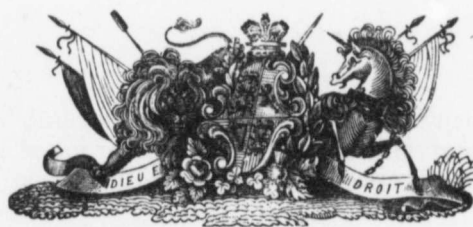


NINETEENTH REPORT
OF THE
DAIRYMEN'S ASSOCIATION
OF THE
PROVINCE OF QUEBEC.

SUPPLEMENT TO THE REPORT OF THE HONORABLE
COMMISSIONNER OF AGRICULTURE AND
COLONISATION

1900



QUEBEC

PRINTED BY CHARLES PAGEAU,

Printer to His Most Excellent Majesty the King.

1901

ANNUAL REPORT
DAIRYMEN'S ASSOCIATION

PRESENTED TO THE HONORABLE
COMMISSIONER OF AGRICULTURE AND
COLONIZATION



PRINTED BY CHARLES...

DAIRY

To the Honorab

SIR,—

The Board of
of Quebec has the
during the year 19
and 10th January 1

THE SECRET
AS:

Saint Hyacinth

Nineteenth Annual Report

OF THE

DAIRYMEN'S ASSOCIATION

OF THE

PROVINCE OF QUEBEC

*To the Honorable Commissioner of Agriculture,
Quebec.*

SIR,—

The Board of directors to the Dairymen's Association of the Province of Quebec has the honor to offer you the following report of its operations during the year 1900, and of the Annual Meeting held at St Jérôme, 9th and 10th January last.

THE SECRETARY-TREASURER OF THE DAIRYMEN'S
ASSOCIATION OF THE PROVINCE OF QUEBEC,

EMILE CASTEL.

Saint Hyacinthe, May 6th 1901.

Officers and Directors of the Dairymen's Association

FOR 1901

Honorary Presidents : { THE HON. F. M. DÉCHÈNE, Québec.
 { THE HON. S. A. FISHER, Ottawa.
 President : M. J. A. VAILLANCOURT, Montreal.
 Vice-President : M. J. C. CHAPAIS, St-Denis en Bas, Que.
 Secretary-Treasurer : M. EMILE CASTEL, St-Hyacinthe.

DIRECTORS :

DISTRICT	NAMES	RESIDENCE
Arthabaska	MM. CHS. A. GAUVREAU	M. P. Stanford.
Beauce	P. VEUILLEUX	St-François.
Beauharnois	R. NESS	Howick.
Bedford	C. H. PARMALEE, M. P.	Waterloo.
Charlevoix et Saguenay	C. E. DUBORD	Mastaï.
Chicoutimi	JOS. GIRARD, M. P.	St-Gédéon.
Gaspé	REV. M. GAGNÉ	Maria.
Iberville	SAM. J. ROY	Sabrevois,
Joliette	J. B. RICHARD	Joliette.
Kamouraska	DOMIN. LÉVESQUE	Rivière Ouelle.
Montmagny	L. A. BOUCHER	L'Islet.
Montreal	J. H. SCOTT	Montreal.
Ottawa	J. DE L. TACHÉ	St-Hyacinthe.
Quebec	N. GARNEAU, M. P. P.	Ste-Foye.
Richelieu	ARSÈNE DENIS	St-Norbert.
Rimouski	CHAS. PRÉFONTAINE	Isle Verte.
St-François	A. CHICOINE	St-Marc.
St-Hyacinthe	J. N. LEMIEUX	St-Hyacinthe.
Terrebonne	LOUIS LABELLE	St-Jérôme.
Three-Rivers	CHS. MILOT	Ste-Monique.

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LEGISLATION

AUTORISING THE FORMATION OF AN ASSOCIATION UNDER THE NAME OF "DAIRYMEN'S ASSOCIATION OF THE PROVINCE OF QUEBEC."

(1749 to 1755 Q. R. S. and Schedule.)

1749.—The Lieutenant Governor in Council may authorise the formation for the Province of an association, having for its objects to promote improvement in the manufacture of butter and ch ese, and of all things connected therewith under the name of the "Dairymen's Association of the Province of Quebec," 45 V., c. 61, s. 1.

1750. The association shall be composed of at least fifty persons, who shall sign a declaration in the form of the schedule annexed to this section ; and every member of the association shall subscribe and pay, annually, a sum of at least one dollar to the funds of the association.

The Commissioner of Agriculture and Colonisation shall be *ex-officio* a member of the association. 45 V., c. 66 ss. 2 and 6 ; 50 V., c. 7, s. 12.

1751. Such declaration shall be made in duplicate, one to be written and signed on the first page of a book to be kept by the association for the purpose of entering therein the minutes of their proceedings, during the first year of the establishment of such association, and the other shall be immediately transmitted to the Commissioner of Agriculture and Colonisation, 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. 45 V., c. 66, s. 3 ; 50 V., c. 66, s. 4.

1752. From and after the publication, in the Quebec Official Gazette, of the notice of the formation of the association, it shall become and be a body politic and corporate, for the purpose of this section, and may possess real estate to a value not exceeding twenty thousand dollars. 45 V., c. 66, s. 4.

1753. The association shall have power 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 management of its affairs and property. 45 V., c. 66, s. 5.

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1753a. The association, with a view of obtaining a more prompt and complete diffusion of the best method to be followed for the production of milk, the fabrication of dairy produce, and, in general, for the advancement of the dairy industry, may subdivide the Province into regional divisions, in which syndicates, composed of proprietors of butter and cheese factories and like industries, may be established.

The formation and working of such syndicates are to be governed by the regulations made by the said Association and approved by the Lieutenant-Governor in Council; and such syndicates shall be under the direction and supervision of the Association.

To such syndicates, the Lieutenant-Governor in Council may grant, out of the Consolidated Revenue Fund, a subsidy equal to one half of the expenses incurred for the service of inspection and instruction organized therein, including the salary of inspectors, their travelling and other expenses directly connected therewith, but not to exceed the sum of two hundred and fifty dollars for each syndicate.

1753b. The inspectors, including the Inspector General, are appointed by the Lieutenant-Governor in Council, and shall be experts who hold certificates of competence from the board of examiners mentioned in article 1753d.

The inspectors are to superintend the production and supply of milk, as well as the manufacture of butter and cheese in the establishments so organised into such syndicates, the whole in conformity with the regulations made by the said Association and approved by the Lieutenant-Governor in Council.

1753c. The salary of the Inspector General shall be paid by the Association.

His duties shall be defined by regulations to be passed by the Association and approved by the Lieutenant-Governor in Council.

1753d. A board of examiners may be appointed by the Association for the purpose of examining candidates for the office of inspector.

The working of such board shall be governed by the regulations to be passed for that purpose by the Association and approved by the Lieutenant-Governor in Council.

1753e. It shall be lawful for the Lieutenant-Governor in Council to grant to the said society an additional sum of one thousand dollars, annually, for the direction and supervision of the syndicates, for the maintenance and working of the boards of examiners above mentioned.

1754. The association shall hold an annual meeting, at such time and place as shall have been selected by the board of directors, besides those which may have been prescribed and determined by the by-laws.

At such a vice-president, district of the Province, domiciled

1755. The present, at the operations during the Association, factories, invention, and giving of the dairy industry

We, the undersigned, the provisions of Revised Statutes of the Province, the treasurer and sums opposite to the rules and by-laws

At such annual meeting, the Association 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 Association, domiciled in such districts. 45 V., c. 66, s. 7.

1755. The officers and directors of the Association shall prepare and present, at the annual meeting of the Association, a detailed report of their operations during the past year, indicating the names of all the members of the Association, 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 interest of the dairy industry. 45 V., c. 66, s. 8.

SCHEDULE

MENTIONED IN ARTICLE 1750

We, the undersigned, agree to form ourselves into an association under the provisions of section thirteenth of chapter seventh of title fourth of the Revised Statutes of the Province of Quebec, respecting the Dairy Association of the Province of Quebec ; and we hereby, severally, agree to pay to the treasurer annually, while we continue members of the Association, the sums opposite to our respective names, and we further agree to conform to the rules and by-laws of the said Association :

NAMES	\$	Cts.

45 V., c. 66, schedule.

52 VICT. 1899 CAP. 22, QUEBEC.

AN ACT TO PROVIDE FOR THE FORMATION OF FARMER'S AND
DAIRYMEN'S ASSOCIATIONS*Assented to 21st March, 1889.*

HIS MAJESTY, by and with the advice and consent of the Legislature of Quebec, enacts as follows.

1. The following section is added after section thirteenth of chapter seventh of title fourth of the Revised Statutes of the Province of Quebec :

SECTION XIV.

FARMER'S AND DAIRYMEN'S ASSOCIATIONS

" 1755a. The Lieutenant-Governor in Council may authorise the formation in each judicial district of the Province of an association, having for its object the promotion of agriculture, the improvement of the manufacture of butter and cheese, the inspection of butter and cheese factories, and all other things in connection therewith, to be called the Farmer's and Dairymen's Association of the District of

" 1755b. The association shall be composed of at least twenty-five persons, who shall sign a declaration in the form of the schedule annexed to this section.

Every member of the association shall subscribe and pay, annually, a sum of at least one dollar to the funds of the association.

" 1755c. The Commissioner of Agriculture and Colonisation shall be *ex-officio* a member of the association.

1755d. Such declaration shall be made in duplicate, one to be written and signed on the first page of a book, to be kept by the association for the purpose of entering therein the minutes of their proceedings, and the other shall be immediately transmitted to the Commissioner of Agriculture and Colonisation, who shall, as soon as possible after its reception, cause to be published a notice of the formation of such association in the Quebec Official Gazette.

1755e. From and after the publication, in the Quebec Official Gazette, of the notice of the formation of the association, such association shall become and shall be a politic and corporate body for the purpose of this section, and may possess real estate to the value not exceeding five thousand dollars.

" 1755f. describe the mode of election and arrangement of its objects of the association.

" 1755g. *chef-lieu* of the district in which the Quebec Official Gazette shall be published.

" 1755h. and place as shall be determined by the Lieutenant-Governor in Council.

" 1755i. A present shall elect a district for which the association domicile directors of the association.

" 1755j. The president and vice-president and such other officers as may be elected for the objects of the association.

" 1755k. The term of office of the directors of the association shall be one year.

Such report shall contain the amount of the subscription, the names and number of the members, and such other information as shall be required for the dairy industry.

A triplicate of the report shall be deposited in the office of the Commissioner of Agriculture of the Province of Quebec.

2. This act shall be deemed to have been assented to on the 21st day of March, 1889.

We, the undersigned, do hereby certify that the provisions of section 1755 of the Revised Statutes of the Province of Quebec have been printed and bound in the Revised Statutes of the Province of Quebec.

" 1755f. The association shall have power to make by-laws, to prescribe the mode or manner of admission of new members, to regulate the election and appointment of its officers and employes, and generally, the management of its affairs and property, for the purpose of carrying out the objects of the association.

" 1755g. The first meeting of the association shall be held at the *chef-lieu* of the district, on the second Wednesday of the month following the one in which the notice of formation of the association is published in the Quebec Official Gazette.

" 1755h. The association shall hold an annual meeting, at such time and place as shall have been selected by the board of directors.

" 1755i. At such annual meeting, the members of the association present shall elect three directors from each county forming the judicial district for which the association is formed, chosen from the members of the association domiciled in the said counties, who shall constitute the board of directors of the association.

" 1755j. The board of directors shall elect, from their members, a president and vice-president, and shall appoint a secretary-treasurer and such other officers and employes as they may deem necessary for carrying out the objects of the association.

" 1755k. The directors shall prepare and present at the annual meeting of the association a detailed report of their operations during the past year.

Such report shall indicate the names of all the members of the association, the amount subscribed and paid into the hands of the secretary-treasurer, the names and number of the factories in their district, and give such other information as shall be deemed useful and in the interest of agriculture and the dairy industry.

A triplicate of such report shall be transmitted to the Commissioner of Agriculture of the Province, and another to the Dairy Association of the Province of Quebec.

2. This act shall come into force on the day of its sanction.

SCHEDULE

MENTIONED IN ARTICLE 1755b.

We, the undersigned, agree to form ourselves into an association under the provisions of section fourteenth of chapter seventh of title fourth of the Revised Statutes of the Province of Quebec, respecting Farmer's and

Dairymen's Associations, and we hereby severally agree to pay to the secretary-treasurer, annually, while we continue members of the association, the sums opposite our respective names, and we further agree to conform to the rules and by-laws of the said association.

NAMES	\$	Cts.

SECTION III

SOCIETIES FOR THE MANUFACTURE OF BUTTER OR CHEESE OR OF BOTH

(R. S. P. of Q., Art. 5477 to 5483.)

§ 1.—*Formation of such Societies*

5477. When in any part of the province, five or more persons shall have signed a declaration, that they have formed an association for the manufacture of butter or cheese (or of both, as the case may be) in a certain place which shall be designated as their principal place of business, and have deposited such declaration in the hands of the prothonotary of the Superior Court in the district where the society intend to do business, such persons and all such other persons as may thereafter become members of such society, their heirs, executors, curators, administrators, successors and assigns, respectively, shall constitute a body politic and corporate, under the name of "butter and cheese manufacturing society (or of both, as the case may be) of (name of the place and number of the manufactory as mentioned in the declaration.)"

The prothonotary shall be under the duty of registering in the registry office of business, and Agriculture and
5478. The provisions, shall, in or manufacturing sc

5479. Every association which has been established, especially those which are not in conformity with the provisions of its proceedings as contained in c. 65, s. 2.

5480. The place within the district, as mentioned in article 5477, of the share-holders, at the meeting of the officers and agents

The annual meeting of the society shall be held

5481. A body politic and corporate, consisting of a certain number of shares, and the name of the society. 45 V., c. 65.

5482. Each society shall be subject to the inspection of the prothonotary

5483. During the year ending on the 31st day of December next after the date of its incorporation, the prothonotary of Agriculture and Fisheries. 45 V., c. 65.

We, the undersigned, do hereby certify that the above is a true and correct copy of the Act of the Legislature of the Province of Ontario, in the fifth year of the reign of Her Majesty Queen Victoria, and that the same has been duly enacted and passed.

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The prothonotary shall deliver to such company certificate stating that such declaration has been made, which certificate shall be registered in the registry office of the place in which such society has its principal place of business, and be also, without delay, forwarded to the Commissioner of Agriculture and Colonisation, 45 V., c. 65, s. 1 ; 50 V., c. 7. s. 12.

5478. The declaration, to be made under the provision of this section, shall, in order to constitute into a corporation any butter and cheese manufacturing society, be in the form annexed to this section, 45 V., 15, s. 9.

§ 2—General Powers and Duties

5479. Every such society so formed, for the purposes for which it has been established, shall enjoy all the powers vested in ordinary corporations, especially that of choosing officers from among its members, of passing by-laws not contrary to the laws of this Province, to determine the number of its members, for its internal management, and for conducting its proceedings and the administration of its affairs in general. 45 V., c. 65, s. 2.

5480. The first meeting of the shareholders of the society shall take place within the eight days following the deposit of the declaration mentioned in article 5477, after a special notice to that effect has been given to the share-holders, at least two days before the meeting for the purpose of electing officers and approving the by-laws of the society.

The annual general meetings afterwards, and all special meetings of the society shall be regulated by by-laws. 45 V., c. 65, s. 3.

5481. A book shall be kept by each society for entering the subscriptions of shares, and another for entering in detail all the transactions of the society. 45 V., c. 65, s. 4.

5482. Each of such books and the by-laws shall be constantly open to the inspection of the members of the society. 45 V., c. 65, s. 5.

5483. During the course of the month of December, in each year, a statement of its operations for the year shall be forwarded to the Commissioner of Agriculture and Colonisation by each society formed under the section. 45 V., c. 65, s. 12.

SCHEDULE

IN ACCORDANCE WITH ARTICLE 5473.

We, the undersigned, agree to form ourselves into an association in virtue of paragraph one of the third section of the fourth chapter of the eleventh title of the Revised Statutes of the Province of Quebec, to be entitled "The Association for the manufacture of butter (or) cheese, (or) of butter and cheese, of the parish of _____ county of _____, and we pledge ourselves to conform to the rules and by-laws of the said association.

(Signatures) 45 Vic., c. 65, Schedule.

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477 to 5483.)

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4. No person shall sell, send or bring to a cheese, or butter, or condensed milk factory, or to the owner or manager thereof, or to the maker of such butter, or cheese, or condensed milk, any milk taken or drawn from a cow that the knows to be diseased at the time the milk is taken or drawn from her.

5. Every person who, by himself, or by any other person to his knowledge, violates any of the provisions of the preceding sections of this Act, shall, for each offence, upon conviction thereof before any justice or justices of the peace, forfeit and pay a fine not exceeding fifty dollars and not less than five dollars, together with costs of prosecution, and in default of payment of such penalty and costs, shall be liable to imprisonment, with or without hard labor, for a term not exceeding six months, unless the said penalty and costs of enforcing the same, be sooner paid.

6. The person on whose behalf any milk is sold, sent, supplied or brought to a cheese, or butter, or condensed milk manufactory for any of the purposes aforesaid, shall *primâ facie* be liable for the violation of any of the provisions of this Act.

7. For the purpose of establishing the guilt of any person charged with the violations of any of the provisions of sections one, or two, of this Act, it shall be sufficient *primâ facie* evidence on which to found a conviction, to show that such milk so sent, sold, supplied or brought to a manufactory as aforesaid to be manufactured into butter, or cheese, or condensed milk, is substantially inferior in quality to pure milk, provided the test is made by means of a lactometer or cream gauge, or some other proper and adequate test, and is made by a competent person. Provided always that a conviction may be made or had on any other sufficient legal evidence.

8. In any complaint or information made or laid under the first or second sections of this Act, and in any conviction thereon, the milk complained of may be described as deteriorated milk, without specification of the cause of deterioration, and, thereupon, proof of any of the cause or modes of deterioration mentioned in either of the said two sections, shall be sufficient to sustain conviction. And in any complaint, information, or conviction under this Act, the matter complained of may be declared, and shall be held to have arisen, within the meaning of "The Summary Convictions Act," at the place where the milk complained of was to be manufactured, notwithstanding that the deterioration thereof was effected elsewhere.

9. No appeal shall lie from any conviction under this Act to a Judge of a Superior, County, Circuit or District Court, or to the Chairman or Judge of the Court of the sessions of the Peace, having jurisdiction where the conviction was had; and such appeal shall be brought, notice of appeal in writing given, recognisance entered into, or deposit made, within ten

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days after the date of conviction, and shall be heard, tried, adjudicated upon and decided without the intervention of a jury, at such time and place at the Court or Judge hearing the same appoints, within thirty days from the date of conviction, unless the said Court or Judge extends the time for hearing and decision beyond, such thirty days ; and in all other respects not provided for in this Act, the procedure under " The Summary Convictions Act," so far as applicable, shall apply.

10. Any person accused of an offense under this Act, and the husband or wife of such person, shall be competent and compellable to testify.

11. Any pecuniary penalty imposed under this Act shall, when recovered, be payable one-half to the informant or complainant, and the other half to the owner, treasurer or president of the manufactory to which the milk was sent, sold or supplied for any of the purposes aforesaid, in violation of any of the provisions of this Act, to be distributed among the patrons thereof in proportion to their respective interest in the product thereof.

CONSTITUTION OF THE DAIRYMEN'S ASSOCIATION

(Incorporated by Q. R. S., 1749 to 1755 and schedule.)

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 of all things connected with the above manufacture.

3. To become a 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 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 office, the voting shall be by *sitting* and *standing* (*assis et levés*.) the secretary shall count the votes, and the president shall declare elected the candidate who shall have the majority of votes.

7. The officer, and shall

8. The president of the meetings of

9. The president of the board of

10. To the other valuables be register, minutes of directors, and these, by the vice-president, keep books monetary operation association, the statement of accounts

11. The vacancies temporarily filled by directors for those judicial

12. The board claim the services

RULES AND REGULATIONS

1. The annual meeting of the board of directors shall be held on the first day of January next following the meeting of the board of directors. Notice of the meeting shall be given in writing to each member of the board of directors beforehand.

2. At the request of the president the president may call a special meeting of the board of directors on the form mentioned in the regulations.

3. At the meeting of the board of directors, exclusive of the president, the president shall preside.

4. The board of directors shall have the right to appoint a committee to audit the accounts of the association, and may think necessary to do so.

5. The order of business shall be determined by the board of directors.

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 meeting, and at the meetings 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 moneys 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 without delay, all the monetary operations of the association. At the end of the fiscal year of the association, the secretary-treasurer shall present before the board a statement of accounts for the director's approbation.

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

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

RULES AND REGULATIONS OF 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 meeting of the board of directors ; 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 laid 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.

SYNDICATES OF CHEESE AND BUTTER FACTORIES

BY-LAWS ADOPTED BY THE DAIRYMEN'S ASSOCIATION AND ASSENTED
TO BY THE LIEUTENANT-GOVERNOR IN COUNCIL

*Copy of the report of a committee of the Honorable Executive Council,
dated January 23rd, 1891, approved by the Lieutenant-Governor
January 24th, 1891. (Translation.)*

No. 75.—On the approval of certain regulations of the Dairymen's Association.

The Hon. the Commissioner of Agriculture and Colonisation, in a memorandum, dated the twenty-third of January of the current year, 1891, recommends that the regulations of the Dairymen's Association of the Province of Quebec, a copy of which is annexed to the above memorandum, be approved.

Certified true copy,

(Signed,) GUSTAVE GRENIER,
Clerk of the Executive Council.

REGULATIONS OF THE DAIRYMEN'S ASSOCIATION

Whereas, by a law passed at the last session of the Legislature of the Province of Quebec, the Dairymen's Association of the Province of Quebec was authorized to create regional divisions in which the proprietors of creameries, cheese factories, and other dairy establishments may form themselves into syndicates, for the purpose of securing a more prompt and complete diffusion of the best methods of conducting the production of milk, the manufacture of dairy products, and the advancement in general of the dairy industry ;

And whereas the said association was, by the same law, entrusted with the duty of :

1. Establish syndicates ;

2. Of directing

3. Of establishing and of the inspection of the manufacture of syndicates ;

4. Of appointing dates for the opening of the working of the syndicates ;

And, where the outlay incurred by the syndicates, in the purchase of land and other expenses, must not be granted more than one cent for each syndicate ;

Whereas, the said syndicates, by the receipt of a subsidy and other assistance, to the amount of ten thousand dollars, in the Province of Quebec, in consequence of the tendency of the syndicates, in the Province of Quebec, of the Province of the board of directors ;

The said association, in consequence of the information and work done, of the management, and of the directors, and of the directors ;

The province of Quebec, in consequence of the organisation :

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1. Establishing regulations for the formation and working of the said syndicates ;
2. Of directing and superintending the syndicates ;
3. Of establishing rules to define the duties of the Inspector General and of the inspectors who are to superintend the production of milk and the manufacture of butter and cheese in establishments so organised into syndicates ;
4. Of appointing a board of examiners for the examination of candidates for the office of inspectors, and of laying down regulations for the working of the said board ;

And, whereas, there is granted to each syndicate a sum equal to half the outlay incurred for the service of inspection and instruction organised in the syndicates, including the salary of the inspector, his travelling expenses, and other expenses relating directly to the said service, but which sum granted must not in any case exceed \$250 (two hundred and fifty dollars) for each syndicate ;

Whereas, there has been granted to the said association, besides its subsidy and other ordinary concessions, an additional sum of \$1,000 (one thousand dollars,) for the expenses necessary for the direction and superintendence of the syndicates, as well as for the maintenance and due working of the board of examiners above mentioned ;

The said association constitutes, as follows, the programme of the formation and working of the syndicates, of their direction and superintendence, of the manner of conducting the proceedings of the board of examiners, and of the duties of inspectors :

I

DIVISION OF THE PROVINCE.

The province shall be divided as follows, for the purposes, of the new organisation :

a. Syndicates of cheese factories or of cheese-factories and creameries :

No. of division.	Counties comprised in the division.
1.....	Gaspé, Bonaventure, Matane, Rimouski, Témiscouata.
2....	Kamouraska, L'Islet, Montmagny, Bellechasse.
3.....	Dorchester, Lévis, Beauce.
4.....	Lotbinière, Mégantic, Arthabaska.
5.....	Nicolet, Yamaska.
6.....	Drummond, Richmond, Wolfe.
7.....	Sherbrooke, Stanstead, Compton.
8.....	St Hyacinthe, Bagot, Richelieu.

- 9 Rouville, Iberville, St John's.
- 10 Shefford, Brome, Missisquoi.
- 11 Verchères, Chambly, Laprairie, Napierville.
- 12 Beauharnois, Chateauguay.
- 13 Huntingdon.
- 14 Saguenay, Lac St Jean, Chicoutimi, Charlevoix.
- 15 Portneuf, Québec, Montmorency.
- 16 Three-Rivers, Champlain, St Maurice, Maskinongé.
- 17 Montcalm, Joliette, Berthier, L'Assomption.
- 18 Hochelaga, J.-Cartier, Laval, Terrebonne, Deux-Montagnes.
- 19 Argenteuil, Ottawa, Pontiac.
- 20 Vaudreuil, Soulanges.

b. Syndicates of butter-factories.

As any limitation of territory would be a hinderance to the formation of syndicates of butter-factories, on account of the small number of such existing in the province, liberty may be granted them by the association to organise themselves in accordance with the following regulations ; and the united counties in which such a syndicate shall have been formed shall constitute a territorial division for all the purposes of the present regulations.

II

DIRECTION AND SUPERINTENDENCE OF THE SYNDICATES

1. The association shall direct the working of the syndicates :
 - a.* By means of a fortnightly or monthly bulletin published during the season of manufacture, the prospectus-number of which shall be published at once, and distributed among the old and new members of the association and those of the public who are interested in the dairy industry ; this bulletin shall contain, especially, instruction and advice to farmers, producers of milk, patrons of factories, to inspectors and makers of cheese and butter, relating more especially to the time of year following the issue of each number ; it shall also contain general information in connection with the dairy industry.
 - b.* By means of the school-factory of the association, whose work shall be conducted with a view to the new organisation.
2. The superintendence of the syndicates shall be exercised by the association :
 - a.* Through the Inspector-general and the inspectors of the syndicates, whose duties and office will be defined hereafter.
 - b.* Through its ordinary officers, as regards all private or public com-

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munications it may have to make to the representatives of the syndicates of the factories syndicated.

3. The association does not pretend to exercise any control over the interior management of the financial arrangement of the syndicates ; it will suffice, if the latter conform to the present regulations, to entitle them to be considered as having accepted the direction and superintendence of the association.

4. The direction and superintendence of the association shall be exercised with a view to securing especially in the syndicated establishments :

a. A regular attention to the testing of the patrons' milk, in order to obtain from them milk of the best quality, neither skimmed, nor watered, nor adulterated in any way ;

b. A scrupulous attention to the general keeping in order of the factories, and to the maintenance of cleanliness therein ;

c. Good quality and uniformity in the products manufactured.

d. A uniform system of bookkeeping sufficient to insure exactness and integrity, of the operation of the year, which each factory will have to furnish to the association.

III

ORGANISATION AND WORKING OF THE SYNDICATES

1. A syndicate shall be constituted by the associating together of creameries, cheese factories, or other dairy establishments, to the number of not fewer than (15) fifteen, or more than (30) thirty ; it shall have for its aim the diffusion over the division in which it is formed of the best methods of producing milk and of manufacturing dairy products ; it may also aim at adopting and exercising all measures calculated to protect such interests of the patrons and proprietors as are to the general advancement of the dairy industry ; the proprietors or representatives of the syndicated factories shall for that purpose engage to support between them, in a proportion left to their discretion, the expense of the hiring of one or more experienced inspectors, who shall superintend the production and supplying of the milk, as well as of its manufacture into cheese and butter in the syndicated factories. The inspector shall be under the direction of the Dairymen's Association, under the conditions hereinafter enumerated, and shall conform to the present regulations.

2. The syndicate shall organise, as much as possible, by the beginning of the manufacturing season.

3. The syndicate shall organise by the signature in duplicate of the proprietors or the representatives of the factories who wish to form themselves into a syndicate to a declaration, on a printed form, which shall be

furnished by the association, and a duplicate of which shall be sent without delay to the secretary of the association, who shall acknowledge its receipt.

4. In each territorial division, syndicates composed exclusively of cheese-factories or of creameries, or of creameries and cheese-factories, may be established.

5. If in any division there be not found a sufficient number of factories whose representatives desire to form a syndicate, these factories may agree with those of a neighbouring division to form a syndicate, or to become part of an already existing one.

6. Every factory shall have the right to ask for admission into the syndicate of its division.

7. Every syndicate shall have the right to prevent any factory of its division from uniting with a syndicate of a neighbouring division, except in the case provided for by the following article.

8. For special reasons, the association shall be empowered to allow certain factories of a division to unite with the syndicate of a neighbouring division, provided that this permission hinder not the formation of a syndicate in the former division.

9. The representatives of the factories associated into a syndicate shall name a president, a vice-president, and a secretary-treasurer, who shall be the officers of the syndicate and whose addresses shall be given to the association; all official correspondence shall be carried out by the medium of the secretary-treasurer.

10. At the end of each season, the syndicate shall render an exact account, certified by its secretary-treasurer, of the salary paid to its inspectors, his travelling and other expenses in direct connection with his duties of inspection, such as hire of carriages, railway and steamboat fares, board, stationery, postage, purchase of instruments for the inspector's use, etc., etc.

11. As the government grant is given specially for the service of inspection, this grant in no case shall exceed the half of the genuine amount of the expenses alone just mentioned, provided that half do not exceed two hundred and fifty dollars (250.00); and the payment thereof shall only be made at the end of the dairy-season, after the report mentioned in the preceding article shall have been made to the association by the syndicate.

12. A subscription shall be paid by the proprietors, or by the representatives of each factory, to the Dairymen's Association, or to the dairy association of the district in which the syndicate is formed, in order that the makers or the directors may be kept *au courant* of the work of the association; moreover, they shall forward to the association a complete certified report of the operations of their factory, according to the official form adopted by the association; which report shall not be made public except by consent of those therein interested.

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IV

OF THE INSPECTOR-GENERAL AND THE INSPECTORS OF SYNDICATES

1. The Inspector-General and the inspectors of syndicates are appointed by the Lieutenant-Governor in Council ; but in neither case will any one be appointed until he shall have previously undergone an examination sufficient to establish his qualifications before the board of examiners of the association. The Inspector-General shall be paid by the association, and other inspectors by the syndicates.

2. The duties of the inspectors, belonging exclusively to the teaching of the best methods for the production of milk and its proper supply to the factories, the manufacture of dairy-products, correct accounts, and the orderly management of the factories, these officers shall carefully avoid meddling with any troubles, with which their duties have no concern, whether they arise between neighbouring factories, between buyers and sellers, or between patrons and proprietors. They must, under pain of immediate dismissal, observe the most guarded discretion in regard to all matters they note in the exercise of their duties, and reveal them to no one except to the society or to the officers and servants of the factories concerned.

§ 1. OF THE INSPECTOR-GENERAL

1. The Inspector-General is the representative of the association accredited to the proprietors, the makers, and the representatives of the establishments under syndicates ; all the instructions, therefore, he shall give, with the approbation of the association, are to be observed.

2. Before the opening of the season, or even during the season, if he see fit, or if he receives orders to that effect from the association, the Inspector-General shall call together the inspectors of syndicates, by groups, at the school-factory of the association, or at some other factory, and keeping them there a few days, instruct them in their duties and in the best methods of manufacture.

3. After the opening of the season, the Inspector-General shall keep himself in communication with the inspectors of syndicates by going at different times to pass two or three days alternately with each of them, to ascertain the efficiency of the factories they have in charge. In these visits, the Inspector-General shall not be so much bound to visit the factories in particular, as to follow the steps of the inspectors in their ordinary duties.

4. The Inspector-General shall lend his aid to the working of the school-factory, which he shall visit, taking it in turn with the syndicates.

5. The Inspector-General shall keep, in duplicate, a special notebook, in which he shall insert, day by day, all the observations he makes

on the work of each of the inspectors, and on the general management of their factories ; these notes shall be regularly communicated to the association, in time to be printed in each number in the bulletin. in which everything of public interest shall be inserted ; the Inspector-General shall also keep a daily account of his travelling and other expenses.

6. With the consent of the association, the Inspector may visit the model establishments of this province or of Ontario, for the purpose of the studying and of publishing any new process of working which may have passed into current practice.

7. At the end of the season, the Inspector-General shall prepare a complete report of his work, giving a condensed statement of the observations he has made ; the report shall be in two parts ; one containing the matters interesting to the public, the other, private notes on the work of each of the inspectors.

§ 2. OF THE INSPECTORS OF SYNDICATES.

1. The inspectors of the syndicates are the servants of the syndicates, and as regards questions of interior management, such as wages, payment of expenses, &c., are under the control of the officers of the syndicates.

2. As regards the performance of his duties, the inspector of a syndicate is under the direction of the association, and he must strictly conform to the instructions received from its officers or from the Inspector-General.

3. The wages, travelling and other expenses of the inspector are to be paid by the syndicate.

4. It is obligatory on each inspector to attend all the meetings called together by the Inspector-General.

5. After the meeting convoked by the Inspector-General before the opening of the season, the syndicate inspector shall convoke his makers in one of the earliest opened factories, and shall repeat to them all the information he has received from the Inspector-General.

6. In order to learn as soon as possible how far his makers understand their business, the inspector shall visit as quickly as possible all the factories he has in charge ; this done, he shall devote himself to the assistance of the least skilled makers, passing a day with each of them ; later, he shall visit those whom he thinks the most skilful.

7. After having thus made himself acquainted with the situation of affairs, and having helped each maker, in proportion to his needs, with his assistance and advice, the inspector shall arrange his visits so as to make a regular routine journey from factory to factory.

8. After or about the 1st June, the inspector shall so divide his work that between two visits made to the same factory no greater number of days shall elapse than there are factories in the syndicate.

9. Unless the inspector shall find milk in company with milk ; he shall not be allowed to remain in the season ; the instruments for

10. The nature, the general attention of the allowed to remain

11. The book, in which the inspection ; from the Inspector-General, or the association, at the

12. The inspector and give in the syndicate ; adding the of his next week's sires may comm

13. On payment nobody, unless in the association, his observations employed in them ; or of the president persons the tenor

14. In all cases either to the patron about his work, the inspector shall first otherwise ; it is of neglect, or of evidence to whom the ascertainment in various cases, the Inspector-General or of the

15. The inspector the most guarded in all the details of ed by the withdrawal of examiners.

9. Unless prevented by distance, bad roads, or other hinderances, the inspector shall be present every morning at some one factory, to receive the milk in company with the maker, and shall test sample of each patron's milk ; he shall note the result of each test in a special memorandum book, which shall be preserved and handed to the association at the end of the season ; the inspector shall always have with him on his journeys good instruments for testing milk, with which the syndicate shall provide him.

10. The test of the milk, its delivery in good condition, its manufacture, the general state of the factories, the accounts, shall receive the constant attention of the inspector, that nothing in any factory be neglected or allowed to remain in arrear.

11. The inspector shall receive from the association a special notebook, in which shall appear all the observations made in the course of his inspection ; from it he shall extract and forward an abstract to the Inspector-General, or to any other officer who shall be indicated to him by the association, at the end of each season.

12. The inspector shall daily note down all his travelling expenses, and give in the details once a week to the secretary-treasurer of the syndicate ; adding the list of factories visited, and indicating the probable route of his next week's journey in order that the secretary-treasurer, if he desires may communicate with him.

13. On pain of instant dismissal, the inspector shall communicate to nobody, unless it be to the Inspector-General or the secretary of the association, his observations on the factories and the work of the persons employed in them ; still, he may, at the request of the proprietor, of the maker, or of the president of the directors of any factory, communicate to such persons the tenor of such notes of his as concern that factory.

14. In all cases, wherein he shall see need of making observations, either to the patrons in regard to the supplying of the milk, to the maker about his work, or to the proprietor about the fittings of his factory, the inspector shall first of all address the person in fault privately, by letter or otherwise ; it is only after having ascertained the existence of serious neglect, or of evident evil intention, that the inspector shall warn the parties to whom the ascertained bad state of things will cause injury. In very serious cases, the inspector shall avail himself of the advice of the Inspector-General or of the officers of the association.

15. The inspector should be deeply impressed with the importance of the most guarded discretion, not only in regard to the foregoing cases, but in all the details of his duty ; a serious infraction of this rule may be punished by the withdrawal of the certificate of competence granted by the board of examiners.

V

OF THE BOARD OF EXAMINERS

1. The board of examiners shall be composed of three members and a secretary appointed by the board of directors at the annual convention, or about that time.

2. This board shall settle, and publish immediately, a programme of the examination to be passed by the candidates for the office of inspector to give them a right to a certificate of competence ; it shall, at the same time, give the date and the place of examination, and mention the references to be furnished by the candidates, and the other formalities to be gone through before admission.

3. To those who pass a satisfactory examination the board shall give a certificate of competence ; this may state the degree of success obtained—pretty well, or well,—and it shall be either provisional or definitive ; the provisional certificate will be good for only one year, and the bearer may be called upon to pass another examination, either in all the subjects of the programme, or in certain specially reserved subjects.

4. The board of examiners shall, without delay, make to the Honorable Commissioner of Agriculture and Colonisation a detailed report of the result of the examination, containing specially the names of the candidates and of those who shall have received the certificate, with the degree of success obtained.

5. Even the definitive certificate of competence may be withdrawn by the board of directors of the association from any inspector who shall be guilty of a serious breach of the rules, or who, for any other grave cause, shall be considered unfitted to discharge his duties properly.

6. If the number of candidates be not sufficient to warrant the holding of the examination in more than one place, the association may, out of the funds allowed for the purpose of the syndicate, pay one-half of the travelling expenses of the more distant candidates from their homes to the place of examination.

AN ACT TO PREVENT
CHEESE, AND

HIS MAJESTY
and House of Commons

1. This Act

2. No person shall expose or have in his possession or control any skimmed milk, or such milk.

1. Every person who, after conviction thereof, fine not exceeding five pounds, together with the fine and costs, shall be liable for a term not exceeding three months, if enforcing it are so

3. No person shall sell, or expose for sale, any cheese or milk as "skimmed milk," to which skimmed cheese," are brands of every cheese, and contains the same, three quarters of a

2. No person shall, or in any way effect, such cheese, or on

3. Every person who, after conviction thereof, upon conviction thereof, liable to a fine not exceeding five pounds, if in his possession for any such cheese, or in default of payment of the same, or without hard labour, fine and the costs of

56 VICTORIA, CHAP. 37, OTTAWA.

AN ACT TO PREVENT THE MANUFACTURE AND SALE OF FILLED OR IMITATION CHEESE, AND TO PROVIDE FOR THE BRANDING OF DAIRY PRODUCTS

Assented to 1st April, 1893.

HIS MAJESTY, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows :—

1. This Act may be cited as *The Dairy Products Act, 1893.*

2. No person shall manufacture, or shall knowingly buy, sell, offer, expose or have in his possession for sale, any cheese manufactured from skimmed milk, to which there has been added any fat which is foreign to such milk.

1. Every person who, by himself or by any other person to his knowledge, violates the provisions of this section, shall, for each offence, upon conviction thereof before any justice or justices of the peace, be liable to a fine not exceeding five hundred dollars and not less than twenty-five dollars, together with the cost of prosecution and, in default of payment of such fine and costs, shall be liable to imprisonment, with or without hard labor, for a term not exceeding six months, unless such fine and the costs of enforcing it are sooner paid.

3. No person shall sell, offer, expose, or have in his possession for sale, any cheese manufactured from or by the use of milk commonly known as "skimmed milk," or milk from which cream has been removed, or milk to which skimmed milk has been added, unless the words "skim-milk cheese," are branded, marked or stamped in a legible manner upon the side of every cheese, and also upon the outside of every box or package which contains the same, in letters not less than three quarters of an inch high and three quarters of an inch wide.

2. No person, with intent to misrepresent or to defraud, shall remove, or in any way efface, obliterate or alter the words "skim-milk cheese" on such cheese, or on any box or package which contains the same.

3. Every person who, by himself or by any other person to his knowledge, violates any of the provisions of this section, shall, for each offence, upon conviction thereof before any justice or justices of the peace, be liable to a fine not exceeding five dollars and not less than two dollars for every such cheese, or box or package which is sold, offered, exposed or had in his possession for sale, together with the costs of prosecution, and in default of payment of such fine and cost, shall be liable to imprisonment, with or without hard labor, for a term not exceeding three months, unless such fine and the costs of enforcing it are sooner paid.

4. No person shall apply any brand, stamp or mark of the word "Canadian," "Canadien" or "Canada" as a descriptive term, mark or brand upon any cheese, or upon any box or package which contains cheese or butter, unless such cheese and butter have been produced in Canada.

1. No person shall knowingly sell offer, expose or have in his possession for sale, any cheese or butter upon which or upon any box or package which contains the same the words "Canadian," "Canadien" or "Canada" is applied as a descriptive term, mark or brand, unless such cheese or butter has been produced in Canada.

2. Every person who, by himself or by any other person to his knowledge, violates any of the provisions of this section, shall, for each offence, upon conviction thereof before any justice or justices of the peace, be liable to a fine not exceeding twenty dollars and not less than five dollars for any such cheese or box or package, which is sold, offered, or had in his possession for sale, together with the costs of prosecution, and in default of payment of such fine and costs shall be liable to imprisonment, with or without hard labor, for a term not exceeding three months, unless such fine and the costs of enforcing it are sooner paid.

5. No person shall sell, offer, expose or have in his possession for sale, any cheese or butter which is produced in any foreign country, unless the name of the country where such cheese or butter was produced, is branded, stamped or marked in a legible manner upon the outside of every box or package which contains the same, in letters not less than three-eighths of an inch high and one quarter of an inch wide.

1. Every person who, by himself, or by any other person to his knowledge, violates the provisions of this section shall, for each offence, upon conviction thereof before any justice or justices of the peace, be liable to a fine not exceeding five dollars and not less than two dollars for every such cheese, or box or package of butter, which is sold, offered, exposed or had in his possession for sale, together with the costs of prosecution, and in default of payment of such fine and costs shall be liable to imprisonment, with or without hard labor, for a term not exceeding three months, unless such fine and the costs of enforcing it are sooner paid.

6. The person on whose behalf any cheese or butter is manufactured, sold, offered exposed or kept with a view to its sale, contrary to the provisions of the foregoing sections of this Act, shall be *prima facie* liable for the violation of any of the provisions of this Act.

7. In any complaint, information or conviction under this Act, the matter complained of may be declared, and shall be held, to have arisen within the meaning of *The Summary Convictions Act*, at the place where the cheese or butter complained of was manufactured, sold, offered, exposed or had in possession for sale.

8. No appeal from any conviction under this Act shall be brought, into or deposit made, or an appeal shall be heard, without the intervention of a justice of the peace, until the same appointed by the court or judge extended to ten days; and in all cases under *The Summary Convictions Act*.

9. It shall be the duty of the court or judge to enforce the provisions of this Act, and to punish any person who is guilty of violating the provisions of this Act, or of offering or exposing for sale any cheese or butter; and any person who is liable to a penalty of twenty-five dollars and costs, without hard labor, shall be liable to a penalty and costs of twenty-five dollars and costs.

10. Any pecuniary penalty covered, be payable to His Majesty.

11. The Governor in Council may consider necessary in the regulations so made in the *Canada Gazette* any information made in the

An Act to provide for the Branding of Dairy Products and the Branding of Dairy Products as to the dates of

HIS MAJESTY, by the House of Commons

1. This Act may be

2. The Minister of Agriculture a book to be called "The Dairy Culture," and any person

8. No appeal shall lie from any conviction under this Act except to a superior, county, circuit or district court, or the court of the sessions of the peace, having jurisdiction where the conviction was had; and such appeal shall be brought, notice of appeal in writing given, recognisance entered into or deposit made, within ten days after the date of conviction; and such appeal shall be heard, tried, adjudicated upon and decided, without the intervention of a jury, at such time and place as the court or judge hearing the same appoints, within thirty days from the conviction, unless the said court or judge extends the time for hearing and decision beyond such thirty days; and in all other respects not provided for in this Act, the procedure under *The Summary Conviction Act*, so far as applicable, shall apply.

9. It shall be lawful for any person who may be charged with the enforcement of this Act to enter upon the premises of any person suspected of violating the provisions of this Act, and make an examination of cheese or butter; and any such suspected person, who obstructs or refuses to permit the making of any such examination, shall, upon conviction thereof, be liable to a penalty not exceeding five hundred dollars and not less than twenty-five dollars, together with the costs of prosecution, and in default of payment of such penalty and costs, shall be liable to imprisonment, with or without hard labor, for a term not exceeding six months, unless the said penalty and costs of enforcing the same are sooner paid.

10. Any pecuniary penalty imposed under this Act, shall, when recovered, be payable, one half to the informant or complainant, and the other half to His Majesty.

11. The Governor-in-Council may make such regulations as he considers necessary in order to secure the efficient operation of this Act; and the regulations so made shall be in force from the date of their publication in the *Canada Gazette*, or from such other date as is specified in the proclamation made in that behalf.

60-61 VICTORIA.—CHAP. 21.

An Act to provide for the Registration of Cheese Factories and Creameries, and the Branding of Dairy Products, and to prohibit misrepresentation as to the dates of manufacture of such Products.

[Assented to 29th June 1897.]

HIS MAJESTY, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. This Act may be cited as *The Dairy Act, 1897*.

2. The Minister of Agriculture shall keep in the Department of Agriculture a book to be called "The Cheese Factories and Creameries Register," and any person engaged in the business of cheese or of butter making

may apply to the Department of Agriculture, at Ottawa, for the registration of the cheese factory or creamery owned or duly represented by him ; and, on receipt of the particulars as set forth in schedule to this Act, the Minister of Agriculture, or such officer of the Department of Agriculture as is designated by the Governor in Council, shall forthwith send to the owner or representative of such cheese factory or creamery a certificate showing the registration number allotted to such cheese factory or creamery.

