AGRICULTURAL IMPROVEMENTS IN CONNECTION WITH THE PRODUCTION OF MILK by Mr. I. J. A. Marsan.....	105
ORIGIN OF CANADIAN CATTLE, by M. Max. Houelbecq.....	115
MILK, by Mr. J. C. Chapais.....	122
CHEESE MAKING, by Mr. D. M. McPherson.....	133
ADVICE ON VETERINARY MEDICINE by Dr. J. A. Couture.....	140
REPORT of Inspector Jos. L. Painchaud.....	143
" " Saül Côté.....	147
" " John A. McDonald.....	149
Discussion on cheese-making.....	155
" " butter- ".....	160
Relations between Patrons and Makers, discussion.....	165
Resolution concerning FALSE-REPORTS from factories by J. C. Chapais.....	171
Report from the SCHOOL-FACTORY, by Mr. J. M. Archambault.....	172
INSPECTION, condensed table of visits to factories.....	177
EXPERIMENTS ON BUTTER-MAKING, by Mr. Alexis Chicoine.....	178
REMARKS ON BUTTER-MAKING, by Mr. J. de L. Taché.....	181
REMARKS, by the Hon. Louis Beaubien.....	187
COMPETITION of Canadian Cows.....	189
Reports of Factories.....	190
List of Members, 1888.....	196
Receipts and Expenditures of the Association.....	208
Table of Contents.....	209

BITURE

888.

\$1000.00

300.00

432.00

29.50

10.00

56.00

176.51

2004.01

\$281.00

67.33

0.00

137.55

200.00

400.00

300.00

310.77

40.00

40.00

104.84

881.49

122.52

004.01

e pronounce them

J. C. CHAPAIS.

ET. CASAVANT.