3. The person to whom such registration number is assigned shall thereafter have the exclusive right to use it for the purpose of designating the dairy products manufactured by him at such cheese factory or creamery, in the manner shown in schedule B to this Act.

4. No person shall sell, offer, expose, or have in his possession for sale, any butter or cheese made in Canada, and destined for export therefrom, unless the word "Canadian," "Canadien," or "Canada" is printed, stamped or marked in a legible and indelible manner, in letters not less than three-eighths of an inch, and one quarter of an inch wide upon—

(a) The box or package containing the butter or cheese, and—

(b) Moreover, in the case of cheese, upon the cheese itself, before it is taken from the factory where it was made.

5. No person, with intent to misrepresent, shall remove or in any way efface, obliterate or alter the word "Canadian," "Canadien" or "Canada," or the registration number on any cheese, or on any box or package which contains cheese or butter.

6. No person shall knowingly sell, or offer, expose, or have in his possession for sale, any cheese or butter upon which, or upon any box or package containing which, is printed, stamped or marked any month other than the month in which such butter or cheese was made ; and no person shall, knowingly and with intent to misrepresent, sell, or offer, expose, or have in his possession for sale, any cheese or butter represented in any manner as having been made in any month other than the month in which it was actually made.

7. Every person, who, by himself, or by any other person to his knowledge, violates any of the provisions of sections four, five and six of this Act shall, for each offence, upon summary conviction, be liable to a fine not exceeding twenty dollars and not less than five dollars, for every cheese or box, or package of butter or cheese which is sold or offered, exposed, or had in his possession for sale, contrary to the provisions of those sections, together with the costs of prosecution, and, in default of such fine and costs, shall be liable to an imprisonment, with or without hard labor, for a term not exceeding three months, unless such fine and the costs of enforcing it are sooner paid.

8. Any penalty, be payable, be payable half to Her Majesty

9. The Governor considers necessary the regulations in the Canada Gazette in that be

Particulars for

1. Name of

2. Where situated

(a.) Province

(b.) County

(c.) Township

(d.) Post Office

(e.) Telegraph

(f.) Railway

3. Name of owner

Post office

If a co-operative

Name of society

Post-office

4. Registered

5. Registered

The above is

Witness.....

Witness.....

8. Any pecuniary penalty imposed under this Act shall, when recovered, be payable, one half to the informant or complainant, and the other half to Her Majesty.

9. The Governor-in-Council may make such regulations as his considers necessary in order to secure the efficient operation of the Act ; and the regulations so made shall be in force from the date of their publication in the *Canada Gazette*, or from such other date as is specified in the proclamation in that behalf.

SCHEDULE A

Particulars for the registrations of cheese factories and creameries :

- 1. Name of cheese factory or creamery.....
 - 2. Where situated :—
 - (a.) Province.....
 - (b.) County.....
 - (c.) Township or parish.....
 - (d.) Post Office.....
 - (e.) Telegraph or telephone Office.....
 - (f.) Railway-station or shipping port.....
 - 3. Name of owner.....
 - Post office address.....
 - If a co-operative dairy association or joint-stock company :—*
 - Name of secretary.....
 - Post-office address.....
 - 4. Registered brand or trade-mark, if any.....
 - 5. Registered number allotted.....
- The above is certified correct.

.....Owner
P. O. Address.
Secretary.
P. O. Address.
 Witness.....
P. O. Address.
 Witness.....
P. O. Address.

SCHEDULE B.

Form of brand for registered number to be allotted to cheese-factories and creameries :—

REGISTERED
No. *
DAIRY ACT 1897

* The figure or figures of registration to be inserted

Dairymen's

ARGE

Arudel Rvd Mr P. Art.
Brownsburg Thos. Ross
Cambria Thos Ross &
Dalesville " "
Grenville " "
Harrington " "
Hill Head " "
Lachute " "
" " "

" George Campbell
" Thos Ross & Son
Mabel Thos Ross & Son
Mille Isles " "
Morin Flats Arthur Davi
St Andrews Thos Ross &
" Thos Ross &
" Thos Ross &
St-Philippe " "

ARTHA

Arthabaskaville..... E
B
St Albert..... F
Ste Elisabeth d'Auteuil. E
Ste Hélène de Chester.. A
St Norbert..... A
St Paul..... H
St Patrick's Hill..... J
St Philippe de Chester.. J
N.
St Remi de Tingwick... E
Al
E.
L.
J.
J.
St Rosaire..... P.
St Valère de Bulstrode.. J.
Stanford..... C.
Ed.

to cheese-factories

LIST OF MEMBERS
OF THE
Dairymen's Association of the Province of Quebec
FOR THE YEAR 1901.

ARGENTEUIL

Arudel Rvd Mr P. Art. Cesbron	
Brownsburg Thos. Ross & Sons Monaléa	No 5
Cambria Thos Ross & Sons Monaléa	16
Dalesville " " "	12
Grenville " " "	11
Harrington " " "	14
Hill Head " " "	10
Lachute " " "	3
" " " "	8
" " " "	19
" George Campbell	
" Thos Ross & Sons	
Mabel Thos Ross & Sons Monaléa	18
Mille Isles " " "	17
Morin Flats Arthur Davis	
St Andrews Thos Ross & Sons, butter factory	
" Thos Ross & Sons	
" Thos Ross & Sons, Monaléo	No 9
St-Philippe " " "	6

ARTHABASKA

Arthabaskaville.....	Eugène Pellerin
	B. L'Heureux
St Albert.....	H. Desruisseau
Ste Elisabeth d'Auteuil.	Edmond Desfossés
Ste Hélène de Chester..	Alf. Provencher
St Norbert.....	Alf. Dusseault
St Paul.....	H. Vallières
St Patrick's Hill.....	J. Er. Beauchemin
St Philippe de Chester..	Jos. Leclerc
	N. Brunelle
St Remi de Tingwick..	Ed. Lavasseur
	Alb. Lavasseur
	E. Cantin
	L. Moreau
	J. Ashmore
	J. Moreau
St Rosaire.....	P. Leclerc
St Valère de Bulstrode..	J. L. Blanchette
Stanfold.....	C. Dion
	Ed. Baril

ARTHABASKA (Continued)

Tingwick.....	Z. Desharnais
	Philius Laroche
	H. Ouellette
	P. Roux
	Xavier Moreau
Trout Brook.....	Onésime Lemay
Victoriaville.....	G. St Pierre
	Alp. Desprès
	Philippe Houle
	Geo. Blanchet
Walker's Cutting	A. St-Laurent
Warwick	Alf. Bergeron
	Au. Bergeron
	Emile Morin
	Nazaire Vidal
	A. M. Méthot
	W. Côté

BAGOT

Acton Vale.....	Pierre Guertin, 2 subs.
	Phaneuf & Picard
Ste Christine.....	J. Bte Dépôt
St-Dominique	Emile Chagnon
	D. S. Davignon
	G. Ern. Viens
	Alph. Leclair
	Josué Touchette
	Alvarez Chagnon
St Ephrem d'Upton....	J. Albert Dion
	Pierre Savoie
Ste Hélène.....	M. Houle, Cheese mak.
	Edmour Decelles
	C. B. Beck
	Elie Sylvestre
	A. Boissonneault
St-Hugues.....	L. T. Brodeur
	Emile Lefebvre
	Adélard Brasseur
	Alph. Guilmette
	F. X. Belhumeur
	L. Lussier

ED

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BAGOT (Continued)

St Liboire	Joseph Lemonde Wilfrid St-Onge Sim. Deslauriers Adélaré Dupont Aimé Cayouette Moise Beauregard Lajoie et Frères
St-Nazaire.....	Aurèle Leclercq R. Vadebonceur
St-Pie.....	H. Lapalme
Ste Rosalie.....	Jos. Laliberté Jos. B. Grenier
St Simon.....	F. X. Lajoie Adélaré Tétreault A. Deslauriers fils
St Théodore d'Acton...	Isidore Jodoin Ls. de Grandpré Ovide Pouliu
Upton.....	Jean Maurice Emile Mabrice Arthur Lussier Octave Cardin

BEAUCE

East Broughton.....	Georges Filion Wilfrid Doyon
Ste Angés.....	Ferd. Mercier
St Ephrem de Tring....	Oct. Roy, Prop. Nac. Pomerleau
St Evariste de Forsyth..	Louis Bernier
St François.....	Charles Busque
St Georges.....	Wenceslas Talbot
St Joseph.....	Joseph Paré
Ste Marie.....	L. E. Faucher J. A. Painchaud Jean Faucher (4)
St Martin.....	J. E. Pelletier
St Méthode d'Adstock..	M. Jos. Bureau
Scott Junction.....	W. R'Haven P. de Bacourt Louis Gosset Omer Martin

BEAUHARNOIS

Beauharnois.....	Ovila Harelle A. Allard
Landreville.....	Wm. Durnin, (2)
St Etienne.....	L. Labeage G. Brosseau
St Louis de Gonzague..	A. Pilon Georges Gardner Georges Bergeron Omer Pilon, (2)
St Lewis.....	Georges Gardner James Symons
St Stanislas.....	A. Lemieux, (2)

BEAUHARNOIS (Continued)

St Thimothée.....	Jos. Ringuette Aug. Crevier, (2) Oscar Crevier Nazaire Desrosiers Euclide Poirier L. Sauvé
Vendôme.....	J. Gendron
Valleyfield.....	Louis Simpson J. Mac Bean

BELLECHASSE

St-Charles.....	Onésime Mercier
St-Damien.....	Napoléon Brochu

BERTHIER

Berthier.....	Joseph Allard Isaie Drainville
Berthierville.....	Jos. D. Parent C. Chênevert
Isle du Pads.....	Thomas Sylvestre Ls. Jos. Laforest Ed. Courchesne Remi Hérard
Lanoraie.....	Arthur Ferland
St Barthélemy.....	Louis Morand Horm. Brunette Edouard Trudel
St Cuthbert.....	Mme Vve A. Robert Isaac Grégoire P. O. Colombe
St Damien de Brandon..	Gravel & Sylvestre
St Gabriel.....	Joseph Brissette Jos. Ayotte
St Michel des Saints...	Léandre Ménard
St Norbert.....	Sull. Denis Arsène Denis Jos. Laporte Jos. St Georges Ad. L'Heureux

BROME

Adamsville.....	Frank Ravenelle
Eastman.....	D. Gervais Naz. St François
Knowlton.....	Robert Wherry
Laroche.....	Alfred Lapierre Louis Coderre
St Etienne de Bolton...	Ludger Bachand Henri Boucher Mag. Fleurant

CHAMBLY

St Basile.....	Art. Jos. Monat F. G. Bouthillier E. P. Gaudreau
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Batiscau.....

Cap de la Madelei.
Champlain.....Mont Carmel.....
Ste Anne la Péraie

Ste Geneviève....

St Jean des Piles..
St Luc.....

St Maurice.....

St Narcisse.....

St Prosper.....

St Séverin Prouxvill

St Stanislas.....

Ste Thècle.....
St Tite.....

CHA

Baie St Paul.....

Isle aux Coudres....
Les Eboulements....
Murray Bay.....
St Hilarion.....
St Irénée.....
St Placide.....
St Urbain.....

CHAMPLAIN

Batiscan.....	L. P. Lacourcière P. Lapointe, (2) Ernest Tourigny
Cap de la Madeleine.....	F. X. Lapointe
Champlain.....	Jos. Carpentier Eugène Charrelle
Mont Carmel.....	Phil. Rhéault
Ste Anne la Pérade.....	J. H. Gendron Jos. Godin, son Jean Mic. Lorange J. E. Z. Marchand P. Laflèche & Co.
Ste Geneviève.....	Ernest Jacob Léo. Marchand Aug. Trudel Léop. Trudel Gilb. Moreau
St Jean des Piles.....	Rv. M. E. H. Poisson
St Luc.....	Beaudoin & Déry Georges Déry
St Maurice.....	Frs Ducharme Oscar Nobert
St Narcisse.....	Isidore Derouin Trefflé Trudel Wilb. Boulanger Dosithée Cossette
St Prosper.....	J. A. Massicotte J. B. Trudel Alfred Trudel F. X. O. Trudel Benoit Trudel Jos. T. Trudel
St Séverin Prouville.....	Maj. Bordeleau Trefflé Veillet Ep. Mongrain
St Stanislas.....	Jos. L. Jacob Sef. Dessureau
Ste Thècle.....	Audy. Nault & Co.
St Tite.....	J. A. Lambert

CHARLEVOIX

Baie St Paul.....	Joseph Fortin Alf. Gagnon, Insp. Jos. Simard Ad. Ménard, Ch. M. Jos. Tremblay, (son of Wm) Cheese M. Edmour Boily David Fortin, C. M.
Isle aux Coudres.....	Régis Perron
Les Eboulements.....	Jos. Bouchard
Murray Bay.....	Jules Bradet (2)
St Hilarion.....	Méridée Tremblay
St Irénée.....	Ferd. Gauthier
St Placide.....	Gédéon Perron
St Urbain.....	Charles Fortin Ad. Gaudreault

CHATEAUGUAY

Allan's Corner.....	Thomas Drysdale
Aubrey.....	Macpherson & Ferguson
Brysonville.....	John Dunning
Chateauguay.....	N. R. Laberge P. Macfarlane
Holton.....	Ant. Vinette
Howick.....	Robt Ness Macpherson & Ferguson
Nth Georgetown.....	A. E. Marleau E. Marleau
Ormstown.....	A. S. Lloyd Jas. Cottingham Macpherson & Ferguson
Riverfield ..	John MacGregor
Russeltown.....	N. Beaudin E. Beaudin
St Chrysostome.....	E. Gamelin John Boyd J. P. Brown, M. P. J. A. Huberdeau Willie Prévost
Ste Martine.....	Ed. MacGowan (7)
Ste Martine, Laberge, P. O. .	J. B. Primeau
Ste Philomène.....	F. P. Laberge Delphis Lacoste J. B. Damour
St Urbain.....	Arthur Barette
Stokwell.....	H. W. Stuart

CHICOUTIMI

Chicoutimi.....	Dr L. E. Beauchamp Pitre Gaudreault Richard Gagnon Louis Guay Jean Perron (2) Edmond Tremblay Elie Fortin Ovide Boulianne Alp. Desbiens Jean Perron & Jos. Maltais
Grande Baie.....	Willie Tremblay
L'Anse St Jean.....	Zéphirin Desgagné
Laterrière.....	J. Art. Gaudreault Alfred Tremblay Frs Brassard Perron & Tremblay
St Alexis.....	Ernest Lavoie Benj. Larouche
St Alphonse.....	Pierre Tremblay Dydime Bouchard Jos. Maltais Jos. Côté

ER (Con.)

...Salomon Picard
 Amédée Fournier
 Pierre Chouinard
 Simon Fortin
 ..Jos. Dion
 Pierre Corriveau
 ...Linière Maheux
 ...Joseph Gagnon

OND

...Arthur Marcotte
 Elisée Parent
 O. Lemaire
 Jos. Marcotte
 ...A. Franceur
 Jos. Lefebvre
 Alcide Houle
 ..Léon Bahi
 Chas. MacDougall
 L'Association de
 l'Avenir
 ..Dorilla Desmarais
 ..Arthur Neveu
 Pierre Quintal
 L. Autotte
 ..D. Drolet
 C. Dalpé
 Edouard Laplante
 Henry Bélisle
 ..Olivier Rajotte
 J. H. Leclerc
 Edouard Lafond
 O. Vadebonœur
 Emile Dubuc
 Euclide Sylvestre
 Antoine Bernier
 Evariste Leclair
 Michel Gauthier
 Od. Vadebonœur
 ..J. E. Gaucher
 Hormidas Laprade
 Ovide Major
 ..A. J. Hyde (2)
 Alfred J. Miller
 Alex. Desmarais
 O. Daniel Towns
 ..Adolphe Lécuyer
 ..Joseph Demers
 J.
 J. Adrien Gauthier

GA

John L. Brodie
 Wilf. Dusseault
 G. Ant. Larue
 Mme veuve J. B.
 Magnan

HUNTINGDON

Athelstan J. A. MacDonald
 Boyd's Settlement..... Macpherson & Ferguson
 Cazaville. D. Vass
 Clyde Corner D. M. Macpherson
 L. M. MacLean
 L. M. Lean
 Dewitville Macpherson & Ferguson
 Elgin Macpherson & Ferguson
 Gore..... D. M. Macpherson
 Herdman .. Georges W. Lormis
 Huntingdon..... G. W. Robertson
 W. H. Walker
 Macpherson & Ferguson
 Archie Muir
 Kelso John Smaill
 Macpherson & Ferguson
 Lorne Macpherson & Ferguson
 New Erin B. Durnin
 Newfoundland Macpherson & Ferguson
 Port Lewis " " "
 Powerscourt..... J. A. Plamondon
 Rivière Outarde. Macpherson & Ferguson
 Rockburn..... Olliver & Goldie
 John Runnie
 St Anicet A. Latulipe
 Ste Barbe E. Bergevin

IBERVILLE

Iberville Th. Ménard
 Willie Goyette
 Isle aux Noix..... L. Landry
 Henryville..... Philippe Grenon
 Ed. Ryan
 Mount Johnson .. D. Bernard
 Thos. Barrière
 P. Monast
 Sabrevois..... Féodor M. Meunier
 S. J. Roy
 N. L. Duhaime
 A. Labrecque (son)
 C. Laplante
 St Alexandre..... A. Labrecque
 N. Breault (son)
 Art. Boudreault
 Jos. Boudreault
 St Athanase..... A. Davignon
 Ste Brigitte..... Hormidas Tessier
 O. Archambault
 Jos Touchette
 G. Tessier
 St Johns O. Guertin
 Ste Sabine Aldéi Lanoue
 St Sébastien..... Pierre Brault (son)
 Versailles..... Joseph Brault

JOLIETTE

Joliette..... J. B. A. Richard
 Aimé Riopel
 St Alphonse Thériault et Frère
 St Ambroise de Kildare.... Tanc. St Georges
 Eph. Beauregard
 Clément Laporte
 Ste Béatrix F. Mireault
 St Charles Borromée..... Charles Rivet
 St Cléophas Auguste Boucher
 J. L. Coutu
 Ste Elisabeth..... P. L. Gadoury
 Horm. Ducharme
 Evan. Ducharme
 Ste Emélie de l'Energie Joseph Coutu
 Camille Bazinet
 Joseph Beaulieu
 Emile Bazinet
 St Félix de Valois Georges Asselin
 Noé Gravel
 Eugène Boucher
 Charles Gravel
 Maxime Poirier
 F. Xavier Breault
 Onésime Boucher
 Octavien Roberge
 St Jean de Matha..... J. O. Danis
 T. Gadoury
 Moise Roy
 Sylvestre Desroches
 Ste Mélanie Jos. Roberge
 St Paul..... Adrien Lessard
 St Thomas Ephrem Dion (2)
 Maxime Coutu

KAMOURASKA

St Alexandre..... J. Jules Bélanger
 St Denis..... J. C. Chapais
 Charles Boucharde
 François Gagnon
 St Germain L. A. Lévesque

LAC ST JEAN

Chambord..... Octave Lefrançois
 Hébertville..... J. Elisée Hudon
 Alfred Lavoie
 Arthur Tremblay
 Pitre Ouellette
 Charles Tremblay
 Josaphat Deschênes
 Alexis Gervais
 Adélarde Lemay
 Normandin..... Alphonse Poirier
 St André..... Alfred Harvey
 Charles Simard
 St Bruno..... Servule Tremblay
 Pitre Gaudreault
 St Cœur de Marie..... Robert Lemay

LAC ST JEAN (Con.)		LOTBINIÈRE	
St Cyrille de Normandin.....	J.E.Paquin (butt.)	Lotbinière.....	Léger Pepin
St Gédéon.....	Jos. Girard, M.P. Adm. Gagné		Joseph Beaudet
	Edgar Desgagné	Méthots Mills.....	Emile Lemay
	Thomas Lavoie	Parisville.....	Z. Bergeron
St Jérôme.....	Joseph Gagnon		Francis Hamel
	J. B. Bergeron	St Agapit.....	Benj. Bergeron
	S. Savard & Co.		J. N. Allard
St Joseph d'Alma.....	Liguori Harvey		Francis Roger
	Edmond Boulay		G. Marquis (butt.)
	Elzéar Harvey		Association of fabrication of butter and cheese
Ste Lucie d'Albanel.....	A.Corriveau(C. M.)	Ste Agathe.....	P.Pomerleau(butt.)
St Prime.....	Adélarde Perron		J. O. Boulanger
LAPRAIRIE		St Antoine de Tilly.....	Guil. Laroche
Laprairie.....	Syndicat de Laprairie		Isaie Côté
St Constant.....	Joseph Fyfe	St Appollinaire.....	Pierre Fortier
St Isidore.....	J. S. Poupert		Ephrem Aubin
L'ASSOMPTION		St Croix.....	Henry Bergeron
Lachenaie.....	C. Aristide Laurier		Adélarde Hamel
L'Assomption.....	I. J. A. Marsan		Léger Vidai,(C.M.)
	Joseph Parthenais		Ernest Lauzé
	Charles A.Vaillant		Zéphirin Lemay
	Docteur Forest	St Edouard.....	Joseph Coulombe
L'Epiphanie.....	Joseph Morand		Hon. Castonguay
	H. Prévost		Ed. Daigle (2)
Repentigny.....	Jos. N. Thouin		Hyppolite Lord
St Henry Mascouche.....	Alphonse Soucisse	St Emilie.....	Alphonse Lord
St Lin.....	Brillantet Gauthier		Evariste Lauzé
	E. Desmarais		Philippe Bernard
	Théodule Corbeil	St Flavien.....	Jos. J. Beaudet
	J. B. Archambault	St Jean Deschailions.....	J. Louis Bibeau
St Paul l'Hermite.....	Samuel Chagnon		Phydime Hamel
	Philias Léveillé	St Louis.....	Philias Laliberté
	Arthur Demers		Em. Boucher
St Roch l'Achigan.....	Wilfrid Lachapelle		Philias Desrochers
St Sulpice.....	J. A. Chicoine		J. Henry Pagé
			Gvide Durand
LAVAL		St Narcisse.....	Didace Kirouack
St Martin.....	J. L. Allard	St Patrick.....	Alphonse Mercier
Ste Rose.....	J. G. Héroux	Ste Philomène de Fortierville.....	Alphonse Laquerre
	G. Jubinville	St Sylvestre.....	Payen et Bisson
	J.E.Léonard (advocate)		
	F. Labelle(undertaker)	MASKINONGÉ	
St Vincent de Paul.....	C. E. Paré	Louiseville.....	L. A. Paquin
	J. H. Paré		Milot et Gélinas
			A. Allard
LEVIS		Maskinongé.....	Théophile Sicard
St Nicolas.....	Gabriel Desrochers		Jos. Dalcourt
			Armand Dauplaise
L'ISLET		Nancy.....	F. X. Dionne
L'Anse à Gilles.....	Eugène Métivier	St Justin.....	Ovide Lemire
St Aubert.....	Bart. St Pierre	St Léon.....	L. Milot
St Cyrille.....	A. Morin (butt. & ch.m.)		Thomas Roy
Trois Saumons.....	J. A. Talbot	Ste Ursule.....	Wilbrod Ferron
			Maj. Bellemare

Causapscal.....
Mechins.....
St Paul des Cap

Lyster.....

Clarenceville.....

Cowansville.....

Farnon.....

Farnham.....

Miranda.....

Noyan.....

N. D. de Stanbridg

Pike River.....

Stanbridge Station

West Farnham....

M

Les Dalles.....

St Alexis.....

St Calixte Kilkenn;

St Esprit.....

St Jacques l'Achigan

St Liguori.....

Ste Marie Salomé

MO

Berthier en bas....

Cap St Ignace.....

Isle aux Grues...

St François, Riv. du

MONT

Ste Anne de Beaupr

St Jean, Isle d'Orléan

St Joachim.....

IÈRE

... Léger Pepin
 Joseph Beaudet
 Emile Lemay
 ... Z. Bergeron
 ... Francis Hamel
 ... Benj. Bergeron
 J. N. Allard
 Francis Roger
 G. Marquis (butt.)
 Association of fabrication of butter and cheese
 ... P. Pomerleau (butt.)
 J. O. Boulanger
 ... Guil. Laroche
 Isaïe Côté
 ... Pierre Fortier
 Ephrem Aubin
 ... Henry Bergeron
 Adélar Hamel
 Léger Vidai, (C.M.)
 Ernest Lauzé
 Zéphirin Lemay
 Joseph Coulombe
 ... Hon. Castonguay
 Ed. Daigle (2)
 Hyppolite Lord
 Alphonse Lord
 ... Evariste Lauzé
 Philippe Bernard
 Jos. J. Beaudet
 ... J. Louis Bibean
 Phydime Hamel
 ... Philias Laliberté
 Em. Poucher.
 Philias Desrochers
 J. Henry Pagé
 Gvide Durand
 ... Didace Kirouack
 ... Alphonse Mercier
 e. Alphonse Laquerre
 .. Payen et Bisson

NGÉ

L. A. Paquin
 Milot et Gélinais
 A. Allard
 Théophile Sicard
 Jos. Dalcourt
 Armand Dauplaisé
 F. X. Dionne
 Ovide Lemire
 L. Milot
 Thomas Roy
 Willbrod Ferron
 Maj. Bellemare

MATANE

Causapscaal Zoel Boudreault
 Mechins J. Art. St Pierre
 St Paul des Capucins Christophe Côté

MEGANTIC

Lyster Lucien Lemay
 F. A. Préfontaine

MISSISQUOI

Clarenceville A. Tremblay
 A. Tougas
 Cowansville A. MacFarlane
 Farndon Henry Desroches
 Farnham A. Charland
 Miranda H. Poissant
 Noyan Geor. W. Robinson
 N. D. de Stanbridge A. Courtemanche
 A. Marois
 Pike River O. Courtemanche
 P. Noël Ménard
 Stanbridge Station Simon Touchette
 West Farnham H. Archambeault

MONTCALM

Les Dalles Aquilam Lefebvre
 St Alexis Ernest Liard
 St Calixte Kilkenny Ferdinand Thinel
 Roch Gamache
 St Esprit Pierre Lesage
 Eloi Rochon
 Homère Labelle
 C. Laviolette
 St Jacques l'Achigan Jos. Gaudet
 Art. Desrochers
 J. N. Marion
 St Liguori Moïse Breault
 Abel Tremblay
 Ste Marie Salomé L. B. Fontaine
 J. E. Gaudet
 Marcel Mirault
 Rosario Lacasse

MONTMAGNY

Berthier en bas Amable Mercier
 Elzéar Ménard
 Cap St Ignace G.S. Dugal (Ch. M.)
 Isle aux Grues Joseph Lachaine
 St François, Riv. du Sud Ludger Lecomte

MONTMORENCY

Ste Anne de Beaupré Alphonse Fortier
 St Jean, Isle d'Orléans N. Roberge (but. M)
 St Joachim J. N. Pépin
 Albert Fortin
 Isidore L'Heureux
 Célestin Fortin
 David Fortin

MONTMORENCY (Con.)

Antoine Thomassin
 Hugh Brown
 St Pierre, Isle d'Orléans ... F. X. Côté
 Ed. Gendreau

MONTREAL

333 Rue des Commissaires ... J. A. Vaillancourt
 67 William Street F. A. Dorion
 2 et 4 Foundling St. N. E. Clément
 c/o A. A. Ayer Coin des rues
 St Henry & St Paul J. H. Scott
 71 William Street F. H. Ryan
 33 William Street James J. Murray
 65 William St. F. Cypriot
 Boîte 845 H. G. Nivin
 327 Commissioners St. John S. Clunie
 321 Commissioners St. Joseph Ward
 355 Rue Drolet J. D. Plante Jr.
 333 Rue des Commissaires ... M. Monette
 75 Rue St Jacques M. MacDonald
 411 St Antoine St. Wilf. R. Leroux
 2 & 4 Foundling St. Isaïe Trudel
 381 Rue St Denis R. G. Mailhot
 333 Rue des Commissaires ... J. A. Vaillancourt, son
 248 Rue des Seigneurs. ... Albert Danis

NAPIERVILLE

Napierville Elie Boivin
 St Remi A. Laplante

NICOLET

Bécancourt Gaspard Côté
 Alp. Perreault
 Sévère Moreau
 Gentilly Alf. Fournier
 H. E. Fontaine
 Achille Fournier
 Georges Barabé
 Nicolet Nap. Desfossés
 J. Lucien Doré
 Ab. Beaulac
 Jos. W. Belcourt
 Ste Brigitte Adélar Ménard
 J. Gunn
 St Célestin Fréd. Moreau
 Phil. Duguay
 G. Ellison
 Ste Eulalie Nap. Fortier
 Ste Gertrude Arsène Houle
 Noé Morrissette
 Phil. Brunelle
 St Grégoire Albert Bellemare
 Elph. Lescadre
 Johnny Richard
 G. Houle
 Nap. Ricard
 St Léonard d'Ashton Herc. Desrochers

NICOLET (Con.)	
St Léonard d'Ashton.....	Joseph Hébert Zéphyrin Durocher Alf. Danneau
Ste Monique.....	Charles Milot (2) B. A. Pothier J. B. Beauchemin (3) C. Jos. Lemire
Ste Perpétue.....	Alp. Sicard Arthur Lemoine (2)
St Pierre les Becquets..	J. H. Lefévre (butter and cheese maker)
St Samuel.....	Arthur Picard
St Sylvère.....	J. N. Parent Henry Mailhot
St Wenceslas.....	Ant. Sicard
OTTAWA	
Buckingham.....	Thos Ross & Sons Monaléa No 15
Greece Point.....	Thos Ross et Sons
Hollands Mills.....	Thos Ross & Sons Monaléa No 18
Little Rideau.....	Thos Ross & Sons Monaléa No 1
Maniwaki.....	Frère Joseph Laporte O. M.
Montpellier.....	Louis Montpellier
Lac Nominingue (Canton Loranger.....)	Aimé Chartrand
Ripon.....	Elzéar Leduc
St Casimir Ripon.....	Damase Séguin
Thurso.....	Thos Ross & Sons Denis Charlebois E. Z. Quenneville
PORTNEUF	
Allen's Mills.....	Eug. Gauthier (Ch. M.)
Cap Santé.....	Gabriel Hamel
Deschambault.....	Uldéric Benoit
Les Ecureuils.....	Oliva Auger
Grondines.....	Ls. Archambault M. Laganière
Lachevrotière.....	J. A. Guertin Gédéon Laganière
N. D. des Anges.....	Aubert Bédard Rvd M. S. Garon
St Alban Poiré.....	J. Phil. Moreau Ros. Dusseault (Ch. M.) Hubert Perron Arthème Baril
St Augustin.....	Jos. S. Drolet
St Casimir.....	L. T. Germain Jos. Perron Eugène Rivard (2) Johnny Savard
Ste Christine.....	J. O. Naud
St Gilbert.....	Art. Morrissette Méril Morrissette Narcisse Naud
St Raymond.....	Louis Carreau
St Ubalde.....	Ludger Hardy

QUEBEC (city)	
Rue Desjardins.....	Dr J. A. Couture
Séminaire.....	Rvd M. F. C. Gagnon

QUÉBEC (County)

Beauport.....	Pierre Lortie
Hedleyville.....	Honoré Lortie
Les Saules.....	Amb. Jobin
Ste Foye.....	N. Garneau M. P. P. J. E. Moisan

RICHELIEU

St Aimé.....	Norbert Laplante Xavier Larivière Norb. Lamoureux Jos. Beauregard (2)
Ste Anne.....	Léonid. Latraverse
St Louis.....	Ovide Durand
St Marcel.....	Cléop. Vadnais Alb. Courchesne
St Ours.....	Honoré Lachambre Frs Robillard Edouard Durocher Pierre Dufault & Co. Arthur Durocher Ad. Pérodeau & Co. Cy. Delabarré & Co. Félix Messier Euc. Messier Prisque Hébert Omer Hébert P. F. Arpin & Co.
St Robert.....	J. P. Paquin Adélar Paquin Pierre Rajotte & Co. Duhaime et Frère Donat Collette Alexis Collette Horm. Lapointe Alex Daigle
Ste Victoire.....	Hercule Paul Hus Amédée Bonier Albert Chapdelaine Horm. Plante & Co. Antoine Girouard H. Chapdelaine (son)
Sorel.....	Sergius Salvail C. J. C. Wurtele (adv.)

RICHMOND

Asbestos Mines.....	Alex. Parenteau
Brompton Falls.....	Zoel Pellerin
Corris.....	Pat Cassidy
Danville.....	Louis Lafrance Jos. Desfossés
Flodden.....	Gilbert Stalker
Kingsbury.....	John Watson
Kingsey Sading.....	W. Lallier
Melbourne Ridge.....	James Dunbar W. D. Stalker (2) John Munroe

RIC

Nicolet Falls.....
Richmond.....

St Claude.....
St Cyr.....

St F. X. de Brompton
St Georges de Win

Upper Melbourne..

Windsor Mills.....

R

Bic.....
Rimouski.....
St Fabien.....
St Simon.....

RIC

Abbotsford.....

Angéline.....
L'Ange Gardien....

Marieville.....

Pauline.....
Richelieu.....

Ste Angèle Monnoir..

St Césaire.....

St Jean-Baptiste.....

Ste Marie Monnoir....

RICHMOND (Con.)

Nicolet Falls.....	L. M. Smith
Richmond.....	Alex. Stewart
	S. Wintle
	Sth. S. Carr
St Claude.....	Charles Charland
St Cyr.....	William Houle
	John Cooper Frost
	Alp. Charpentier
St F. X. de Brompton....	Pierre Labbé (Ch. M.)
St Georges de Windsor..	O. H. Bruneau
	Zotique Lemire
	S. H. Thibault
	Maj. Bisson
	Jos. Lépine
	Jos. Martel
Upper Melbourne.....	J. M. MacKay
	H. W. Armstrong
Windsor Mills.....	Jos. Proulx
	J. H. Lindsay
	A. Lindsay

RIMOUSKI

Bic.....	Adélard Blais (Ch.M.)
Rimouski.....	Etienne Côté (Butt.M.)
St Fabien.....	Hermel Beauchesne
St Simon.....	A. A. Nicole

ROUVILLE

Abbotsford.....	Jos. Martin
	H. Langevin
Angéline.....	J. B. Dubé
L'Ange Gardien.....	Théophile Barré
	Elie Bourbeau
	Marc MacDuff
	Joseph Lacoste
	Georges Cayer
	Hector Lajoie
	W. Bourbeau
Marieville.....	Alfred Ostiguy
	Pierre Savary
	J. R. Lafèche
Pauline.....	J. P. Rocheleau
Richelieu.....	Edéas S. Bessette
	J. Freddie Larivière
Ste Angèle Monnoir.....	J. A. Lapierre
	P. Boulais
	A. Tétreault
St Césaire.....	Samuel Aubin
	D. Brodeur
	H. Normandin(Ch.M.)
	Arthur Normandin
	J. H. Vadnais
	X. Senay
	Simon Sénécal
	Horace Leroux
St Jean-Baptiste.....	Roch Tétreault
	L. F. Robert
	Alfred Desnoyers
Ste Marie Monnoir.....	F. Bessette (son of P.)
	J. Archambault
	Horm. Lussier

ROUVILLE (Con.)

St Mathias.	Joseph Gladu
	Joseph Trudeau
St Michel de Rougemont.	D. Métivier
ST HYACINTHE	
La Présentation.....	Jos. St Pierre
	Michel Côté
St Barnabé.....	Horm. Gadbois
	Nap. Lapointe
St Charles.....	Horm. Auclair
St Damase.....	Cheese factory-Butter
	factory of Corbin, Z.
	T. Marchesseault, sec
	Cheese factory of the
	Bridge, Z. T. Mar-
	chesseault, sec.
	Michel Desnoyers
St Hyacinthe.....	J. de L. Taché
	J. G. Bouchard
	Alfred Vigeant
	Emile Desjardins
	Rvd C. A. Beaudry
	Emile Castel
	J. B. Lamoureux
	H. H. Duchêne
	Albert Cordeau
St Judes.....	A. Lacroix (butt. M.)
	Pierre St Germain
	Pierre Grégoire
	O. Larivière & Co.
	Stanislas Lafrenais
Ste Madeleine.....	Louis Chabot
	Henry Vêroneau
St Thomas d'Aquin	Charles Dandelin

ST JEAN

L'Acadie.....	J. Deland
Lacolle.....	Honorius Auger
St Blaise.....	R. Painchaud
St Luc.....	E. Gamache

ST MAURICE

Pointe du Lac.....	Olivier Duplessis
Radnor Forges.....	Max. A. Cossette
St Barnabé.....	Thos. Lacerte
	Arth. Corribeau
	Nazaire Héroux
	Alph. Grenier
	Paquin et Lefrançois
St Elie.....	Adolphe Héroux
St Sévère.....	Victor Milot
	Alf. Ferron
	Paul Pelletier
Shawenegan.....	Télesp. Pellerin
	Alb. Corribeau
Yamachiche.....	Hercule Bourassa
	Ovila Gendron
	Hector Gélinas
	Phil. Villemure

(city)
Dr J. A. Couture
Rvd M. F. C. Gagnon
(County)
Pierre Lortie
Honoré Lortie
Amb. Jobin
N. Garneau M. P. P.
J. E. Moisan

LIEU

Norbert Laplante
Xavier Larivière
Norb. Lamoureux
Jos. Beauregard (2)
Léonid. Latraverse
Ovide Durand
Cléop. Vadnais
Alb. Courchesne
Honoré Lachambre
Frs Robillard
Édouard Durocher
Pierre Dufault & Co.
Arthur Durocher
Ad. Pérodeau & Co.
Cy. Delabarre & Co.
Félix Messier
Luc. Messier
Grisque Hébert
Germ. Hébert
F. Arpin & Co.
P. Paquin
Adélard Paquin
Pierre Rajotte & Co.
Guthaime et Frère
Gonat Collette
Alexis Collette
Norm. Lapointe
Alex Daigle
Hercule Paul Hus
Médée Bonier
Albert Chapdelaine
Norm. Plante & Co.
Antoine Girouard
Chapdelaine (son)
Argius Salvail
J.C. Wurtele(adv.)
ND
ex. Parenteau
Mel Pellerin
t Cassidy
uis Lafrance
s. Desfossés
Albert Stalker
in Watson
Lallier
nes Dunbar
D. Stalker (2)
in Munroe

SHEFFORD	SHEFFORD (Con.)	TER
Dalling Ely.....	Siméon Larocque P. P. Towlar	La Plaine..... New Glasgow.....
Egypte.....	J. L. C. MacDuff	Piedmont.....
Granby.....	Arth. Bousquet E. W. Payne J. A. O. Martel Alph. Beauregard P. O. Domingue Andrew Fossey	Ste Adèle..... Ste Anne des Plaines.....
Lawrenceville.....	Nap. Salois L. E. Désilets	St Jérôme.....
Mawcook.....	J. H. Rocheleau	St Jovite.....
Milton East.....	Fréd. Maynard Azarie Côté	St Sauveur des Monts.....
North Stukely Bonsecours.....	Hormidas Simonneau Hormidas Boissé Eugène David	Ste Thérèse.....
North Stukely.....	Louis Fleurant Irénee Breault Godf. Beauthiette	Terrebonne.....
Racine.....	Geor. M. Norris	
Rochelle.....	Jos. Morin	
Roxton East.....	Nap. Côté	
Roxton Falls.....	Louis Brasseur F. A. Dorion Henry Seney R. Favreau Pierre Chicoine Louis Côté	
Roxton Pond.....	Isidore St Pierre Trefflé Lemoine	
St Alphonse de Granby.....	Denis Allard Adélaré Authier	
Ste Anne Stukely.....	Louis Lozeau C. Bernier Arthur Arès Georges Potvin Max. Archambault	
St Joachim.....	Jos. H. Hébert	
St Valérien.....	André Brasseur Maxime Robert Arthur Marsan Désiré Chaput E. W. Bourbeau Alph. Leclair	
Savages Mills.....	Eucl. Gandreault	
Shefford Mountain.....	F. D. Swett	
South Ely.....	Ass. L. Darby	
South Stukely.....	W. S. Purdy	
Valcourt Ely.....	Joseph Véronneau Arthur A. Fournier Henry Balthazar Napoléon Côté	
Valcourt.....	Hormidas Laplante Louis Côté	
Warden.....	L. E. Richardson	
Waterloo.....	J. A. Bourbeau C. H. Parmelee, M. P. J. Aug. Hayes	
West Ely.....	Nelson Moffat	
West Shefford.....	Z. S. Lawrence	
SHERBROOKE		
Ascot Corner.....	Georges Hector Proulx	
Sherbrooke.....	Rvd F. Venant Charest	
SOULANGES		
Pont Chateau.....	J. A. Bourbonnais	
Rivière Beaudette.....	Louis Méthot Georges Bourbonnais	
St Clet.....	Fabien Châtelets Joseph Farand	
St Polycarpe.....	J. Hector L. Leclair	
St Téléphore.....	J. H. Gareau Louis Charlebois	
St Zotique.....	Alph. A. Véronneau Eugène Prieur	
STANSTEAD		
Baldwin Mills.....	E. A. Baldwin	
Barnston.....	G. B. Hall (?)	
Boynton.....	T. A. Davis	
Cassville.....	Alexandre Thompson	
Coaticook.....	Auguste Gérin	
Dixville.....	Humphrey & Childs	
Fitch Bay.....	P. F. Remick	
East Hatley.....	C. E. Standish J. D. Morisson (2) N. J. Nibblock	
Kate Vale.....	Moise Rainville	
Ladds Mills.....	E. C. Wells H. I. de Mary	
Magog.....	F. H. Kearns Hébert & Hébert	
Marlington.....	W. B. Bullock	
Oliver.....	A. P. Oliver	
Smith Mills.....	H. N. Holbrook	
Sth Barnston.....	E. A. Rainville	
Stanstead.....	Thos. Gibson	
TÉMISCOUATA		
Isle Verte.....	Préfontaine et Frère	
Old Lake Road.....	F. Flo Souey	
St Arsène.....	J. A. Saindon	
St Epiphane.....	Aug. Breton Frs Patoine	
St Louis du Ha Ha.....	Georges Michaud Louis Pelletier Arsène Pelletier	
		La Plaine..... New Glasgow..... Piedmont..... Ste Adèle..... Ste Anne des Plaines..... St Jérôme..... St Jovite..... St Sauveur des Monts..... Ste Thérèse..... Terrebonne..... Trois-Rivières..... VAU Beauvoir..... Graham..... Hudson..... Mont Oscar..... Pointe Fortune..... Rigaud..... Ste Justine de Newton St Lazare..... Ste Marthe..... Vaudreuil..... VERC Contrecoeur..... St Antoine..... Ste Julie..... St Marc..... Ste Théodosie..... Varenes.....

ID (Con.)

L. E. Richardson
J. A. Bourbeau
C. H. Parmelee, M. P.
J. Aug. Hayes
Nelson Moffat
Z. S. Lawrence

ROOKE

Georges Hector Proulx
Rvd F. Venant Charest

NGES

J. A. Bourbonnais
Louis Méthot
Georges Bourbonnais
Fabien Châteleois
Joseph Farand
J. Hector L. Leclair
J. H. Gareau
Louis Charlebois
Alph. A. Véronneau
Eugène Prieur

LEAD

E. A. Baldwin
G. B. Hall (3)
T. A. Davis
Alexandre Thompson
Auguste Gérin
Humphrey & Childs
P. F. Remick
C. E. Standish
J. D. Morisson (2)
N. J. Nibblock
Moise Rainville
E. C. Wells
H. I. de Mary
F. H. Kearns
Hébert & Hébert
W. B. Bullock
A. P. Oliver
H. N. Holbrook
E. A. Rainville
Thos. Gibson

OUATA

Préfontaine et Frère
F. Flo Soney
J. A. Saindon
Aug. Breton
Frs Patoine
Georges Michaud
Louis Pelletier
Arsène Pelletier

TERREBONNE

La Plaine.....Georg. Robertson
New Glasgow.....Am. Désormeaux
Georges Bennett (2)
Piedmont.....A. W. Kimpton
Ste Adèle.....Dr W. Grignon
Ste Anne des Plaines...G. E. Grenier
Siméon Giguère (2)
Mag Forgette
St Jérôme.....Israël Dion
Wilb. Gareau
Louis Labelle
Honoré Clavel
St Jovite.....Célestin Bisson
St Sauveur des Monts...E. Brasseau
Gég. Bélanger
Ste Thérèse.....Ant. Desjardins
Rvd M. Cousineau
J. D. Leclair
J. B. Waddell
James Ramsbotham
Terrebonne.....Henry Moody
Pacif. Vézina

TROIS-RIVIÈRES

Trois-Rivières.....J. A. Milot
Hect. Deschênes

VAUDREUIL

Beauvoir.....A. O. Ranger
Graham.....Trefflé Pilon
Hudson.....Isaac Simpson
Mont Oscar.....Napol. Quesnel
Pointe Fortune.....Thos Ross & Sons
Rigaud.....J. E. Chevrier
Ste Justine de Newton...Henry Charlebois
Théoph. Doucet
St Lazare.....Oscar Denis
Ste Marthe.....Peter Monaham
Rosario Seguin
Frank Monaham
Denis Ladouceur
Vaudreuil.....Am. Castonguay
Elzéar Brasseur
J. B. Besner

VERCHÈRES

Contrecoeur.....Joseph Cormier
Honoré Handfield
St Antoine.....Donat Hébert
Christ Collette
J. O. Phaneuf
Ste Julie.....H. Provost
Alexis Chicoine (son)
Rvd J. C. Daigneault
St Marc.....Alexis Chicoine
Ste Théodosie.....J. E. Beauregard
Varennes.....L. Beauchemin, (father)

VERCHÈRES (Con.)

Varennes.....L. Beauchemin (son)
Joseph Bernard
Verchères.....Ubalde Lorange

YAMASKA

Baie du Fevre.....J. T. Bélisle
Uld. Lévesque
Naz. Lemire
J. Ls. Lemire
Zéph. Duguay
J. N. Duguay
Grég. Hébert
Chatillon.....Ovide Lépine
St David.....Alb. Melançon
Alma Blanchard
St Elphège.....Dolp. Coll
Wm Parent
St Frs du Lac.....Hector Biron
St Pie de Guire.....Edmond Coll
Ed. Giguère
St Thomas de Pierreville...Emile M. Dion
Adélaré Boisvert
Zénon Parent
St Zéphyrin.....Herman Lefebvre
St Zéphyrin Courval...Emile Lahaye
Phil. St Germain
Yamaska.....Cal. Robidoux
Narc. Parenteau (2)
Yamaska Est.....Dolphis Parent
Joseph Parent

WOLFE

D'Israëli.....Aimé Gagné
Fecteau's Mills.....P. Binette
A. Lavigne
A. Lamarre
Garthby Station.....Adjutor Lepage
Ham Nord.....Georg. Cloutier
Achille Richer
O. Cloutier
Elie Leblanc
Chs. Patry
Herm. Guertin, (father)
Herm. Guertin, (son)
Lake Weedon.....Ed. Laliberté, (Ch. M.)
Marbleton.....Ephrem Lizée
Ste Camille.....Pierre Caron
Saül Provencher
St Fortunat.....G. Côté
St Hyppolite de Wotton...Stanislas Ouellette
Stratford Centre, Saint
Gabriel.....Victor Côté
Weedon Centre.....Hyp. Lussier & Co.
Weedon Station.....Pierre J. Desprès
Elzéar Desprès
Norbert Rondeau
Wotton.....Charles Turgeon

ONTARIO	FRANCE (Con.)
Clarence Creek..... Godf. Wilf. Fortier	La Ferrière d'Allevard
Dalhousie Mills..... J. H. Gareau	(Isère)..... Frs Horace Coquand
Ottawa..... Honorable S.A. Fisher	Paris 18 Rue Clauzel... R. Lézé (Exchange)
NOUVEAU BRUNSWICK	Ouilly le Vicomte (Cal-
St Louis de Kent Sussex.. L. Cyriaque Daigle	vados)..... C. Morice (Exchange)
ETATS-UNIS	Lisieux (Calvados)..... Edmond Groult
Gardiner City (Oregon).. J. A. Janelle	(Exchange)
Manistee (Michigan).... Aimé Lord	Mende (Lozère)..... E. Rigaux (Exchange)
East Taunton (Mass).... Jeffrey Gingras	Lyon..... Eastern Union of the
Boston (Mass) 290 Colom-	agricultural Syndi-
bus Avenue..... Jno. Bibby	cates (Exchange)
Manchester (N. H.) 571	Basses Pyrénées..... André Salefranque
Elem Street, Room 4... Jos. Simard	
Champlain (N. Y.)..... Clément Dalpé	ANGLETERRE
FRANCE	London, 16 St Helen's W. Weddel & Co. Co-
Menton, (Alpes Mari- Charles Raynery	Place..... lonial Dairy Produce
times)..... (Exchange)	Report (Exchange)

RECAPITULATION AND TOTALS BY COUNTY

Argenteuil..... 19	Lac St-Jean..... 28	Rouville..... 26
Arthabaska..... 37	Laprairie..... 3	St-Hyacinthe..... 25
Bagot..... 45	L'Assomption..... 18	St-Jean..... 4
Beauce..... 21	Laval..... 7	St-Maurice..... 17
Beauharnois..... 25	Lévis..... 1	Shefford..... 61
Bellechasse..... 2	L'Islet..... 4	Sherbrooke..... 2
Berthier..... 24	Lotbinière..... 1	Soulanges..... 10
Brome..... 9	Muskinongé..... 12	Stanstead..... 23
Chambly..... 3	Matane..... 3	Témiscouata..... 8
Champlain..... 40	Mégantic..... 2	Terrebonne..... 24
Charlevoix..... 16	Missisquoi..... 13	Trois-Rivières..... 2
Châteauguay..... 34	Montcalm..... 17	Vaudreuil..... 16
Chicoutimi..... 43	Montmagny..... 15	Verchère..... 14
Compton..... 11	Montmorency..... 11	Wolfe..... 24
Deux-Montagnes..... 9	Montréal..... 18	Yamaska..... 26
Dorchester..... 18	Napierville..... 2	Ontario..... 3
Drummond..... 38	Nicolet..... 44	Nouveau Brunswick..... 1
Gaspé..... 1	Ottawa..... 12	Etats-Unis..... 6
Hochelaga..... 4	Portneuf..... 26	France..... 8
Huntingdon..... 26	Québec..... 7	Angleterre..... 1
Iberville..... 26	Richelieu..... 37	
Joliette..... 34	Richmond..... 32	Total : 1158
Kamouraska..... 5	Rimouski..... 4	

THE

Rivière

M

Session opened, M.

RI

To the Board c

o

Mr. President and C

I have to honou
Inspector-general ofThis season I v
shed, I visited twice
syndicates. I was t
from visiting two or
I inspected 314 facto
follows :

ON

ICE (Con.)

vard

... Frs Horace Coquand

... R. Lézé (Exchange)

Cal-

... C. Morice (Exchange)

... Edmond Groult (Exchange)

... E. Rigaux (Exchange)

... Eastern Union of the agricultural Syndicates (Exchange)

... André Salefranque

ETERRE

W. Weddel & Co. Co-

... lonial Dairy Produce Report (Exchange)

COUNTY

ville. 36

lyacinthe. 25

an. 4

aurice. 17

ford. 61

brooke. 2

anges. 10

stead. 23

iscouata. 8

ebonne. 24

-Rivières. 2

reuil. 16

hère. 14

. 21

aska. 26

rio. 3

eau Brunswick. 1

-Unis. 6

e. 8

terre. 1

: 118

THE DAIRYMEN'S ASSOCIATION

19th ANNUAL CONVENTION

HELD AT

Rivière du Loup, 9th and 10th January 1901

MORNING SESSION, JANUARY 9th

Session opened, M. J. A. Vaillancourt in the chair, at the Jarvis Hall, at 10 a. m.

REPORT OF M. J. A. PLAMONDON, Ass.-Inspector-General of Cheesery Syndicates.

To the Board of Directors of the Dairymen's Association
of the Province of Quebec.

Mr. President and Gentlemen,

I have to honour to submit to you my fifth annual report as Assistant-Inspector-general of the Dairymen's Association of the Province of Quebec.

This season I visited 29 syndicates ; five of which, being newly established, I visited twice in succession, making, altogether, 34 visits paid to syndicates. I was taken ill about the middle October which prevented me from visiting two or three other syndicates which I should have liked to see. I inspected 314 factories and examined 22,210 cheeses, which I classified as follows :

CLASS	Number of syndicates visited	Number of factories visited	Factories and appurtenances, drainage, etc.	Machinery, utensils within and without the factory	Condition of the factory	System of manufacture	Number of cheeses examined	Number of factories in which all the cheeses were first class.	Number of first class cheeses	Number remaining for classification	AROMA	BODY	TEXTURE	COLOUR	GENERAL APPEARANCE
1st			86	214	172	204	22210	85	5714	16496	12931	10993	5570	10733	10407
2nd	34	314	205	99	127	97					3518	5197	10521	5457	5078
3rd			23	1	15	13					47	306	405	306	411

You will observe that I did not find many factories of the first class; only 86 out of 314 visited. But I must allow that this year I only put in the first class those that had model or improved ripening-rooms, or very good ones of the old pattern. I put all the rest in the second class, except a few in the third.

Nevertheless, I am happy to say that, this year, I found many more factories the cheese in which was first class, and the number of first class cheeses was nearly double that of last year. Of the remaining 16461, I only found less than one-fourth "off flavor", about one third poor as to "body" and rather more than one third inferior in colour and general appearance; while, as to texture, I found less than one-third, 5,560, first class, 10,521 second class, and 405 third. Had it not been for those *open* cheeses, more than two-thirds of the cheese I saw this year would have been in every respect first class, and what a glorious report I should have had to present to you in that case! Still, there is no excuse for the defect I have mentioned, as the cause is entirely under the control of the maker. There are some other defects; bad aroma, too much acidity; which do not depend on the maker entirely; but the one I speak of does depend upon him; it is due to nothing but carelessness and being in too great a hurry to finish the day's work, for at present there are very few makers who have not learned how to avoid this fault, either at the dairy-school, or by working in syndicated factories. It is true that our number of factories, this year, is very large: 42 in all, or four more than we have ever had. In those factories that had never before belonged to a syndicate I invariably found the worst cheese, especially at my first visit, and on my second visit I found a great improvement.

Now let us see to be found in the vat is generally perhaps under the where getting combined do not cannot do better t

"The Dairy need better sanita

"With the a ings of both crea chief causes of thi. vat, if neglected, t crobes, and a men but also to the hea plays the carelessr care, it may be saf factory itself are no a sort of test that i throughout the wh

It is only too t gard to the matter. one of the largest e England, declared against all cheese f attributes even sucl and oniony cheeses from that district m for this is that make of their factories. C by dirty patrons. Y apron; the factory i paid there to cleanli had a bad effect on t makers can never ho their cheese until th roundings are respo

"These words induce the makers to proceed from a man

BODY	TEXTURE	COLOUR	GENERAL APPEARANCE
0993	5570	10733	10407
5197	10521	5457	5678
306	405	306	411

s of the first class ;
ear I only put in the
rooms, or very good
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I found many more
number of first class
aining 16461, I only
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, first class, 10,521
open cheeses, more
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to avoid this fault,
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Now let us examine a little the causes of so much bad cheese being still to be found in this province. In the first place comes the whey-vat. This vat is generally placed just in front of the door, or under an open window, perhaps under the scale-platform, or even under the floor of the factory where getting at it to clean it is out of the question. All other causes combined do not do so much harm as do these filthy whey-vats. Here I cannot do better than quote an article, from the "Farming-World."

"The Dairy-trade is in danger, want of cleanliness is the cause, we need better sanitary conditions.

"With the advent of summer, the unwholesome state of the surroundings of both creameries and cheeseries begin to show itself. One of the chief causes of this condition is the whey-vat and its neighbourhood. This vat, if neglected, becomes the breeding place of all sorts of dangerous microbes, and a menace, not only to the quality of the products of the factory, but also to the health of those living in that locality. If the whey-vat displays the carelessness and negligence of those who are responsible for its care, it may be safely concluded that the general sanitary conditions of the factory itself are not of the best. The whey-vat may, in fact be regarded as a sort of test that indicates the degree of cleanliness observed by the maker throughout the whole of his operations.

It is only too true that efficient measures are urgently required in regard to the matter. Only the other day, Mr R. M. Ballantyne, of Stratford, one of the largest exporters of Western Ontario and recently arrived from England, declared that a great deal of prejudice existed in that country against all cheese from the district west of Toronto. One of our local papers attributes even such words as the following to him. "Cracked or dry cheese, and oniony cheeses, have been so numerous that the very name of cheese from that district makes buyers fancy they smell onions in it. The reason for this is that makers do not pay sufficient attention to the surroundings of their factories. Cheese of a bad smell comes from dirty factories supplied by dirty patrons. You have seen factories in which the maker wears a foul apron ; the factory itself has a general air of dirtiness, and no attention is paid there to cleanliness in receiving and preparing the milk. All this has had a bad effect on the cheese from the western part of the province, and the makers can never hope to satisfy the English dealers with the quality of their cheese until they have learned the lesson of cleanliness. Filthy surroundings are responsible for all the defects.

"These words are a justly severe condemnation, and they ought to induce the makers to improve their manufacture, and the more so since they proceed from a man whose interests are identical with those of the dairy-

men of the West of the province. By following out patiently proper methods, the conditions relating to the cleanliness or the unhealthiness of the surroundings can be kept thoroughly under control, and there is no excuse for the state of things mentioned above. Should the whey-vat, the churns, the floors, be in need of repairs, and not be in a state which enables the maker to keep them clean, he should insist upon their being put in good order at once. If the factory and the surroundings be in good order, and the filthiness be due to the negligence of the maker, then he ought to be compelled to apply a remedy to these things or else to resign his situation. No half or tardy measures should be applied to these affairs. A virulent disease requires prompt and active remedies. A dangerous complaint seems to have affected the dairy-business in one half of this province; prompt and energetic remedies are needed, and the sooner they are applied the better. What these remedies are, we need hardly explain; every maker, every patron knows, or ought to know, what they are. They may be summed up in one word "cleanliness"; cleanliness observed by the patron in the care of the milk; cleanliness observed by the maker in keeping himself, his factory, and all about it in the best sanitary condition possible. These remedies being properly applied, there are good reasons to believe that Western Ontario may soon renew its former reputation for cheese having a good aroma."

This is exactly my own opinion, and that which is true of the cheese from Western Ontario is, unfortunately, only too true of a very great number of our own factories. If we only had a law permitting us to go to a factory and say to the proprietor; do this, or do that, before a certain day, or you will be fined. But as things are; one may speak till one is blind to no purposes; so long as he sells his cheese as well as his neighbour, it does not matter whether it be at the highest market price or not, the maker does not care two straws. Bad floors, bad drainage are undoubted sources of corruption, in spite of all that the cheese-maker can do to prevent it.

We some times find makers too young, to inexperienced, beginning to work after they only had a few weeks apprenticeship. They do not know enough to vary their methods in accordance with the change of temperature as the season advances, but work away, spring and fall, always following the same routine. Many, too, hire at low wages men who are not held responsible for their work, and who, naturally do not care much how they do it. Proprietors think they save a good deal by hiring such men, but in nine cases out of ten find they are losing money before the end of the season.

And there are patrons who lower the price of making to a rate so low that it is impossible for the proprietor of the factory to make the needed re-

pairs, or equip it regards tools, even the great mistake roughly understar is at the expense is due to a spirit of each is to make Soft cheese loses are the ripening r tain extent, the ca much as any other factory. This year tories within a rad had good cheese; view to destroying do one another in third class cheese. prevent its injuring ket, and to sell it f for any other purpo

There is another vice in our factories certain cheese-makers making out the average hours, who, in their plain, under pain of some means of putting only the good factories make away with so how much milk each quantity of milk lost liver a great quantity too much pains to put what "Farm and Home" what are we indebted and cheeseries of Canada. The number of factories doubled. A great decrease of the country; but certainly, responsible for the sum total of \$137 during the year expired exported was then cal

pairs, or equip it so as to be fit to make good work; he is obliged to buy, as regards tools, everything that can be had cheap. The patrons, too, commit the great mistake of sending in their milk badly aerated. A man who thoroughly understands his business, may, indeed, turn out a fair article, but it is at the expense of the patron. A great deal of our soft off flavoured cheese is due to a spirit of rivalry and opposition between the makers. The object of each is to make the milk yield so much cheese as to out-do his neighbour. Soft cheese loses its aroma far sooner than firm, well made cheese. Neither are the ripening rooms fit to keep soft cheese. The patrons are, to a certain extent, the cause of this, for they insist that their factory shall pay as much as any other factory, under the threat of going over to the opposition factory. This year, I was in a certain locality where there were seven factories within a radius of 12 miles, but of the seven there were only two that had good cheese; the others were only rival factories established with a view to destroying their neighbours and they were doing their best to out-do one another in their products. It is in such factories that we find our third class cheese. If we were allowed to confiscate such cheese so as to prevent its injuring the sale of our good cheese by appearing on the market, and to sell it for soap making, as is done in New-Zealand, or indeed for any other purpose, we should soon put an end to these little factories.

There is another very blameable and unfortunately too common a practice in our factories, especially in the smaller ones; I mean the practice of certain cheese-makers of cutting down the weight of their milk, thereby making out the average of their production to be higher than their neighbours', who, in their turn, find themselves obliged to follow this bad example, under pain of seeing their patrons leave them. It is a pity that we have no means of putting a stop to this practice, for it is highly injurious to not only the good factories, but also to the patrons; for in general, the makers make away with so many pounds of milk from each can without reckoning how much milk each can holds, so that those patrons who deliver a small quantity of milk lose, proportionally, a great deal more than those who deliver a great quantity. Let us be thoroughly persuaded that we cannot take too much pains to preserve our reputation as regards our dairy-products. See what "Farm and Home" says in its last No., under the heading of "To what are we indebted for our prosperous times?" In 1891, the creameries and cheeseries of Canada turned out \$10,698,000 of goods. Since that period, the number of factories and the value of their products have more than doubled. A great deal is being said nowadays about the general prosperity of the country; but our farmers must not forget that they are in great measure, responsible for this, and that they have contributed a large share of the sum total of \$137,361,000, the value of the goods exported from Canada during the year expiring June 30th, 1899. The value of the butter and cheese exported was then calculated at \$20,500,000 or more than one seventh of

the value of all of our exports. This year, their value is estimated at \$24,500,000. Surely a business that brings in such results is worth looking after! We ought indeed to do our best to keep our place in the first rank and to prevent every other country from passing us in the contest.

I am, gentlemen,

Your obedient servant,

J. A. PLAMONDON,

Asst. Ins. General.

DISCUSSION

M. J. C. Chapais.—I must at once thank M. Plamondon for his admirable report, for in it he, in his quality as inspector, has not been afraid of pointing out all the faults he has observed. It is of great importance that the region below Quebec should get rid at once of the defects mentioned by M. Plamondon as being very injurious to the dairy-trade. I have just received a letter from M. le curé Pelletier, of St Alexis and Matapedia, excusing himself for not being here (on account of illness) and in this letter, he calls my attention to one of the chief defects (a defect I myself have observed) in dairying; it is that too many makers devote themselves to working for the greatest yield to be got out of the milk delivered; this they do in order to surpass their competitors in their neighbourhood and to crush them. This defect is the cause of much injury to our trade. It causes us to send to England cheese that lowers our reputation and leads to the appellation of

French cheese to M. Plamondon of trying to get quality, does to discussion of to vince those wh change their pro

M. Plamondon province. I have North-Shore, be must say that I factories. Every show his patrons too soft cheese is

A week or two dealer buys it with to go bad, and is

Such is the way to be made firmer if makers they reply and my yield is greater is the great yield I will make better and I get a greater work, but the market would not hear of a syndicate, "because patrons left him.

The season has been bad advice, as the is far more difficult. What we must make have, say, two cheeses of age between the ma: Why? Because that has turned so our cheese is charging smell.

Dr Grignon.—

M. Plamondon

Dr Grignon.—
out the defects in our

French cheese there to the cheese from the province of Quebec. I would ask M. Plamondon to be good enough to tell us all the injury that this method, of trying to get the greatest possible yield from the milk without regard to quality, does to our trade; and I trust that all those who can assist in the discussion of this point will unite with M. Plamondon in trying to convince those who have acted on this principle in the past, that they must change their procedure and do better for the future.

M. Plamondon.—This fault is unfortunately, far too common in this province. I have not yet had an opportunity of visiting the counties on the North-Shore, below Quebec, because we have no syndicates there; but I must say that I find the fault prevalent everywhere, even in the syndicated factories. Every maker strives to get an extra yield out of his milk, in order to show his patrons better results than his neighbour can show; consequently, too soft cheese is made, which spoils at once.

A week or two after it is made, this cheese still retains its aroma; the dealer buys it without distrust, but before it reaches England, it has begun to go bad, and is no longer eatable.

Such is the result of aiming at too great yields; the cheese must be made firmer in texture. And yet when we speak in this way to the makers they reply: *I get the same price for my cheese as my neighbours get, and my yield is greater.* In the county of Bagot a maker said to me: "It is the great yield I am after; when buyers are willing to pay me for quality, I will make better cheese. They pay me the same prices as my neighbour and I get a greater yield than he does." The factory in question is still at work, but the man who thus answered me has left it long ago, because he would not hearken to the inspector. The next year, he would not join the syndicate, "because," he said, "I was always scolding him," and his patrons left him.

The season before last, we were advised to make softer cheese, this was bad advice, as the cheese we were making was already too soft. Besides, it is far more difficult to make a soft cheese that will keep than a firm cheese. What we must make is a cheese firm enough to keep without difficulty. You have, say, two cheeses in the ripening-room with only two days difference of age between them; you find that one has a good, the other a bad aroma: Why? Because one is well and the other badly made, is full of whey that has turned sour and given the cheese that "fruity flavor" with which our cheese is charged, even when it is not charged with having a disgusting smell.

Dr Grignon.—Can a soft cheese of keeping quality be made.

M. Plamondon.—Yes, if the milk is good: but it must be very good.

Dr Grignon.—You show plenty of pluck in your report, in pointing out the defects in our cheese and the causes of its bad qualities. You have

attacked the makers, and I expected that some of them would rise to reply: not one has done so. There is a proverb that says: "he who defends himself, admits the accusation" (*qui s'excuse, s'accuse*). Perhaps the makers fear this proverb, and do not rise for fear of accusing themselves. Still, we must not lay the whole burden on their backs, for I think the patrons themselves ought to be more careful, and set a better example as regards cleanliness. In my lecturing tours, I find that proper care is not taken of the milk, as a general rule. If the patrons were to put themselves into the position of being justified in blaming the makers, they could of course make them keep their factories cleaner, but if they deliver dirty milk, they will find it difficult to say to the maker: "There; make us good cheese with that."

Every where, where I lecture, I ask the folk: what would you like me to talk to you about?

Tell us about the care to be given to the milk: many people take no care of their milk.

Why don't you?

And then one of them says: I had an aerating strainer, and used for some time to strain my milk. My neighbour had none and my wife said to me one day: "Why do you use that thing, it only makes one more utensil to wash? my neighbours did not wash-out their cans; their milk was tainted: once when mixed with ours it spoiled it; and my aerating strainer was no protection at all. Some others who had these, doubtless reasoned in the same way, for in a short time they no longer used them, and then those who had not bought one, came to the conclusion that they were useless", for said they, "so and so has one, but he no longer uses it."

Reasoning thus, the patrons take bad milk to the factory, and the maker says:

"Ah, they bring me bad milk and I make bad cheese out of it." The desired reform should begin at the farm-house. We need rules to compel the patrons to use these aerating strainers, for with this system at work, the patrons would be in a position to insist upon the makers turning out good cheese.

M. Plamondon.—There is a law to fine a patron who waters his milk, but no law to fine a patron who delivers bad milk at factory, and yet the latter does more harm than the former or than he who skims his milk, since a single can of tainted milk may ruin ten thousand pounds of milk. If we could fine these careless patrons, we might possibly see the last of the bad milk sent to the factories. But special acquirements are needed to distinguish thus between good and bad milk. There are instruments that enable one to detect in five minutes the degree of acidity in milk, there is the "curd-test," by means of which the one, among a hundred patrons, who has delivered bad milk can be detected, but this test is lengthy, it takes a whole day.

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Last year, M. Castel told us about a factory the patrons of which were complaining and asked for an inspector. Their maker knew his business. He used to say: "How is this? I make good cheese, but after being some time on the shelves, all at once it loses its flavor."

An inspector was sent to examine the cheese, with the apparatus for the curd-test, which is adopted in all our syndicates, he discovered on his first visit who it was who delivered the bad milk, and in that milk he detected the same bad smell that was present in the cheese. The patron in question was asked how he treated his cows and his milk: all seemed to be quite right; but yet there must be something wrong. Is the water the cows drink bad? No, replies the patron. But as they were talking the matter over, "Stop," exclaimed he, "I had an old horse die this spring, and I drew it three or four arpents into the wood." Going thither, they found the carcass lying within four or five rods of the pasture in which the cows were feeding. The inspector had the carcass burnt, the bad aroma lasted two or three days more in the cheese, and then ceased throughout the summer.

Bad milk can be detected by this means, but experience is needed. The makers had better come to the St Hyacinthe School to study the process; it is simple enough and can be shown to the patron the next morning. No great demonstration is needed; you need only make the patron smell the milk the next day, and this especially in cold weather, for in hot weather, the patrons are forced to look after their milk, while in cool weather, in the fall, they do not trouble themselves about it, and all sorts of bad smells hover over it. When delivered in the morning, it is cool; the faults are not perceptible; but when warmed up, the vile smell comes out and then it is too late to cure the ill effect it has had. It is very difficult at the time to say who has delivered the bad milk, for the only mode of detection is to test the milk of every patron. They are told, in general, to bring no more bad milk; but if they could be told: If you bring any more milk like that, you will be fined, I think a fine would be the best way of putting a stop to this. I talk about the makers, no doubt, but I also talk about the patrons, for, as you cannot make a good door out of rotten wood, so, you cannot make good cheese out of bad milk. If the maker, with milk like that, turns out cheese that passes on the market, it is the patron who suffers; but if he makes cheese that will not pass on the market, it is the maker himself that suffers. One great fault with the patrons is that they do not take care of their cans. One often sees, as one drives along the road, at three or four in the afternoon, the cans standing with the whey still in them. This autumn I found one with three turkeys perched on its rim.

A voice.—On which side were their tails turned?

M. Plamondon.—I did not observe (Laughter.) Another time the pail was turned, the mouth downwards, on a stake covered with mud, and pigs were lying beneath it! how, on earth, can good cheese be made under such conditions?

M. Vaillancourt.—Do the makers reject much milk ?

M. Plamondon.—Not enough; and that on account of the competition of the factories. Should a can be rejected, it will generally be taken to the next factory and accepted, and then half-a-score of other patrons, connexions of the one whose milk was rejected, will also leave the former factory, which of course ends by greatly injuring the maker that refused the milk; and that is the reason why makers accept some milk that they should refuse. If the patrons of a whole district would coalesce, and pass their word to each of the makers : “ If you refuse a can of milk it shall not be accepted elsewhere,” this would put a stop to this bad practice.

Why is there less bad milk in Ontario ?

Because the factories are on a large scale, and receive from 35,000 to 40,000 pounds of milk a day. There is no factory within a radius of less than 7 or 8 miles of another, so the patrons are obliged to deliver good milk or to keep theirs at home. Here, they would take it to the next factory and it would be all right.

M. Chagnon.—What is your opinion about false weighings, and of makers who dock them 5 or 6 per cent ?

M. Plamondon.—This, at present, is one of the curses of our dairy-trade; and it is an equally culpable injustice to take off 5 or 6 per cent, as to take 5 or 6 pounds per can. The inspector verifies the scales very carefully, but as soon as his back is turned, they are set back again. In some places, the inspector has been too emphatic on this point, and has been told : “ If you are not satisfied, we shall discharge you.” Were there a law empowering a special inspector to inflict a fine every time a false weight is given, this fault might be put a stop to. The inspectors of syndicates are not in a position to deal rigorously with the people, for if an inspector is too severe, he runs the risk of losing the factory altogether.

Dr Grignon.—The patrons have something to say in the matter; it is not only the makers who compose it, it is the business of patrons to attend to its interests.

M. Plamondon.—In many places it is the patrons who see to that and who compel the makers to syndicate themselves. In other places it is the patrons who oppose it.

M. William Parent.—I have found that the greatest wrong that is done at present with regard to false weighings, is the “ cuts ” that are made.

Formerly, we used to compel each maker, by our rules, to swear that he weighed everything correctly. I was then justice of the Peace as well as inspector, and I put my makers under oath ; but since I have been no longer a magistrate, the makers do not trouble themselves to go and be sworn by a justice who perhaps lives at a distance from their factories; so the

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practice has been discontinued and they have begun again to falsify the weighings. A great many makers ask us if it is not possible to get a law passed to compel every maker to testify upon oath, which cannot be done now. It is especially in the smaller factories that frauds are carried on.

Mr. Robert Ness.—At our place, another plan is adopted to check this evil. The patrons buy scales and weigh their milk at home. When they have caught out the maker two or three times in changing the weighings, he soon learns to be prudent and to stop doing so. In my opinion, that is the best way of stopping this bother.

M. Plamondon.—Mr. Ness is quite right. If every patron had a set of scales, the trouble would be abolished in a very short time. As to the oath, this is what my opinion is on the subject: A man dishonest enough to steal, will not hesitate about taking a false oath. I take for instance, a man who waters his milk; if you take that man to the court and offer him the oath, he will almost infallibly perjure himself.

M. Vaillancourt.—I do not agree with you. Many men will be more serious if they are put on their oath. At Montreal he who has to weigh goods for the public is obliged to take an oath before weighing; why not do the same with the cheese-makers?

An unknown delegate.—Practically, it is impossible to proceed otherwise than by oath.

M. William R'Haven.—Have you remarked if the "cut" in the weight is made at the time of the weighing or after?

M. Plamondon.—At the very moment.

M. R'Haven.—In many places the cut is made afterwards, when time of payment arrives. It is then that the patrons are cut from 5 to 10 per cent.

M. Plamondon.—The patron has his book.

M. R'Haven.—In the larger factories no one has books: When pay-time arrives, they says it is 85cts per 100 lbs, and no one troubles himself about the number of pounds taken to the factory: it is generally at the moment of payment that the cut in the milk is made in all the parishes.

M. Plamondon.—In all well managed factories every patron has his book.

M. R'Haven.—When the patron reaches the pay-table, "How much milk have I entered?" "says he." "So much" is the reply and no more questions are asked. I will tell you a fact than was laid before the Minister at Quebec to see what means could be employed by him to put a stop to this.

Two largish factories were at work pretty close to one another. One of them used always to pay 10% more than the other. The amount paid was the same, and one paid 50 cents the 100 pounds of milk, while the other only paid 80 or 82 cents. The patron could not make this out. We tried to find out the cause of this discrepancy and when the time for discussion arrived the maker was asked to show us his book of weighings, to see if the entries were in accordance with the pay-lists. This he refused to do, saying that he had lost the book. The cut takes place, more or less, every where, and, in at least two thirds of factories, at the moment of payment. In this way, the patron is not robbed; he gets the same amount of money; but between two factories, injury is done to the one that does not cut at all.

M. R'Haven.—It is not the maker who makes the payment; he gives his weigh-sheet and that is all. If you wish to put a stop to that, make the one who pays take an oath, that the milk the account of which he is rendering is perfectly equal to the weigh-sheet of the maker.

M. Plamondon.—You are right; it is very often the pay-master who is in fault. Still, the maker is often guilty as well. When I was making cheese, there was an operator, half a mile off, who was working a factory belonging to the same proprietor, Mr. D. MacPherson. I do not know why he did so, but he always used to mark by the five pounds; never entering fractions. Thus, instead of putting down 57 lbs, he always entered 55 lbs.

Here, indeed, was a maker who gave a greater percentage than I, and yet made no more cheese. I used to be asked: "How is it done, M. Plamondon?" Of course, I knew well how it was done.

M. R'Haven.—The most guilty is the maker who is also proprietor of the factory. One of such men used to weigh the milk and deduct 5 lbs, nay, even 10 lbs. He had two cows, whose milk he took in to the factory. Simple enough was his calculation: He had his vat that held a certain number of pounds of milk, say 5,000 lbs. He added up the milk delivered, and found 4,500: the balance he used to say was the milk of his cows. On the others remarking that he had only two cows, he replied. Yes, they are capital milkers; they are first rate cows. He showed the weigh-sheet: the difference was, the milk he had not attributed to one of the patrons he had reckoned as coming from his two cows.

M. William Parent.—What difference per cent of milk may there be as to yield between soft and firm cheese, both being of marketable quality?

M. Plamondon.—I found this summer, that the great trouble one has to complain of is the cutting of the weighings.

I cannot say what difference there is between a soft and a firm cheese; it is very difficult to say exactly; I have never made any experiments in the matter. When I started, soft, i. e., American cheese was made. Nowadays, if one is to suit the market, it will take 10½ lbs of milk to the pound of

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cheese, throughout the season. Of course there are soft cheeses that take much less than that ; those are not cheese, they are paste, though sad to say, they sell very often as high as good cheese. The market wants a cheese that is neither firm nor soft, but medium; one that resist pressure, leaving something between the fingers when a piece of it is crushed in the hand. As the demand goes now, I should not like to get a greater yield than a pound from 10½ lbs, while occasionally only 9 lbs are used.

Another thing I would point out to you, is that, when the cheese is cut on the Montreal market, no reason for the cut is assigned to the makers. If the reason were given, it would show the makers the fault to be avoided.

M. William Parent.—Do you not think, Mr. Chairman, that it would be as well to bring the question before the Board of Trade ?

M. Vaillancourt.—The first step to be taken is to put the man who weighs the milk on his oath, next, that, every patron should have scales at his house with which to weigh his own milk.

M. Robillard.—If the local inspectors had scales to weigh the milk immediately after the maker, and thus find out if he cheated or not, it seems to me it would be a good thing.

The local inspectors ought to have fewer factories to visit, and they would need each a pair of scales to use unknown to the maker. If he kept a daily account of these weighings, he could then, at the end of the month, check the weigh-sheets of the maker, and show the cuts he had made. In this way the trouble might soon be ended.

Dr Grignon.—I weighed milk for twelve weeks, unknown to the maker, and before two witnesses, and I compared my figures with those of the maker. One morning he robbed me of two pounds; you do not begin badly, said I to myself. The next day, five pounds; the day after eight. Taking my two witnesses with me, I accosted the maker thus : Sir, your weighings are not correct. I have detected you in a fraud; on such a day you robbed me of so many pounds of milk, and if that happens again, I will denounce you at the church door : That put an end to it. I do not think it will be necessary to weigh the milk every day; when the maker finds that the patrons have scales at home, he will be on his guard, and that is why, Mr. Chairman, I agree with you when you say that all farmers ought to have scales.

M. Plamondon.—Last year I was away from home; my house was shut up, the key being left with my brother-in-law, who lived next door. During the summer, my brother-in-law found that his weighings were not very correct; so he took to weighing his milk at my house, on my scales. He found that the maker robbed him of as much as 25 lbs, a morning, out of from 300 to 400 lbs of milk. Whereupon, my friend determined to deli-

ver the milk himself the next day, which he did, and all that he said to the maker, quite privately, was : " I have a pair of scales at home, and I weigh my milk." At these words, the man coloured, and not a single pound more milk did my brother-in-law lose during the whole summer. The mere telling the maker that he had scales put a stop to the robbery.

M. Dussault.—Formerly, we had three factories at M. Piché's and there never was more than a cent of difference between one factory and another. I left M. Piché and went to St Dominique. The first sale that was made, and before pay-time, the president said to me : My lad, you know the weighing must be cut; you must deduct 5%; I did so : There was no robbery; the first sale *au retour*, I had over-paid three cents in the hundred. I said to myself; how is this ? I cut to equalise things, but I am equal to the rest : I was a stranger, and they told me that I should not stay there two weeks, but I have passed through it without cutting the weighings. I bought the milk; the patrons found the cans grew larger. " How is this ?" Said they, " it seems to me I had not so much as that." The next summer, they took to weighing their own milk; they found a great difference. They said. How is it I do not agree with you ? I explained the position telling them that if they had not confidence in me they had better take their milk to the new factory. To give the same thing that I give, he must do the same as I do. I changed my position : they built me a factory, and since that time, all goes well.

I asked my patrons; I said : my good friends, there is a question that causes a great deal of trouble; you all know it, it is the question of the cuts on the weighing. Well, I will not cut the weighings and you may be sure I will give you as good a yield as any one. I will not stoop to deceive you by false figures, and false weights. There are plenty of ways of cutting....

M. Castel.—But, pray do not teach them to others. (laughter.)

M. Dussault.—When I used to cut, I got on like the rest. To-day it annoys me to see that this plan is still pursued in many places.

As to the yield per 100 lbs, M. Plamondon, I do not agree with you. The maker who turns out a too pasty cheese for the sake of increasing his yield, deserves to have his cheese cut a cent a pound. I think there would not be more than I $\frac{1}{2}$ lb of difference in the yield.

The one that cuts appears to give a greater percentage than the one that does not cut, and that strikes the imagination of the patron so very forcibly, that he does not seek to investigate the maker any deeper; for he fancies he has a greater return and that is all he cares for. He will gladly travel four miles for an extra 3%.

M. Plamondon.—When I was a cheese-maker, I always kept my weigh-sheets and never let them leave my factory. It was not I that made the dividend; I was working for Mr. Macpherson, to whom I sent a copy; I

used to retain the patron would bring his book : " M. delivered to me. ed with mine; th was found at on trouble people co

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REPORT OI

Mr. Chairman, an

This year, for inspector-general c I found that it wou themselves, rather gain a thorough kn ties of their charge so the report I hav will be summary.

I am happy to of this province, I the superintendence before I was one of marked difference in pectors had been eff

used to retain the original sheet, and as errors occasionally crept in, the patron would bring his book for comparison, for all our patrons had each his book: "M. Plamondon," one would say, "there is an error in the milk delivered to me. I would reply: "We will see." I took his book; compared with mine; the amount was correct; we sent to the office and the error was found at once. Were all the factories to adopt this process, all the trouble people complain of to-day would be avoided.

AFTERNOON SESSION OF JANUARY 9th

The secretary of the association gave certain explanations on the cheeseries.

M. Vaillancourt.—This question of syndicates is perhaps the most important of all, if we desire to succeed in making perfect goods. All the cheese that comes from the syndicated factories realises on the Montreal market an eighth, and often even a fourth of a cent more than cheese from non-syndicated factories.

Each syndicate has its inspector, under the superintendence of an inspector-general; and it is through their inspection and advice that we can hope to dispel all the little troubles between the patron and maker, and all causes of injury to our cheese during the process of manufacture.

REPORT OF M. J. D. LECLAIR, INSPECTOR-GENERAL OF CREAMERIES

Mr. Chairman, and gentlemen,

This year, for the first time, the Dairymen's Association has had an inspector-general of syndicated creameries. At the opening of the season, I found that it would be highly advisable to pay a visit to the inspectors themselves, rather than to the makers under their guidance, in order to gain a thorough knowledge of the manner in which they fulfilled the duties of their charge; of that visit I made a special report to your directors; so the report I have to submit you, on what concerns the makers in general, will be summary.

I am happy to say that, having in preceding years visited the factories of this province, I found this year a notable improvement in those under the superintendence of the inspectors. I had already visited some of them before I was one of the society's inspectors, and at this second visit I found a marked difference in the factories, proving that the work done by the inspectors had been efficient. Of course it gives me pleasure to inform you of

this improvement. I found myself, and the inspectors have told me several times, that during the last two or three years, that is, since they have had syndicates under their care, they have found a very perceptible improvement both in the management of the factories and in the quality of the goods produced.

I also learn from the verbal reports of the inspectors of the syndicates, that the visits of the inspector-general invariably causes a great improvement in such factories as are open to improvement. We regret that these results have not been more complete, because with the labours I was charge with this year, I was only able to pay a short visit to the inspectors, without going through the factories in a thorough manner. I propose to lay before you to-day certain general considerations, and to talk to you about divers important improvements still required in the management of the factories, and in the process of manufacture.

It is absolutely necessary that the temperature of the cream be under the control of the maker. As to this point, I observed in almost every factory that the cream-vats are not so constructed as to easily admit of the cooling of the cream, and this is the cause why a great number of makers are unable to give it the proper care, that care they know to be requisite if their products are to have the superior quality it is their aim to confer upon them. I make these statements, gentlemen, in order that the manufacturers here present may take note of them, and make their vats in future better fitted to the needs of the butter-makers. Speaking generally, the factories should be so contrived as to enable the makers to control the temperature with greater facility, as much as regards the ripening of the cream as the working of the butter.

A large proportion of the makers are convinced of the great benefit resulting from the cooling of the cream, after or even during the separation. This has not yet been generally practised, because makers had not at their disposal an apparatus that enables them to do so easily. To-day, I think most of the makers here present see how very desirable this cooling is; and knowing that, in all probability, there will be on the market, next spring, special apparatus, which will cool the cream at once, I insist upon this point, so that they shall not fail to procure them, and thus be in a position to turn out the best possible goods.

In the course of the autumn, there is, as you know, a competition of butters held for the district of Quebec; I was present, as one of the judges, and we found, among other things, that many of the makers neither took the trouble nor the time needed to get rid of the peculiar smells that milk emits in the fall.

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this flavor the trade complains, and with reason, and I regret to say that I found this *gout d'herbe*, so injurious to the reputation of our trade, in a great many samples.

One means of dispelling this peculiar taste of grass, whether it occurs in spring or in fall, is to cool down the cream rapidly ; a considerable evaporation is thereby produced that carries off the smells from the cream. I trust that now you know how to get rid of these smells, you will not fail to equip yourselves with an apparatus that will enable you to do the work easily.

The same thing again happens when the churning is not done at a sufficiently low temperature, a fault common to many, aye, to very many makers. Hence occur great losses of fat in the buttermilk, and this is due to the proper temperature of churning not being observed. Many factories have but slight facility for changing the temperature and cooling the cream promptly, and I think it is due to this that churning is conducted at so high a degree. I have examined some of the reports of our inspectors and I find that very considerable losses are incurred that might be and ought to be easily avoided.

It has given me pleasure to find that a great many factories are now furnished with cold chambers. It is hardly three years since we began the crusade in favor of these chambers. The thing was well worked out, and I think they have answered. I would earnestly persuade those who have not yet got them, to build them as soon as possible, and, without being justified in stating it as a fact, I hope the Ottawa government will continue, as in the past, to give you a special subsidy, and will prolong the grant from year to year for some years longer, for the benefit of those who take the trouble to erect these buildings, and to keep up the high reputation of our dairy products in general.

A NEW WAY TO MAKE BUTTER

The programme of this meeting announces that I am to describe to you a new way of making butter. This I proceed to do in a very concise fashion, and I think that the question you cannot fail to put to me will assist in the development of this description and enable you the better to lay hold on the good results to be expected from the process. You will judge yourselves of the value to be attached to the experiments made, and whether they are to be trusted as affording a hope of the improvement of our products, and especially of rendering them uniform.

At all our meetings you will doubtless have observed that we aim at uniformity in our goods. It was not very difficult to attain to a moderate

degree of uniformity. We have made some progress and this progress keeps on increasing ; but it is too tardy, and the trade still complains of the want of uniformity in our goods.

The new process aims at the expulsion of the difficulties attendant on the ripening of the cream, which it is not easy to carry out under present conditions in a uniform manner. The usual process is to ripen the cream by causing it to assume a proper degree of acidity. In order to control the development of this acidity, the maker has to be constantly on the watch to regulate the temperature of the ripening body. Thus, according to the greater or less competence of the operator, according to the ease with which he can regulate this temperature, according to the degree of care which he devotes to this ripening process, do we see the quality of our butters vary, and hence results the peculiar fact that, owing to these variations, very few butters made on the same day possess characteristic uniformity enough to enable us to class them together.

This, then, was one of our chief draw back, and we have been trying to improve the process, so as to simplify it, thereby rendering more easy the production of the same aroma in every sample. Since the aroma peculiar to butter seems to be due to the emanations produced during fermentation, it follows that it is by the emanation of a propitious ferment that the fatty matter will be endued with the requisite flavor.

If, instead of allowing the germs of a milk more or less carefully treated, that is, more or less contaminated, develop themselves naturally in the cream, it were possible to have at hand a good ferment, and to mix it with the cream so as to ensure to the butter a flavor acceptable on the market, it follows the uniformity of flavor would depend on the ferment. We have planned this new process, in order to see if the flavor acquired by this butter during the limited time the cream and the ferment are in contact would really be appreciated on the market. This trial has turned out satisfactory results. It proved to be impossible to distinguish the butter produced in this way, i. e., possessing an aroma proceeding from a momentary contact of the cream with artificial ferments, from butter made from cream that had undergone a natural fermentation lasting 24 hours.

Could the cream be prepared so as to be freed by cooling from the bad smells that it had contracted while the milk remained at the farm, it would be quite ready to imbibe the emanations of these good ferments and to acquire a cleaner flavor. We have tried this procedure and it has proved eminently successful. There was one thing to fear, a thing the trade could not endure; the churning of sweet cream was known ; but losses have always accompanied in the buttermilk, losses so great that this procedure had become impossible. We have tried if it were practicable to reduce those losses to a minimum, and we have tried to ascertain what the minimum would be.

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Our experiments reduce these losses to a minimum not exceeding the losses found to subsist in cream ripened naturally under the best care we could give it.

There was still another thing to find out : Would this mode of working be more burdensome to the operator ? Would it inflict on him an additional amount of work impossible for him to perform, and might not this so energetic cooling be too costly for the proprietor of the factory ? We have on these two points satisfied ourselves that the new process will require neither more ice nor more labor than the old process. So, in these respects, then can be no objection to it.

There, then, is a very brief summary of the process I had to explain to you. It consists in withdrawing the cream from all foreign influences which might affect it while in the factory ; it consists in no longer allowing the quality of the butter to depend upon the greater or less attentive watchfulness of the maker, and on his greater or less knowledge of his business. In sum : to give the desired flavour to the butter of the future, all that is necessary will be to prove the degree of acidity of the cream.

DISCUSSION

Mr. Grisdale.—When do you put in the ferment ? Before you reduce the temperature or after ?

M. Leclair.—By this process we cool the cream even during the separation, by means of the apparatus that will soon be on the market. We cool the cream down to 50° as fast as it is separated ; that operation is very easy and the cooling is done in an admirable manner. The cream we leave at this temperature of 50° long enough for the fatty matter to become firm enough to avoid any loss in churning ; about three hours seems to be enough. We have tried experiments to prove what length of time cooling showed the least loss. We kept the low temperature given for a long time and the result was highly satisfactory ; but by degrees we came to the conclusion that the time necessary for the firming of the fatty matter at the temperature of 50° is, in summer, about three hours. If the temperature of the cream is maintained at 50° for three hours, you may feel assured that in churning the losses will not exceed those in the buttermilk when the process is properly conducted in the old-fashioned way.

Mr. Grisdale.—You reduce the temperature to 50° and put in the ferment ?

M. Leclair.—When the cream has been kept for three hours at 50°, we put the ferment into the churn with the cream. We do not put the ferment to the cream while the temperature is at 50° ; it is only during the churning

and we find that the time during which the cream is in contact with the ferment is sufficiently long for the butter to acquire the sought-for flavour and to give satisfaction on the market.

Mr. Grisdale.—In what proportion ?

M. Leclair.—We find 20% to be a fair proportion. We have not as yet made special experiments to discover the nature of the ferments, but simply to ascertain if butter made in this way would be acceptable on the market. It was approved, and we are now about to institute experiments on the nature of the ferments to be employed, and on the percentage of ferment to be added, in order to obtain the maximum of aroma.

I am enchanted to learn that the President of the Dairymen's Association was one of the judges at the butter-exhibition of which I spoke just now, where it was ascertained that the process I am speaking about imparts an aroma sufficient to please the trade, by, in winter, putting the ferment in contact with the cream during the time of churning. In summer, we have not pasteurised the milk because it is generally better in summer than in winter. In summer we have only cooled it, keeping the cream during a certain given time before mixing it in the churn with the ferment, immediately before churning.

Now the results in winter are not so satisfactory. The cream is affected in a more disagreeable manner; even an additional percentage of ferment does not satisfy us; and that is why we pasteurise the cream, cool it afterwards, and then go on with the churning just as in summer; and thus by increasing the percentage of ferment up to 60 or 62% of the cream, we succeed in bringing the butter in from 50 to 60 minutes.

M. J. de L. Taché.—Do you not think that by taking a ferment of a given strength, and allowing it to be longer in contact with the cream you might use less of the ferment ?

M. Leclair.—We once tried adding the same proportion of ferment all the time the cream was kept cool, but found no great difference. The percentage to be added necessarily varies. The ferment is strong enough by itself, and is kept in contact with the cream long enough for the butter to acquire a flavour. The next series of experiments will bear upon the selection of the ferment to be employed.

Now, if you wish to know the degree of acidity of the ferment we used; we had a ferment whose acidity varied from one per cent (1%) to one and ten hundredths, (1.10%) to one and fifteen hundredths (1.15%) of acidity. In order to succeed in making butter easily, we had to take into account the peculiar characteristics of the cream, since it is frequently impossible to churn at a low temperature if the cream is thin. We therefore separated our cream so as to be as thick as possible. And this weak percentage, which might be 10% in summer, enabled us to extract the whole of the fatty

matters from the ferment enough to render easy churning in the art of churning termilk, here are

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matters from the milk leaving no losses behind. Still, the cream is consistent enough to receive an addition of 20% of ferment and yet allow of an easy churning not lasting more than 50 to 60 minutes. We have mastered the art of churning, and if you wish to know how much we lose in the buttermilk, here are the figures.

We began a series of experiments on the 26th June: the skimming was done at 72° F.; the cream was cooled down to 45°, in the apparatus I mentioned just now, and the cooling went on at the same time as the separation. We kept the cream, for the first experiment, at 50° for 5 hours. The test of the buttermilk gave us two hundredths (0.02%) of loss in the churning. Needless to go over the whole series; we have varied the trials before reaching this average of time which we find sufficient to enable us to avoid losses. On December 5th, the cream was kept at rest for 3 hours at 50°; we had a loss in the buttermilk of fifteen hundredths (0.15%); the next day, seventeen hundredths (0.17%); and on the next of thirteen hundredths (0.13%), always at the same temperature and during the same number of hours.

There, gentlemen, you have the average of losses that we make by this process. We had the butter examined by judges, and I trust that our President, who was one of them, will be good enough to give us their opinions, as well as his own, of our samples.

We will try to reduce still more the time during which the cream has to be kept at a low temperature, and to diminish this percentage of losses. We had among our samples of butter one that was made after the ordinary method of ripening during 24 hours, and I think M. Vaillancourt will not have forgotten its peculiar taste, and the difference he found between the two samples.

A voice.—Cannot the loss of 0.17% be lessened?

M. Leclair.—Yes, by keeping the cream longer. If you choose to keep your cream cool for four hours, the losses will be reduced in proportion, and so on. A very easy way of diminishing these losses, is to keep the cream a longer time at a low temperature. Seventeen hundredths after all, is not a great quantity—0.17—only seventeen hundredths of 1%; considering the trifling quantity of buttermilk we have, the quantity lost is not worth considering, and I think the result is very acceptable.

M. Grisdale.—What is the loss in the ordinary way of churning?

M. Leclair.—About from one-tenth to one-twelfth or one-fifteenth, is the average.

Mr. Grisdale.—And about the same by the new process?

M. Leclair.—True.

Dr. Grignon.—Did you, in the month of June, calculate the loss, after cooling for three hours instead of five, to see if there is a difference between spring and fall?

M. Leclair.—On the third day, we kept the cream for two hours fifteen minutes, and found the loss to be 0.26; and about the same loss occurred after keeping it only two hours.

We afterwards worked during July, keeping the cream 2 hours 20 minutes; the loss was still more considerable. Next, the series of experiments was recommenced in September.

And now you would probably like to know how much ice it takes to cool the cream as it flows from the separator. The operation is generally done at 75° to 78°. To cool down thence to 50° is a good deal to do, especially when the cream has to be kept at that temperature for three hours; the churn, too, has to be cooled. We have worked in a temperature of 78° and for a quantity of about 4,000 lbs of milk, we have never exceeded a total expenditure of 275 lbs of ice. Judge, then, you who have to cool for 24 hours, if 275 lbs of ice would be sufficient to enable you to give to the cream the exact temperature you wish to give it in order to make the quality of butter you wish to make. Do you find that quantity of ice exorbitant? I think not!

Dr. Grignon.—What is the proper temperature in the cold chambers?

M. Leclair.—To get the grant, the temperature must be maintainable below 38°.

Dr. Grignon.—It would be too cold for the cream if it was put into the ice house?

M. Leclair.—It would be the cause of changes of temperature in your cold chamber.

A voice.—Supposing you employed a ferment, at what temperature would you keep it?

M. Leclair.—That depends upon the length of time your ferment has been prepared. If it is prepared to-day for use to-morrow, you keep it at about the same temperature at which it is maintained. The ferment may be made fresh daily; in fact, I think it ought to be; and pray do not fancy that it is a great task to prepare it; all there is to do, is to take a quantity of skim-milk proportionate to the quantity of cream you are to use; this skim-milk you may pasteurise, and cool it, placing it simply in the same temperature. The next day, your ferment will be ready for use; it is very easily done and very difficult to make any mistake in doing it. Had you once worked at it you would not be afraid of the undertaking.

M. Vaillancourt.—Last month (December) M. Leclair submitted to us some score of samples of butter made during the summer. Some of these

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were made after the old process, others after the new. We were four who judged the butter, and neither of us knew one sample from another. After having examined the samples, those we unanimously placed in the front rank as superior to the best were all found to be made after the new process.

We even found between butter made on the same day a difference in value of four to five cents a pound, in favor of the new process. New process butter made in June, was as fine as old process butter made in September.

We were therefore unanimous in advising M. Leclair to continue his studies on the new process. There is not the least doubt that it will have to be adopted before long, and there will be everything gained by it. A great deal of inferior butter reaches the market. The cause is often due to the improper ripening of the cream. Some keep the cream 24 hours, some keep it longer. Here, is a more or less properly arranged chamber; there, is one utterly unfit for its purpose, and, hence, the cream being improperly matured the butter made from it cannot be good.

With the new process in operation, this trouble can be avoided.

Mr. Grisdale.—I have been very much interested by M. Leclair's report. This novel process ought, in my opinion to be deeply pondered. A vast number of creameries subsist in the country in which the process may be tried. The want of uniformity in our products causes a great deal of injury to the good repute of our butter.

It is hardly possible for us to load a cargo of butter for England, of all the same quality and of uniform appearance. There will be so many hundred pounds at 20 cts., so many at 23 cts., &c. That is by no means what English dealers want; they seek for butter of the same quality and that is the reason why M. Leclair's process is likely to be of such great value; and I hope that both this province and Ontario will give it a thorough trial.

A voice.—By this new process, will the patrons be obliged to keep their milk in clean and proper order as usual, or will they be at liberty to neglect it? (Laughter.)

M. Vaillancourt.—A remark on the size of the butter-boxes: I advised you never to put more than 56 lbs of butter into a box. It often happens that boxes weighing 57 or 58 pounds are sent to England and we have to lose the overplus. There had better be one pound under the 56 lbs than one pound over.

M. C. E. Mortureux's lecture, on manures, forming part of the review of the former transactions of the Association, will be printed at the end of this report, with the other lectures of the same kind.

The Chairman.—The Association of dealers in butter and cheese of Montreal having delegated M. N. E. Clement to represent it here, I hope that M. Clement will be good enough to address us.

ADDRESS BY M. N. E. CLEMENT

Mr. President

and Gentlemen,

Delegated by the Association of the dealers in Butter and Cheese of Montreal, to represent it at your grand Convention, it gives me great pleasure to address the Members of that great family of Dairymen which, by its industry, its products, its energy has, during the last few years so thoroughly changed the face of the Province of Quebec.

You may well tell yourselves, gentlemen, that thanks to your energy, you have become a source of wealth to this province, to our dear country as a whole. You have of late realised a vast progress in the manufacture of butter and cheese, and it has paid you well for your pains.

But, is it very certain that there remain no further steps in the road of progress to be taken, and is it sure that we, in this province, have attained the highest degree of perfection in the manufacture of those products that the English market demands from us? Is it quite true that we always take every fitting precaution to preserve in the best conditions of packing and temperature our products derived from the dairy?

Ask those questions of the members of the Association I have the honor to represent at this Convention, and the answers will be:

1° Too frequently the package is defective; the wood for the cheese-boxes is too thin, the sides are broken *in transit*. The bottoms and the covers are sometimes made of wood so green that it conveys its moisture to the cheese, destroys its rind and causes it to mildew, especially in hot weather. Too many pieces are used in the covers and the bottoms. West of Toronto, all the boxes are made of soft elm, from an inch in thickness of which five sides are made, while in Quebec a wood is used from which in the same thickness of one inch seven or eight sides are made; and I may add that oftentimes the cover and bottom are made of four or five pieces, while they ought never to contain more than two or at most three. A good box ought to be solid, made of dry sound wood. If the box is thus made, the cheese, if it is well made, can never mildew or deteriorate in

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any way ; cannot even get dirtied on its journey. Consider for a moment how often a box of cheese has to be handled and re-handled before it reaches the consumer, and you will then easily see why all the dealers in and exporters of cheese insist upon the good quality of the boxes that contain it.

At this point, allow me to tell you that too much attention cannot be paid to the transfer of cheese from the factory to the station. Cheese must be as carefully protected from the rain as from the burning rays of the sun and from dust. Moisture, heat, and dust are three enemies from which it must be guarded, and for that reason I must advise those who are good enough to listen to me with so much attention to supply their vehicles with a water proof covering of cloth or cotton.

2^o I should also like to say a few words to you as to the good appearance a cheese should present. With a very simple degree of care, the maker might give it a better aspect. You will easily see the importance of this if you will judge from your own experience. Suppose you wanted to buy a ready-made great-coat ; you would go to the shop-keeper who would show you several of these garments ; if there is one that is shabby, rumpled, even if it were of the finest quality of cloth, would you not by preference choose a neighbouring one, which, though of perhaps not so good a cloth, has a well got up appearance that pleases the eye. And so it is with cheese ; the one who will get the highest price will be that which will be the most approved of, i. e., the one that not only is of the best quality but which is also of the best appearance.

There is one fault that is very common to cheese in the eye of the buyer, that is, the top and bottom are not well finished off. To correct this fault will not give the maker much trouble. When a cheese is put in press, and the screw properly tightened, it must be loosened again to adjust the bandages ; then, after having passed the whole night in the press, the cheese should be turned, its sides trimmed, and the cheese should be replaced in the press the ends being pressed down. Take care to always have the moulds in good order, that is that the hoops and "fouleurs" fit well, so as to prevent any curd working its way out between the hoops and the "fouleur". Treated in this way, your cheese will look better, which involves, at the same time, its getting a higher price.

Some makers follow well the advice to make large cheeses, but they do not select high enough boxes. The cheese must never pass out of the top of the box.

The maker should brand the weight on the side of the box instead of marking it with a pencil ; never brand or mark on the cover.

Let the boxes be uniform, say from 70 to 75 pounds, and then with uniformity of size in the boxes, careful packing, and good looks, Quebec

cheese will sell as high as the cheese of Ontario. It is not its quality that is inferior, it is the carelessness of its dress.

3° As regards the cheese itself, we find a genuine improvement in those makers who have ripened their goods in the ripening chambers fitted up on the principles advocated by the Quebec Government. Those ripened in a temperature not over 65° have kept very well ; their texture is homogeneous and presents no trace of mouldiness.

Of course this could not be so, unless the milk used was of good quality. Bad milk cannot make good cheese. No patron who sends bad milk, whether dirty or lowered, can expect his maker to turn out good cheese.

I must allow that the makers of the province of Quebec have indubitably made great improvements, as much as regards the quality as in the packing of their butter and cheese, but there is still plenty of room for improvement. One most efficient means of improvement is the establishment of good factories, suitably fitted up : then the patrons will receive the highest prices for their goods.

No doubt you will be addressed by others on the means of getting your cows to yield plenty of rich milk ; you have been told, and will hear the lesson repeated, how to take care of the milk so as to preserve in it all the qualities needed for its conversion into butter and cheese ; into their domain it is not mine to enter, but I may permit myself the expression, of this counsel: put into practice the teaching of experience, if you aim at getting good products, products that will sell freely and at prices that will largely repay you for your trouble.

A propos of this, allow me to quote to you the words of an expert who is thoroughly conversant with all that passes in the cheese-trade in this province of Quebec. Not being authorised thereto, I do not give his name, but this is what he wrote to me last month :

“The factories of the province are becoming more and more numerous and there are too many small ones. Half of them, I am convinced, could be closed with advantage to those interested in them, for you cannot keep competent makers of butter or cheese without paying them sufficient to enable them to lay by money. The moment you try to pay them only common day-wages, they lose all interest in the concerns and only work in proportion to the pay they get. If not properly remunerated for their work, in order to make greater savings they will buy only the least costly materials and furnishings, and consequently will produce nothing but inferior goods.”

These remarks, Gentlemen, were made long ago for the first time, but it is wise to recall them from time to time, since they are the expression of what is true and the truth must finish by triumphing over error. For it was an error, the continues multiplying of cheeseries in certain districts.

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There are parishes which were growing rich through the work of a solitary cheesery, and are now hardly making a living because they divide their milk between two or three factories ; they have to pay two or three makers, and their general expenses are doubled or tripled ; the makers earn but small wages, and the patrons make no profits.

Our experience in the cheese-trade teaches us that both makers and patrons are desirous, anxious even, to do well, to do better and better ; therefore we pray them to take into consideration the remarks we have thought it our duty to present to them in their own interest as well as in the interest of our export-trade which cannot but profit by any progress accomplished in the making, the ripening, the packing, and the freighting of our cheese.

BUTTER

Allow me now to offer a few observations on the subject of butter. As you know, the omission of a trivial detail is often the cause of a great difference in the price of goods so perishable as butter.

1^o Thus, people fancy sometimes that they are making a saving by using a thin parchment-paper in packing. It costs less, it is true, but consider what sort of an economy you will find it if, owing to its thinness, the butter tastes of wood. It is at once a quarter, a half, or even a whole cent a pound the buyer will knock-off from what he would have paid had the butter been packed in parchment-paper of at least 40 lbs to the ream. Thick paper protects the butter properly, thin paper insufficiently.

2^o If you want to be saving, do not make your economies on boxes or tubs, any more than on paper ; buy the best, those made of sound wood, dry and well seasoned, and clean. Should you pack your butter in boxes, choose those that fasten with hooks ; they are the easiest to sell.

I cannot too strongly advise those who work far from a railroad station to put their boxes into bags (hemp ?) to be returned by the buyer ; sent in this way the boxes will arrive safely and clean, and their butter will fetch the highest price its quality will warrant. Those that have no bags must cover the load of butter with a "waggon-cloth", to protect it from the sun, the rain, the mud, and the dust.

3^o As regards weight, there are some makers who think they do well by packing more than 56 lbs in a box. This is a mistake ; the English dealer demands 56 lbs to the box, but he will not pay for any overplus. So it is very important that the maker buy boxes that when full hold exactly 56 lbs, and no more, when they are weighed in the public scales.

Others makers complain that they are sometimes "cut" in their weight ; the way to remedy this is to see that the boxes they pack hold in reality the

indicated weight ; if they fail by the fraction of a pound, the makers run the risk of losing a whole pound.

With the lapse of time, butter loses both in weight and quality : we must not lose sight of this essential point. We advise that butter be sent off weekly, if the factory have not a very good icehouse, and at the latest, fortnightly, if the factory have very superior icehouses, or refrigerators. The trade demands fresh butters. It is chiefly owing to their fresh condition when they reach the English market that the Danish, Irish, and French butters fetch better prices than Canadian butter.

Important, too, is the question of the salting of butter ; we recommend that salt should be used at the rate of from 2 to 2½ per cent from 1st June to 1st November, and from 3 to 4 per cent for the rest of the year. The salt must be equally distributed through the whole mass of the butter.

Pure salt, and no other, should be employed ; we have no intention of "puifing" any special brand, but every maker knows perfectly well which are the pure salts to be found on the Canadian market.

Be particular in giving a good appearance to the surface of your box or tub by making the butter very smooth and laying on the parchment-paper very carefully.

4° It is well understood that these remarks, however well observed they may be, will not suffice alone to win the highest market price for the butter.

The highest price can only be obtained for the best quality of butter packed in the best made box or tub ; the highest price, in a word, is only paid for the article that is the best in every respect.

Begin then by making a butter of superior excellence.

Many qualifications are requisite to constitute a superior excellence in butter.

We will recite these briefly, so as not to wear your attention, but each point, observe, is of great importance. Do not imagine that the making of butter is carried out in the factory alone : it is begun in the udder of the cow. If the cow give good rich milk, you can get good butter from it. The quality and quantity of the food affect the yield and richness of the milk. Therefore, if you want to make good profits, keep none but good cows and feed them well.

When you have drawn good milk from your cows, do not leave it in the cowhouse, for however clean it may be kept, the milk would take on a bad flavour and cannot give good butter. Mind that all the milk-pails and others dairy-utensils be kept exquisitely clean, and that the cream when ripening be kept in a place free from any strange smell ; that the hands and clothes of those that handle the milk or milk the cows be clean and free

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from deleterious smells, and thus your butter will be of first-rate quality—if your maker knows his trade, for the rest of it is his affair ; it is he who is to give to the grain of the butter its velvety look, produce a mass uniform in texture, as well as an equal, pale yellow colour over and through the entire body of the butter.

There, Mr. Chairman, there, Gentlemen, is what I have, not to teach you, but to recal to the memory of those who have forgotten that we must never stand still in the road of progress, but always keep advancing, if we desire to increase still more our exports of the products of the dairy-trade.

We are not the only ones working in this direction ; other nations have the advantage over us of being nearer to the English market ; but in spite of this we must gain the victory over them, and this victory can only be won by our improving the quality of our goods.

DISCUSSION OF THE REMARKS OF M. CLEMENT

Dr Grignon.—You, Sir, are, I believe, an exporter of butter and cheese, a merchant. Would you kindly tell us, in general terms, if you pay higher prices for butter and cheese coming from syndicated factories than from those made at non-syndicated ones ?

M. Clement.—In reply to that question, I would say that butter and cheese from syndicated factories are generally of superior quality, but as for saying that we pay higher prices for these because they come from syndicated factories, is rather a delicate thing to say. An article of merchandise is always an article of merchandise ; though not made in a syndicated factory it may be of first-rate quality. In general, we find good qualities of butter and cheese in syndicated factories, and I would advise all factories of butter and cheese to be syndicated.

M. Vaillancourt.—The remarks you have just heard, and which are addressed to you in the name of the dealers in butter and cheese, are of the greatest importance. It is as much to your interest as to that of the dealers that these lessons be learnt. You would hardly believe all the good that would accrue to the province of Quebec and to the high reputation of its dairy-goods, if you were to put into practice the advice you have received. And first, of the boxes ; it is in this item we are probably most guilty. It is positively disgraceful, the condition in which the boxes reach us at Montreal. If you could get yourselves boxes made of dry wood, thick enough, and with bottoms composed of not too many pieces, there would be a grand point gained.

Next ; if you could provide yourselves with presses capable of holding cheeses of 75 to 80 lbs. that is the size the English prefer.

An exporter told me himself that if he could always get cheese of 80 lbs he would willingly pay one-sixth of a cent a pound more than for cheeses of 60 to 70 lbs. Next ; it often happens that cheeses are a couple of inches higher than the boxes, and that they reach the market all broken to pieces.

Mr. Hodge.—I think the Dairymen's Association has great reason to congratulate itself on the success of this meeting ; I met a man here this morning who had come 60 miles in a sleigh to the station on his road hither. This proves the great interest taken by the people in dairying.

I have heard a good deal of talk about *French cheese* : my London correspondent asked me this spring for some cheese from the west and some from Quebec, white and colored. I sent him two from Ontario and two from this province. He told me that the Quebec cheese suited the trade better than the Ontario cheese. Of course I do not mean to say that all the Quebec cheese is better than that of Ontario ; we have inferior cheese everywhere ; but what I have related to you I said to show you that the Quebec makers can make good cheese if they choose.

M. Vaillancourt.—To what Mr. Hodge has stated I can add a remark Mr. Ayer made to me. He said that when he wanted a good cheese for family use, he chose a Quebec in preference to an Ontario cheese. (Cheers.)

Nevertheless, Ontario cheese still sells for half a cent more than Quebec cheese. This is an anomaly that we must speedily cause to disappear.

M. J. B. A. Richard delivers an address to which apply the same remarks that applied to M. Mortureux's address, p. 68.

SESSION OF WEDNESDAY EVENING, JANUARY, 9TH

OFFICIAL OPENING OF THE CONVENTION

ADDRESS OF WELCOME

The Mayor, M. L. H. Levasseur, read the following address :
Mr. Chairman,
And Members of the Nineteenth Convention of the Dairymen's Association,
Gentlemen,

In addition to the honour of having been chosen during the last few days to exercise the functions of the Chief Magistrate of Fraserville, I have

now the supremely cordial welcome briefly add, mor

The presentation, accompanied by the Minister of Agriculture, the Commissioner of Agriculture, distinguished friends, and the interest that they attach to its expansion, its

Far from doing any work, we are only conceiving the deliberations, and the attraction, but we are opening of the new age of our nation by step alongside the convention may be precious labor, the orator, of Témiscouata accept the assurance of subsidies of

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Address of the
by M. Samuel Rio
M. President,

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now the supreme felicity, as Mayor of that town, of offering you the most cordial welcome. My reign could not open under more happy, and I will briefly add, more brilliant auspices.

The presence in our midst of the members of the Dairy-men's Association, accompanied by such important political personages as the Hon. the Minister of Agriculture of the Dominion, the Hon. F. G. M. Déchéne, Commissioner of Agriculture of the province of Quebec, and of numerous other distinguished friends of the farmer, prove to demonstration the earnest interest that they attach to the noble cause of agriculture, to its development, its expansion, its progress.

Far from dreaming, Gentlemen, of turning you aside from your patriotic work, we are not only anxious to express to you our gratitude for having conceived the agreeable idea of choosing Fraserville as the place of your deliberations, and of making it, for this day at least, a special centre of attraction, but we are pleased to believe and to formulate the prayer at this opening of the new century, that this twentieth century may be the golden age of our national industry, dairying, which marches and is to march step by step alongside of the cultivation of the soil, and that from this nineteenth convention may spring as from a glowing hearth, under the breath of your precious labor, heat-giving rays of prosperity, not only over this vast territory, of Témiscouata and Squatteck, all prepared — let the Hon. Ministers accept the assurance — to receive the generous encouragement and the lavish subsidies of the two governments, but also over the entire province.

May your stay in this little town of ours be as agreeable, gentlemen, to you, as it is to the people of Fraserville.

L. H. LEVASSEUR,

Mayer of the town of Fraserville.

Address of the Agricultural Society of the county of Témiscouata, read by M. Samuel Rioux.

M. President,

Gentlemen :

M. J. Elz. Pouliot, president of the Agricultural Society of the County of Témiscouata and of the Farmer's Club of Rivière du Loup, being prevented, by unavoidable obstacles, from offering you in person the welcome you so well deserve, has conferred upon me the pleasant duty of replacing him, and of telling you how happy he would have been to see at Fraserville, a chosen band, so distinguished and so numerous, of the representatives of the noblest of the occupations pursued by man.

Agriculture, with its different branches, is the pivot on which revolves the world and its divers industries. If it prospers, arts, trade, professions, all prosper. It is the prosperity of agriculture that has given life to empires and nations ; when agriculture declines, nations and empires fall into decadence.

In the earlier age of the world, the farmer was the noblest being on the earth ; to day, he is not less important by his position and his usefulness. From his ranks spring men of action who have made their mark in all the other branches of human industry and occupations. History is there to prove it, even the history of our own times.

Besides, gentlemen, is it necessary to cast our eyes beyond this very hall to convince us that Agriculture knows how to maintain its rank, when we see here manufacturers, men of science, Statesmen, Ministers of the Crown, all active members of your association, encouraging it by their presence, and contributing so largely to its advancement as to conquer for Canada so illustrious a place in the grand meeting of nations in the year that has just fallen into history.

In the farm-house, or in the rural parts, have been born almost all those men who constitute our honour and our glory.

May then this convention, that you have so gracefully appointed to be held here, fix more deeply in the heart of the countryman whatsoever he may be, proprietor or laborer, the love of the land, of that land which is not content with feeding its children, but defends and protects them, and which oftentimes conserves their faith and their morals by keeping them away from towns and manufactories.

May, once more, this convention more than ever inspire the rural population of the banks of the St-Lawrence with regard for the fields that saw them born or grow to manhood ; may it help them to profit by the lessons from the lips of farmers so skilled and experienced as you, gentlemen, all are, and thus for its part contribute largely to the progress and prosperity of our dear country.

It is with this object in view that you have come hither, and for this we thank you most cordially. May this meeting, that so greatly honors us, be profitable to all of us ! May your stay in our town be as agreeable to you as it surely is to us ! Once more, thank you ! We thank you for having come, in such vast numbers, in such a rigorous season, so far from your hearths and homes.

The remembrance of this visit will, be sure of it, remain for ever engraved on our hearts.

The Agricultural Society of the County of Témiscouata,
By S. C. RIOUX,
Secretary.

Fraserville, January 9 1901.

REPLY C

Mr. Mayor,

Mr. M

As I have no means, in my representation to the Dairy whither I well know your wisdom, so as not

It is many a long day since I have seen you. I had this morning the pleasure of being invited. We met with harmonious notes and the town offers to the Dairy by none but millionaires, and I congratulate the Dairyman's

I regret that the Dairy should have been given the precedence. He has been called upon to accept of his vice-presidency and it is his duty to resign. I ask for subsidies for the Dairy through your Agency. I fancy Fraserville has you have here the

I am happy to visitation. He is one

Our visit to this before the new century hold another convention

I thank you for the fine, spacious hall you convey to the Council their kindness.

Mr. Secretary of kind expressions you doubtably the sister conventions we treat on the words of encourage

REPLY OF THE CHAIRMAN, M. J. A. VAILLANCOURT

Mr. Mayor,

Mr. Minister, and Gentlemen,

As I have not the slightest pretension to eloquence, I shall by no means, in my reply to those two magnificent addresses that have been presented to the Dairymen's Association, attempt to rise to heights of oratory whither I well know I cannot possibly attain ; I had far better aim at conciseness, so as not to weary you too long.

It is many a long day since I first heard of Fraserville. I only left my bed this morning to travel hither, because our convention could not be postponed. We met with an agreeable surprise on our arrival in listening to the harmonious notes of your band and in admiring the lovely views that your town offers to the enraptured gaze. One would fancy that it was inhabited by none but millionaires ! you must be proud, Mr. Mayor of being its first citizen, and I congratulate you thereupon in my own name and in the name of the Dairymen's Association.

I regret that the Hon. M. Fisher could not be here this evening. I should have been glad for this part of the country to have made his acquaintance. He has been a member of our Association since its foundation ; one of its vice-presidents, too, and would have been its president, only, being called upon to accept the post of Federal Minister of Agriculture, he thought it his duty to resign his position of vice-president. When you are about to ask for subsidies for the district, you are certain on addressing M. Fisher, through your Agricultural Association, of obtaining all that you desire. I fancy Fraserville has already not been neglected by the government, since you have here the workshops of the Intercolonial.

I am happy to see that the Hon. F. G. M. Déchéne has accepted our invitation. He is one of the most regular of our attendants.

Our visit to this town will leave behind it a pleasant reminiscence, and before the new century is far advanced, I hope we shall return hither to hold another convention.

I thank you for the superb reception you have given us and for the fine, spacious hall you have placed at our service. I beg you, Mr. Mayor, to convey to the Council and people of Fraserville our grateful thanks for their kindness.

Mr. Secretary of the Agricultural Society ; I am not surprised at the kind expressions you have made use of towards us, for your society is indubitably the sister of ours. We both aim at the same object. In our deliberations we treat on agriculture as much as on dairying. I thank you for the words of encouragement and welcome you have used towards us, and

miscouata,
LOUX,
Secretary.

we shall never miss any occasion to say a good word in favor of Agricultural Societies ; our lecturers sympathies generally as much with your aims as with our own.

Mention was made just now of the fact that almost every great man has sprung from our rural districts ; and it is very true. It is a recognised fact that the men who do most honour to our country spring from the rural parts.

After all the kind words you have spoken, we cannot do less than labour earnestly at the work we have undertaken. We are working without remuneration at the grandest undertaking that can be conceived : A National work of which I am proud of being the President.

OPENING ADDRESS

The president then rose, and in opening the Convention spoke as follows :

Mr. Minister,

Mess. of the Clergy,

And Gentlemen,

It is not my intention to address you at any great length, as I must keep some of the little time we have at our disposal for other speakers, who are here this evening, whom you would like to hear and who will be better able to entertain you than I can hope to do.

Only allow me to tell you how proud I am to find that you have responded in such large numbers to our invitation, showing thus the interest felt in dairying, for I see that the clergy, the liberal professions, and trades are represented here as well as our farmers.

We are entitled, Gentlemen, to be proud of our work.

As we have not been working for our personal interest, but for the interest of the whole farming class, we have a right to look back with complacency on the road we have been travelling during the last nineteen years.

We can affirm without fear of contradiction that our association has from its very foundation, had a share in every thing that has tended to promote progress in the dairy-trade.

She it is that has revealed to our law-makers the mine of national riches this industry contain.

She is it that has suggested the means of profiting by it.

But let us acknowledge the services of the nation which have always been the pursuit of her object.

Our associations have increased the number of profits that dairy farming has produced by the manufacture, to the improvement of the industry.

By a means of securing a constant improvement throughout the production.

But once more such a great work, our governing power has to be exercised as in the activity of others to labour, and to have honor, and entitle to the industry.

For the present elaborate character of the industry during the two years.

I will not touch the Secretary is going to be audited; any more than the general will make their own.

The lecturers are all the subjects connected with the industry: animated discussion: from these discussions will profit as he may.

I feel that I must be a farmer himself, he will be a farmer himself, he will be a farmer himself.

If the trade in dairying is not afraid of saying to the Minister of Agriculture.

But let us acknowledge frankly that she has always met among the rulers of the nation men of good will, who, with an enlightened political sense, have always been ready to supply her with the resources needed for the pursuit of her object.

Our association, by developing in her meetings the unveiling of the profits that dairying offers to the farmer, has contributed to the annual increase of the number of creameries and cheeseries. By the system of inspection organised by her, she has aided in the improvement of the process of the manufacture, to the development of the knowledge of the operators, to the improvement of the installation of the factories.

By a means of the organisation of syndicates, she is on the point of securing a constant uniformity in quality and appearance of dairy-goods throughout the province.

But once more, I repeat that, if our Association has succeeded in doing such a great work, she has found this facility of action in the good will of our governing powers, who have known how to appreciate all the advantages which flow from such labors, as much for the prosperity of the province as in the activity of certain of our members, who in a better position than others to labour strenuously for the regeneration of our suffering agricultural body, have done their work with a zeal and energy which do them honor, and entitle them to the gratitude of the agricultural population.

For the present convention we have prepared a programme of a very elaborate character ; one that will demand a vast amount of labour on our part during the two days that our meeting is to continue.

I will not touch upon the financial condition of our Association, for the Secretary is going to read to you a statement of the accounts that have been audited; any more than on the work of our syndicates, as the Inspectors-General will make their report on it.

The lecturers are enrolled and will appear before you, treating almost all the subjects connected with dairying. These, no doubt, will give rise to animated discussions, and I feel convinced that this year, as in the past, from these discussions will dart out beams of light by which every farmer will profit as he marches along the road of progress.

I feel that I must in a special manner thank Mr Fisher, the Minister of Agriculture, who has done so much for the Dairy-Industry. Being a farmer himself, he understands the needs of his brother-farmers.

If the trade in dairy-goods has increased in so vast a proportion, I am not afraid of saying that a great share of the improvement is due to the Minister of Agriculture, from his having given us the means of freighting

our goods in refrigerating compartments on board both steamers and cars, without it costing the farmer or the trade a cent, the whole being at the cost of the government.

Not content with this, he has offered to each factory proprietor, who will build an ice-house, a bonus of \$100.00. Lastly, he helps, to support the School at St-Hyacinthe.

But, since the Minister has done so much for us, he will allow us to ask one thing more from him.

It is to be good enough to build at the principal stations on the railroads, refrigerator-warehouses in which our butters may be stored while waiting the arrival of the freight-trains which do not always ply at regular intervals, for during the great heats of summer, butter has sometimes to stay on the plat-form for two or three hours, which injures it considerably.

I wish also to thank the Hon. Commissioner of the Province of Quebec, M. Déchêne, who, too, has done his part by putting at our disposal the funds needed for the maintenance of our butter and cheese-syndicates, by paying half the expenses incurred, by contributing to the budget of the St-Hyacinthe School, by opening the competition of dairy-products, recompensing the leading makers and indicating to others through competent judges the faults to be found in their make, and by giving a suitable bonus to each proprietor of a cheesery who would build a ripening-chamber. Pushing his generosity still further last year, he paid the travelling expenses of MM. Bourbeau and Henry to England, whither they went for the purpose of studying the most modern improvements in the art of cheese-making.

Well rewarded have these honorable gentlemen been for their efforts by the reputation our Canadian products enjoy on the English market.

Moreover, the butter and cheese of Canada were highly approved at the Paris Exhibition, when they took the "Grand Prix," which is a superior honor to the gold-medal or the first prize at our shows. It is our duty to congratulate our governments on the success obtained not only by our dairy-exhibits, but by our other products in general. Such results are calculated to reflect great credit on Canada.

The Clergy, too, I must thank, as I see among the members of that body many zealous supporters of our trade.

Many a factory in parishes owes its success to the curé who has aided in starting it.

The season, gentlemen, that has just ended has been indisputably one on which we have a right to congratulate ourselves, for it was exceptionally favorable both as regards production and prices.

For this reason your board of directors has requested the Curé of Fraserville to celebrate a "messe d'actions de grâces," which is to be sung tomorrow morning at 8.30, and at which you are all invited to be present.

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I trust that the coming season will be equally propitious, and appearances promise well.

We shall probably begin the season without any accumulation of stock on either the English or the Canadian market.

We exported more than \$20,000,000 worth of butter and cheese in 1900 :

Cheese.....	\$16,600,000.00
Butter.....	3,600,000.00

Which figures show an increase in the export of cheese and a decrease in that of butter. The high price of cheese caused the lessened export of butter. Of England's entire imports of butter we only supplied 6.25%, while of her cheese-imports we sent her 60%, or nearly so.

There have been divers financial disasters during the past year. I trust no one in this district has been a sufferer from them.

Allow me to earnestly advise you to inform yourselves invariably with the greatest certainty as to the solvency of the purchasers of your goods. You have the means of ascertaining this with ease through your bankers or the secretary, who will always be happy to supply you with any information you require.

In finishing this opening address I must close with a word of deep regret for a vacant space I see before me. We have had the misfortune to lose in the course of the past year The Rev. M. T. Montminy, our devoted president for several years, and M. D. O. Bourbeau, one of our directors.

May they remain in our memories as models to be imitated, and let us hand down in the archives of our Association the remembrance of these upright citizens, who when in life, were two of our most distinguished and who will certainly be two of our most regretted members.

M. J. C. Chapais—I take the occasion of the words that have just fallen from the lips of our chairman, recalling the memory of our two departed friends, to inform you that the Board of Directors, last night, passed a resolution of condolence on the decease of these two distinguished members of the Dairymen's Association. I propose that this resolution be submitted to the convention to enable them to bear witness to their devotion. (Cheers.)

M. Samuel Chagnon read the following proposal :

Proposed by M. Chagnon, seconded by M. Arsène Denis, and resolved unanimously :

“ That all those present at the Convention held at Fraserville, on the 9th and tenth of January, 1901, are rejoiced to find that the Hon. the Commissioner of Agriculture at Quebec exercises an earnest care over the development of the Dairy-industry of that province ; that he devotes all his activity and attention to it, and consequently, in the name of the farmers of this province, we beg to offer our just homage of gratitude to the Hon. F. G. M. Déchêne, and that especially for the special studies and the very great interest he has lately caused to set to work, to ensure an improvement in the manufacture of cheese in this province. (Cheers.)

ADDRESS OF THE HON. F. G. M. DÉCHÊNE

MINISTER OF AGRICULTURE

Mr. Chairman and
Gentlemen,

It was with pleasure that I heard my old friend, M. Levasseur, in his quality of Mayor of the town of Fraserville, offer us an address of welcome. They who are not in the habit of visiting this place can but have been greatly surprised at the magnificent reception of which we were the object, but those who knew the town were not astonished at the generous accord we received on the part of the inhabitants, to what ever party they belong ; beside, it is one of the effects of the politeness that distinguishes our race.

Before entering into the discussion of the questions that specially concern you, I must, in the name of the farmers of this country, offer to the town of Fraserville and to the Agricultural Society the most sincere thanks. I must also congratulate them on the interest they show in this convention, because instruction is in vogue everywhere, because science is more than ever needed in every country in the world. If there is a positive fact, indisputable at the present time, it is that a living is becoming more and more difficult to win, and that one must work and gain instruction if we wish to create for ourselves a place in the middle of those who surround us, and to figure therein honorably.

I told you that I congratulate the town of Fraserville and the Agricultural Society on its kind welcome. It remains for me to express my regret that the Hon. S. A. Fisher, Minister of Agriculture at Ottawa cannot

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possibly be here. You would have been pleased to listen to him, and to hear him take part in the discussions. Unfortunately, circumstances out of his control compel him to remain at Ottawa.

You are very probably asking yourselves, why is this great Convention of the Dairymen's Association held? Why this is great agricultural meeting, why bring men hither from all parts of the country? Why bring them together to discuss before you questions that, at first sight, appear simple enough? It seems so simple to the townman to make good butter; it is so simple — in theory — to make good cheese and to export it abroad. Still, as you know, Gentlemen, when one arrives at the practical working of all these so simple things, one perceives that difficulties begin to peep out, that success is not so easily attained as one was wont to believe; and, in a word, one comprehends that the subject involves complications and needs much experience and multiplied precautions.

These conventions are held in order that those that make a special study of the theory of the subject may spread abroad their own knowledge and share with their compatriots, their fellow-citizens, their brother-farmers, the benefits acquired by study. The conventions, again, find the reason for their being in the fact that they permit those who have not only science, but experience as well, to benefit the public by their practical experience. Experience, combined with science, is productive of the best results. Here, those who possess great practical knowledge come and communicate that they know to those who have more theory, and impart to them what their daily labour has taught them. And for this reason it is of advantage that all farmers, all without exception, should come and listen to the discussions and reports which are held at conventions like that we are attending to-day. Every one has something to learn from his neighbour, and every one has something to teach to his neighbour.

I come hither as a member of the government of the province of Quebec; I have not the slightest intention of discussing at length the agricultural politics of the government, still, I may say that my principle is to let the farmers farm, my part, which I am playing to the best of my intelligence and good will, consisting in supporting them as much as possible in their experiments, in encouraging them, not only in the production but also in the export of the products of the land.

A little while ago, I was glad to hear M. Rioux refer to the fact, authentic and recognised not only in the province of Quebec but over the entire world: that the best men have sprung from the agricultural classes. If you cast a glance over those who occupy the first places in the highest sphere of politics, over the clergy, the magistracy, you will find that three-fourths of those men are sons of farmers who, leaving the fields in poverty, have, thanks to their intelligence and their love of work, have succeeded in reaching the first, the loftiest rank of honours. It is because those who know

how to comprehend the true nobility of their origin know better how to raise themselves, than those who believe themselves to be superior to others, and who by thus thinking only give a proof of a ridiculous self-satisfaction.

The chairman of this meeting told you just now that we had made great progress in dairying. The Agricultural and Colonisation Societies have always placed their distinctive enterprise far above the wretched political contests we perhaps too savagely wage. The Dairymen's Association has also banished politics from the primordial question that concerns it, and thereat we should rejoice; for the end it pursues and which it must attain, is for the province of Quebec of too vast an interest to allow of its success being arrested by any cause whatever.

If I may be permitted, let us cast an eye over the past of the province of Quebec, and look back only 25 years, at the early days of the Dairymen's Association. What do we see? Twenty-five years ago, dairying was in such a condition that the butter of Kamouraska was always quoted at from 2 to 3 cents a pound lower than that of the rest of the province, and the butter of the province of Quebec in general, at lower prices than the butter of the other provinces.

The question was taken up in earnest, and to-day, we produce in the province of Quebec perhaps the best butter and the best cheese in the world. Unfortunately, we have to contend with a bad reputation. We are assuming the ascendant, it is true, and on the European markets the butter and cheese of Canada are beginning to obtain the highest prices. It is not without considerable efforts that we have regained the ground we had lost. As the Chairman said, in his opening address, we send to England 60% of all the cheese she imports; we must try to arrive at sending her more cheese, and especially more butter. Instead of only furnishing 6½% of her imports in butter, we must aim at sending her 60%, as we do of cheese; then, indeed, every farmer in the province of Quebec would be a seigneur! If during 20 years farmers had sold their products as they have sold them this year, ease if not wealth, would have reigned here long ago. If, in future, you continue to turn out goods of the first quality, if you keep up with the progressive march of modern dairying, profiting wisely by the improvements made in process of manufacture, the situation cannot help being greatly improved in a very near future. (Cheers.)

From this province we export a considerable quantity of butter and cheese; but that does not mean that we cannot do better. He who should dare to tell you that we have attained perfection and the maximum of production would deserve to be banished from this association, for we have not as yet attained to perfection. It would be a falsehood to defend such a statement; and as it is always wise to confess to one own's self the truth so as to avoid subsequent mortification, let us remember that it is far from the time when we can safely say: let us repose on our laurels.

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We can, then, produce a great quantity of butter, but we must have quality too; and when I mention quality, I mention an object absolutely necessary to be hit, and which the Dairy-school of the Association must study to reach without cessation and without weakening.

Let us then try to arrive at uniformity of products in this province, for never shall we command the markets of any part of the world, unless we have the uniformity which will allow of our butter being recognised by its special colour and flavour, points that must never vary. All consumers, then, must be able to distinguish that which they buy, and know that in buying to-day Quebec butter, they will be certain of getting butter of absolutely the same quality as that they may have bought on some previous occasion.

It may not be quite out of place to remark here that he who is the proprietor of a creamery or a cheesery, that he who is a maker of butter or of cheese, and who does not devote the whole of his time and skill to his duties, is guilty not only towards his patrons, but also towards his neighbouring factories in a still greater degree, since he is contributing to the discredit of the products of the province of Quebec. When his inferior butter reaches Europe, under the style of "Quebec butter", people will say at once that the province of Quebec's butter is bad, and this one careless maker is thus doing an immense injury to our trade.

In this province we have assisted both creameries and cheeseries. From the outset, the governments have been so liberal of grants, that we have to-day in the province too many creameries and too many cheeseries. When a proprietor of factories receives but a small quantity of milk, he is obliged, on account of the small profits, to engage workmen at low wages. Now, trouble and worry always come from such men, for too often they do not know their trade, and they turn out inferior goods. "One always gets the worth of one's money," and the proverb finds here its application.

During the last few years Mr. Fisher has been busy at obtaining for exporters cold-warehouses, and refrigerator compartments on the cars and steamers, for the exportation of the products of the farm, and we all know that we have obtained from them the best results.

At Paris I saw butter as well preserved, as fresh as if it had never left the cold-room of the creamery. I saw, in the Canadian Pavilion, in the month of July, butter kept that could yield in nothing to the butter we have in daily use at home. At the time of the Paris Exhibition (excuse this short digression), in spite of our being a province the majority of the people of which speak French, we were not so well known in France as we ought to have been, and many people were surprised to find that after two centuries of separation from the mother country we were still speaking French on the

banks of the finest river in the world. They were astonished to find among us, after two centuries, the same aspirations, as well as the same habits as this so haughty a people, who have never renounced the glories of the past, and of whom we are the descendants.

Mr. Fisher encouraged the creameries, and the Quebec government the cheeseries. The last time I was present at a convention of the Dairy-men's Association, I announced that the provincial government would help the proprietors of cheeseries to build themselves ripening-rooms. It was then agreed that cheese must be ripened under better conditions if it was to realise the higher prices. This is the object we sought to attain with the greatest possible expedition.

The first year we put this new project into practice, we spent on it, in the whole, \$450.00. For the second year, our expenditure was \$3,100 solely for ripening-rooms, and this year, we shall probably expend more than \$5,000.00, for every one seems to understand how necessary the ripening-rooms are, and they hasten to profit by the government grant. Ask M. Vaillancourt what sum is represented at the end of the season by an eighth or a sixteenth of a cent more on each pound of butter and cheese, and you will be surprised at his reply.

We have, then, expended a sum of more than \$3,000.00 simply for ripening-rooms in cheeseries.

When we came into power, in 1897, there were 27 syndicates, now there are probably more than forty. In face of these facts, it would be difficult to deny the development of dairying in this province. We have not only continued the policy of our predecessors in encouraging the inspection of the syndicates, by a grant of \$250.00, for the payment of the inspectors, but last year I got the law amended and I went beyond the syndicates. They only pay \$250.00; the government is authorised to pay \$300.00. Nor should we stop there. There was no Inspector-general for syndicated and non-syndicated creameries; every one cried out for one. We appointed one who entered upon his duties last year. He traversed part of the province and has sent in a report on it.

Whatever may be the state of poverty in which the province finds itself at any time, funds are sure to be forthcoming to help the farmer and to second him in his efforts.

There is another point, gentlemen, to which I wish to draw your attention most particularly.

We have found, indeed, that we must produce good butter, good cheese; but that is not yet enough; your products must be according to the taste of the consumers of them if you expect to realise the profits you have a right to expect from them. In order the better to ascertain the wants of the English consumer, since it is he whom we have to look after chiefly,

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we agreed with the dealers in cheese and the Dairymen's Association to send two men to England, two men whose thorough experience in the trade is beyond cavil. They went thither and made a tour through the country to learn how the cheese that gratifies the palate of the English is made. These gentlemen have made a report, and they are about to set to work to make here a style of cheese that shall please the taste of our clients in Great-Britain. The government of Quebec has willingly paid the expenses of this enquiring, and it only remains for me to wish, with you, in the interest of all who devote themselves to the dairy-industry, that the mission of MM. Henry and Bourbeau may be fruitful and respond to our desire. But even if this mission does not bring back in hard cash the profits we expect from it, if their shall still remain further steps to be taken, I am one of those who will be ready to begin over again to-morrow. Both in general farming and in dairying, perseverance is the surest pledge of success. (Cheers.)

I have spoken to you a good deal about butter and cheese, for the Dairymen's Association is chiefly interested in those things. There are other points connected with agriculture that I might submit to your consideration, but I do not intend to detain your attention this evening too long.

I mentioned the too great number of factories in some districts. I might treat of other questions which should interest you but which, unfortunately, are not sufficiently studied by the majority of farmers. All those who interest themselves in political economy in the country know that the heaviest tax paid by the farmer is that imposed by our bad roads. Farmers, where the roads are bad, are the men who pay probably the heaviest of all rents. Besides, it is probably on account of these very same bad roads that we have so many of the small factories that are so much complained about, and with so much reason.

The government is well aware that this question of roads is of the greatest importance. We regret that this policy has not been more popular in this part of the province, that not even a trial of it has been made. In other parts, efforts have been made and successful ones too, and the people begin to believe that bad roads levy the heaviest of all the taxes imposed on the farmer. I have often asked myself : how is it that our farmers, who are fond of keeping fine horses and pretty carriages, have been content to put up with such wretched roads ? I have, however, every hope that, as regards the high roads, the future reserves better days for us.

One word more. It is not only butter that can interest you, farmers that hear me. Farming is a most complicated business. It is an art, a science (?) ; One must not only be able to hold the stilts of the plough to be a farmer, one must be an artist, a scientist ; one must be a chemist, a manufacturer, a carpenter to repair the things that are daily in use ; the farmer must know something of everything. They who are in the habit of making

fun of the farmer, who try to disparage the intellectual attainments of the man of the fields, are decidedly "bad style"; they are nothing but ill-bred calumniators, who do not know the first word of what they are talking about.

The government of the province of Quebec intends, before long, to place in the hands of the farmer a fruitful means of improving their breeds of cattle and horses. Most of you are so far read in history as to know that war is being waged between England and the Transvaal, and that during this war it has been found out that mounted troops are far more useful in these colonial expeditions than infantry. England has been obliged to send into Africa more than 100,000 horses. Putting them at only \$100.00 a head, they come to a pretty costly figure. Now I feel confident that England would have been glad could she have found these horses in Canada. We have only supplied her with 3%, you will admit with me that this is an insignificant percentage. Still, more could not be sent, as our animals were not considered, for the most part, fit for military service. Has not the time come, then, for us to try to improve our breeds of horses? I trust that, before long, the House will be called upon to vote on a bill destined to facilitate the improvement of our breeds of horses, cattle, sheep, etc., in the province of Quebec.

In time to come, the district of Quebec and that part of the province which extend as far as Gaspé, which, in the past, has imported its horses from the West, will not only breed enough for its own use, but will revive those good times when men from the States used to come hither to buy horses. We should sell them to the European nations who will be obliged to remodel their armies. We shall sell them on newly found markets, as we sell butter and cheese, and we shall export for millions of dollars worth of them.

We are here in a province that Providence has created on purpose for us to live happily therein. Here are none of those discussions on religious matters that sow divisions in the old world. Here are none of those revolutions which disturb the peace of the nations of Europe. We engage in the wars of the mother-country only when we choose. No conscription, that wastes the countries of Europe, exists here. Our liberty we enjoy to the fullest extent; we have the finest sky in the world, the finest climate, the richest pastures; in a word, we possess everything that reasonable beings can desire to enable us to live a happy life.

I know well that the farmer will say that his work is hard, that he would prefer being a member, or a minister of note to being a farmer. . . . I myself, said in my boyhood, that I thought those happy who had nothing else to do but to sit on a well-stuffed arm-chair. But, when this pictured

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happiness is won, when once one is a member, when one has the misfortune to be in power, and, above all, when one has gained a seat in the cabinet, our manner of looking at these things changes wonderfully. There are some of these men whom you think happy because they are at the head of the government. Go, and seek them at two, at three, at four o'clock in the morning, you will find them not yet asleep, plunged deep in studies of sometimes great obscurity. Tell me, then, if farmers who do their day's work, and then leave to Providence the care of making grow the grain they have committed to the ground, tell me if they are not happier than he who has to reckon on the breath of the people.

Gentlemen, I thank you for your kind attention. I close my address by repeating that the farmer of the province of Quebec is the happiest of mortals. I have seen the farmers of France, and of some other countries. They live in houses inferior to yours, and have only five or six arpents of land from which to win the subsistence of their whole family. On my return from Europe, when I saw the people of my country living, how peacefully, and sheltered from all disquiet, I could not help saying to myself: How good it is to return to the province of Quebec, to live there in peace and in the enjoyment of all those blessings that a benign Providence has so copiously showered upon us. (Cheers.)

ADDRESS OF M. CHS. A. GAUVREAU, M. P.

Mr. Minister,

Mr. Chairman,

and Messrs. Delegates,

I let myself be induced to believe that it is the duty of the federal member to offer a welcome to your society on the part of this flourishing town of the county of Temiscouata, a town that you are about to know and admire under the appellation of Fraserville. And this duty is all the more pleasant, this task all the more easy, inasmuch as it demands no expenditure of eloquence; for, were it otherwise, I should be very ill at ease, in the presence of such powerful orators as the Minister of Agriculture, and the accomplished lecturers I see around him.

I shall not conceal the pleasure I feel and the delight your people must manifest in seeing you in our midst, for your arrival here to hold the grand session of your convention marks an important date in this part of the province of Quebec and of Temiscouata in particular.

This is not the first time we have had the honour of a visit from the Hon. the Minister of Agriculture, M. Déchéne. We have all of us met him often. Very young was he when he entered into active life ;

.....But,

You know well, Sirs,

.....when men are nobly born,

Courage does not depend on length of years. (1)

I do not know that I can better describe him than by reciting to you a passage I read in an agricultural paper published lately in, I think, the town of Hull.

"We have always been opposed to the idea of having professional men as Minister of Agriculture ; but, really, M. Déchéne has shown so much activity, so much knoweldge, and so much devotion to the great cause of Agriculture, that we are prepared to make an exception in his favour, and to declare that he has been one of the best ministers of agriculture we have as yet had at Quebec." I could not have expressed this so well myself. I am fortunate in having fallen on this paper that gives me an opportunity of saying what every one thinks of him ; so I profit by it to thank him in the name of my constituents, in the name of Fraserville, for having come hither to preside over this meeting and to impart to it the prestige of his name and the support of his attainments.

As to Mr. Fisher, I regret his absence this evening. For now a period of four years we have seen him at work, and without wishing to lower the reputation of any of his predecessors, I may be allowed to say that he surpasses all those who have preceded him in the seat of the minister of Agriculture, in that which concerns Canada as a whole, by the energy he manifests in accomplishing his duty as a conscientious minister and by his enlightened patriotism solely from the point of view of the interests, the well considered interests of this country, the finest country in the universe, where we are fortunate to be living in peace and harmony, where we only desire one thing: to envy no one, and to contend with one another only in the field of emulation, of progress, and of energy exercised in making of our land a prosperous country, happy and fully furnished with the most smiling hopes for the future.

Let us leave to fanaticism her perverse work, so that the cries of race and religion may have no hold on us ; raise we our heads in a more lofty port, let us travel along our road without any backward glance, and do our best to accomplish here below that work of peace, union, and harmony that alone can give us riches, and prosperity.

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Your association, gentlemen, is a potent factor in this work of peace and union ; you are teaching men the salutary lessons of legitimate rivalry ; everywhere you are distributing the noble seed of good to be accomplished, and the country and its government will deeply indebted to you.

There is a general waking up, especially in the province of Quebec, an awakening to which you are no strangers. New methods are being implanted, the old routine no longer goes along limping on one leg, and we already perceive the Aurora of the day when new methods and new sources of knowledge will revolutionise our agriculture and all trades connected with the farm ; the farmer will be jubilant, and the country will have every thing to gain by it in wealth and importance.

Agriculture came to our rescue in the day of the conquest, when there were hardly 60,000 of us here :

“When our fair flag, moistened with bitter tears,
“Closed her white wings and re-traversed the waves.” (1)

The soil, the belfry, the farm and the altar, or rather, as one of our popular orators phrased it : “The Cross and the plough,” accomplished marvels among us.

To day, improved farming, dairying placed on a firm basis such as Mr. Fisher has given it, the well studied products of the farm, give us vigour, energy, with ease and contentment.

And in a not distant future, all these things of the farm and the land will make us wealthy, offering to the old world a people strong and united, a nation full of manliness, fearing nothing, because it will have learnt and profited by the lessons, and put in practice the information that falls from the lips of men of experience such as you all are, gentlemen.

I did not intend to be so long, Gentlemen : moments are precious, and we are longing to listen to you.

Still, I cannot leave the tribune without bidding you welcome, and hoping that your labours among us may not be seed sown on sterile soil.

You will hear many things spoken of. Forget not one thing that pains us bitterly, and which may be spoken of here with perfect propriety, I mean the redintegration of our people from the United-States, which is by no means going on so well as our patriot heart could wish. Is this the will of Providence ? Have our people abroad, in the land of exile, a mission to discharge on the other side of the line 45° ? I know not, but in spite of the zeal of our agricultural missionners, and we have in this county the Rev. MM. Bérubé, Thibault, and Pelletier, in spite, I say, of their zeal and of the expenditure of the two governments, the practical result is not yet visible.

(1) Lorsque notre drapeau mouillé de pleurs amers,
Ferma son aile blanche et repassa les mers.

Talk of this, Gentlemen ; it will go well with the work you have undertaken.

I thank your Association for having thought upon us ; especially do I thank our good friend Préfontaine for the zeal he has shown as our representative on your board, and for the success that has attended his efforts to lead you hither. Thanks for your attention, and may your congress leave among us lasting sowings and fruits to console us in your absence.

ADDRESS OF M. DION, M. P. P.

Mr. Chairman,

Mr. Minister,

Messrs. Members of the Dairymen's Association.

This is the first time since my election as a member of the Provincial Chamber that I have been brought to the test by having been asked to address a convention of the Dairymen's Association, and I must frankly avow that the subject is rather strange to me, as I have not yet had an opportunity of studying what there may be of interest to my constituents in this institution.

Pray believe that I intend to study it, and I trust that I shall, before long, succeed in understanding the value of this association, and I hope that to-morrow I shall have the honour of seeing my name entered in the books of the Association as one of its humblest members if you will condescend to accept me. (Cheers.)

When I see a minister of agriculture leave his occupation to come hither to meet us, and discuss the advantages of the Dairymen's Association, I feel myself more encouraged than ever to study the thing. In accordance with the explanations that have been given here, I pledge myself to support all the measures that the government shall take up and submit to the Legislature in the interest of your association, and to support them with all the force of my feeble capacity. (Cheers.)

I understand that the Dairymen's Association is working on behalf of the farmer, and although I have not the pleasure of calling myself a farmer, I may honestly say that I am deeply interested in all things connected with farming. Allow me, in the name of the County of Temiscouata, to thank the promoters, and in general the members of the Association, for having chosen, this year, our town for the rendez-vous of their meeting. I hope that farmers will put in practice the wise counsels that the skilled lecturer, here present have given them and will give them again. I hope, Gentlemen of the Dairymen's Association, that you will retain a pleasant recollection of

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the farmers and people of the town of Fraserville. As the St-John the Baptist Society is carrying on a national work, I will, with your permission, ask the President of that Society to address to you a few observations. (Cheers.)

ADDRESS OF M. N. GARNEAU, M. P. P.

Mr. Chairman,

and Gentlemen,

It is always a fête for me to be present at the annual Convention of the Dairymen's Association, and the pleasure would be unmixed, were it not that I have to address the meeting after everything has been said. What indeed, can I find to say that will interest you after the marvellous results obtained this year by the Society, results so well recounted by the Chairman; after the noteworthy addresses of the Hon. the Commissioner of Agriculture, of your members of the Chambers, and of the learned lecturers to whom you have listened to-day. What can I say to you more on the agricultural position of the country, particularly as regards dairying, than has been said to you by those who have preceded me. I can only repeat the praises that have been bestowed on the Dairymen's Association of the province of Quebec, praises that are deserved if praises ever were deserved. Indeed, Gentlemen, how can all the good the Association has done, all that it has done for the happiness and welfare of our people, how can all this, I say, be forgotten. For every one knows that it has created the dairy-industry, that it has increased the revenues of our farmers by 20 millions of dollars a year, that it has greatly increased the numbers of our herds, the foundation of all paying farming, contributed more than anything else to the improvement of our system of cultivation, and furnished many a hundred of our young men with lucrative situations. Everyone knows all this, but there is one thing that is not sufficiently known and of which, however, no one should be ignorant, it is, the number of families that it has befriended and helped to settle on farms, the number of those whom it has maintained there, who, without it, would have left the country.

Nobody ought to be ignorant of the number of parishes to the foundation of which it has contributed, of families it has enabled to live, of the genuine increase of the national wealth it has produced.

Had not the Association come to our aid twenty years ago, by creating a fresh resource for farmers, the French-Canadian-Nationality would no longer be inhabiting the banks of the St-Lawrence, but New-England and the Western States. The French-Canadian habitant would have deserted the life of the fields, abandoned his land, which shortly would have only offered him as a means of livelihood the resources of the operative. Our people would have ceased to be farmers ; they would have become manufacturers. There will always be, for the good of our nationality, too many of our people who will abandon the life of the fields for the life of the town, where, as says Louis Veillot so eloquently :

“Man, that little panting being, laden with burdens, streaming with sweat, seems all the smaller by the side of those gigantic engines he rules, all the poorer in the midst of those riches he disturbs (*remue*), all the more fragile before the monuments he erects !.....

“In the hurly-burly of the town, in vain does the Angelus wing its flight from the steeples ; its sound is not heard ; if it reaches the ear of man, its message is not felt.

“In those clouds of dust, on that scorching pavement, not one thing done by man is done of his own motion, it is not his own when done, it gives him no pleasure, bequeathes him no memorial.....

“Reverse the picture ; in the mountains, a herdsman surrounded by his docile cattle ; on the plain, the ploughman with his hands on the stilts ; in the foresta, wood-man attacking the power of the oak ; all these appear to be the lords of the world ; and are they not so ?

“Are they not in their own domain? Do they not exercise dominion over the earth and its creatures ? The great beasts obey the herdsman's voice.... The woodman selects the spot where the pride of the oak shall lie; seated on the prostrated giant he wipes the sweat from his brow, and at leisure eats the bread he has earned ; and the bird sings, and the Angelus traversing the air recalls to his mind that he is the adopted child of Mary, of Mary the Mother of God. The ploughman lays open the bosom of the earth that it may be prepared to restore to him a hundred-fold the wheat that he entrusts to its protection.”

Had the Dairy-men's Association no more at its credit than its deeds of having retained our compatriots on their farms, of having rendered possible to them a country life, of having contributed to increase the number of happy, prosperous farmers, of having dissuaded a vast number from entering upon the wretched life of the operative, it would have merited all the praises it has received, all the thanks that have been paid to it.

ADDRESS OF St. JEAN

Mr. Chairman,
Revd. Messrs.
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ADDRESS OF M. CAMILLE POULIOT, PRESIDENT OF THE
St. JEAN-BAPTISTE SOCIETY OF FRASERVILLE

Mr. Chairman,

Revd. Messrs. of the Clergy,
Gentlemen,

You do not of course expect a speech on dairying from me, for it would be a great mistake on my part to attempt to inflict such a thing upon you. Those gentlemen who have already addressed you have served you with the rich, the luscious cream of their eloquence ; my words can only be the skim milk, divested of all palatable flavour, and robbed of every nutritious matter.

Nevertheless, I feel bound, since you do me the honour to seek for my humble support in this joyous fête of the Canadian family, to express to you all the pleasure I feel in witnessing the excellence of the work you are promoting, by raising in some degree the status of the farmer, by convincing him that his condition is inferior, neither in seemliness nor in dignity, to that of the other professions ; by striving to instil into his mind, together with the taste for hard work, in-born with the cultivator of the soil, an emulation of higher aims, whereby to improve, to render more modern, more practical and therefore more profitable, the worn-out methods of farming.

I rejoice with you, Gentlemen, in the expanding success of your association, whose prolific ramifications are already penetrating the whole expanse of our country.

Continue your work, Gentlemen ; continue your work, of which a distinguished priest, Abbé Montminy, a former curé of St-Antonin, whose memory is still fragrant among us ; was one of the most ardent promoters and for some years the leading spirit, under the benevolent patronage of Mgr. Labelle, of being whose fellow-citizen, Mr. Chairman, you are justly proud, you whom we are glad to welcome here this evening as the zealous and faithful continuer of his programme of colonisation.

Call no halt, Gentlemen of the Dairymen's Association ; call no halt in your onward march ; continue to attach the farmer most firmly to his native soil. Teach the son to covet, to deserve. and to accept without hesitation, with joy, as a sacred heir-loom, the paternal farm, in whose bosom the labour of each day shall see spring forth fruit more plentiful, less bitter, less deceptive than that which our farmers' sons too often seek for in the factories of the States, or in the danger-fraught situations of the railroad.

Induce farmers to take in, besides the Journal and the Quebec Gazette, some of the agricultural reviews, which will, besides the technical instruc-

tion therein contained, be attractive to all the members of the family when encircling the stove after the rough labour of the day.

Sully, a great statesman, said one day, that manufactures and agriculture were the two nursing breasts of France, a true and sound comparison, which will not, I hope, shock even the most modest ear of those here present.

For, indeed, if it is by trade and manufactures that a people is developed, expands, and is amplified, it is, to my mind clear that it is by agriculture that it supports and strengthens itself. Between these two factors of our life as a nation, there is the same correlation, there must exist the same harmonious action that exists in the human organism. Should one of these mamillary glands become surcharged, swell up out of measure, abnormally, to the detriment of the other, and proceed so far as to produce congestion, it will be a certain indication that medical aid is needed without loss of time.

And so it is with the internal economy of a nation ; agriculture and commerce, the two nursing breast, must go on side by side, that both may mutually, sympathetically support the one the other, and each take a fair share of the work.

The finest of parts is assigned to the farmer ; his constant daily labour protects him from the changes of the morrow. His investments in agriculture and chiefly those in dairying, are never lost, since he is certain to be able to realise at par and even at cent per cent. With the cream, the butter, the cheese, that by skilful manipulation he extracts from the milk of his herd, he feeds his fellow-men ; with the fleece of his sheep he clothes our childrens ; he builds our abodes with the lumber of his forests, and warms our shivering limbs with their logs ; with the seed he confides to the land, with careful economy and which is returned to him tenfold, he kneads our wheaten bread, and weaves the flax of those head-dresses to which our women give so elegant a shape, and which contribute so much to the adornment of their charming features.

Lastly, by his regular, industrious, conscientious work, the farmer is an example and a model to be imitated by his children, always so numerous in a Canadian home, and who, hereafter, will be that which you are to-day, upright citizens, happy in that you are able to work for the advancement, the progress, and to prepare the future glory of a common country.

Permit me, Mr. Chairman, while thanking you for your kind attention, to express a hope that this your nineteenth anniversary will cause to spring into life a free and prolific grain of mustard-seed that may bear here, and in all other parts of the province, its most blessed fruit.

M. Vaillancourt.—Now, in very deed, I am proud of being the son of a farmer !

This is not the Convention of the Chairman, M. Vaillancourt met me here, ten years ago when I was striving for freedom that flowed from Couture, M. Mars hurried headlong to Paris.

To-day, my presence whom I was in dread of, am exactly in the position yesterday. Some say I determined to buy a house but to find an organization run about loose in the world, satisfied with the vote, endowed with a grant to have him at call.

Pretty much the point of saying accept the association however, some title the service, at any rate the duty of making sometimes to inspecting myself with the to relate to you does the Dominion Government towards the establishment especially as regard

2nd Some of the of this Association, series.

3rd That which extension of this service is mutually allied.

LECTURE OF M. LÉON GÉRIN

THE REFRIGERATOR SERVICE

This is not the first time I have the advantage of being present at the Convention of the Dairymen's Association. The old members, like the Chairman, M. Vaillancourt, M. Chicoine, M. Ness, will remember having met me here, ten years ago, when I was stenographing the deliberations ; when I was striving to pick up at the point of my pencil the words of wisdom that flowed from the mouth of the late Mr. Barnard, M. Taché, Dr Couture, M. Marsan, M. Dallaire, Dr Grignon ; or, again, where I was hurried headlong in a precipitate chase after the winged words of M. Chapais.

To-day, my part is strangely altered. Then, it was the speakers of whom I was in dread ; to-day, it is the audience that makes me nervous. I am exactly in the position of the blacksmith, whose story I was reading yesterday. Some sixty years ago, in one of our country parishes, it was determined to buy an organ for the Church. Well, that was easy enough, but to find an organist at that time was not so easy, as organists did not run about loose in Canada in those days ; so, the church-wardens had to be satisfied with the village blacksmith ; not that he was a great player, or endowed with a grand reputation, but, as they said, it would be so handy to have him at call if any part of the organ broke down or got out of order !

Pretty much the same is my position. The organiser (I was just on the point of saying organist) of the refrigerator-service not being able to accept the association's invitation, I was selected to represent him. I have, however, some title to your attention. If I was not present at the birth of the service, at any rate I watched its first footsteps. I was entrusted with the duty of making précis of the reports addressed to the Department, and sometimes to inspect the work ; in a word, I had an opportunity of familiarising myself with the different parts of the system. Besides, what I have to relate to you does not contain much technical matter ; it is : 1st What the Dominion Government, through the Minister of Agriculture, has done towards the establishment and development of the refrigerator service, especially as regards the creamery-business.

2nd Some of the results obtained by this means, with the cooperation of this Association, and of you all who are proprietors or patrons of creameries.

3rd That which both government and country expect from you for the extension of this service and the butter-trade, to which it finds itself so intimately allied.

I.—WHAT THE GOVERNMENT HAS DONE

The Government determined to establish a complete refrigerator-service, i. e., an uninterrupted line of refrigerators from the starting point, the creamery in Canada, to the consumer on the market at Liverpool, Manchester, Glasgow, Bristol and London. Cold-chambers in the creameries, ice-cars on the railroads, cold-storage warehouses at the sea-ports, and refrigerator-compartments on the steamers.

It is only five years since the refrigerator-service was started ; it dates from 1895. In that year the government made arrangements with the railroad companies for a supply of ice-cars, and with the proprietors of cold-storages in some of the large towns for the storing of export goods. Also agreements were made with some of the steam-boat companies for refrigerator-service by means of ice on the trans-Atlantic boats. In 1897, the refrigerator-service received a fresh impulse : aided by grants from the state, mechanical refrigeration was introduced on ocean-going steamers, and assistance was offered towards the construction of cold-chambers in creameries.

We have now in Canada 413 creameries fitted up with cold chambers. We have ice-cars at our service starting from 43 main-stations (37 weekly, 6 bi-weekly) ; i. e., 16 of G. T. R. ; 15 from C. P. R. ; Canada-Atlantic, 5 ; Quebec-Central, 2 ; Intercolonial, 2 ; United-Counties, 2 ; Lake St-John, 1.

Of large cold-storages we have 2 at Toronto, and at least 4 at Montreal, all private investments without State-aid. One large one at Quebec, the government guaranteeing the interest on the capital invested ; and 1 cold-storage at Charlottetown, P. E. I., aided by a government grant.

We have, besides, 33 steamers with cold-compartments, 23 of which are still assisted by the government. Of these, the Allan line has 8 ; Donaldson and Thompson lines, 9 ; the "Manchester-Liners", 3 ; Furness-Whitby, 2 ; Pickford and Black, 1.

II.—THE RESULTS OBTAINED.

You will doubtless ask me : But what has been the effect of all this outlay on the dairy-trade ?

The effects I observe are three in number : 1. the increase in the number of creameries. In 1895, the first year of the service, there were in the province of Quebec 307 ; in 1899, 711. In the six counties below Quebec, Bellechasse, Montmagny, l'Islet, Kamouraska, Témiscouata, and Kimouski, in 1895 there were 52 creameries ; in 1899, 86. The second result has been the increased quantity of butter exported. In 1895, our butter sent to Great-Britain was hardly 2,700,000 lbs. ; in 1900 it exceeded 24,000,000 lbs., i. e. it had almost multiplied itself by ten in six years !

Here are the

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The third result is that in 1895, Australian butter was sold at a higher price than Canadian butter. In 1900, the difference was 10 shillings a quintal.

II

But we have to observe that it is true, lessened our butter-trade, but we have still a large market in the Danish. We have received \$500,000 that Britain receives from her factories, is only a very trifling amount at our ports. Out of 700,000 lbs. of butter exported, 100,000 lbs. are still without them. The rest is sold in the arena without proper protection. Our butter-trade under the present general interests of

Observe that in our butter to equal our system of manufacture, so that our exports, so that of the article. On the other hand, it will not increase, though it is kept up, is developed. The other, on the other hand, the production, i. e., the

Now the first result is that the proprietors and patrons of the industry are in your hands. The transmission of the industry

Here are the figures for the six years :

1895.	2,751,848 pounds
1896.	4,970,047 “
1897.	10,413,131 “
1898.	10,491,823 “
1899.	19,129,034 “
1900.	24,317,436 “

The third result has been the relative selling value of our butter. In 1895, Australian butter was quoted at from 9 to 13 shillings a quintal dearer than Canadian butter. To day, our butter is generally quoted as high as Australian butter. During the same period, we have succeeded in reducing the difference between our butter and Danish butter by from six to nine shillings a quintal.

III.—WHAT REMAINS TO BE DONE BY US

But we have not yet earned the right to rest upon our oars. We have, it is true, lessened the distance between our butter and the Danish butter, but we have still as much ground to go over before we attain to a level with the Danish. We have considerably increased our butter-exports; instead of \$500,000 that Britain used to pay us six years ago for our butter, we now receive from her for the same article nearly \$5,000,000. All the same, that is only a very trifling proportion of what Britain pays for her butter-imports. Out of 700 creameries in Quebec, rather more than 300 are provided with suitable cold-chambers; but 400 remain that, to all appearance, are still without them. So there are 400 athletes engaged in the commercial arena without proper arms for the contest; 400 exporters who engage in the butter-trade under conditions unfavorable to themselves and injurious to the general interests of their country.

Observe that in this affair every thing is interdependent. If we want our butter to equal the Danish butter in price, it is not enough to improve our system of manufacture and our packing, but we must increase our annual exports, so that the British market may have constant, regular supplies of the article. On the other hand, the quantity of butter made and exported will not increase, the sale price will not rise, unless the refrigerator service is kept up, is developed, and works perfectly from one end of the chain to the other, on the ships, in the warehouses, on the cars, and at the places of production, i. e., the farmer's fields.

Now the first link in this refrigerator-chain is you, yourselves, the proprietors and patrons of the creameries of the province of Quebec: you hold it in your hands. The refrigerator-service, indeed, has no other object than the transmission and preservation of perishable goods. Of all the

goods of this nature carried up to the present time from Canadian ports, the most indisputably important is butter, and the chief province producing butter is Quebec. Out of the 413 creameries provided with cold-chambers in Canada, 310 are in Quebec !

Here then is a result on which you may justly pique yourselves; an important branch of commerce in which you have taken the lead. Yet, by the very fact that you have done so, you have assumed a vast responsibility; it is on you that in great measure depends the butter-trade and the refrigerator-service in Canada. The movement was started by the State but it can only be kept going by private exertions. It never was the intention of the government to take upon itself the perpetual up-keep of any one of the links of this service-chain. I told you just now, that in many of the large towns the depots had already fallen into the hands of private firms; and in the same way, many of the ships fitted up with refrigerator-compartments no longer receive grants from the State, and the State will sooner or later cease paying premiums for refrigerator-chambers in the creameries. You, therefore, that hold the first link of the chain will be more responsible than all the rest for the proper working of the refrigerator-service.

The Chinese, like many other nations, are more remarkable for the good sense of their sayings than for their doings. They have a proverb that runs thus : " If every one kept his own doorstep neat, the whole street would always be clean." If proprietors, makers, and patrons were to do a little lecturing in their own villages, there would soon be no creamery in Quebec without a refrigerator-chamber.

Of the 86 creameries at work in the 6 counties below Quebec, there are hardly 30 to 35 that have good cold-chambers. It is your business, Gentlemen, to draw the fifty sluggards from their pillows. (1)

Write to the Commissioner of Agriculture and Dairying, Ottawa, for a copy of his report for 1897, which contains plan and details relating to the construction of icehouses and cold-chambers for creameries.

IV.—HOW TO BUILD AN ICEHOUSE

And first of all, the icehouse, i. e., the compartment, or building, in which the ice is stored. Here are a few very simple hints on this subject. The bottom, on which the ice rests, must be so made as to admit of an easy exit for the water from the melting ice, while it keeps out air. For this purpose, lay down 12 inches of broken stones, or pebbles, and on the top of them 6 inches of sawdust.

The walls may consist of a framework of studdings or posts, (*colombages ou montants*), on which nail, on the outside, a rank of clap-boards, and on the

(1) Retardataire is a recruit who has not joined his regiment in due time.

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inside, a rank of rough boards. Between the ice and walls, leave a space of 12 inches, to be filled with saw-dust; if to be filled with hay or straw-chaff, 18 inches will not be too much. Saw-dust may be also used to cover the ice; a foot in depth is enough, and more will do no good. Spruce-branches, covered with a thickness of 2 feet of straw, will be better than saw-dust. Lastly, between this covering of saw-dust or straw and the roof there must be left at each gable-end, an opening for the entrance and exit of the air, which can thus circulate freely, and prevent the saw-dust or straw covering from heating. And especially must a place be chosen for the ice-house that is suitable to the preservation of its contents. A maker, whom I visited last year, was in misery because in his ice-house, which was built after the plans of the Department, the ice melted away apace, to the great amusement of his neighbours, who had nothing but a hovel open to every wind, in which the ice kept better than in the one in the creamery in question. What do you think I found as I was making my inspection? The poor fellow had built his ice-house close to the side of his boiler; and he was surprised to see his ice melt away as if by enchantment.

Observe, that to get the premium, you are not obliged by the rules of the Department to build an icehouse, but only a cold-chamber. Provided you provide this cold-chamber and keep it at the regulated temperature, the Department leaves you at liberty to buy the ice, or to make your provision of it in any way you please. It is satisfied with showing you the best way of preserving ice in an economical way, should you have to make a provision of it.

V.—HOW TO CONSTRUCT A COLD-CHAMBER

As to the cold chamber, it must be most carefully built, so as to be perfectly impervious to the air. For this, the floor must be at least 3 inches thick and enclose two thicknesses of paper between the rows of boards or planks. The walls must be made of two rows of studdings or posts, six rows of boards and as many of paper, disposed in the following order: 1 row of boards, 2 rows of paper, 1 row of boards, 1 of studding; 1 row of boards, 2 rows of paper, 1 row of boards. In this manner, we should have in each wall a double layer of still air which will make the chamber impermeable. The bottom of each compartment or space comprised between the studdings must be filled, to a height of 6 inches, with mineral wool, saw-dust, or dry sand, so as to prevent the entrance or exit of air. These compartments, with confined air, must be continued into the ceiling, without interruption at the corners, and each row of paper placed on the side must be refolded both on the ceiling and under the row of boards above the floor.

The butter-chamber is cooled by pipes of galvanised iron filled with

ice, or with ice and salt. These pipes, placed in this butter-chamber, go through the ceiling, and are filled from above, on the crushing floor, where they are open.

An antechamber precedes the butter-chamber, which prevents the rise of temperature when the doors are opened. The doors and windows must absolutely be double, and each frame must have double panes of glass. A good plan is to hang a heavy curtain at each door, which will fall to on you, and allow but little cold to escape from the chamber.

And now let me point out to you a few of the most striking faults I met with in my visits last autumn. In several cases I found that the ceiling, and more frequently perhaps, the floor and the walls, had not been built with sufficient care? In passing the hand along the line of meeting between the wall and the floor or the ceiling, one felt at several spots that the interior air was creeping in. Frequently I found that the doors did not close quite tight; on shutting them after one, a thread of light could be seen all round the top and sides of the frame. Most of the time this fault might be easily cured by fixing india-rubber bands on the border (*rebord*) of the door. The ice-tubes, at the points where they pierce the ceiling, were sometimes found to be insufficiently wadded with tow, and the ceiling had thus become pervious to the air. In other cases, the small pipes that lead away the water from the melting ice was found not to be re-curved into the form of a siphon, as they should be, but straight, and of course allowed free passage to the air; or, even worse, there were no drainage-pipes, but only a hole in the floor, so that the water dripped on to the floor and the chamber became damp and unhealthy.

Lastly, there were two faults that were very common, especially among proprietors anxious to do right but ignorant of the principles of refrigeration; these were cement floors and ventilators. Cement does not make a good floor for the cold-chamber as it is too good a conductor of heat. We advise those who have a cement floor to cover it with one of wood, with a lining of felt-paper. As to ventilators, there must not be any, either in the cold-chamber or in the ante-chamber; for the effect of a ventilator is to introduce the warm air from outside. Now, if you let hot air into a room where the temperature is low, not only will this hot air raise the temperature of the cold room, but it will cause the deposit of the moisture held in suspension, and you will find the chamber damp and unhealthy. So, abolish at once all ventilation, in butter-chambers and ante-chambers.

In conclusion, let me say that we reckon upon you to ensure the construction of proper cold-chambers in every creamery in your neighbourhood; as well as the maintenance of a sufficiently low temperature in those chambers (not higher than 38° F.) You will not fail in the double task; you will see

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SERMON DI

Superior of the

My Brothers,

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to it from self-interested motives, and in some degree from patriotism. An excellent thing indeed is patriotism, when taken in this sense; a feeling that tends to stimulate the intelligence and activity of a people and to improve its prosperity.

SECOND DAY OF THE CONVENTION

SERMON DELIVERED BY THE ABBE DOMINIQUE PELLETIER

Superior of the College of Ste-Anne, at the thanksgiving mass, celebrated in the church at Fraserville, at the convention of the Dairymen's Association

You shall love labour and
agriculture that have been
instituted by the Lord.

My Brothers,

It was a good idea that led you to insert in the middle of this agricultural meeting an act eminently religious, or rather, I should say the most emphatically religious of all acts; the august sacrifice of the mass. You wish to render thanks to God for benefits received, and to draw down the blessings of heaven on your work. For that purpose, nothing can be more effective than the Eucharistic Sacrifice, which expresses exactly the act of thanksgiving, and which receiving from agriculture its material, gives us in return Him who *intercedes for us without ceasing with his Heavenly Father.* (Heb. 7, 25.) A wish has been expressed that the Holy Word should be conjoined with so many eloquent phrases to encourage the farmer, and to bring to mind the utility of your association; allow me therefore to lay before you a few considerations regarded from a Christian point of view, and on some of the numerous advantages of your association.

I. The farmer is naturally a christian, or at least he ought to be. Let the self-styled savant, in the recesses of his laboratory, isolated from the active world, and lost in the wanderings of his mind, finish by imaging that there is no Creator and that all is the effect of chance; that is indeed a monstrosity; but may be explained in a certain degree by the pride of the human mind pushed to the extremity of madness. Does the man who only lives for pleasure, does the libertine in the midst of his debauchery, do they exclaim? There is no God; this is the cry of their passions not the excla-

mation of human reason; The fool has said in his heart : there is no God. Does the artisan in his workshop, where he sees nothing but brute matter, more or less modified by the hand of man; does the workman in the factory where, embarrassed by smoke, he passes most of his life; do these men forget their God? A sad, a lamentable fact it is, but, after all, it is to be explained in some degree by their isolation from the work of God owing to the works of man.

But that the farmer, daily in presence of those divine works, the farmer who every morning sees the sun majestically rising from his couch of fire, and who at eve again contemplates him descending into the glowing West, who rejoices more than any other in the rich firmament extended above his head like an immense azure pavilion, dotted with grains of gold, not one single fold of which is beyond his ken; who follows with so much earnest attention the regular course of the seasons; who is daily so anxious about the variation of the temperature; who prays so frequently for the late and early rains, as the Bible calls them, that propitious rain in due season which is kept as in a treasure bank by God who alone has access to its key; the farmer who is continually present at that marvellous and divine work, the germination of seeds, their development, their lovely flowering, and their abundant production of fruit; that the farmer should forget, that he should deny God! That cannot be; and it is not. The farmer is naturally a christian; and it is his soul, the soul of the farmer, that, with Tertullian, we may call a soul naturally christian.

Agriculture is as old as the universe : what say I? it is a divine institution; and it is literally that we must take these words of Holy Writ : agriculture was created by the highest. All the arts, liberal or mechanical, are of man's invention; they were invented by the children of Cain more than 200 years after the creation of the world, and they seem, even by the abuse men have always made of them, to have preserved something of the malignity (1) of their inventions.

Agriculture is of divine institution, and so shares in the excellence, the universality, the duration, in the holiness even, of the work of God. "He placed the first man in a garden of delights, to care for it and to till it." And later, after his sin, when agriculture, instead of being for him an agreeable relaxation, became a task, a punishment, an expiation, in which, doubtless, he was to recover his lost life, his natural and his moral life, agriculture became such by a sentence from the mouth of the Lord himself : "In the sweat of thy brow shall thou eat bread."

Would you believe it, My Brothers? Agriculture itself has had its own heresy, that the church has been compelled to prosecute and condemn;

(1) In French, *malice* has two meanings; one *amiable* : archness ; the other just the reverse : malignity. A. R. J. F.

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yes, in the 4th century, Faustus, the Manichean, dare to treat agriculture as an impious pursuit, and to qualify all farmers as assassins, because, said he, everything in nature has life; now the farmer, in reaping his harvest, gathering his grapes, his apples, pears, and other fruit, deprives them of life and consequently assassinates them. This heretic of a novel sort, was chastised, as he well deserved, by the delicate irony of St-Augustin, who used to speak of agriculture as "the most innocent of all the arts."

And of the arts, agriculture is also the most honorable; the first men and the best among the first, were farmers; Adam, Abel, Seth, Noah, Abraham, Isaac, Jacob. Immediately after the deluge, Noah, whom Holy Scripture calls "a husbandman" *vir agricola*, resumed the tradition and practice of agriculture and even completed it by the addition of the cultivation of the vine. Saul and David, the two kings, had been previously graziers. Older Rome used to seek at the ploughtail her first Kings and Generals, and that to such a point, says Pliny, that soil thus worked by the hands of emperors, seemed happy and proud of being turned by a plough adorned with the laurels of victory, and by a farmer who had won the right to Triumphs from the wars: *Vomere laureato et triumphali aratore*. Lastly, the Church herself has sometimes saluted her Sovereign Pontiffs from the sons of the men of the soil, such as the Sylvii, the Adrians, the Sylvesters and others.

Hence, the ancients concluded that the pastoral life was an apprenticeship to the government of men; and they classified as "brothers" the arts of managing estates and governing nations: *Sorores quaedam sunt pastura et regni administratio*, says St-Basile. And nowadays, if princes no longer follow the plough, agriculture in reality is not less honorable, and even, from a certain point of view, not less honored by the great: and it is fair that it should be so.

For agriculture is, indeed, the most excellent, the most useful of all the arts. The ploughman feeds the country and defends it; he is not more bold in watering its furrows with his sweat, than the field of battle with his generous blood; and this was what made Aristotle say, that "agriculture is the art that combines justice and conformity with human nature; it contributes greatly to the strengthening of the body, as it does to the strengthening of the mind; and while the other arts enervate and debase men, to him who only exercises himself in the heat of the sun, and in rough labour, it imparts the power of resisting bravely all the attacks of the enemy." The philosopher adds, and here both State and Church subscribe to his sentiment: The best people is that formed out of husbandmen; for while they are working for their livelihood, they are so absorbed in their work that they do not dream of coveting the goods of their neighbours; and it is better pleasing to them to plough their land than to govern the Republic." Ci-

cero used to say, after him, "that of all the ways we have of getting things, there is no one preferable to agriculture, no one more pleasant, or more worthy the pursuit of a free man." Still, in order that it may be so, the agriculturist must be such as is stipulated by Holy Writ : he must love his art ; not make a common trade of it; devote all his attention to it; all his care, all his heart : He should devote all his heart to the stirring of the soil and the shaping of the furrows. (Eccli. 38, 27.)

These thoughts naturally suggest some reflections on the morality of agriculture. A mysterious thing, My Brothers, and one that is not sufficiently noticed; that it has entered into the views of heaven that agriculture should follow the two great phases of humanity; that it should take its part in man's state of innocence and also in that of his fall and restitution. It was first given to man by God himself as one of the pleasant relaxations of the earthly paradise. The Lord then took man and placed him in the garden of delights to guard it and to till it; and immediately after his fall, it was imposed upon him, as well as upon his children, as a punishment during their whole life, and as a salutary expiation : *In laboribus comedes ex eâ (terrâ) cunctis diebus vitæ tuæ, in sudore vultus tui vesceris pane.* And it is with these labors that thou shalt gain thy food all the days of thy life, and with the sweat of thy brow shalt thou gain thy bread. (Gen. 3, 17, 19.) Which make of agriculture not only, as St-Augustin says, the most innocent of all the arts, but, in addition, the one most tending to make men moral and holy. Doubtless, the farmer frequently neglects to think of all this, but he perceives it by the pious instincts of his soul, in the main christian.

Under the secret and salutary influence of this pious sentiment he does his work as a matter of duty, in his morals he preserves innocence and simplicity, all the greatest virtues, such as patience, courage, resignation, the spirit of self-sacrifice come naturally to him; and there are heroes in the Church and in the State whose heroism has sprung solely from this life of the fields.

His life he sanctifies by prayer. He prays better than other men because he is farther from men and nearer to God, whose wonderful works he has continually before his eyes and whose presence and support he feels most vividly.

His labor he sanctifies by the seventh day's repose, the need and desire of which are written on his limbs as well as in the law of the Lord. He sanctifies it by the hearing of the holy Mass, wherein is operated that divine transformation of bread and wine, of which he more than any other has by his labour furnished the material. He sanctifies it, lastly, by the reception of the sacred bread, derived from his furrows, and which now conceals, with its mysterious appearances, the Divinity itself.

There, that is the Christian farmer; and the more his art, instituted by the Lord, is noble, useful, and necessary, the more worthy and necessary

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of getting things, ant, or more worthy so, the agriculturist love his art ; not ; all his care, all of the soil and the are the trades and associations subsidiary to the art of the farmer, which they organise, and make one of the best instruments of prosperity both public and private. Among these associations, your own, which is concerned with so important a branch of agriculture, no doubt deserves a leading post. Allow me to tell you how grand and useful it is, because it brings together the workers, enlightens them, encourages them, and labours with them for the good of their families and the country.

II. When one regards human affairs, one perceives that they are dominated by two laws : the law of inequalities, and the law of joint responsibility.

Yes, everything is unequal here below, and we shall not change this law. There is physical inequality, intellectual inequality, moral inequality, but these inequalities may be palliated by the action of the liberty of the individual, as by the action of a genuine public spirit and by wisely managed associations.

There are physical inequalities. When one is born into the world, fortune is not always by one's side, and one does not always see how to attract it thitherwards. Many a long year ago an ancient poet said :

“ Haud facile emergunt quorum virtutibus obstat
Res angusta domi.”

That is to say : It is difficult to find a suitable place in life when the poverty of one's home has rendered the first step hard to find.

Genuine, personal valour is a valuable possession, doubtless, but when one is not sustained by the material elements of existence valour often stands sad and disappointed. There are then physical, material inequalities, an inequality of forces, of resources, of health. Moreover, there are frequently around us circumstances that do not answer our purpose. You all know that human affairs are governed by a superior power that we ourselves do not over-rule. Yes, things themselves seem sometimes banded together against us. Several things there are that we can master; but others are too strong for us. There, then, are material, physical inequalities, all of which cannot be equally in the right.

Secondly, there are intellectual inequalities. We are not all born with the same mental powers, the same intellectual energy, with a judgment equally correct and sure, with like aptitudes. There is not less difference between intellectual capacities than between faces. Do we not sometimes see, what is common enough, men placed in like situations, but who by no means possess the same powers of extricating themselves.

Lastly, there are moral inequalities. Not only do the physical forces differ, not only is the mind not the same; but the moral energy, the courage, the virtues, all differ in degree in individuals. With many people the

character is not coherent, is not consistent; they are changeable, inconstant; they change their projects almost every day, their ideas every morning.

But there are on the contrary some powerful, firm characters that appreciating life at its true value, ask from it what is right, enter upon it and make their mark in it, marking their passage through it by actions that aid their present lot or make up their eternal future, or, still better, settle both the one and the other.

These, then, are the inequalities that society presents, and their destruction does not depend upon ourselves. They subsist, they live, they stay among us, and they will remain after we are gone. There is no use, then in cursing them, or in rebelling against them. We must rule them and make a wise use of them, making them an element of our deserts and of our glory for time and for eternity.

Now this is to be done in two ways : by personal efforts, and by unlimited or social efforts.

By personal efforts; yes, every one, by means of activity, decision, hard work, and virtuous principles, can conquer hostile circumstances, rule over them, turn them to his own profit. In fact, labour is our universal law; it governs great and small, it affects both mind and body. A happy law, the aim of which is to elevate us in the present and prepare us for the future, while idleness debases us by teaching us all the vices.

Now, your Association is a school of hard work, it organises, directs, it renders it more productive. Its solemn conventions are intellectual feasts, where the cultivators of the soil find abundant and varied food.

By the side of work we must range virtue. Work alone, activity, is not sufficient; that activity must be moral. It is not enough to produce largely, our productions must be used in moderation.

Along side of the labour, the courage that produces, let us place therefore moderation, wisdom that teaches how to use discretion in the consumption of the things produced. Thus, My Brothers, by industry, by virtue, we shall correct the inequalities of which I have been speaking.

But there is another thing that it would be well to call to our assistance in our attempt to level, or at least lessen as much as possible, these inequalities. Association; mutual assistance. "Man's daily experience of the feebleness of his powers, says Leo XIII, incites and impels him to unite himself with a foreign cooperation. We read in the Bible the maxim : *It is better to be two together than all alone, for then advantage can be derived from their association. Should one fall, the other can support him. Unfortunate is the solitary man, for if he fall there is no one to raise him up.* (Ecc. 4. 9. 10.) And again : *Brother aided by brother is like a strong city.* (Prov. 18. 19.)

From this natural society, then in the and restricted, are the working class.)

Not only is assigned a duty. Who owes a duty to others. Each for all and all that which is passing to himself, he depends on his own needs ; in this accomplished this moment, there is another must throw, so to speak knowledge, experience cannot do individual moments and the mean. utilising them, the bation.

So here we have the national inequality work, personal effort:

Agree among you abroad through our b of the public prosperity; thus acting you c will be for you if you

From this natural bent, as from the same genus, spring, of all, civil society, then in the very bosom of this, other societies, though imperfect and restricted, are none the less true societies. (Enc. on *The condition of the working class.*)

Not only is association one of the needs of man, but it is often the object of a duty. When man has done what is necessary for himself, he still owes a duty to others. We all live in this world under the rules of this law. Each for all and all for each. No one can regard himself as indifferent to that which is passing around him. Doubtless, man must owe his first duty to himself, he depends upon himself, and must do his best to suffice for his own needs ; in this there is both dignity and grandeur. But, when one has accomplished this condition, and even during the time of its accomplishment, there is another duty that deserves our attention and our care : we must throw, so to speak, into a common stock the qualities, the thoughts, knowledge, experience, force, so as to realise by association that which we cannot do individually. We must unite and study together our requirements and the means of providing for them, the resources and the art of utilising them, the best methods of working and their most efficient application.

So here we have, My Brothers, the two great means of attenuating the national inequalities that Providence has dealt out to the human race : work, personal efforts, and association.

Agree among yourselves then, Gentlemen, to do your best to spread abroad through our beloved province all useful notions, for the promotion of the public prosperity by applying, in increasing ratio, science to industry; thus acting you deserve will of your fellow-citizens, and this merit will be for you if you desire it, an anticipated title to the favors of Heaven.

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MORNING SESSION OF JANUARY 10TH

ELECTION OF DIRECTORS AND OFFICERS

M. L. H. Levasseur, Mayor of Fraserville, in the chair.

Proposed by M. J. A. Vaillancourt, seconded by Dr Grignon ;

That the Hon. Messrs. Fisher and Déchéne be both elected *Honorary Presidents* of the Dairymen's Association of the Province of Quebec.

Carried unanimously.

Proposed by M. O. Dubord, seconded by M. E. Dallaire;

That M. J. A. Vaillancourt be elected *President* of the Association.

Carried unanimously.

Proposed by M. Chas. Gauvreau, M. P., seconded by M. Magloir Déchéne;

That M. J. C. Chapais be appointed *Vice-president*;

Carried unanimously.

M. Camille Pouliot.—It gives me great pleasure to congratulate the Association on the idea it conceived of choosing M. Chapais as its Vice-president. It is an honor both for the town of Fraserville and the district. M. Chapais has been actively engaged for many a long year in all things that more or less closely concern agriculture and dairying. I congratulate M. Chapais and am delighted to do so, for this election proves that the wings of the Dairymen's Association are wide enough to shelter all parties, and that its members are sufficiently large-minded to forget all political divisions that may affect us, to render unto Cesar the things that are Cesar's, and to render to M. Chapais the due to him and of which you have the merit of paying to him.

M. Chapais.—After these too flattering words of M. Pouliot, I have only one word to say in reply : Merci.

Proposed by M. J. N. Lemieux, seconded by M. Chs. A. Gauvreau, M. P.

That M. Emile Castel be re-elected Secretary.

Carried unanimously.

M. Castel.—I thank you for continuing me in my office, and will allow of my being re-elected at any rate, I promise to give my service.

The following districts

DISTRICT

- Arthabaska.....
- Beauce.....
- Beauharnois.....
- Bedford.....
- Charlevoix et Saguenay.....
- Chicoutimi.....
- Gaspé.....
- Lotbinière.....
- Pollette.....
- Kamouraska.....
- Montmagny.....
- Montréal.....
- Ottawa.....
- Quebec.....
- Richelieu.....
- Saguenay.....
- St François.....
- St Hyacinthe.....
- Terrebonne.....
- Trois-Rivières.....

M. L. H. Levasseur.—I offer you a new candidate entering on his second year, and that it has gained him

For my part, I am glad the Association are making progress, and I am very much pleased as the Hon. M. Déchéne is the Association, farmer and all other classes of

M. Castel.—I thank you, Gentlemen, for the honour you do me in continuing me in my post as secretary. I trust that my renewed health will allow of my being more assiduous in my duty this ensuing year. At any rate, I promise you to deploy all my exertion and my good will in your service.

The following directors were elected by acclamation :

DISTRICT	NAMES	RESIDENCE
Arthabaska.....	MM. Chs. A. Gauvreau, M. P.	Stanford
Beauce.....	Philius Veilleux.....	St François
Beauharnois.....	Robert Ness.....	Howick
Bedford.....	C. H. Parmelee, M. P....	Waterloo
Charlevoix et Saguenay....	C. E. Dubord.....	Mastaï
Chicoutimi.....	Jos. Girard, M. P.....	St Gédéon
Gaspé.....	Rvd. M. Gagné.....	Maria
L'Érable.....	Sam. J. Roy.....	Sabrevois
Joliette.....	J. B. A. Richard.....	Joliette
Kamouraska.....	Domin. Lévesque... ..	Rivière Ouelle
Montmagny.....	L. A. Boucher.....	L'Islet
Montréal.....	J. H. Scott... ..	Montréal
Ottawa.....	J. DE L. Taché.....	St Hyacinthe
Quebec.....	N. Garneau, M. P. P....	Ste Foye
Richelieu.....	Arsène Denis.....	St Norbert
Kimouski.....	Chas. Préfontaine....	Isle Verte
St François.....	Alexis Chicoine.....	St Marc
St Hyacinthe.....	J. N. Lemieux.....	St Hyacinthe
Terrebonne.....	Louis Labelle.....	St Jérôme
Trois-Rivières.....	Charles Milot.....	Ste Monique

M. L. H. Levasseur, Chairman pro temp. As president, I have not to offer you a new candidate in the person of M. Vaillancourt, since he is now entering on his second term of office. So well has he discharged his duties that it has gained him his present great popularity.

For my part, I am rather ignorant as to the way in which the affairs of the Association are managed, but the little I do know about them delights me, and I am very much pleased to find myself to-day one of its members. As the Hon. M. Déchêne said, if they follow the instructions and advice of the Association, farmers will continue in the road of progress in which they have long since started, and if the farmers are getting on, the tradesman and all other classes of society are sure to get on, too.

Our member, M. Gauvreau, paid great thanks to M. Préfontaine, last night, for having done his best to bring the Association's meeting to Fraserville. I, as Mayor of the town, unite with M. Gauvreau in thanking M. Préfontaine afresh for his work. I trust that neither M. Préfontaine nor M. Chapais will be blamed for having brought about the present meeting at Fraserville. We might have been better able to entertain you in summer, for it is not so easy to amuse guests in winter ; but the little we have been able to do, we have done from our hearts.

I hope that after this meeting separates, its members will all retain a pleasant memory of Fraserville, and that we shall, some day, have the pleasure of seeing you here again. (Cheers.)

M. Vaillancourt.—I am not about to make a speech, for it is nearly noon and we have still a great deal to do ; still, I must ask you to allow me to make a few remarks.

I am glad to see that the Hon. Minister of Agriculture, M. Fisher, and the Hon. Commissioner of Agriculture, M. Déchène, have been elected Honorary Presidents of our Association. These two gentlemen are so favourably inclined towards us, that we cannot show them too much gratitude. M. Déchène speaks about butter and cheese like an old dealer in such things. Personally, I thank you for the honour you have done me by electing me again as your president. I had no intention of occupying the post any longer, but you oblige me to continue in it ; I thank you for the honour you thereby do me.

I was greatly pleased yesterday, and more than I have been for a long time, at the magnificent reception that greeted us here. My rejoicing was two-fold, as the son of a farmer and as president of the Dairymen's Association.

I regret very much that we are losing some of our old directors. They are all men who have done their best for the Association, as well as for the dairy-trade at large. But the association will not suffer by their departure, since they have been re-placed by men who will also do their best, and will devote their energies to ensure the success of our cause. Those directors who have not been continued in their posts may be re-elected hereafter. Meanwhile, I thank them, in my own name as well as in the name of the Board of directors, for what they have already done.

I am proud of the selection you have made of a vice-president, in the person of M. Chapais. During the two years that I have worked at his side for the success of our association, I have always looked upon M. Chapais as our father; not because he is the oldest among us, but on account of the good advice he has always given us, on account of his attainments, and on account of his good sense that invariably leads him straight to his end. I must, therefore, congratulate you on his re-election.

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I thank the Ma the grand reception

Lastly, I offer Mass of this mornin M. Préfontaine has

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Mr. President and

Gentlemen

I have great ple England on the mak entering upon the su ing you to abandon English system exclu and sells for higher p at all, in fact, there are tions under which the which our men work.

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I will show you l judge of the difference

First of all, the n adder of the cow is th special dress, which is very clean. Immediate

(1) M. Bourbeau's ann tion in England, published by

The reelection of our secretary, too, gives me great pleasure, and I trust that he will in future, as in the past, employ all his energies in forwarding the interests of the Association.

I am satisfied with the composition of the new board, and with such colleagues I cannot but hope that all will go well and that the Dairymen's Association will continue to advance in the future as it has done in the past.

I thank the Mayor, the Councillors, and the people of Fraserville for the grand reception that greeted us.

Lastly, I offer my thanks to the eloquent and learned preacher at the Mass of this morning. I trust that every one is pleased as well as I am, and M. Préfontaine has a right to be proud of the success he has won.

REPORT OF M. BOURBEAU

INSPECTOR GENERAL OF CHEESERIES (1)

Mr. President and

Gentlemen,

I have great pleasure in communicating to you the notes that I took in England on the making of Cheddar-cheese there. Allow me to say, before entering upon the subject, that I have no intention in this lecture of advising you to abandon the Canadian system of making and to take up the English system exclusively, although the English cheese is superior in quality and sells for higher prices; but before advising this change, or any change at all, in fact, there are enquiries and experiments to be made, since the conditions under which the English makers work differ greatly from those under which our men work.

The climate is different; the pastures are not the same; and the milk is not cared for equally, that is, the milk is better cared for in England than it is here. These are all things with which the maker has to reckon.

I will show you how the milk is cared for in England, and leave you to judge of the difference.

First of all, the milking is done with the most scrupulous care; the udder of the cow is thoroughly cleaned with a damp cloth; the milker wears a special dress, which is used for no other purpose than milking, and is kept very clean. Immediately after milking, the milk is taken to the factory, care-

(1) M. Bourbeau's annual report is mixed up, this year, with the report of his tour of inspection in England, published by the Department of Agriculture at Quebec.

fully strained and cooled by aerators, if the weather is warm, and as soon as that is finished, the milk-pails are washed out in cold water, then in hot water, and then steamed.

I think you will admit with me, that in consequence of such treatment, the English makers are in a better position than our makers, and that this is indisputably one of the causes of their success. I think I may fairly add that we must necessarily improve our conditions if we wish to gain ground on the English market or even to retain our position there.

I must pull up on this subject, for I see that I am straying from the subject of my address, to which I now return, and take up the point where the milk is in the vat just after it has been received. The milk is raised to a temperature of 84° F., and after the addition of ferment, according to the acidity of the milk, but without any fixed rule, the rennet is added, in quantity sufficient to have the curd fit to cut about 45 minutes afterwards, if the percentage of acidity in the milk is normal. The curd is very soft when the first cutting is made; the second succeeds the first cutting after an interval of 15 minutes, at which time the curd has the same degree of firmness that we advise for our curd at the first cutting. After the second cutting, the curd left alone for 15 minutes to allow of some of the whey to be taken for the warming-up, which is done by heating a portion of the whey in another vat, which is then mixed with the curd; the first time, the whey is warmed sufficiently to raise the curd after its being mixed with it, is to 88° to 90°; the operation is repeated to get a temperature of 94°, which is the "cooking heat," after which the curd is stirred for an hour and left to consolidate. It is then left at rest until the discharge of the whey, which takes place, in August, when the whey has an acidity of from 0.19 to 0.20, and the curd gives threads from the hot iron of $\frac{1}{4}$ inch. As the curd was at rest before the whey was drawn off, it is sufficiently clotted together to be cut and put upon the drainer, it is then wrapped in cloths and submitted to a pressure of 50 lbs.; at 20 minutes afterwards it is cut into pieces, the sides of which are 2 inches and the thickness 4 to 5 inches, at the second cutting, it is cut finer still, and at the last the pieces are 2 inches square (cube?). It is then turned over every half-hour, the pieces being carefully separated.

The curd is then put through the mill, when the whey that leaves the curd has an acidity of 0.90 to 0.93; the temperature is usually 75° to 80° F. The mill used tears the curd instead of cutting it, and as soon as it has left the mill, it is salted and put to press, where it remains for 4 days, the pressure being very moderate at first but being gradually increased. The second day in press, the cheese is taken out of the mould to be greased and wrapped in a cloth which is not taken off until the cheese is sent away.

M. E. Bourbeau.—I think, Gentlemen, that I ought to add a few words to the report I have just read to you. First, I will compare the two processes that you may thoroughly understand what has been read. There are

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differences, all along the line, between our process and that of the English. First of all, the English generally ripen the milk less before renneting; then, they curdle the milk at a lower temperature. Here, this is done at 86° to 88°, and in England it is done at 84°. They use less rennet, and the curd takes longer to take. The English cut the curd softer than the Canadians do. The "cooking" is done at a lower temperature there and it takes much longer, because the apparatus used in England differs entirely from ours. They do the cooking at twice, because they take some of the whey, warm it and replace it with the curd, and this process they repeat. The cooking takes longer about than it does here, and is done at a lower temperature. The curd is less worked there; it is stirred for nearly an hour with a tool something like a digging fork, so the work is not hard. After being stirred for an hour it is left quite still. Here, it is the practice to drain the curd thoroughly; there, they draw off the whey without disturbing the curd. After the draining, we put the curd at once on the drainer, or sink; there, the curd is slightly pressed; more work is given to it; it is turned over more frequently, cut into small pieces, and submitted to a pressure, wrapping in cloths that separate it into two. After 15 to 20 minutes, the small blocks are separated. the lumps are turned over, placed one upon the other, and pressure is applied until the curd is sufficiently acid, when it is passed through the mill, salted, and put to press. Now, Gentlemen, you will ask me if there is any great difference between this cheese and the cheese we make here. My reply is that there is a great difference, and I am sorry to say that the difference is not in our favor. The English cheese, the good cheese that is, is indisputably superior to ours. It is not pure fancy that makes the English pay some cents and even as much as 4 or 5 cents a pound more for English cheese than for ours. Seeing that their cheese is of superior quality, would it be wise for us to adopt their plan, that is, to make a softer cheese? To this, my answer is, that the conditions under which we work are not the same. The English market, indeed, wants a less firm cheese than it use to want, but we must thoroughly appreciate the question: it want a cheese that though soft preserves its flavour. I ask you, then, if, by following the English plan of making, it would be possible for us, under our conditions, to make a cheese that should preserve its aroma and flavour: evidently, you answer, no.

There are certainly changes that might be made, and I have made them myself since my return, from which I expect great improvements, but I must not yet submit them to the public.

Why cannot we make a soft cheese here? Because we are not under the same conditions that the English are. We have not control over the milk; we receive too much bad milk. I ask you, Gentlemen, and I specially address the farmers present: are there many of you who take the trouble to rinse out their cans in the evening, to wash them with hot water, and to steam them? Not many of you. How many of you, unfortunately, wash

out their cans carelessly, who take back the whey in them, and who scald their cans with cold water at night? Their names is legion. We want to keep on improving our products; but sometimes it is discouraging; and we shall arrive at no good results if we do not take means to improve our milk-delivery, or rather if our farmers do not take means to deliver their milk in better condition. And we are warned that if your present system is continued, we shall have to give up the English market, because England, the States, New-Zealand, are all doing their best to supplant us there.

I intend make some experiments, if the Association desire it, and if the government will supply funds, for the improvement of our situation; but to succeed we must have control of the milk, because the system in which are instructed nowadays is not suited to the present conditions.

While I was in England, I employed the time, while the cheese was ripening, in visiting different towns which take our cheese, and there I asked for the worst samples of Canadian cheese. At certain places, I found a great deal too much of it. I saw some capital cheeses from this province, cheese unsurpassed by those from any county of England. I saw cheeses from Quebec that I recognized; there was nothing to beat them there. But I saw a great many bad cheeses; there were sour, moist, badly flavoured, badly packed cheeses, especially badly flavoured ones; and that is due to bad milk, because the proper process of making is generally well practised in Quebec, especially in the districts visited by our inspectors. Let us try to improve the milk, and I tell you that by the exertions of the Dairymen's Association, the best organisation existing, we shall succeed in improving our practice and our goods will be of better quality.

I must thank you, Gentlemen, for your attention; I have perhaps detained you too long. . . . I thank you very heartily. (Applause.)

M. O. E. Dallaire.—I gladly, Mr President, thank M. Bourbeau for his address. I repeat what M. Plamondon said yesterday: Take care of the milk for all the trouble arises from bad milk. Milk is the basis of our trade. If bad milk is delivered, good cheese cannot be made. What is the cause of the delivery of so much bad milk? The whey-vat at the factory, in which the whey keeps badly and becomes a regular poison. When the whey is taken home in the cans, the cans are generally carelessly washed, and thus it is from the whey-vat that the evil arises. I have traversed the province of Quebec from one end to the other, and *en passant*, I beg to congratulate many of our inspectors, both of cheeseries and creameries; but at the same time I do not hesitate to say that many inspectors just pass through our factories without making sure that the work that ought to be done in them, is done. They will say: Your whey-vat is not clean, it must be washed. Yes, replies the maker; the inspector leaves, and the vat remains as it is.

I have seen this too often with my own eyes, not to call attention to it.

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I have look over M. Plamondon's report: how, on earth, can a maker insist upon cleanliness being observed by his patrons, when he himself sets an example of most revolting filthiness? Such cases are, I hope, exceptional, but if there were only one, there would be one too many; so get rid of the last, the only one if possible. Before preaching, set an example.

Dr Grignon.—We have met here for the purpose of making suggestions; do you not think that it would be as well for each inspector to enter in a register, kept at the factory, the remarks to be made about the way the factory should be kept, and that these remarks open to the public and to the directors of the factory, whether of butter or of cheese, should be known to all the world. It would surely be the one means of correcting the fault complained of. At present, the inspectors pass through, they only make a remark or two to the maker, and everything remains as before; there is no improvement. But if the inspector's remarks were entered in a book known to the people, it might cause things to improve.

M. Plamondon.—Unfortunately, our inspectors have not sufficient powers; in the district of Beauharnois, there is an inspector who is both an inspector and the proprietor of factories. He, in his capacity, can look after his makers and compel them to do as he pleases. If they refuse, he can discharge them. But our own local inspectors have not the same power. It is all very well for them to tell the makers what to do, to show the faults in the management of their factories, the maker promises compliance with their orders, but, as soon as their back is turned, he makes fun of them. Had the inspectors the power of saying to a maker: you will do such a thing at once or you will be fined, things would go on better. Or, again, one might also meet with other makers; find the proprietor and tell him that his maker is not doing his duty, and have him discharged. But, unfortunately, most of the makers are also proprietors of their factories, and they only too frequently treat all that we say to them with contempt.

M. J. C. Chapais.—The register of which Dr. Grignon speaks is in the hands of our inspectors who make their report every week to the Inspector-general of syndicates, and they leave a copy of their report at the office of the factory.

M. Bourbeau.—A cheesery pays its patrons according to the richness of the milk. Is this system fairer towards the patrons than the simple paying by weight? This question has just been put to me. It would probably take too long to explain this point at length, so I must refer you to the 12th report of this Association, in which are given the experiments made in New-York State. These experiments prove that the payment for milk according to richness is as fair for the cheesery as it for the creamery.

Still, this involves certain conditions: the maker must be able to take samples, to preserve them, and to analyse them. You will agree with me that there are many makers who are not competent to do these things.

M. Chapais.—I rise with pleasure to support M. Bourbeau's remarks on the subject of bad milk. In England, it is much easier to get first class milk. I would know of M. Bourbeau if the St-Denis plan of delivering milk twice a day is not likely to result in better milk being used?

M. Bourbeau.—I think it would be the best plan to adopt. As to its paying, that is the business of each individual; but it is certainly the best way of getting good milk. In this way, the maker has absolute control of the cans, and the milk. I think it would go far to ensure cleanliness.

A Voice.—Would not the same result be obtained by having two sets of cans?

M. Bourbeau.—The milk is not better because the maker collects and delivers it, but because he has the care of the vessels and of the milk during the night. In my parish, we used, formerly, to receive the milk twice a day, and that milk was better than the milk we receive to day. Still, we had no ripening-chamber; the milk was kept at a temperature of 90° to 95°; and the cheese kept pretty well. We must look at the cost, of course, but as to guarantees, I am perfectly sure that this system guarantees an improved quality of milk.

M. J. C. Chapais.—Mr D. M. Macpherson once told me that the system of twice a day delivery of milk was the only one that would place the milk under the control of the maker. Unfortunately, he said, it cannot be carried out every where, but I am convinced that wherever it can be carried out it is a most excellent practice.

M. Trudel.—Did M. Bourbeau find, when in Europe, that many defects in our cheese arose from want of proper ripening?

M. Bourbeau.—In England, I found many badly flavored cheeses, and this was due to two causes: bad milk and badly managed ripening, particularly the latter. Several cheeses I saw on the London market that had been sent too soon; some of these seemed to be not more than a fortnight old, and yet had reach that spot. At Liverpool, I saw heaps of cheeses that were too acid, mealy; and this fault I attributed to their having been sent off too soon, particularly the mealy lot, which could have neither fermented nor dried; it remained moist and mealy. Lots of this sort of cheese I found in England, especially at Liverpool.

M. Pouliot.—Allow me to put a question, Mr. Chairman, people say that our cheese sent to England wants flavour; may not the want of litter be one cause of the excess of aroma in cheese? May it not be that in England, where they make such good cheese, they take more care of the litter than is taken in this part of the province?

M. Bourbeau.—In England, in my opinion, they have everything to favor the making of good cheese: good pastures, good climate, grass always green; the milk is very good. Here, we are admirably well suited in

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these points. In a factory I visited, at Rivière Ouelle, a building was put up after the government plans, which could hardly be kept warm enough in summer!

In England the grass may be a little better; the fields have been down in grass much longer, the grass is almost always green, and that helps to make good cheese.

There, the cows are only kept in after calving. Sometimes they are in the pastures as late as March; they pass the winter out of doors or in simple sheds, and only go into the "cowhouse" after they have calved. No cheese is made in winter, only in summer. In winter, the milk is sold to the town-dealers.

Dr. Grignon.—Do you recommend cheese to be made in spring when the cows are in the house?

M. Bourbeau.—The making of that sort of cheese has injured our credit greatly.

M. Robert Ness.—In Scotland, the climate is almost the same as here. The animals are as long in the house, and yet they make capital cheese.

M. Bourbeau.—I spoke of English cheese. I do not know the practice in Scotland. I specially studied at the Somerset county dairy-school. I was only two days in Scotland.

In reply to the question about fodder-cheese; three or four years ago, we received a request from the dealers that we should make it. At other times they tell us just the contrary. I think, for my part, that it would be better to lose a few sous and to regain them later by the high repute of our goods. There is plenty of bad cheese already on the market.

Dr Grignon.—Supposing that the cow-houses were well painted, light, that the most absorbent materials were used for litter, and that the well known "smell of the stables" were expelled from the cow-houses, do you not think that a decent cheese could be made?

M. Bourbeau.—When you, as a lecturer, have succeeded in getting these improvements into working order, I, in my turn, will advise people to make fodder-cheese.

M. Castel.—M. Bourbeau, in reply to M. Trudel's question, mentioned the effort of "cold storage" in the quality of cheese. In Switzerland, in experiments that were being made there, it was found at the Berne station that cheese put into "cold storage" before it was ripe became soapy. Our cheese, too often, leave the ripening-chamber before they are fit. They are not kept so long as they might be and as they ought to be. They are sent off as soon as fermentation has just made its first start, when every one knows that it takes ten or more days to get it really into its work. In general, before that time, the cheese has left the factory. I think it would be

interesting to have experiments made at Montreal to test the effects of cold on cheese during its fermentation.

M. Bourbeau.—Mr Lloyd states that cheese will not ripen properly in a temperature below 65° F., but it will take on a bitter flavour.

M. Castel.—I published lately, in the Journal d'Agriculture, an account of an experiment, made at Cornell on cheese, made at 55° and at 65°. The one at 65° gave the better results ; that at 55° sold for much less than the other.

M. Bourbeau.—I, with M. Vaillancourt's son, visited several importers of cheese, and almost all of them told me : See: this is *French* cheese, that is from Ontario. I asked how they distinguished between the two ; by the appearance of the cheeses, replied they. I saw Quebec cheeses that were every bit as fine as any English cheeses. Outward looks go for a long way in England. I do not say the English are bad judges, but there may be prejudices. We must, then pay attention to looks. The meanest style of wood on the market is bought for box-making, it is cut too thin, the wood is black, and the cheeses are of all sorts and sizes ; and thus it is that by not looking after the exterior of goods, they get the name "French" applied to them in England. It is by no means a bad name, nationally speaking, but, as regards the cheese trade, it is by no means complimentary.

M. J. de L. Taché.—Before this discussion closes, I wish to draw your attention to several important points.

Many of you are present for the first time at our annual meeting. I should like to point out to their attention the importance of the conclusions to be drawn from the address of M. Bourbeau, as well as to the reform that this address will necessarily bring about. But we shall never improve our goods to a sufficient degree until we have obtained control over the milk. We cannot make cheese as good as the English cheese for the sole reason that the milk is not under control.

What I have just said, applies equally to our butter. First class butter can only be made with first class milk. The reform we want to bring about must be begun at a higher point than the question of details. The progress that has been made began not, as it ought to have begun at the farm, but higher up the scale. Government has set the example by improving the means of carriage. If you entrust your first-class goods to-day to the steamers you may be sure that they will not be spoiled. Now, our studies in progress are getting nearer together ; government gives premiums to aid in the building of icehouses and ripening-rooms. There, too, your products will be safe.

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Now, give us perfect milk, and you will have in return better goods. It is to this point that all our attention should be this day devoted. Bad milk: that is the weak point in our dairy-trade.

In this point progress is more difficult to effect. When there are a thousand people to bring into order, it is not so easy as if there were only ten to deal with. If you have ten makers to deal with instead of one, you have additional difficulties. M. Chapais spoke at large lately on the necessity of keeping the whey-vat clean. M. Dallaire noticed the case of makers that take in good clean milk and yet do not keep themselves clean. It is no use for the patron to be clean if the maker spoil his goods. Still, in this case, it would be easier to succeed in making progress, than in the case of patrons that deliver bad milk, since the patrons that are careless, dirty, are many more in number than the makers who fail in their duty. If we wish to make perfect goods we must positively have perfect milk. Would you try for instance, to make good bread with bad flour? I draw your attention then to the question of the milk, the whey, the reform of factories, the aeration of milk, and, lastly, the reformation of the maker himself.

There are in the parishes a number of people, clean themselves, who agree in thinking that a certain factory is not kept clean. Why cannot they boldly go to the maker and insist upon the factory being kept clean. Let the directors press it upon the maker and they will have their way. Formerly our advice was not much attended to, as a general thing, but to-day, the labours of the Association have extended far enough to ensure that every maker knows that in demanding cleanliness from him we are only asking for a reasonable thing.

Now, Gentlemen, comes the question of the cartage of milk. M. Chapais has asked the question: would not the cartage of milk twice a day resolve the difficulty before us? I consider this a most essential reform to be brought about. I am well aware of the objections opposed to it. It is not practicable in the case of most of our small factories. It can only be carried out in the large factories able to pay cent per cent of profits. But there is a means of attaining this result, i. e., by cooperation. This cooperation already exist, but a law is needed to give these societies a permanent character. At present, there is a lot of associations formed, but at the end of four, five, or six years, they fall to pieces and pass into the hands of a single proprietor. If we cannot place associations (*firms*) of patrons in such conditions as that they shall be assured of having supplies of milk, in spite of other people, we shall not succeed, and that leads me to speak of a question of legislation that I have already explained at one of our former meetings. Cooperation is destined to expand still more, and in future we must try to put it on a successful footing. How is that to be done? The first step is to unite a whole parish or a large district. One great obstacle exists in the numerous small factories already prevalent in one and the same parish.

How to get rid of them ? How can you induce men to bring their milk six or seven miles to the central factory ? If factories have become so numerous, it is on account of the great distances that have to be travelled every morning in bringing milk to the factory.

How to do away with this ? By making the carting of milk obligatory. But how can you induce a farmer that lives close to a factory to pay for the cartage of the milk of a patron who lives seven miles from it ? By getting him to take an interest in the factory by shares, and showing him that it is to his interest that the milk should be carted. He will not oppose it if he finds that it pays him.

How are we to get at this point ?

I propose that it should be ordained by law, that in places where a certain number of farmers, having together the pre-arranged number of cows, should agree, it should be permissible for these farmers to form themselves into an association and to pass an edict to the effect that in that place there shall be no other factory than the central one. Such members as are afraid of displeasing their constituents fear that such a law could not be passed in the House, because it would be to employ force on people and aim a blow at the freedom of trade. I have spoken to many people on the subject, and it seems that the difficulty may be got round. If the House were prayed to pass a law to this effect: When a cooperative society is formed, all the partners that enter into it, shall not be able to do so unless they bind themselves never to leave it, except upon payment of an indemnity for the milk of which their leaving deprives the society. There are people who engage to supply their milk to the factory, and at the end of a certain time, leave off, doing so for no earthly reason. They ought to pay an indemnity to their fellow-partners. The consequence of that will be that no one will suffer, but every one who shall enter the society will be compelled to send his milk to that factory.

There are other objections ; the factories now at work will not approve of this. So, in order not to commit any injustice, I propose that, as a condition of the formation of such societies, it should be compulsory for them to buy the already existing factories, and in this way, you will obtain the consent of their proprietors.

Now there is another thing: were I a legislator, I would not consent to the establishment of such associations except on the condition that the cartage of the milk shall be obligatory ; in that way you would secure the good quality of the milk.

If instead of having, as now, 50 patrons, a factory had 200, you see the consequences : you would then have no objection to pay good wages to a good maker, and to make the outlay needed to furnish a perfect out fit of implements and machinery.

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This is the reform that is needed, and it is a reform that can be made in places that wish for it ; but in other places, how then ?

You know that this association has created a system of syndicates. We have inspectors too to see that makers do their duty. But how can they succeed in discharging this duty of theirs ? The Inspectors are engaged by the syndicates, and it often happens that if the inspector does not speak out roughly enough, it is because he is afraid of not being engaged in the following year. If our inspectors had behind them some one of higher powers, who is not engaged by any individual or any society but by the government, and entrusted with authority sufficient to bring any patron "into line" who will not come to of his own accord, affairs would go on better. More extensive powers are given to inspectors in New-Zealand. A patron who is found guilty of sending bad milk to the makers can be brought before the magistrate by the inspectors and fined. And now if the patron were to say : you will have no more of my milk, for I shall take it to the next factory ; as people do here ; the New-Zealand inspectors can have any sick cows put into quarantine ; order the cleaning of all foul vessels ; and, thirdly, order that no more milk shall leave the farm of the guilty patron until the inspector is satisfied that the offence will not be repeated. The law of New-Zealand compels the inspector to do justice. Is not that fair ? (Applause.)

Reform may still be introduced in our legislation. I had taken upon myself to draw up a lecture for this meeting on the reform in the legislation. But there are so many materials to be got together on the subject that I have not yet finished the work. It is just 20 years since we began talking about this, and we are hardly more advanced now than we were then. I want the Dairymen's Association to take up the subject from a higher stand-point and it should lay down a programme which would enable us to act.

Mr Ness.—One thing M. Taché has forgotten to treat : without good roads we can never gain our end.

The session was then adjourned.

AFTERNOON SESSION OF WEDNESDAY JANUARY 10 th.

The session opened ; Dr Grignon in the chair.

M. O. E. Dallaire.—I have been requested by the Association to prepare a lecture for this evening ; it is not that lecture I am about to deliver now ; that you shall have to night. Now, I place myself at your disposal to reply to any of and all the questions you may please to put to me. Do not hesitate ; we are here *en famille* , and I ask you to question me, not with any hope of imparting knowledge to you, but with a desire of gaining instruction myself. You will do me a service by putting the most difficult questions in your power to me. If I cannot answer them to-day, I will study them in hopes of being able to answer them at some future time, for if there is any one whose duty it is to study, it is the lecturer.

PLOUGHING AND AUTUMN CLEANING OF STUBBLES.

A Voice.—What is the time for ploughing, July and August, or September and October?

M. Dallaire.—If you practise autumn-cleaning of stubbles, that is a shallow-furrow as soon as the grain-crop is carried, the earlier the better. In general, land should be ploughed directly after harvest.

The Same Voice.—I am speaking of land (*friches, en paturages*) left for grazing in stubble, in pasture after crop.

M. Dallaire.—I would plough in the fall, in that case.

The Same Voice.—I have tried the other plan, and I prefer the months of July and August.

M. Dallaire.—There are several reasons for that.

The Same Voice.—I am speaking of new land.

M. Dallaire.—Stubble-cleaning or summer ploughing is generally the best. If a second ploughing is to be done, the former should of course be shallow, and second athwart the former (and deeper). Stubble-cleaning is very important, because in autumn the ground is at times very hard, when the ploughing cannot be done but must be put off till spring. The way to never fail of success is to plough early. In stubble-ploughing early, one is sure of having one ploughing at least done. A shallow furrow, as soon as the crop is off, can always be made and the second ploughing is thereby rendered more easy. The second advantage is, that if there are lots of weeds, the seeds germinate after the shallow furrow, and as they can only

germinate once, they destroy them.

Mr. Grisdale.—plough.

M. Dallaire.—ger of working the

A Voice.—He

M. Dallaire.—treat it like an achi other ways of deali buckwheat, &c., al couch. Allow me ly successful. If upright teeth, harro seeds ; the couch w dressing of well-rot Lotbinière, and the told me that it was said that by that me

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Mr. Grisdale.—Experiment-farm tha ploughed 3½ to 4 in quite dry, we rolled tooth harrow. This root.

A Delegate.—O with an interval of a the land a heavy dose together. This is the infected land, harrow line remains, it will g great aid in this. So may be sure that you

germinate once, the frost comes before they have completely grown out and destroys them.

Mr. Grisdale.—Do you recommend harrowing immediately after the plough.

M. Dallaire.—That would of course do good. There is never any danger of working the land too much.

DESTRUCTION OF COUCH-GRASS.

A Voice.—How would you set about killing couch-grass.

M. Dallaire.—Couch is difficult enough to kill ; the best plan is to treat it like an aching tooth, that is, to take it away, to pull it out. There are other ways of dealing with it : repetition of hoed-crops, or growing clover, buckwheat, &c., after a hoed-crop. These are all good ways of killing couch. Allow me to relate to you an experiment that I am told was perfectly successful. If you have a meadow full of couch with a harrow, with upright teeth, harrow, in spring, along and across, and resow with grass seeds ; the couch will disappear, particularly if you give the meadow a top-dressing of well-rotted dung. This experiment was tried at St-Augustin de Lotbinière, and the curé with some of the farmers there, who had tried it, told me that it was successful. I cannot speak from experience, but they said that by that means they had get rid of the couch.

Another plan is to manure the land very heavily, for in rich soils the couch is easily destroyed as the roots keep always near the surface.

A Delegate.—To destroy couch, I ploughed early in the spring and allowed the couch to grow and the land to dry up. I then harrowed the land in every direction and the couch was destroyed.

Mr. Grisdale.—Two years ago, we had a two-acre piece of land at the Experiment-farm that was full of couch. In the middle of July, the piece was ploughed $3\frac{1}{2}$ to 4 inches deep, and allowing the furrow to lie until it was quite dry, we rolled it with a heavy roller, and harrowed it with a spring-tooth harrow. This was done in dry weather, and the sun dried up every root.

A Delegate.—Our way of killing couch is to plough twice in spring, with an interval of a fortnight between the ploughings, then, after giving the land a heavy dose of dung, to sow it with pease and let the whole rot together. This is the only plan that succeeds with us. Plough the couch-infected land, harrow it as much as you please, if a piece no longer than a line remains, it will grow again ; it must be made to rot, and pease are a great aid in this. Sow them thick, with a heavy coat of dung, and you may be sure that you will see no more couch-grass in that field.

M. Marsan.—According to that which you have just heard, it is easy to see that there are two methods of destroying couch-grass. First, there is the process of growing "smothering crops", that produce a fermentation in the soil : in this process I am a believer.

I have also made, personally, an experiment which was perfectly successful. It is the same precisely as the one related to you by Mr. Grisdale. I ploughed up a field in the fall, with a very deep furrow, and the following spring the land was so full of couch that we could not sow roots as we intended. I told my men to plough the land again and to pass the heavy roller over it. Unfortunately, I did not look after my men, so the land was ploughed when too wet; consequently, it became like a brick and the couch was imprisoned in it. I rolled again with a very heavy 4-horse roller which embedded the bricks in the mould; dragging them out they were again crushed by the roller. Another ploughing was needed to mix the soil, after which, the grubber &c., were used to drag out the couch. We grew roots on the piece, the horse-and hand-hoe got out the few bits of couch that survived, and the land was in fine condition without a single root of couch remaining.

At another time we destroyed couch by a fallow, the last plan to be pursued, since it is very costly. This was one spring-time, when we could not sow our grain-crop. I had a Scotchman at work, to whom I had given orders to plough a certain field. He came to me and said : If you do have it ploughed, you will get no crop; it is full of couch. Nevertheless, the couch had grown after hoed crops. We gave up this piece as an essay-ground for the pupils, to plough it about all the summer : all the couch was thus destroyed.

These are the two plans we followed. In wet summers, they are not successful, since the couch does not dry up in the sun but remains green and vegetative. There is my plan; it is confirmatory of the other.

WEEDS AND GOOD SEED.

A delegate.—Tell us about daisies, *bouquets blancs*; how to kill them.

M. Dallaire.—Just the same way; enrich the land. Were your land in better heart, you would always have less trouble: Daisies grow because the land is often incapable of growing anything better; it is ruined, worn out, and the good grasses, whether for pasture or for hay, will not grow; other things take their place, daisies, &c.

A delegate.—They come in the seed we buy; how can we avoid that?

M. Dallaire.—Buy good seed through the farmers clubs, and do not haggle about the price; unite together in your purchases.

Dr Grignon.
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Dr Grignon.—I am about to relate to you a fact that happened at our place. As secretary of the club, I bought seed for the members. One day, a member said to me: "you sold me bad clover-seed ; come and look at it growing." I went with him, and there was nothing but daisies and charlock to be seen. To him I then said: "Now, come and look at my clover;" it was some from the same sack of seed that the other was, and there was nothing but fine clover and timothy visible. Now, first, the other man's land was undrained; secondly, he had only allowed a pound of clover-seed to the *arpent* against my ten pounds. My belief is that when the land is well drained and seeded with ten pounds of clover to the *arpent*, with a gallon of timothy, the crop is assured.

Now, you may always be sure of good seed, if you buy for a whole parish together of a wholesale dealer in seeds ; for he will always be interested in giving you something good, for fear of losing your custom.

Mr Grisdale.—If you are not satisfied with any seed you may have bought, you have only to send a sample to the Ottawa Experiment Farm. You will learn if there is any weed-seed in it, and it will cost you nothing.

M. J. C. Chapais took the chair.

THE DRAINAGE (1) OF THE LAND

M. Dallaire.—The draining off of the superfluous moisture is the important point for us, if we wish to give good food to our cows, from which to secure good milk, enabling us to produce good butter and cheese. Land is not drained solely for the purpose of carrying off the moisture, but also to warm the land. The severer the climate, the more it needs drainage. Here, especially, if its land is to be well drained, it must be, so to speak, over-drained; I mean, that one would often be glad to recover the water drained off for the purpose of subsequent irrigation.

Why does not the land become warm when it is badly drained ? Badly drained land passes the winter in a state of ice. In spring, a couple of inches or so thaw under the influence of the sun, but the rest is kept cold, like an ice-house. The subsoil only thaws later in the season, remains saturated with water, and when the first warm rains arrive, their water intended to warm up the land, falls on a soil already full of moisture and runs off along the water-furrows and ditches, leaving the land as cold as it was before. Now, if the land had been well drained, these rains would have penetrated

(1) *Egouttement* means superficial work by water-furrows. In French, our own word *drainer* is employed, to signify to under-drain by pipes, &c. A. R. J. F.

into the soil and warmed it. When you mean to sow corn, for instance; sometimes it starts well, grows to the height of a foot, fifteen inches; but the day on which the root reaches the layer of cold soil, the growth stops, and the corn begin to turn yellow, because the roots cannot penetrate the cold soil.

What is good ploughing? It is the act of getting rid of the superfluity of water by means of the plough. I have seen ploughing so badly done that it would have been better to have harrowed the land instead of ploughing it. Bad ploughing is laying the furrows (and ridges) too flat; trying to plough too much land in a day. Do less, but do it better. Make your ridges fairly rounded up, and mind that your furrows-slices are well packed. Why? Because, if your slices are not packed tightly, if stubble or weeds are visible between them, you are thus making nesting places for all sorts of rubbish.

WEEDS

One word more about weeds: first of all, mow all weeds along the roads as early as possible, say, about the end of June. The municipal councils of every parish should make up their minds to do their duty and see that this is done, because if the weeds are cut down early they will not be able to run to seed spreading themselves thus all over the place. Pastures with hardly anything but daisies growing in them I have seen: why not mow them before seeding? It would not kill a man to take a scythe and cut down the daisies to prevent them from spreading their seed over the whole neighbourhood. To nothing but negligence is the greater part of the foulness of our fields due. For ten years I have accompanied in their tour the judges of Agricultural Merit. We meet a farmer at his farm and say to him: "you have some charlock in your oats, have you not?" Yes, he replies, "but not enough to do any harm." but that is just what will do harm; next year, how much will there be of it?

A delegate.—It should be pulled, then?

M. Dallaire.—Yes, at once. (Applause).

In a process of control at hand work equally well be used, more acid must be at hand when the whey is &c. A good make bility of being dec on the behaviour For guidance, the It took an apprent competent to carry good makers beca present in their or

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LECTURE BY M. GABRIEL HENRY

ACIDIMETRY

In a process like the making of cheese, there must be, necessarily, means of control at hand. Every maker of cheese knows that all milk will not work equally well; with some milk higher temperature in "cooking" must be used, more acidity must be given in the whey; in other milk, less. Means must be at hand by which to find when the milk is fit to receive the rennet, when the whey is ready to be drawn off, when the curd is fit for grinding, &c. A good maker should be able to detect all these things without the possibility of being deceived. To that end, he should profit by certain observations on the behaviour of the milk, as well as on their flavour, odor and their look. For guidance, the old makers had positively to trust to their senses alone. It took an apprentice several years practice to become an expert maker, competent to carry out his work properly, and many of them never became good makers because certain of the senses, such as taste and smell, were not present in their organisation in full force.

What was the result? This: as the skill of the makers varied in almost every factory, as their observations, the data from which they started, varied almost every day, as well as the quality of the milk and the temperature, the uniformity of the lots of cheese in the province felt the influence of the variations greatly; whence arose a fall in the average price of the goods.

A special means of recognising approximately the acidity of the curd was then introduced: the hot-iron test. This test was already an improvement, a means more efficient and more exact than the flavour, smell, or look of the whey and curd, to recognize the moment for the drawing off of the whey, and the moment when the curd is fit for grinding. Still, this test was only fairly approximative; for indeed one cannot easily judge of the exact temperature of the iron, and the curd does not always behave in the same manner, when the iron is very hot and when it is only moderately hot, when the lumps of curd are wet or when they are dry. On the other hand, all curds do not give the same length of thread to the iron, and, lastly, all makers do not judge in the same way of the length of thread produced by contact with the hot iron. So, there we have a crowd of causes of error that still create marked differences in the quality of our cheese.

The use of the hot iron, although an improvement in the means of control, especially in the hands of skilled makers, is very far from being sufficiently precise in the hands of a vast number of makers.

To ascertain if the milk is ripe enough for renneting, a test by rennet has been introduced, a test that, when carefully put in practice, gives very precise results. It is a vast improvement in our means of control, but it cannot be applied to the whey in the subsequent operations.

acid to the 10,000 lbs. The curd may then be said to be fit for grinding. If no whey can be got at just then, the guide must be the use of the hot iron, as formerly, as well as the smell, touch, the look of the curd. The last acidity to be taken is that of the whey from the press, which should be 5 times that of milk just after it is drawn from the cow.

While curd is being ground, salted, and put into moulds, the acidity increased by about 10 to 20 lbs. to the 10,000 of milk. If, then, before grinding, the milk shows 90, one may be pretty sure that it will show 100 on leaving the press.

This last test should be made on a sample of whey taken immediately after the shutting down (serrage) of the press.

We only quote these figures *en passant* to show the importance that the acidimeter may assume as a means of control in the making of cheese. Were its use to become general, it is certain that, after a short apprenticeship, every maker of average intelligence would be able to make good cheese more uniformly than in the past, for this manufacture, with so exact a means of control, would indubitably become more easy, and would require only a trifle more care and attention on the part of the maker.

Every maker would of necessity have to learn to use this instrument properly.

We by no means desire to abuse the ancient means of control; they have been of great service, but there is no doubt that they are, as regards the majority of makers, less handy and less sure in action than the acidimeter will be when once its use is spread abroad. There are makers well-skilled in judging of the milk, the whey, the curd, by taste, smell, and look; but we cannot expect the same great skill in every one of the makers of the province, and since a means more easy, more within the reach of all, for the control of the manufacture presents self, we must avail ourselves of it. The average quality of the cheese of the province will assuredly gain by it, especially as regards uniformity.

And, now, as to the way of using the acidimeter. There is a liquid, known as phenolphthaleine, which does not change colour when mixed with another *acid* liquid, such as milk or whey, for instance, but which assumes a very deep red colour when mixed with an *alkaline* liquid, i. e., one containing caustic, soda or potash. If to a certain quantity of milk we add some drops of phenolphthaleine, this milk, as long as it continues acid, will not turn red; but if, by adding a certain quantity of a solution of caustic soda, we destroy the acidity, as soon as the acidity vanishes and the milk becomes alkaline, that instance will the red colour appear.

One can easily understand, after this explanation, that the greater the acidity contained by the milk, the greater must be the addition of the soda solution to make the red colour appear. If the same quantity of milk is

used at each test, and a solution of soda always of the same strength, the quantity of soda to be added each time must necessarily be proportionate to the acidity of the whey. If the whey has an acidity of, say, 20, for instance, we must use, let us suppose, 40 drop of soda-solution. If its acidity be double, i. e., 40, the double quantity of the soda-solution, 80 drops, must be used before the red colour will appear.

Here, then, we have a very simple means of testing the acidity of a liquid. Still, in practice, there is some difficulty in seizing the exact moment when the red tint appears; for milk is opalescent and that tint has to be pretty strong before it can show itself completely. However, in practice we can arrive at a sufficiently exact point. A drop more or less represents, with the apparatus we now find in the trade, a difference of a half pound of acid to the 1,000 lbs. of whey, which as concerns the actual work of making is no great thing. Yet, in order the better to define the exact moment when the colour appears, we are advised to employ the method called "la touche" (assay). The procedure in this case is as follows: to the whey is added the proper quantity of soda, one or two drops about, then on a white plate are put a few drops of phenolphthaline, one by the side of the other; with a glass-rod a drop of the whey with the soda added is lifted, and carried on to one of the drops of the phenolphthaline on the plate. If the red tint does not make itself apparent, a drop of soda is added to the whey and the "touche" is begun again on another drop of the phenolphthaline: if the tint shows itself, it is a sign that the liquid is saturated; if not, the same process is continued till the tint appears, then, there only remains the determination of the quantity of soda solution employed.

For this, glasses graduated in cubic centimetres and tenths of the same, and a soda solution of such strength that each tenth of a cubic centimetre of soda represents a pound of lactic acid in 10,000 lbs. of milk or whey. A soda-solution of one half less strength is often used, i. e., such as that each tenth of a cubic centimetre indicates $\frac{1}{2}$ lb. acid in 10,000 lbs.

As to the form of the instrument, it varies greatly, and it would take too long to describe now the different sorts to be found in the trade, each of which has its advantages. We had made, at Paris, a "drop acidimeter" each drop of which represents an acidity of 5 lbs. to the 10,000 lbs. It resembles a graduated glass (burette) and gives capital results.

The chief causes of error in the acidimeter are:

1. The reading off of the quantity of soda used; but with a little practice this difficulty is easily obviated, and a uniformly regular reading secured.

2. The seizing of the exact moment when the red tint appears. This is one of the most ordinary causes of error. Frequently, especially with milk or the whey running from the press, the red tint does not show itself

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at once, and we have to wait a quarter or half a minute before it is perceptible. If one does not know this, and one gets hurried, it may be supposed that the liquid is neutralised before it really is so. After, in pouring the soda-solution into the milk, or in letting fall the drop of whey on to the phenolphthaline, the red tint appears and then vanishes, and if one does not wait for a few moments, it may seem the liquid is neutralised when it is not so in reality. There must then be no hurry in this work, but the test must be done with care.

3. Another cause of error lies in the soda-solution itself; if it is exposed to the air it loses strength, because the air always contains carbonic acid, and this acid combining with the soda destroys its strength.

To avoid this trouble, there are divers means; the soda solution may be kept in a large flask with a good stopper (*à l'émeri*) and, for *daily use*, a small bottle may be filled with enough to last a few days.

In this way, as the larger flask will rarely be opened, the liquor will keep well in it, and as the smaller one will be frequently renewed the solution in it will not have time to depreciate. There is another way which consists in using a *flacon-laveur*, containing a soda-solution through which the air has to pass before it can penetrate into the large flask, and in which it gets rid of its carbonic acid. Thus purified, it is deprived of all action on the solution.

It is very desirable that in the general interest of the province the use of this so handy a means of control should become general; for the thing is well known, and we found it so even in England, that the want of uniformity in the lots of cheese from this province is one of the causes of the difference of price between Quebec and Ontario cheese.

A delegate.—Would you be good enough to give the difference between 20 lbs. of acid at the time of drawing off, as compared with the hot iron test?

M. Henry.—As a general thing, according to the result of our experiments of the past summer: when the whey shows 30 or 33, that indication represents, I think, three lines of acid by the hot iron.

t appears. This especially with not show itself

Proposed by M. Louis Labelle, seconded by MM. Arsène Denis and S. Chagnon, and carried unanimously.

That the Dairymen's Association, met in convention at Fraserville has listened with pleasure to the noteworthy lecture of M. J. D. Leclair on his new process of making butter, which promises to revolutionise the butter-industry; that it congratulates him on his success and offers him its thanks, desiring to encourage him to continue his experiments and researches, with a view to carry the process to perfection and to put it within the power of every butter-maker.

Mr GRISDALE'S LECTURE

ON THE FEEDING OF THE MILCH-COW.

AGRICULTURAL-INSTITUTES

Messieurs,

I am about to address you to-day on the subject of our farm-stock in general but especially on the milch.cow.

More over, I would speak to you about another matter, a matter of the greatest importance in these days of unbridled competition ; a matter that every farmer desirous of extracting ever-increasing profits from his farm, is studying, a matter that our brothers in the other provinces are striving to enrol in the domain of perfected things and which we, farmers of the province of Quebec, have no right to thrust aside, if we wish to preserve the enviable position to which we have attained by our energy and labour. Unfortunately, to treat this question at length in a meeting like this might seemed to occupy the time that others might more usefully employ, and there fore I will only add a few words on this subject after I have finished the remarks I am about to make on our animals, especially on milch-cows.

To make our cows yield all that they are capable of yielding is a matter of such importance to every farmer, that I trust you will pardon me if I add some thing more to your programme already so well filled.

Will any one dare say that we get from our cows all that they can be made to yield ? I am certain that there is not a man present who gets from his cows all the profit that they can and ought to yield. But observe ; I have not the least intention of discrediting, of abusing the farmers here present, who devote themselves to dairying, nor farmers in general, but I want to impress upon their minds how great are the difficulties that impede every step taken by the farmer who aims at extracting the greatest possible profits from his cows.

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I cannot draw your attention too forcibly to this point :

Many herds of cows give good profits—that is true enough—but not one of these herds gives all the profit it can and ought to give.

When I was appointed agriculturist at the Experiment-farm at Ottawa, there were in the cow-shed 33 milch-cows.

I made no change in the method of feeding then in practice ; I allowed the man in charge to go on feeding them as usual; only we noted down every day the milk each cow gave and the butter made from it, without, of course, for getting to enter to the debit of each cow, to the very last pound, the food given her.

During the year, 1899, the cows consumed on an average \$41.22 worth of food apiece, and yielded an average of 5,413 lbs. of milk, or 240 lbs. of butter. So, according to our books, each cow's gross return was \$51.22, or a profit of \$10.00 a head.

At the beginning of 1900, we adopted a new system of feeding to which we still adhere, and from which we have derived marvellous results. From three feeds a day, as they were, we reduced them to two a day, the morning, a mixture of roots and silage-corn, sprinkled with meal followed by hay or straw, not chaffed, at 4 P. M., again roots and silage-corn with meal, and hay or straw, not chaffed.

The meal of these two feeds consists of one-half bran, and the other half oat-meal, barley-meal, and pease-meal, in equal parts.

The quantity given of these meals varies as follows : Ten pounds a day is the quantity given, as a rule, to our best milkers during their milking time, when the milk is most abundant ; the worse milker the cow, the less rich is the food.

Cows nearly dry do not get meal. Each cow is the object of special study during her milking period. None receive more food than she can convert into milk, but they all receive as much as they can work-up to advantage.

For extraordinary milkers, I add to the meal-ration of which I have spoken a little more bran and a small quantity of linseed and cotton-cake.

It is only by constant study of a cow that one can succeed in finding out how much she can consume with profit. To say that 5 lbs. or 8 lbs. of meal is a good ration for a cow, is nonsense, an absurdity. Unless a farmer knows the quantity of milk given by a cow, he can not tell how much meal he can give her with profit ; even then, he is not positively certain. We must, there fore, make a special study of the milking aptitudes of each cow.

Though we cannot determine with exactitude the quantity and quality of the food that is profitable and advantageous to give to each cow, there nevertheless exists certain principles from which we must not deviate in the rational feeding of our herd.

The pasturage in the month of June is the best food for the cow. It is during this month that she yields the greatest quantity of milk. Let us, then, make every month in the year a month of June, i. e., let us make the cow's food-ration resemble as much as possible the grass of the June pastures. During the summer-months, we can easily provide near our pastures some green-crop for our cows, with, if convenient, a little meal. For winter, we must make a good provision of succulent food, mangels, turnips or silage, with plenty of grain, so as to be able to compose rations resembling as much as possible the grass of June.

Another most important point: the atmosphere of your cow-houses must be as pure as the air the cows breathe in the fields in summer. Should it be impossible to have a cow-house warm and at the same time filled with pure air, sacrifice the warmth to the ventilation. No animal can with impunity breathe impure air throughout a whole winter. Now, I must tell you the results of this novel feeding-system of ours, or rather the results of this novel system of preparing the ration for each cow and keeping an account of it, have been remarkable.

First, the keep of each cow has cost \$5.00 less, i. e., each cow has cost for food \$36.00 instead of \$41.22, as in the preceding year. Secondly, the gross returns have risen from \$51.22 to about \$65.00. Again, the average yield of each cow has risen from 5,414 lbs, the yield of the preceding year to 6,544 lbs, an increase of 1,130 lbs, and the make of butter has consequently risen from 240, the make of 1899, to 290 lbs.

Naturally, there has been a difference in the profits. In 1899, each cow gave us, on an average, a net profit of \$10.00, on the food consumed. The net profit in 1900 rose to about \$28.00. I must say, though, that in that year we got a cent a pound more for our butter.

Now, will you please observe that I have by no means tried to insinuate that each of our cows gave us a net profit of \$28.00. That would not be true, for we have some in our herd that hardly paid for the food they ate, while others made as much as \$56.00 of net profit. Nothing is easier than to discover which cows in a herd eat up the profits that their sister cows make, and we should not neglect to avail ourselves of the discovery, so as to let butcher's knife pay its devoirs to these robbers.

These results up to which our experiments of last year led us, seemed to me so important that I thought I ought to lay them before you, as I think I ought to do with another fact of no less importance.

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I have as yet only spoken to you of one class of animals, and that in a very summary manner.

I here address only a small number of farmers, of whom there are thousands in the province,

I only give my way of thinking, and there are many and many of our farmers who may not think as I do.

Do you not think as I think, that we shall always find something to learn in farming, so long as we are not intimately acquainted with the manner in which each individual farmer looks at each of the leading agricultural questions? Out from the crowd of ideas thrown upon the same question, may not truths be darting though still in the shade, but which we shall be allowed to contemplate with profit in the light which is always born from the shock of ideas?

How, then, are we to get at the opinion of these thousands of farmers with, perhaps, a greater experience than we in the cultivation of the soil? Yes, how can we succeed in procuring information so important that will put an end to many a discussion, that will show us the true road to follow?

How? I ask you, I have often asked myself the question; every one is at work on the same question.

Our agricultural papers, the reports and bulletins of the Experiment-farms, and other like institutions, conventions like this one, have already, I am happy to acknowledge, made a great stride towards a solution of this question.

Beside this, in addition to the information contained in our agricultural publications; without reckoning the ideas, often correct, emitted in the farming papers, there are, diffused over every part of the country, numerous results of individual experiments, which varied results if reunited, grouped together, and discussed, would constitute wealth for us, contribute to our welfare, and procure for us a greater degree of comfort; but the question recurs: how shall we manage to become acquainted with these results.

You see at once the importance of the point to which I wish to draw your attention.

Submitted every where to a serious inquiry, on the Atlantic, as well as on the Pacific coast, this arduous problem would seem to have found its solution in the establishment of the Agricultural Institutes of the province of Ontario.

This system of Agricultural Institutes has been developed in a very striking manner in this sister province. In 1891, the professors of the Agricultural College of Guelph devoted their winter holidays, in the month of January, to visiting certain farming towns, and giving lectures there on

those subjects most interesting to farmers. Every where they were received with the heartiest welcome, but their time was so limited that they only visited a very small part of the province. Still, during that same year, 75 meetings were held, and 2,500 farmers were enrolled as members of these institutes. Such was the commencement of this admirable institution.

The second thing accomplished was to send with each lecturer one of the best farmers of the province, and to hold sessions of two days. No long time elapsed before the requests for lecturers became so numerous that they could not all be granted, and it became necessary to appoint a manager to superintend the work: rules were made and published, fixing the date of meetings, and every thing was arranged for regular and effective operation.

Since that time, the work accomplished has, each year, gone on increasing and, at the end of the year, closing on June 30th, 1900, there were 16,808 members of these institutes who had paid their subscriptions, 677 meetings had been held and 3,133 lectures given before 114,402 auditors. The speakers and the lecturers are chosen from the best in the province; and men most distinguished for their knowledge of agriculture are brought from the United-States and other countries.

There is one thing noticeable; the cost of each meeting and of the calling it together have been always decreasing, in proportion to the increase of the number of these meetings, and of the people attending them. The cost of the entire meetings was generally about \$35.00: the average is now about \$13.00, and at many of these meetings there were three lecturers.

It may be said with perfect truth that the Institutes are to the farmer in general what the dairymen's societies are to the makers of butter and cheese, what the college of physicians is to the disciples of Galen.

By means of these institutes, the farmer, almost without stirring, finds himself in a position to hear addresses from men who have been successful in their business, i. e., in the different branches of agricultural science, and to profit by the experience of these men without the expenditure of a sou. In each district, from Essex to Glengarry, such meetings have been organised where the best farmers have been called upon to explain to their brother the causes of their success.

In other parts of Ontario even more has been done, by the getting up of excursions to take the members of the institutes to the chief source of farm science, to the provincial college of agriculture. In this way, farmers have been able to gather abundant information on the best system of cultivation, on the breeding of farm-stock, dairying, and the profitable treatment of swine.

The discussions, the work of these meetings of the members of the institutes, have had a very remarkable influence. From one end of Ontario to the other one finds uniformity of cultivation, great quantities of products of

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the same quality and character, a dream impossible of realisation before the establishment of the institutes. Throughout the province, one observes a greater tendency to union among the farmers, a sentiment that was nowhere perceptible before.

And a better thing still; farmers are now so convinced of the importance, the real value of the system, that they loudly cry out for an extension of it, so as to attain, in time to come, the greatest success more promptly. Every day, they are getting more anxious to devote themselves to the raising of fine bred stock, because they are more and more convinced of the immense advantage to be derived from keeping none but animals fit for a definite object. They have arrived at a better knowledge of their needs; have formed societies that are growing every day more powerful, and with which the governments are obliged to reckon. Now a days, it is no longer the Minister of Agriculture that advises farmers to do such or such things, but the farmers that demand from the minister the adoption of certain laws, that they think advantageous, and see to it that, when passed, these laws shall be strictly enforced.

There is no need to look elsewhere for the cause of the great popularity of the system, which resides in the vast advantages that the farmer derives from it. Once or twice a year, every farmer enjoys the society of men who have been very successful in farming, hears new ideas that are of the greatest value to him, which sometimes inspire him, always encourage him. And better still, he himself has a chance of submitting to discussion ideas of his own, and of finding whether or not they agree with the experience of others.

By means of this system, the information thus acquired is rapidly dispersed over the whole of the country, and a great deal of useful knowledge, which would have taken years to reach the more retired parts of the province, promptly enters the ears of the farmers who are energetic enough to attend the meetings.

It is really wonderful to see the effect produced by these institutes on the quality of the products of the farm. For instance, one used to see, and not very long ago, pigs of all sorts in Ontario, and yet the great packing-houses could hardly find a hog fit for the export trade. Now, the most celebrated dealers in England, acknowledge that nowhere in the world can there be found finer hogs, better made and of more uniform build, than in Ontario, and this is due entirely to the lectures delivered at the institutes and to the discussions arising therefrom.

You say that you have no market that asks for a superior quality of pork, fit for bacon. You are quite right, since your market at present wants the quality of meat you are making and it is quite possible,—though I do not know it,—that the bacon-hog would bring you a cent a pound less

that the pickled-pork hog. This is due to existing local conditions, i.e., to the variety of swine that you are breeding. You have every description of swine and you feed them too richly.

A study of the market during the past few years, shows us that the Ontario hog fetches a cent a pound more than ours. This ought not to be. We are better situated than Ontario for the production of a first-class bacon-hog. We are all, more or less, interested in dairying. A province in which the dairy-industry is flourishing is a province able to produce the best bacon.

You can find no sale for more than you are at present producing? May be so; but I have a promise from one of the first houses in Ontario, that from the moment when they can be assured with certitude, of a supply of 500 hogs a week, the firm in question will start a packing-house in your midst, and pay you the same price for your hogs that it is paying to the farmers of the sister-province.

There is no such means of creating a demand than to have a large quantity of a uniform quality of the goods required to supply the demand.

Now, since so great a change has been accomplished in Ontario, since such vast progress has been made in so short a time, ought we not, with such an example before us, to be able to do the same? Profiting by the experience gained by that province, and with the aid of its best lecturers, we can collect a number of skilled lecturers in our own province. Besides, we have an extremely valuable advantage at our service, to guide us in our road, a man who has devoted the freshest years of his life, the greater part of his talents, to the establishment of these institutes, I speak of Mr F. W. Hodson. Mr Fisher, the Hon. Minister of Agriculture, has had the good fortune to secure the service of this eminent man, who is now employing all his energy and skill in making, not only in Ontario, but over the whole of Canada, a success of the breeding of stock.

Mr Hodson has not yet been asked to confer with the farmers and breeders of this province; he has not yet, as far as I know, come into our parts. But I have been sent hither by Mr Fisher to draw your attention to this subject, a subject new, important, serious in the highest degree and worthy of all your attention.

You are asked to study this question attentively by our minister, who is convinced that if it is favourably received by a body of men so important as you are, who have so strongly at heart the interest of agriculture, it will become the subject of discussion between all the farmers of this province.

Mr Fisher well knows the farmers; he knows how intelligent and how careful of their interests they are, and, that if they shall have once felt the immense advantages which are offered by these institutes, they themselves will ask for their establishment.

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Mr Chairman,

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There are here present several persons who are, more or less, acquainted with the work done in Ontario under the guidance of the agricultural institutes, and they could, I am convinced, speak of them more profitably than I; persons who could more persuasively tell you that, when once these institutes are established among us, the farmers of our great and splendid country will be more intimately united, and will work with greater success in promoting their common interests.

And in order to show you how seriously we are trying to excite your attention to this problem, that you may study it earnestly, I am charge to propose to a young man of your province that he shall travel into the province of Ontario, visit the agricultural institutes, investigate their working, &c., and I may add that his expenses will all be paid either by the Ontario or by the Federal government.

The secretary then read the following lecture, by M. G. A. Gigault, Ass. Commissaire of Agriculture.

THE OPERATIONS OF THE AGRICULTURAL SOCIETIES

Mr Chairman,

At the meeting, at St-Jérôme, of our association, I offered some observations on the working of the Agricultural Societies.

Since that meeting, the subject has been treated as regards Ontario by Mr. F. W. Hodson, an official of the Federal Ministry of Agriculture, in an article published in the "Farming World."

With great reason Mr. Hodson attaches great importance to the local associations. He ask that the village societies of Ontario unite with the Farmer's Institutes, and that they devote themselves chiefly to the improvement of live-stock.

This suggestion had led me to study the methods to which recourse has been had in foreign countries to encourage the improvement of cattle and I am about to relate to you the results of some of my researches.

In Denmark, the progress made is something remarkable. In 1861 there were in the country 291,181, pigs, and 1,095,005 head of cattle; in 1898, there were 1,713,735 head of cattle, and 1,157,509 pigs.

In the whole, the number of live-stock has more than tripled itself in the 27 years. The Danes have at the same time greatly increased the

average yield of each cow's milk. These admirable results have been, in great part realised by the Danish farmers by means of their breeding syndicates and agricultural societies.

The following information is taken from the "Journal de l'Agriculture Pratique" :

"The red Danish breed that occupies exclusively the Isles, and is very widely spread over the peninsula of Jutland, is originally from Finland and Russia.

"Formerly, being badly fed, it supplied but little manure and little milk. The mode of making butter was very imperfect, and breeding gave but small profits. The necessity for an increased production of manure, when grain-growing began to be developed, coinciding with improved making of butter, gave rise to successive improvements in the Danish cattle by crossings, and especially by better feeding.

The introduction of the Schleswig breed, chiefly that of Angel, a small cow giving plenty of milk, under the impulse and with the assistance of the agricultural societies, has transformed the native breed in a marvellous manner. From well planned crossings has resulted the creation of a special breed of good milch-cows which is now perpetuating itself without any more importation of bulls from Schleswig.

"There are now in Denmark 329 breeding associations, founded and supported by the agricultural societies and aided by grants from the State.

"Seven-eighths of the products are from breeds improved and fixed by the Jutland bulls, which now are fetching high prices on the market."

Let us now consider what is going on in Belgium, where great efforts are being made to improve the breeding of horses. "Le Journal de l'Agriculture pratique" give us the following information :

"The Belgian Haras (studs) ceased to exist in 1863, and since that year the purchase and keeping of stallions has been given up to private individuals. The government gives grants of money and regulates the services. The nine provinces of Belgium concur with the department of agriculture in the distribution of subsidies to the breeders of draught-horses.

Every stallion must be approved by a committee composed of 5 experts. The approval is only available for one year, and must be renewed every year. In general, the judging is done in the morning, and in the afternoon a competition is held between the best animals present, prizes being awarded to the winners.

Beside the local and provincial competition-prizes, the committee of experts has to distribute the premiums for keeping stallions. These are intended to retain for national service the finest stallions, which without them would be carried off regularly by foreigners, specially by the Germans.

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These premiums for keeping are either provincial or from the government. The first, of 700 frs., may be assigned to the owner of any stallion 5 years old or upwards, that has won a first prize in the local competition.

In case a stallion should possess exceptional good qualities, the provincial premium for keeping for service of 700 frs., may be converted into a government premium of 5,000 frs. payable at the rate of 1,000 frs. yearly for 5 years, presupposing that the horse preserves his good qualities during the 5 years, and is annually approved by the commission of experts. But, the stallion cannot be assigned more than 5 premiums of 5,000 frs. each year.

There are in Brabant premiums for keeping mares for breeding (500 frs. payable in 5 annuities of 100 frs. each;) in East-Flanders, these premiums are of older date, and of 1,000 frs. (annuities, 200 frs.)

Apart from a few modifications in detail relating to the members of the commission of experts, to the amount of premiums, and to the right of the State to intervene, all the preceding arrangements are admitted into most of the Belgic provinces.

The same paper declares that the competition of horses at the Paris exhibition of last year, "brought into lively relief the great progress made by Belgium in the breeding of the draught-horse."

In Ireland, there has lately been established a department of agriculture; its first act was to labour for the improvement of cattle by favouring the purchase of good males. It, too, granted an annual premium for keeping of £12 for two years, for each pure-bred bull, registered, that has won a first prize at a competition opened by an agricultural society; this bull must, in addition, be accepted by veterinaries and experts appointed by the department.

The Royal Agricultural Society of Dublin also grants premiums for keeping for service, but only for one year. The "Farmers Gazette" criticised this plan, asserting that these premiums ought to be granted annually, or at least during two consecutive years to the owner of the prize-bull. The new department has accepted this suggestion.

The province of Quebec reckons among its societies some that have successfully encouraged the breeding of both horses and cattle. The Chicoutimi society has done a great deal in this way, and thanks to its work, many fine and useful horses are to be found in that county. Several farmer's clubs too have favoured the improvement of cattle. A club in Megantic reports that the cattle of that district have been marvellously improved by purchases made of good males. The result has been that higher prices are being made for their animals by the farmers. Last year, in Lotbinière, a club spent \$225.00 in the purchase of males, devoting to that purpose the government grant and the subscriptions of its members.

The breeding and improvement of stock occupy an important position in the progress we have to make. Milk, butter, cheese, are daily increasing

in both local and export demand. To develop the production of these articles, not only must the number of the cattle that produce them be increased, but the herds themselves must be more carefully bred. If stock is the basis of good farming, if it is necessary for the retention of the fertility of the soil, breeding must be one of the most important operations in the management of the farm.

That which has been chiefly admired by the French agricultural papers is the combination of means adopted by Denmark to assure the development and improvement of the butter-industry, and particularly the efforts to conduct breeding in a judicious manner and to improve their herds. The greatest possible success has crowned the work of the Danes, and their agricultural societies have largely contributed to this splendid result. Let us profit by their experience.

The "Journal de l'Agriculture pratique", recently published an article on farming in Germany, mentioning that the agricultural products of that country had of late greatly increased. Among the causes of this increase it quoted the improvement of the competitions of the agricultural societies. In very truth, the progress of agriculture depends partly on the use made by the societies of the subventions granted to them by the State. We must strive, like the Germans, to improve our competitions, and see to it that our societies make a wise use of their funds, by aiding the development of the most important branches of farming and varying their operations.

By devoting part of their funds to the improvement of their stock, they would be indisputably doing great service to the farmers. This improvement is absolutely necessary in a country like ours, where dairying plays so a great part.

Every thing must be done that can contribute to the importance and development of the dairy-industry. That we have been successful should not cause us to slacken in our zeal. If progress is being made here, there is also progress being made abroad, among our competitors. The United-States are congratulating themselves at having increased their annual exports of cheese by two million dollars, and jealous of our success, urge earnestly their farmers to increase this exportation till it shall before long equal ours. Such is the desire expressed by their agricultural publications.

Everything seems to indicate that, before long, Russia will be a formidable rival to us.

Australia neglects nothing in endeavouring to increase her exports of dairy-goods, and her exertions have met with great success.

Among all our competitors associations like ours are being formed, dairy-schools are being established, cattle are being improved, attempts are making to increase the yield of milk, experts, chemists, men of science are being called upon to help, in order that science may give up her secrets and assist in the improvement of dairying.

That which we shall have a for it,—and this contest victory w those who shall respect.

Here, M. J. of the recasting o remarks already pply to the lecture Dallaire.

In closing his Chapais made the

Allow me, G to the primary sch see carried out in our youths in the knowledge of the f educate several the them, some 16 m tours of official le that I found in my and on the advant who, unfortunately to the detriment of may believe, Gentl pleasure even, acce 30 of these schools pils, who listened t by the abstracts ma some of these exerc of age, that are real

So allow me to may be only the be, mation of primary i as many as possibl a great many father

That which is going on among foreign nations shows us plainly that we shall have a most lively competition to encounter. We must prepare for it,—and this is my last word—with the conviction that in the peaceful contest victory will remain to the most skilful, to the most industrious, to those who shall deliver to the customer goods that are faultless in every respect.

Here, M. J. C. Chapais delivered his lecture, which making also a part of the recasting of the works of the association, will be published later ; the remarks already made on the lectures of MM. Mortureux and Richard apply to the lecture of M. Chapais, as well as to those of MM. Marsan and Dallaire.

In closing his lecture (see p. 62 of the supplement, to follow), M. Chapais made the following observations :

Allow me, Gentlemen, to add a few words on the reform to be applied to the primary schools as regards agriculture, which M. Dallaire desires to see carried out in this province. His idea is shared by many instructors of our youths in the country-parts. Among others I can name with a thorough knowledge of the fact, the Rev. Provincial Brothers of the 9 Institutes who educate several thousand children in divers parts of the province. From them, some 16 months ago, I received an invitation to stop, when my tours of official lectures gave me an opportunity, at any of their houses that I found in my route, to deliver a lecture on the nobility of agriculture, and on the advantages that it present as a career to the sons of the farmer, who, unfortunately, in these days, are too much given to neglect farming to the detriment of that art and to the benefit of trade and commerce. You may believe, Gentlemen, that I replied willingly, and with the greatest pleasure even, accepting the invitation; consequently, I have already visited 30 of these schools, and delivered the lecture before about 5,000 of the pupils, who listened to it with attention and intelligence, which is also proved by the abstracts made by them and sent to me by the professors. There are some of these exercises made by children of 15 and even of only 13 years of age, that are really most satisfactory. (Applause.)

So allow me to express a hope, in conclusion, that this first movement may be only the beginning of a regularly organised campaign for the reformation of primary instruction in our country parts, by impressing upon it as many as possible of the agricultural characteristics that M. Dallaire and a great many fathers of families desire for it.

M. Dallaire.—Mr. Chairman, will you kindly allow me to say a word as to the teaching of agriculture in the schools? Last year I was charged by the Council of public Instruction of this province to prepare special lectures on agriculture for the primary schools, and this year, the inspectors of schools had to deliver these lectures to the children in presence of the teachers. This is a commencement of the realisation of the idea of which M. Chapais has been talking. The teaching of agriculture in our primary schools is of the highest importance, especially in the country districts. Agriculture is in fact the basis on which the future of this province must rest. Give to our children practical and useful instruction on this point, and we shall see fewer of our people expatriating themselves and, abandoning farming, burying themselves in the manufacturing towns of the States. I myself have been a teacher, and I know well one thing: many teachers of either sex take no pride in seeing their pupils devoting themselves to farming; but they are pleased when they see them take to trade or the professions. People rest on farming when they are fit for nothing else, and I say this because I know it is so. I leave to you the task of weighing these things.

RESOLUTIONS OF SYMPATHY

On the death of M. l'abbé Théophile Montminy, ex-President of the Dairymen's Association.

Proposed by MM. J. A. Vaillancourt, J. B. A. Richard, Louis Labelle, S. J. Roy, and Chs. Préfontaine;

Seconded by MM. J. C. Chapais, J. de L. Taché, N. Garneau, and A. Chicoine, that the Dairymen's Association of the province of Quebec assembled in its annual convention, being anxious to testify to the family of the late abbé Montmigny how earnest is its sympathy with them on the occasion of the death of the former President of the Association and, at the same time to enter in the archives of the association a fair and worthy appreciation of the services rendered to agriculture in general and to the dairy-industry in particular by this distinguished agricultural missioner;

Has determined to insert in the report of the present convention a portrait of M. l'abbé Montmigny, accompanied by a biographical notice.

And that copies of these resolutions be sent to the family of M. Montmigny and be published in the Journal.

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Rev. TH. MONTMINY,
Vice-President (1890-91) and President (1892-1896) of the
Dairymen's Association of the Prov. of Quebec.

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The Rev. Th. Montminy, his wife, née Macdonald, of Kamouraska County, P. Q. His education was finished, in 1854, at the College of St. Sulpice, discharging the same duties as his Lordship, Bishop of Montreal, appointed curate (vicar) of St. Sulpice, from 1857 to 1877, acting at Sault, Montmorency, Beaurivage, Lotbinière, and Beauce county, in 1877.

Enjoying great respect, he organized a large report, organized a large report, organized a large report.

A second he started in August, 1877, to Africa, and Asia, 1877, England, France, the Antilles, for the resting account of 1877.

When M. Montminy was parish far from poor, and many of the poor parishioners. The "Farmers' Club," a society of agriculturists was organized for farming. He also organized a society of agriculturists, and was so successful afterwards, all the farmers thought no more of farming by the adjoining before large meetings, a knowledge of all the conferring on every subject. He soon became known as the "Apostle of the Farm."

M. l'abbé, having been the "Apostle of the Farm" of the Dairymen's Association of the Province of Quebec.

NOTICE ON THE ABBÉ MONTMINY

FORMER PRESIDENT OF THE DAIRYMEN'S ASSOCIATION

The Rev. Théophile Montminy, the son of M. Joseph Montminy by his wife, née Marguerite Lambert, was born at St Jean Chrysostome, Lévis County, P. Q. His education began at the College of Ste Anne de Lapocatière, Kamouraska county, P. Q., in September, 1858. His course of study finished, in September, 1866, he devoted himself to the study of theology, discharging at the same time the duty of music-master and organist at the same College, up to September, 1870, when he was ordained priest by his Lordship, Bishop Lafèche, at Three-Rivers, P. Q. He was at once appointed curate (vicaire) of Beauport, a post he occupied for seven years, up to 1877, acting at the same time as curate of the mission of St Grégoire du Sault, Montmorency. He was appointed curé (*rector*) of St-Antonin, Témiscouata county, in March, 1877, afterwards became curé of St-Agapit de Beaurivage, Lotbinière county, in July, 1879, and finally curé of St-George, Beauce county, in March, 1889.

Enjoying great musical abilities, M. Montminy, while he was at Beauport, organised a band which soon became one of the best in the province. A second he started at St-Agapit, and a third at St-George.

In August, 1875, when at Beauport, he undertook a voyage to Europe, Africa, and Asia, returning at the end of May, 1876, after having visited England, France, Italy, Egypt, and the Holy-land. In 1886, he sailed to the Antilles, for the sake of his health, and on his return published an interesting account of his trip.

When M. Montminy was appointed curate of St-Agapit, he found that parish far from prosperous. Owing to their bad farming, the people were poor, and many of them were leaving their farms in search of better fortune in the States. The new curate soon found the cause of the sufferings of his poor parishioners. He got up among them, under the title of "The Farmers' Club," a society holding, every month, a meeting at which skilled agriculturists were invited to deliver to the members lectures on good farming. He also organised a parochial exhibition of stock and farm-products, and was so successful in these enterprises, that four or five years afterwards, all the farmers of St-Agapit were in easy circumstances and thought no more of leaving their farms. Such success was not long ignored by the adjoining parishes, and the young curate was invited to lecture before large meetings of farmers, in order that he might convey to others a knowledge of all the good that his system of farmers' clubs was capable of conferring on every parish where the inhabitants would put it in operation. He soon became known over the province of Quebec by the title of "The Apostle of the Farmers' Clubs."

M. l'abbé, having often attended the annual conventions of the Dairymens' Association of the province of Quebec, at which he was invited to

lecture, was elected vice-president of that association in 1891, and president in 1892, which latter position he occupied until December, 1896, taking great interest in the direction of the affairs, in spite of the important and numerous duties he had to fulfil as curate of the great parish of St-George's. If any one wishes to form an idea of all the trouble he took to keep himself fully informed about every thing that concerns the interests of agriculture in our province, he has only to read the remarkable address he gave on "The teaching of agriculture in the primary schools," before the first Congress of the farmers of Quebec, held at the capital of the province under the abbé's presidency, as well as to the opening address he delivered, from the chair, before the annual convention of our Association. These addresses constitute an almost complete history of agriculture and dairying, and of their progress in the province during the five years of his presidency.

In recognition of all these services rendered so freely to the farming population, the Hon. Commissioner of Agriculture of the province of Quebec, in 1892, called the abbé to the Council of Agriculture, the members of which act as advisers to the Commissioner.

In 1894, at the time of the appointment of agricultural missionaries in the province of Quebec, he was one of the first named for the archi-diocese of Quebec, and although the reports of the missionaries make no mention of it, we fancy know from trustworthy sources that he was by no means unconnected with the work of the organisation of their association in 1894.

As it is clearly seen, this zealous priest, while discharging with the strictest punctuality his duties as priest and curé, never neglected devoting his rare moments of leisure to the advancement of agriculture.

The twenty-fifth anniversary of the ordination as priest of the Revd Theophile Montminy was celebrated with great solemnity by the parishioners of St-George's, on the 17th and 18th of September, 1895, and was the occasion of a great demonstration organized by the numerous friends whom the good and beloved curé reckoned among all classes of society in the province of Quebec.

From the year 1895, the health of M. Montminy, never very strong, kept on continually getting worse, and for that reason he passed the winter of 1898 at the Antilles, or West-India Islands, whence he returned with such an improvement in his health that his friends, for a moment, hoped that he had still a fairly long life before him. But Providence had decided otherwise. The abbé passed the early months of 1899 in preparing the plans, first, of a vestry, the work of which has been in progress since last summer, and next, of a church to be built immediately after the vestry. But this work was beyond his strength that had long been falling off. Finding himself seriously ill last September, he resigned his incumbency of St-George de la Beauce, which he had occupied for more than ten years, and betook himself to the house of the Sisters of Charity at Quebec.

It was there during his last few days frequently; it was on Sunday, December 12th, but after he had expired, merits which, do not pass the threshold of that

On the occasion of the Dairymen's Association Proposed by S. J. Roy and C. Seconded by Alexis Chicoine, That the Dairymen testify to the family it feels at the loss Begs to offer And that copies forwarded to the fi

The two above mentioned sessions at its session c

LAST SESSION

The session of the Fraserville Association.

The President.—I have my congratulations to the most intelligent people. I have no fear for those who are paying up and afford from time to time members.

M. I. J. A. M.—I thank you for your contribution.

M. Pouliot.—I thank you for your contribution if they are to be used.

M. Marsan.—I thank you for your contribution.

It was there, in that peaceful asylum, that he had chosen as his abode during his last few days, near many friends, whom he delighted in visiting frequently ; it was there that our Lord called him to Himself suddenly, on Sunday, December 17th, 1899, still comparatively young, as regard years, but after he had passed a life full of devotion and good deeds, a life full of merits which, doubtless, have caused him to find a glorious crown on the threshold of that celestial abode, where every life finds its supreme reward.

RESOLUTION OF SYMPATHY.

On the occasion of the death of M. D. O. Bourbeau, director of the Dairymen's Association for the Arthabaska district.

Proposed by M. J. A. Vaillancourt, J. B. A. Richard, Louis Labelle, S. J. Roy and Chs Prefontaine,

Seconded by MM. J. C. Chapais, J. de L. Taché, N. Garneau and Alexis Chicoine,

That the Dairymen's Association, at its annual convention, desiring to testify to the family of the late M. D. O. Bourbeau how great is the sympathy it feels at the lost of its regretted head,

Begs to offer to that family the expression of its respectful sympathy.

And that copies of this resolution be inserted in the annual report and forwarded to the family of the late M. D. O. Bourbeau and to the papers.

The two above resolutions were unanimously approved by the Convention at its session of Thursday, January 10th, 1901.

LAST SESSION, THURSDAY EVENING, JANUARY 10th.

The session opened, M. Vaillancourt in the chair.

The Fraserville Snow-shoe Club paid its respects to the Dairymen's Association.

The President.—Gentlemen, I am delighted to see you and to address my congratulations to you. As a rule, a snow-shoe club is composed of the most intelligent people of the town in which it is established. (Laughter.) I have no fear for the future of Fraserville when I look up the bright youths who are paying us a visit. I congratulate the club, whose object is to afford from time to time wholesome exercise and pleasant amusement for its members.

M. I. J. A. Marsan delivered a lecture on hoed crops, published further on.

DISCUSSION

M. Pouliot.—I should like to know if fish is a profitable manure, and if they are to be used alone or mixed with any other manure.

M. Marsan.—I am glad M. Pouliot called my attention to this point.

You are in a district highly favored as to manures, you have lots of varech (sea-weed) and plenty of fish. (1)

I have never made a fish-compost. The farmers of this locality can let you know better than I. You have a very valuable source of manure in these two things. Take care of every leaf of varech and every fin of fish on your shore. Fish put into the drills of potatoes do not produce the best results, but I should treat them thus : collect the weed and fish and mix them together in a heap with bog-earth, and use the stuff as a manure when it is rotted enough. This compost would contain phosphate, and you know that phosphate is excellent for potatoes. This manure should be made in the summer, would be finished in the fall and have to wait till the spring following to be applied to the land. I cannot give you any details about this kind of manure, except that I should spread it over the meadows after the hay was carried.

M. O. E. Dallaire gave his lecture on "The Cultivation of Green-Crops on dairy-farms;" the same observation applies.

MAGIC-LANTERN SLIDES, EXPLAINED BY M. J. C. CHAPAIS,
ON THE BACON-TRADE. (v. 18th Report).

The Chairman.—All who have subscribed a dollar will receive, during the year, the report of the Dairymen's Association. In this report will be published everything that has been said here.

Now, Gentlemen, our labors are over. I have only to express to you, in the name of the Dairymen's Association, my thanks. I thanked the Mayor this morning, I thank him again this evening in person of his secretary. The lecturers, too, I thank, who have aided us by their addresses. Lastly, I offer my thanks to the proprietors of the papers, "La Presse," "Le Journal," "The Star" and "The St-Laurent," who sent representatives to our convention.

We may well feel pleased with our meeting here, it has been a very good one, and I think it will yield a crop, for you have paid great attention to what was said. From beginning to end, you have listened like men who are anxious for instruction. I am highly pleased at having made your acquaintance, for I was remarking to myself this evening, and I think communicated my remark to some one: I have not seen a single rowdy (tapageur) since I have been here. I congratulate you, Gentlemen, on your really model town.

Our 19th convention then is finished, Gentlemen. We have only now to pray to Providence to preserve us until next year and, as I said last night, I trust before the century is far advanced, we shall return to you once more, until which time I leave you with: Au revoir. (Cheers.)

(1) *Varech* is the wreck alluded to by Shakspeare in the "Tempest" :

"And, like the baseless fabric of a vision,
"Leave not a wreck behind."

A small fish, the sprat, is used largely in Kent, Eng., for hops, at the rate of 120 bushels an acre, in the hills; cost, 12 cts a bushel. A.R.J.-F.

STATEMEN

ASSOCIATION :

Stationery, stamps,
By cash 16.....
By grant 24.....
Printing
By cash 16.....
By grant 24.....
Trav. exp. Director
By cash 16.....
By grant 24.....
Exp. of Convention
By cash 16.....
By grant 24.....
Purchase of books
and papers
By cash 16.....
By grant 24.....
Salaries grant.....

Balance

SYNDICATES :

Deficit July 1st '99
Cash 9.....
Travelling Exp.
E. Bourbeau Oct. 73.
J. A. Plamondan "
J. D. Leclair "
Sal. E. Bourbeau "
" J. A. Plamondan "
" J. D. Leclair "
Trav. local insp.
By grant 73.....
Boxes tests C. 185.

DAIRY SCHOOL :

Def. Jul. 1st 1899 C. 9
Suppl. for fact. C. 16
Water & c C. 16.....
Washing & c C. 6.....
Cost of office Oct. 125 8
C. 16.....
Salaries
Grant 125..... 211
Cash 188..... 41
Annuit. Col. Oct. 125 —
Annual charges " 12
Cost 190..... 1
Utensils, app. & c., C. 191
Cart milk Cs 195.....

General balance

STATEMENT OF RECEIPTS AND EXPENDITURE OF THE ASSOCIATION
Up to June 30th 1900. (Revenue for 1899-1900)

ASSOCIATION :	CR.	DR.
Stationery, stamps, &c.		
By cash 16.....\$337.29		
By grant 24..... 30.65	367.94	
Printing		
By cash 16..... 50.38		
By grant 24..... 353.05	403.42	
Trav. exp. Direction		
By cash 16..... 59.09		
By grant 24..... 125.00	183.09	
Exp. of Convention		
By cash 16..... 507.75		
By grant 24..... 167.40	675.15	
Purchase of books		
and papers		
By cash 16..... 36.79		
By grant 24..... 203.90	240.69	
Salaries grant.....	112.00	2991.30
Balance :	680.90	
<hr/>		
SYNDICATES :		
Deficit July 1st '99		
Cash 9.....	\$ 12.42	
Travelling Exp.		
E. Bourbeau Oct. 73. 365.72		
J. A. Plamondon " 458.63		
J. D. Leclair " 150.00	974.32	
Sal. E. Bourbeau " 600.00		
" J. A. Plamondon " 540.00		
" J. D. Leclair " 200.00	1340.00	
Trav. local insp.		
By grant 73.....	285.65	
Boxes teste C. 185.	33.50	2645.91
<hr/>		
DAIRY SCHOOL :		
Def. Jul. 1st 1899 C.9	286.98	
Suppl. for fact. C. 16	475.24	
Water &c C. 16.....	810.05	
Washing &c. C. 6.....	302.45	
Cost of office Oct. 125	83.00	
C. 16..... 95.86	178.86	
Salaries		
Grant 125..... 2115.66		
Cash 188..... 477.32	2592.98	
Annuity Col. Oct. 125	079.34	
Annual charges " 122.00		
Cost 190..... 13.50	133.50	
Utensils, app. &c., C. 191	1027.89	
Cart milk Cs 195.....	11879	1658.08
General balance :	237.38	
	12532.67	
<hr/>		
Bal. to Jul. 1st 1899 C. 9		417.62
Subscriptions 1838..... 23.00		
" 1899..... 963.00		
" 1900..... 237.00		
Cash 16.....	1223.00	
" Sale Cs 177..	10.00	
Sale Report C 16.....	21.58	
Quebec govern. grant.	2000.00	3672.20
<hr/>		
Grant of Quebec governt.		2600.00
Excess of expenses :	45.91	
<hr/>		
Summer 1899 C 189.....	1158.62	
Ottawa grant C 11 1000.00....		
" C 13 1000.00....	2000.00	
" Ice houses Cs 11.....	25.00	
Winter 1900 "	70.85	
Cash divers 13.....	6.00	
Prov. grant Oct. 125.....	3000.00	6260.47
<hr/>		
Examined and certified correct :		
J. A. Vaillancourt, J. C. Chapais, J. de L. Taché.		
St-Hyacinthe, Jan. 3rd 1901.		12532.67

CHAPPAIS
 have lots of varech
 this locality can let
 source of manure in
 every fin of fish on
 it produce the best
 and fish and mix
 as a manure when
 late, and you know
 could be made in the
 the spring follow-
 details about this
 meadows after the
 Cultivation of Green-
 CHAPPAIS,
 will receive, during
 this report will be
 to express to you,
 is. I thanked the
 in person of his
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 f the papers, "La
 aurent," who sent
 it has been a very
 id great attention
 ned like men who
 aving made your
 ing, and I think
 a single rowdy
 ntleman, on your
 We have only now
 I said last night,
 o you once more,
 rate of 120 bushels and

STATEMENT OF THE RECEIPTS AND EXPENDITURE OF THE ASSOCIATION

From July 1st, 1900 to January 3rd, 1901.

THE ASSOCIATION.		Bal. to Jul. 1st 1900 C. 17		634.99
Stationery, stamps, &c.,		Souscriptions 1899.	2.00	
By cash 21.....	157.56	“ 1900.	899.00	
By grant 25.....	5.00	“ 1901.	82.00	988.00
Printing Oct. 25.....	260.13	Sale of report. C. 21		10.95
Travell. of Direct. C. 21.	7.25	Divers cash 19....		5.50
Expens. of Conv. C. 21..	10.00	Que. gov. grant C. 25		825.11
Purchase of books, &c..	20.77			3464.55
Salaries grant.....	559.58			
	1020.69			
	<u>1443.86</u>			
SYNDICATES.		Government grant		
Travel. Exp.:		acct. 74.....		2315.41
E. Bourbeau Oct 24....	552.00			
J. D. Leclair “.....	288.50			
J. A. Plamondon “.....	310.91			1151.41
Salaries				
E. Bourbeau “.....	400.00			
J. D. Leclair “.....	400.00			
J. A. Plamondon “.....	360.00			1160.00
Printing.....	4.00			2315.41
SCHOOL.		Making, summer 189.....		718.53
Unc. bal. Jul. 1 1900 C. 17	397.61	Federal govern. C. 21.....	1000.00	
Supplies to factory “ 21	37.20	Making; winter.....	41.77	
Water, fuel, &c., C. 21.	204.49	Quebec government.....	1629.61	3439.96
Grant 126 “ “ 75.00	279.49			
Washing, &c., C. 21....	150.49			
Office expens. (80.40)..	58.00			
Grant 126.....	40.98			98.00
Salaries cash 188.....	517.62			
Grant 126.....	656.65			1174.27
Annuity Col. Oct. 126.	629.34			
Annual charg. Oct. 190.	111.00			
Utensils, &c., Oct. 180.	127.82			
Divers grant.....	32.19			3087.41
Balance.....	352.55			
Grand balance..	1796.41			
				8219.92
	8219.92			

Examined and found correct

J. A. VAILLANCOURT,
J. C. CHAPAIS,
J. DE L. TACHÉ.

St-Hyacinthe, January 3rd, 1901.

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2.17 634.99
 2.00
 899.00
 82.00 988.00
 10.95
 5.50
 825.11 3464.55

231541

..... 718.53
 1000.00
 41.77
 1629.61 3439.92

8219.92

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Supplement to the Nineteenth Report

OF THE

DAIRYMEN'S ASSOCIATION

OF THE

PROVINCE OF QUEBEC.

FIRST PART.

REVIEW

OF THE

ASSOCIATION'S WORK

FROM 1882 TO 1901.

NOTICE TO READER.

As the Dairymen's Association of the province of Quebec, pursuing its arduous task, finds the number of its members and friends increased, so it becomes more and more difficult to supply its new members with the earlier reports of the association, several numbers of which are at present exhausted. At the end of its twentieth year, at the very beginning of a new century, the association has determined to prepare a review of the transactions of the first twenty years of its existence, with a view to enable its members to combine in one volume the whole of its teaching.

It is in accordance with this decision that MM. Chapais, Richard, Moreux, Marsan and Dallaire laid before the Convention at Rivière du Loup, a certain number of essays, which, as mentioned in the report of that convention, form the matter of the annexed supplement. This supplement of 160 pages, comprises almost the whole of the lectures given during 20 years to our farmers, for their instruction in the systems of cropping best suited to the economical production of milk.

To the next report, after having finished what belongs to cropping, properly so called, the important subject of the treatment of cattle will be attacked, and after having dealt with the different breeds of milch-cows, essays will be published on the breeding and improvement of stock, its economical feeding, the production of the bacon-hog, &c.

The following year, the essays relating to dairying, properly so called, the study of milk, the making of butter and cheese, &c., will be reached.

And lastly, in the fourth report, will be presented the essays on rural economy, questions of trade, organisation, cooperation, &c.

Thus, as will be seen by what has preceded, this work of reviewing is considerable, and will extend over four conventions; the 19th., 20th., 21st. and 22nd; to possess it in its entirety, one must have been a subscriber to the association for the years 1901, 1902, 1903, 1904, and have preserved with great care the reports of these four years. Reviews will be published, as in this year, at the end of the report of the conventions, and the paging begun this year will be continued year by year; the reader must not then be surprised at seeing that all the numbers mentioned in the summary of "green fodder-crops" do not appear in this first part of the review; the second part, next year, will begin exactly with No. 173; and so it will go on every year, this work of necessity coming to a stand-still at the end of the last completed format.

Printed and paged thus, the four parts of this review will make a volume of at least 700 pages which will form a genuine Manual of dairying in the province of Quebec, at the end of the 19th century, and by that title will pose as a lofty monument raised by our Association.

THE SECRETARY OF THE DAIRYMEN'S ASSOCIATION.

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Review

Under this
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1. Mr. J. C. Cha
1886, pp. 44 et seq.
2. Mr. Louis Len
11 Rep. D. Ass., 1883
3. Mr. I. J. A. M
77 et seq.
4. Mr. E. A. Barr
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5. Dr. J. Fletcher
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7. Mr. Arthur R.]
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5. Agriculture and
6. Course of croppi
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SYSTEM OF CROPPING
ON A
DAIRY FARM
IN THE
PROVINCE OF QUEBEC.

Reviewed and condensed by M. J. C. Chapais

Under this head, the Dairymen's Association requested M. J. C. Chapais to be good enough to review and condense 8 lectures contained in some of its annual reports, and prepared as follows, by :

1. Mr. J. C. Chapais, assistant commissioner of dairying for the Dominion ; Vth. Dep. Ass., 1886, pp. 44 et seq.
2. Mr. Louis Lemire, former member of the Council of Agriculture of the Province of Quebec ; 11 Rep. D. Ass., 1883, pp. 103 et seq.
3. Mr. I. J. A. Marsan, prof. of Agriculture at the College of l'Assomption IV Rep., 1885 pp. 77 et seq.
4. Mr. E. A. Barnard, Director of Le Journal d'Agriculture of the Province of Quebec ; XIV Rep. D Ass., 1895 pp. 88 et seq.
5. Dr. J. Fletcher, botanist at the Experimental Farm, Ottawa ; XIII Rep. D. Ass., 1894 pp. 82 et seq.
6. Mr. Adélarde Baron, colonist, X Rep. D. Ass., 1891 pp. 162 et seq.
7. Mr. Arthur R. Jenner-Fust, editor of the Journal of Agriculture of the Province of Quebec ; XI Rep. D. Ass., 1892 pp. 212 et seq.
8. Mr. O. E. Dallaire, official lecturer of the Department of Agriculture of Quebec ; XVII Rep. D. Ass. 1898 pp. 123 et seq.

SUMMARY.

1. Introduction ; 2. Grain-Growing ; 3. Emigration ; 4. Breeding stock for the meat-market ; (M. J. C. Chapais, V Rep. D. Ass., 1886, pp. 44 et seq.
5. Agriculture and dairying. (M. J. L. Lemire, II Rep. D. Ass., 1883, pp. 103 et seq.
6. Course of cropping ; 7. Continuous cropping ; 8. Cropping with intervening meadows ;
9. Cropping with intervening pastures ; 10. Cropping with meadows and pastures. M. J. L. A. Marsan, IV Rep. D. Ass., 1885, pp. 77 et seq.

11. System of cropping for dairy-farms ; 12. Rotation of 12 years.
13. First limb, oats and pease ; 14. Second limb : hoed-crops with manure ; Potatoes ; 15. Fodder-corn. (M. J. C. Chapais, V Rep. D. Ass., 1886 pp. 43 et seq.)
16. Hoed-crops ; 17. How to triple our crops ; 18. The defects of our farming ; 19. The great and sole remedy ; 20. Four questions to be resolved ; 21. What hoed-crops is a poor farmer to grow ; 22. Some hoed-crops compared ; 23. Our chief crops compared ; 24. Pease, beans, and corn ; 25. Silage and hoed-crops compared ; 26. How many acres of hoed-crops should be grown every year ? 27. Possible crops on 60 arpents ; 28. Very profitable cleaning rotation ; 29. Table of the composition and value of crops to the arpent ; 30. Table of a 12 years rotation. (Mr. Ed. A. Barnard, XIV Rep. D. Ass., 1895 pp. 92 et seq.)
31. Third limb of the rotation ; 32. Clover ; 33. Fences ; 34. Fourth limb ; Crop of clover ; 35. Fifth limb ; wheat and grass seeds ; 36. Wheat ; 37. Grass-seeds ; 38. Meadows ; 39. Manuring meadows ; 40. Pastures. (M. J. C. Chapais, V Rep. D. Ass., 1886 pp. 46 et seq.)
41. Grass suited to cattle-food. (Mr. J. Fletcher, XIII Rep. D. Ass., 1894 pp. 82 et seq.)
42. The settler and dairying. (M. Adolphe Caron, X Rep. D. Ass., 1891 pp. 102 et seq.)
43. A rotation suitable to a dairy-farm. (Mr. Arthur R. Jenner-Fust, XI Rep. D. Ass., 1892 pp. 212 et seq.)
44. Objection to a rotation of crops having only dairying in view ; 45. Abstract of the crop ; 46. Valuation of the hay-crop ; 47. Complete table of the rotation ; 48. The production of milk ; 49. Money-value of the products ; 50. Law of restitution ; 51. Manures ; 52. Chemical value of dung ; 53. Chemical value of straw ; 54. Fertilising elements to be restored to the land ; 55. Capital invested in farming ; 56. Labour its cost ; 57. Manure from external quarters ; 58. Comparative value of fish, sea-weed, and dung ; 59. The working of the system ; 60. Necessary operations ; 61. Rules to be followed to obtain the demonstrated results ; 62. Cleaning the land ; 63. Water furrowing ; 64. Fences ; 65. Weeds ; 66. Selection of seeds ; 67. Ploughs &c. ; 68. Selection of cattle ; 69. Dung ; 70. Care of stock ; 71. Employment of the products ; 72. A word as to the chemical question ; (M. J. C. Chapais, V Rep. D. Ass., 1886 pp. 48 et seq.)
73. Economy in the production of milk ; 74. Silage ; 75. Ration of support and of production ; 76. Selection of milch-cows ; 77. On cooperation ; 78. On primary education. (Mr. O. El Dallaire, XVII Rep. D. Ass., pp. 123 et seq.)

I.—INTRODUCTION.

The province of Quebec is, by the geographical position which it occupies, in climatic conditions totally different from those of the other provinces of Canada. This difference of climate has a great influence upon its agriculture. I have had an opportunity of proving, by my own experience, what an enormous difference exists, concerning farming operations, between those provinces and ours. Thus, our province sees, its operations commence in spring time at least three weeks later than they have commenced in the west. The late spring frosts are often felt here in June, and this to a degree sufficient to compromise the prospect of the harvest ; moreover, towards the end of August or the commencement of September, early fall frosts occur which ruin the crop at the moment it is just ripening, as happened in 1885, which was a year of scarcity for the province of Quebec. Lastly, severe frosts sometimes take place in October, at the time the crops are scarcely housed, and leave the farmer no time to do his fall ploughing. For all these reasons it happens that the farmer who devotes himself to the

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2.—RAISING OF GRAIN CROPS

which, up to the last years, was the great, the principal, farming business of everybody, finds himself, owing to a lingering spring time, with an immense area to till, before he can entrust his seed to the earth. Late sowings are the results of this, (I have seen wheat sowed on the 28th of June,) and as a consequence, crops which the early autumn frosts find yet unripe, and injure more or less, but almost always to a certainty. Hence follow bad crops from year to year, the impoverishment of the farmer, who finally comes to the conclusion that agriculture does not pay, and becomes disgusted with his calling. In the end, crowds of farmers, and especially of farmers' sons, abandon farming and go in quest of what they think easier and better paying work, in the factories and workshops of the United-States. To the disadvantage caused by the climate, which I have mentioned above, is added, owing to the numerous and disastrous.

3.—EMIGRATION

of our rural population, a scarcity of labor. To-day, this labor commands an extravagant price, and the farmer who must use the services of others, sees his poor and scanty profits go to pay for this hired help, which he can only get at an exorbitant cost. Struck by this state of things, I asked myself, as several others have done, whether there was no way to adopt a system of cultivation other than the old routine and the ruinous system of grain crops upon grain crops, which has been practised for so many years past in our province. Some practical farmers have sought to replace this system by a plan of cultivation having for its aim the

4.—RAISING OF CATTLE FOR THE MARKET

but they have not succeeded in faring any better. I will tell you, in a few words, the reason of it. In our province, the wintering of cattle commences virtually on the 15th of October, and only ends on the first of June. By wintering, I mean here the time during which cattle must be fed in the stable. Now, it is no exaggeration to say that the cattle pass seven months and a half completely in the stable, and must also receive at least one meal in the stable every day during the first fifteen days they go to pasture, from the 1st to the 15th of June, and the last fifteen days they pass there, from the 1st to the 15th of October. This makes nearly eight months of permanent and costly stabling out of twelve.

The system followed by farmers who wish to breed cattle for the markets consists in raising cattle to the age of two years and a half as best they can,

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1894 pp. 82 et seq.)
891 pp. 102 et seq.)
, XI Rep. D. Ass., 1892

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68, Ploughs &c. ; 69,
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and then send them to the cattle dealer who prepares them for the slaughter house. Let us now see, for a moment, what is the cost of raising an animal of two years and a half, and what price it brings :

The calf, on calving, is worth	\$ 1 00
During the first summer it drink milk for	3 00
In the first summer's pasturage, it drinks for the value of	0 60
During the first winter it eats 100 bundles of hay worth at a low price	3 00
During the second winter its pasturage costs	2 00
The second winter it eats 150 bundles of hay worth at \$3 a hundred	4 50
In its third year's pasturage it eats for the value of	4 00
<hr/>	
Making a total cost at two years and a half, of	\$18 10
At which age it sells for	15 00
<hr/>	
Leaving a deficit of	\$ 3 10

These are the average prices. They show plainly that whoever expects to improve his farming and get better profit from it by this system, is mistaken.

In fact we cannot make any profit out of cattle raising upon sales of this kind, because they cost too much and sell too cheap. These low prices are due to the ruinous competition we have to maintain in the markets against the cattle raisers of the western prairies, who can sell their meat at a profit in the market for 4 cents a pound. They have no stabling for their cattle, which pass the winter in the open air on the prairies. The cattle breed by themselves, and live there until they are three years old. Then they are picked out and taken to some great central place, where they are fattened on Indian corn for some weeks, and put on the market at \$4.00 per hundreds pounds, which is almost all clear profit for the owner. Even had we large cattle it would be utterly impossible for us to struggle against this competition. The proportion of loss or the cost of wintering would still be the same.

We must then seek something else, for it is clearly proved that neither the growing of grain crops nor cattle raising for the meat market can pay. There remains farming in view of the dairying industry, that is, having for its principal aim, the production of milk, butter and cheese. After going all through the Province of Quebec, and taking the figures of the best practical farmers, I have come to the conclusion, and this is in keeping with my own experience, that the only style of farming to be followed in the eastern part of the Province of Quebec is the style of farming suited to the dairy industry which I am now about to explain to you.

And in order to show that dairying is as valuable as we assert it to be, we reproduce here the testimony of M. L. Lemire of La Baie du Fevre, one of the best known, most practical, most enterprising of our farmers, and for several years a member of the Council of Agriculture of the Province of Quebec.

After a few in things that he has lows :

Let us fir ducted in the cheeseries. T deal was sown son, floods, &

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The other farms, combin less treatment one saw in eac less backward made ; but eve &c., were far markets. A h was looked upo especially after returns, particu grain, but worr weeds, the yield deeply in debt others, taking t the States. Of economy, succe few of them wh

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(1) The late Juc on a certain field at 5 years running. " A.R

5.—AGRICULTURE AND DAIRYING.

After a few introductory words, in which he states that he shall "speak of nothing except of things that he has seen and had personal knowledge of", Mr. Lemire begins his address as follows :

Let us first of all, cast a glance over the state of farming as it was conducted in the Province of Quebec, about 1872, before the institution of cheeseries. The situation may be defined in a very few words ; A great deal was sown and but little reaped, and dissatisfied with the result, the season, floods, &c., were blamed for it.

Two causes were the chief contributors to the exhaustion of the farms in the long settled districts on the St. Laurence. The former was over cropping ; grain after grain for 10, 20 and even 30 years, until the land was utterly worn-out (1).

The other cause, and the principal one, was, the few cattle kept on the farms, combined with the little care taken of those few, together with the careless treatment of the trifle of dung that was made. Exceptions there were ; one saw in each parish, (at least in those I had the chance to visit) a few less backward farmers who took care of their cattle and of the dung they made ; but even to them, the returns made by the sale of the animals, butter, &c., were far from satisfactory, particularly if they were far from the markets. A hundred dollars from the sale of butter ; the yield of ten cows was looked upon as satisfactory. Very little gain flowed from the sheep, especially after the outbreak of certain complaints in the flocks. The chief returns, particularly as regards hard-cash, were derived from the sales of grain, but worn-out by so absurd a rotation, bothered by no end of root-weeds, the yield from the land grew less and less ; many farmers got more deeply in debt every year ; several sold their farms and went elsewhere, and others, taking their families with them, sought the manufacturing cities of the States. Of course there were some who, by dint of hard work and strict economy, succeed in saving a few dollars every year, but there were very few of them who did so.

The agricultural societies, the Council of Agriculture, of which I was a member, with the assistance of the "Journal d'Agriculture", rendered immense assistance to our agricultural population.

But the whole system of encouragement has always been limited to the most advanced of our farmers. He who could not compete in the first, second or third rank, never dreamt of profiting by the advantage that the efforts of our agricultural societies might realise for him, and remained in the usual of routine.

(1) The late Judge Ramsay's farmer told me, when I complained that nothing would grow on a certain field at St. Hugues, that "It was no wonder, as he himself had sown oats on it for 22 years running." A.R.J.-F.

Then, dairying appeared on the scene, and the most encouraging results followed. This industry is truly worthy of attention by all earnest-minded men, and promises to furnish farmers with a principal source of revenue, while at the same time it improves the land and increases the income from other sources.

Allow me, Gentlemen, to describe briefly to you the establishment of cheeseries in our parish.

The first attempt in La Baie du Febvre took place in 1875. The affair was not known to every one, so very few farmers took their milk to the factory; they had all sorts of reasons for keeping their milk at home and making butter from it. Still, those who tried the cheesery were very well pleased with the results; they compared the returns from butter and those from cheese and the advantage was with the latter. The first year, only 12,000 lbs. of cheese were made; the following year, alterations made by the proprietor in the conditions about the milk, prevented a great number of farmers from patronising the factory; still, the result was very good; no more cheese was made, but some new patrons decided to take their milk to the following year. In 1877, only 17,000 lbs. of cheese was made, but still the profits to the patrons were decent. As butter sold badly that year, about all the farmers made up their minds to take their milk the next year to the cheesery; so that from 17,000 lbs. the figures rose to 108,000 lbs. in 1878.

Cheese fetched lower prices than in the preceding year, in spite of which every one was so well pleased with the working of the factory that four were established for the year 1879, in which 220,000 lbs. of cheese were made; in 1880, 275,000, and in 1881, 370,000. In 1882, though there more factories were at work, and, being near the boundaries of the parish took away a good deal of the milk from our four, 360,000 lbs. were made, and in the season just over there will have been turned out about 400,000 lbs.

This fairly rapid progress is chiefly due to the improvements made by individuals in their farming and in the feeding of their cows.

Since our cheeseries started, every year after the closing of the factories, the secretary-treasurer of each presents his accounts to a general meeting of all the patrons, and gives a detailed statement of the quantity of milk furnished by each, mentioning, as nearly as possible, the number of cows kept by each patron. These compulsory comparisons are productive of much good; they serve to show clearly the progress of each farmer, and create a healthy emulation, as every one tries to beat his neighbour. In order to do this, not only do they feed their cows better, but they sow grass-seeds in the fields intended for pasture, and manure the land. The fields are now divided into two and even three parts; and that the cattle may always have fresh and tender grass, they shift them from one enclosure to another; they

leave them one good root, and know a farmer only ten years: milk than ten y 13 cows grazed there was enough, wishing to of food during give as "green carrots, mangel fall.

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leave them one year in meadow so that the grass may have a chance to take good root, and thus the quantity of grass becomes more than doubled. I know a farmer who, in the same fields in which he used to graze 8 cows, only ten years ago, now grazes 18, and strange to say, each cow gives more milk than ten years ago. I saw in a field of 11 acres, divided into two parts, 13 cows grazed from the end of May to the beginning of September, and there was enough grass to enable them to give plenty of milk. Several farmers, wishing to increase the number of their cows and yet not stint them of food during the season, have some corn, or oats and vetches mixed, to give as "green meat" when the grass becomes scanty. Many are sowing carrots, mangels, &c., for their cows to keep up their milk longer in the fall.

As all these improvements require lots of manure, much greater care is devoted to the dung that formerly ; it is put under sheds instead of being left exposed to the changes of the weather. To get the greatest quantity possible of it, the cows are almost invariably wintered in the house, only being allowed to leave it when the weather is favorable, and even then only to get exercise. Care is taken that they have plenty of litter to absorb the urine and kept them clean ; pains are taken to spend the dung in spring instead of allowing it to pass the summer exposed to the sun and rain ; but if it cannot all be used in the spring, it is laid up in heaps as early as possible, that it may rot a little without losing much of its constituents, and it is then used for dressing the meadows as soon as the hay is carried, or spread in a light coat on the pastures.

If a great many cows are to be kept, more meadows and pastures must be laid down ; less grain of course is sown, but as the preparation for it is better, as much as before is harvested.

Whatever tends to promote dairying, serves to promote the progress of agriculture. The meetings, needed to carry on the business give rise to discussions on the different improvements to be introduced ; each man delivers his opinion, and the rest profit by the discussions.

Thus, by these means, great progress in the care of cattle has been made. I saw, in many cow-houses, cows as fat in March as they were in the fall, and that without greater expense, and with less trouble than in the days where they used to be so badly wintered.

I do not mean to say that things have yet reached perfection, but I find a great progress has been attained, and I trust to see it developed more and more. Already, it is not uncommon to see cows returning a revenue of \$50,000 a year. I could name several farmers whose cows average \$30.00 to \$40.00 each, and that solely for the milk sent to the factory and with herds of 10 to 20 cows ; if one adds the value of the calves, of the butter made after the cheese-season is over and of the whey, I am convinced that many farmers

would average a return of \$50.00 a cow over the whole herd. Did we consider, too, the improvement of the land by the greater quantity of manure made and better managed, by the benefit of the rich pastures produced, one would feel satisfied that dairying, in this province, is the most certain basis of the progress of agriculture and of the prosperity of the farmer; it returns more money with less labour. How many people are there who, before they took to the production of milk, sank deeper and deeper into debt every year, and who, to-day, have discharged their indebtedness, and besides, have made fairly considerable savings.

Considering it now as proved that dairying is the remedy that can heal the sores of agriculture, we are about first, in agreement with the system of cropping that we have to prepare, to consider a question that comprehends everything for him who, in dairying, as in every other branch of farming, desires to succeed, that of *rotation*, the basis of every part of agriculture as properly understood. It is treated at length in the following essay by M. J. A. Marsan, a former professor many a long year at the l'Assomption College of Agriculture.

6.—ASSOLEMENTS (DIVISIONS).

I

A *rotation* or *course of cropping* is the succession of the plants that follow on the same land, during the period of years at the end of which the same succession of crops is grown in a constant order, which enables the soil to produce as much as possible without loss of fertility, and sometimes even regaining that which it has lost by too long a series of exhaustive crops. (1)

L'Assolement, which in common parlance, is often confounded with "rotation," means the division of the farm into equal parts, corresponding in number with the years the rotation comprises. Thus, the assollement cannot exist without the rotation, but the rotation can exist without the assollement, each of the crops comprised in the rotation has to pass over each of the *soles* or divisions of the farms. As the words rotation express it, it is a turn of the wheel. (*Tour de roue.*)

The practice, like the laws of the *assollement*, is, unfortunately, of all things the least understood and the least obeyed by the majority of our farmers; it is in this, truly, that the chief backwardness of our farming consists. The solution of a good *assollement* should be the first occupation of a man who undertakes the exploitation of a farm, since in the solution depends its success or its failure.

(1) *Assollement* is, according to the best dictionaries within our reach "the distribution of crops," Perhaps, *shift* or *lumb* would best express it. A. R. J.-F.

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But to select a good course of cropping, suitable to the soil and favourable to the production of milk, it is necessary to be thoroughly acquainted with the properties and needs of the different kinds of soil (*a*), as well as the wants of the various kinds of plants (*b*) that are to compose the rotation.

So it will not be without utility if we go over summarily the agronomic principles that govern the assolements.

(*a*) Every soil under cultivation must be, first of all, thoroughly got into condition, if it is desired to derive from it all the produce it is capable of yielding.

Clay-soils must be ploughed more frequently, and deeper, than light soils; more heavily manured and at longer intervals.

Land with impermeable subsoils are to be subsoil-ploughed.

Dry sands must be ploughed as seldom as possible, and manured in moderate doses and frequently.

Cold sands, full of rust, must be stirred more frequently, as the action of the air on the rust causes the production of ammonia, which is the most beneficial element of all plant-foods; on the other hand, the oxidation of the protoxide of iron by exposure to the air, makes them lose their natural humidity and their cold and poor character. They may receive heavier dressings of manure, especially of hot dung (horse-dung &c.) Lime improves them greatly, as does the cultivation of roots with dung, potatoes, &c.

On dry sandy soils, sow preferentially corn, potatoes, rye, buckwheat and sheep-pastures. Cooler sands do better with oats than with rye.

Loams bear roots, oats, temporary meadows and pastures.

Calcareous or friable *terres grises*, prefer wheat and fodder-crops; *rusty* and *white clays*, on which only pease are generally sown, ought to be dressed with strawy or turfy manure and after being well worked, sown down with clover followed by *goudriole*, i. e., pease and oats mixed.

As a rule, every pains should be taken on every kind of land to grow as many acres as possible of roots or hoed-crops, if the means and the supply of labour permit; for the extensive growth of roots, for cattle-food is the basis of all improvement of the land and cattle, and of profitable farming.

Rich and fertile land can carry a larger share of exhausting crops; contrary wise, poor or easily worn-out land should be made to bear a larger proportion of restorative crops.

Durable meadows, laid down for long periods that is, should be made on the best marly or alluvial soils, in alternation, at long intervals, with wheat and roots or other hoed-crops.

Rocky, high-lying, broken soils, are used as permanent pastures, and should be taken great care of as regards mendments, &c.

(b) *As to plants*, their demands upon the land, as well as their effects upon it, vary very much.

Some derive all their food from the earth and leave in the soil after harvest nothing but a very trifling part of the substances they have extracted from it ; they therefore impoverish the land, and are therefore called exhausting-crops. They are, in the first rank, wheat, barley, oats, and other grains ; then come root-crops when they are not properly cultivated ; therefore, those should not succeed one the other or each itself, and should not re-appear on the same piece except at long intervals. Most of the grains, especially wheat, favour the growth of weeds, and are therefore called *befouling* crops ; whence arises another motive for not sowing them often on the same land.

Other plants have the property of sparing the soil and of resting it ; they are those that take but little food from it ; such as grains cut green, before the seed is formed, timothy-meadows, &c., buckwheat, and pease and other leguminous plants, even when they are well podded and full of vegetation.

The crops that improve the land and are therefore known as *ameliorating* crops, are those that restore by their remains as much as they take from the soil, or improve it by the dung they receive or the cultivation that is given them ; as does clover, if it takes well, in any soil, since it borrows through the micro-organisms the free nitrogen of the air and returns through its roots to the ground more of the principles than it took from it ; the same with potatoes, carrots, mangels, beans, when they are well manured and cultivated ; corn, too, grown for its grain, although of an exhaustive nature, may still be considered as an ameliorant, when it is well work and heavily dunged.

The growth of roots, besides the effects of the manure they receive which ought to be perceptible through the whole rotation, have peculiar ameliorating properties, on account of the deep ploughing and the thorough working of the land, the harrowing, hoeings and other acts of husbandry given to them. Well manured potatoes occupy the first rank of these.

The arable couch is considerably aerated, enriched, cleaned and increased ; the grain and fodder-crops that succeed them are freer from weeds, plunge their roots more deeply into the soil and with greater ease, and their rootlets extracts a greater mass of nutriment from a far wider range, whence they derive and yield to the farmer more abundant crops of grain, straw and hay.

Clover succeeding a root-crop thrusts out strong and deep roots, that not only produce large crops of hay, but whose remains in the soil constitute a manure that supports its fertility to the profit of the succeeding crops. So we say, with truth, that grass produces grass.

The physical nature of these crops ; but in the better nature, in the better nature, if it is a clay it does not profit, leaving the peace and clover once in 4 or 5 years.

Now the function of cropping is always green-fodder, pease or *ameliorating*.

Generally, even by a fallow, follow pasture, and lastly

If the meadow may follow : one to the soil and climate.

Thus, the most province will be : low or pasture or

As to the relation of a mixed system of meadows and pastures and roots should occur.

But as soon as grow a lot of moss, and it becomes too every year only $\frac{1}{4}$ autumn. Then a piece sown down with grass.

Calculations made above proportions, for stock, and even more 90 arpents of fairly after deducting the

(1) *Meslin*, (*mêler*, to mix) and pulse. A. R. J. F.

(2) Four arpents a

The physical properties of the soil are also considerably improved by these crops ; becoming better aerated, more porous, more retentive of moisture, in the better resists the effects of drought and over-abundant rains ; if it is a clay it does not harden so soon. Still, among the ameliorating fodder-plants, there are several that rapidly *cloy* or *satiate* the land and cease to profit, leaving the soil in a worn-out state apparently, among others are pease and clover which should never be sown on the same land more than once in 4 or 5 years.

Now the fundamental rule to be followed in arranging a system of cropping is always to make a *cleaning* or *smothering* crop, such as roots, green-fodder, pease or buckwheat, succeed a *befouling* crop, and an *enriching* or *ameliorating* crop succeed an *impoverishing* one.

Generally, every rotation should begin by a well worked hoed-crop, or by a fallow, followed by a grain-crop, then laid down to grass, meadow or pasture, and lastly, another crop of grain or *meslin* or pease. (1)

If the meadow or pasture has stood several years, two consecutive crops may follow : one of wheat or oats, and then pease or buckwheat, according to the soil and climate.

Thus, the most rational alternation for most of the arable land of the province will be : manured roots or maize cut green, grain, grasses, meadow or pasture or the two together, grasses or pulse, or grain and pulse.

As to the relative proportions of the different crops that should compose a mixed system for stock, both theory and practice teach us that meadows and pastures should occupy at least $\frac{2}{3}$ of the farm, while grain, pulse and roots should occupy the remainder.

But as soon as the land yields heavily of hay and grass, and does not grow a lot of moss, or get hard ; or when labour is high or difficult to find, and it becomes too costly to grow roots, it may be found sufficient to plough every year only $\frac{1}{4}$ of the land and give the dung to the meadows in early autumn. Then a pulse-crop will succeed the turf, after which a grain-crop sown down with grass seeds.

Calculations made for my own information prove that with crops in the above proportions, four *arpents* will (2) easily maintain one head of horned-stock, and even more. A good farmer, under ordinary circumstances, with 40 *arpents* of fairly good land, may, in the general run of seasons, &c., after deducting the keep of his household, sell \$800.00 worth of the pro-

(1) *Meslin*, (*mêler*, to mix) is still used in Yorkshire, England, to denote a mixture of grain and pulse. A. R. J. F.

(2) Four *arpents* are about $3\frac{1}{2}$ acres. A. R. J.-F.

duce of his farm. I give you these figures to do what you like with, only stating that they are founded on average yields, leaving a wide margin for higher returns attaining easily \$1,000.00 to \$2,000.00, if we suppose the cattle to be of good breeds, the cows good milkers, an improved system of cultivation practised, the land and management first rate, and, I must add, a silo filled every year.

II

I have now reached the practical part of my subject, i. e., the application of the above principles, into plans or formula of shifts. These I divide into four classes : 1. Shifts of continous crops ; 2. With meadows ; 3. With pastures ; 4. With both meadows and pastures.

These shifts are for short terms and pre-suppose meadows and pastures in other parts of the farm. They suit heavy land or light land of good quality, deep in staple and well water-furrowed, such as heavy and light loams with lime and calcareous clays.

Example—1st year,—root—manured—for cattle ;
2nd “ barley or wheat or both ;
3rd and 4th year—clover—or a mixture of clover and vetches ;
5th year—wheat, or meslin, or oats according to soil.

This course is ameliorating, since 3 of its crops are so, against two that are impoverishing. This is the “Norfolk course” (1) in England, and has made the fortune of crowds of English farmers. It can only be carried out in Canada on part of the farm. If the clover is to be mowed the limbs need not be separated by fences.

8.—COURSES WITH MEADOWS

6—year course with meadow hayed, for light loam where the grass will not stand mowing for long :

Example—1st year—roots, potatoes, corn, manure ;
2nd “ barley or wheat, if it can be sown early ; red-clover and timothy.
3rd, 4th, 5th—year—meadow.
8th year—grain, by preference oats ;

(1) The Norfolk or emphatically, the 4 yrs rotation is simply this : roots, barley, seeds, wheat. Now that the clover is found to fail if so often repeted, it is converted into a 8 or even a 2—year course; in this, pease, on light, and horse-beans on heavy land, take the place of clover in the 7th year, and trefoil in the eleventh year. Scotland has quite a different course, in which the seeds lie down two and sometimes three years. *Gaudriole* (*meslin*) should be *goudriole* ; the former means *chanson grivoise*, and the latter is a *patois* and, non-apparent in my dictionary. A. R. J.-F.

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Another for loam, calcareous, or terre grise, a light alluvial soil :

Example—1st year—hoed-crop ;
 2nd “ barley ;
 3rd, 4th, 5th, 6th—year—or longer if the land continues to yield good crops of hay, meadows ;
 7th year—wheat ;
 8th “ meslin or oats.

Another rotation for good mellow land of less extent fit for all sorts of root-crops near the house, with flax :

Example—1st year—different vegetables, or fodder-crops, with dung ;
 2nd “ wheat ;
 3rd, 4th year—or more—meadow ;
 5th year—flax.

9.—ROTATIONS WITH PASTURES.

These are especially suitable to light soils, too dry, or for clays, too poor for hay ; or for any other soils where there are good permanent meadows not in rotations.

For dry sands :

Example—1st year—potatoes or corn, both manured, with mendments ; (1)
 2nd “ rye, with pasture-grasses ;
 3rd, 4th, 5th year—pasture, especially for sheep ;
 6th year—rye or oats, or buckwheat if the sand is not too dry.

Another without manure, with a fallow:

Example.—1st year,—buckwheat ploughed in green with mendment of clay, if possible; for the 1st year alone. (1)
 2nd year,—rye ;
 3rd, 4th, 6th year,—pasture (if there is any); a light top-dressing of dung in the fall of the last year, before ploughing;
 6th year,—potatoes or corn. Then, this rotation will be one of 5 years: grain, three *pacages* or pastures, and potatoes. Still, if the turf is prolific, the *pacages* may be kept 4 years with advantage.

The French “*amendement*” answers exactly to the S.E. of England “*mendment*”, meaning a dressing of lime, turf, marl, &c., things that have a mechanical effect on the soil but are not, strictly speaking, manures.—A. R. J.-F.

In dry sands, potatoes and corn do better on "friche" than on stubble.

In moister sands, and in mild loamy sands, oats takes the place of rye, and a little clover and orchard-grass should be mixed with the grass-seeds. If the land and the grass-growing properties permit, 4 years grazing would be better than three, and after the grain-crop following the pasture, pulse or buckwheat might be sown.

Example.—1st year,—potatoes and corn;
2nd year,—oats;
3rd, 4th 5th 6th year,—cow- pasture;
7th year,—oats ;
8th year,—pease or buckwheat.

As an illustration of the value of these examples of rotation that I have just pointed out for sands, allow me to offer the testimony of some facts, among a thousand which are within my personal knowledge.

"On the southern bank of the little stream, the Achigan, in the parish of St-Lin, L'Assomption county, lies a great expanse of sandy land, formerly covered with pine, hemlock and red-spruce. Many farms in this district belong to Scotsmen, who work the land in a wise rotation suited to the soil: potatoes and corn, dunged, followed by a single crop of grain, and then meadow and pasture. They breed good herds of cows, pigs and sheep, and get off their farms as much produce as, if not more than, the habitants on the opposite bank, who own the finest calcareous clay soils of the province, as rich as the land of St-Hugues, in the fertile valley of the Yamaska. It was one of the proprietors of these iron-sand farms, Mr J.H. Lloyd, who, in 1884, won, with ease, the first prize at the competition for the best cultivated farms in L'Assomption county. These farmers take pains to increase the quantity, and improve the quality of the dung made by their cattle, an essential condition of success on sandy land.

"If it would not weary you, I should like to quote another even more striking instance. Several years ago, a Scots farmer had a rather pretty farm on the banks of the river of Lac Ouareau, at the entrance to the Canton of Rawdon, county of Montcalm ; the soil was light and undulating, formed in part by alluvium of the river. A very pleasant sight did this farm present to the passer-by in summer ; good meadows, green pastures, fine potatoes, rich grain-crops, and a charming herd of Ayrshires. The family, too, seemed to be quite well off. A young Canadian, with some capital, seeing in what a productive state the farm was, thought it a good chance and bought it. In his ignorance of the soil and the proper way to work it, he did as all his people were doing ; he ploughed up everything, sowed oats—no roots, no grass-seeds,—kept but little stock, and that of inferior quality. What was the result ? After a few years, getting out of heart, he sold, at a loss, that farm which he had exhausted and which refused to provide him with a subsistence. Why was this the sad end ?

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"The old proprietor followed an ameliorating rotation: manured roots, grain, meadow, pasture, grain; made lots of dung, took care of it, and the farm, without getting the worse for it, always paid him well for his pains.

"The second broke through the rotation, grew grain after grain, made but little dung and treated it badly, wore out his land, and in few years found himself without pasture, and ruined. There, Gentlemen, you have as a support to my theory the unbending teaching of irrefutable facts."

There is, too, another kind of soil where neither grass nor hay can be persuaded to grow without an appropriate ameliorating rotation: I mean the white clays, which most of the time only give poor crops of pease if dressed with plaster. This sort of rotation suits them:

Example—1st year,—summer-fallow, or green-crop ploughed in, or better, if possible, manured corn cut green, after a deep fall ploughing, and a second furrow in the spring with dung;
2nd year,—oats with clover and pasture-grass;
3d, 4th, 5th year—pasture; but, if there is plenty of stuff on it the first year, it may be mown for hay if that is wanted more than pasture;
6th year,—meslin or pease.

A capital mendment for this sort of soil is a mixture of turf with lime or marl.

"In support of these statements let us bear in mind the example of M. Timothé Brodeur, of St-Hugues, who tells us that on this white soil he grew a capital crop of fodder-corn for his stock.

"Another important case of successful farming on an inferior white clay soil: When M. l'abbé Brassard, the venerable pioneer of Mantawa of St-Maurice, was curé of Ste-Elisabeth, Joliette county, he bought, for a mere song, one of those poor white clay farms, that one of his parishioners had abandoned, because he could no longer make his living out of it. The venerable curé, being well-skilled in agriculture and devoted alike to the spiritual and temporal interests of his people, resolved to set them an example that might serve as a lesson to them. In spite of the observations more or less sarcastic and malicious that were lavished upon him, he got his sticky land (*terre de mastic*) ploughed by means of hired labour (*corvée*), and having well worked it with the harrows, till it was a perfect dust-heap, he sowed it with grain seeding it down with timoty and clover. Fortunately, the season was favorable to the clover, which took well; the grain crop, too, was abundant. The following year, the clover having been plastered, seemed like a vast meadow in the astonished eyes of the neighbours, and for several years, M. Brassard fattened on this once reputed sterile land, herds of bullocks that he sold for good prices, harvesting heavy crops of grain on the pastures that he broke up after they came in turn. Still, this striking example was not invariably followed, for in this, as in several other white-clay districts, ma-

ny farmers even now grow nothing but pease, which they persuade to grow by plaster, in spite of the constant exhaustion of the soil, burning, too often, the haulm (*pesats*) on the field, instead of drawing it home for sheep-food.

“And as regard this last crime, I must say that the legislature ought to pass a law inflicting punishment on all who are guilty of such acts of profligate extravagance”.

10.—ROTATION WITH MEADOWS AND PASTURES.

For farms supposed to be entirely composed of land strong enough and moist enough to grow hay without a great deal of dung, calcareous clay loams, or calcareous sandy loams; good land, friable, sound and grass-growing:

Example—1st years,—hoed-crop, dung;
2nd year,—barley and wheat;
3th, 4th, 5th years,—meadow;
6th, 7th, 8th years,—pasture;
9th years,—pease and oats. (gabourage or goudriole).

This rotation is usually the best, but it is not always easy to practise it on average soils that need a greater dressing of dung than can be supplied to the 9th of the farm by the stock it is able to feed. There will not be more than 20 to 25 loads of dung to the *arpent*, while such soils will not yield full crops of roots and other vegetables, except with a dressing of from 50 to 75 loads to the arpent (58 to 87 loads to the imperial acre:)

Another example for “terres jaunes”, moist, given to grow moss, and needing improvement:

Example—1st years,—roots, dung;
2nd years,—grain;
3d, 4th years,—red-clover;
5th years,—wheat, in an early seed-time;
6th, 7th, 8th years,—pasture;
9th years,—gabourage, pease and oats.

This rotation is not complete; it needs a few additional arpents in timothy for the horses.

It may be modified as follows, on heavier soils, better suited to grow hay:

Example—1st year,—hoed crop;
2nd year,—grain;
3d, 4th, 5th year,—timothy and clover meadow;
6th years,—grain;
7th, 8th, 9th, 10th year,—pasture;
11th year,—grain;
12th year,—pulse or buckwheat.

At l'Assor made to manur cess, this rotati

Example—1st year,
2nd year
3d, 4th,
7th years
8th, 9th,
12th year

The soil is and damp which butter-cups, and plenty of roots high, 42 lbs. to up meadow or p arpent, hay has grew 4,800 *min* of horned stock

Rotation wi

Example—1st year,—
2nd year,—
3rd, 4th, 5
6th, 7th ye

The dung, i first year.

Observations roots well-dunge pulse-crop on the soils it is often b which is to be ag

Wheat does toes than after n

Rye and whi other crop. We such as is used in

Potatoes do l covered with hard potatoes, rye, and

Pastures, per intervening, are o damp, and in orde by stock in the fal

At l'Assomption, on the Portage farm, where is only dung enough made to manure the 12th part of the rotation, we follow, with great success, this rotation :

Example—1st year,—hoed-crops ; potatoes, carrots and mangels, or fodder-corn ;
 2nd years,—barley or wheat ;
 3d, 4th, 5th, 6th years,—meadow ;
 7th years,—oats ;
 8th, 9th, 10th, 11th year,—pasture ;
 12th year,—gabourage.

The soil is a fine alluvial sand, rusty, retentive, and consequently cold and damp which, left to nature, only produces sorrel, couch-grass, fox-tail, butter-cups, and white ox-eyed daisies; but, with the above rotation, we grow plenty of roots, &c., clean, heavy, and wholesome grain ; oats four feet high, 42 lbs. to the *minot* (39 litres, equal to $8\frac{1}{2}$ gallons, imp.) on broken-up meadow or pasture. After potatoes, we have grown 48 minots to the arpent, hay has yielded 200 to 300 bottles to the *arpent*, and last year we grew 4,800 *minots* of roots, &c. ; so that on this farm we can keep one head of horned stock to every four arpents.

Rotation without roots for good hay-land:

Example—1st year,—pease after pacage;
 2nd year,—grain;
 3rd, 4th, 5th year,—meadow;
 6th, 7th year,—pasture.

The dung, if there is any, is applied to the meadows in the fall of the first year.

Observations.—In rotations, including meadows or pastures, without roots well-dunged, two consecutive grain-crops are not permissible, but a pulse-crop on the *couenne*, and then a grain-crop with grass-seeds. In light soils it is often better to sow only one grain-crop after meadow or pasture which is to be again laid down to grass.

Wheat does better and yields a third more grain and straw after potatoes than after mangels, all things, such as soil and manure, being equal.

Rye and white clover do always better after potatoes than after any other crop. We have already grown rye 6 ft high after potatoes on sand such as is used in making mortar.

Potatoes do best, as well as white clover and rye, on sands originally covered with hard-wood, for such timber denotes a soil rich in potash ; now, potatoes, rye, and clover delight in potash.

Pastures, permanent or laid down for some years, without rotations intervening, are only made on good hay-soil, friable, cool without being damp, and in order to secure their being prolific they must not be cleared up by stock in the fall; I myself have seen meadows 30 years old giving 300

bundles to the *arpent* of excellent hay; but on these no stock had ever been allowed in autumn; and I know that then, are in many parts of the province meadows sown for 60 years, and that still yield 300 bundless of superior hay to the *arpent*, the soil being marly, moist and friable.

As to permanent pastures, they can only be made on fields unfit for the plough, at any rate without trying to solve the important problem of permanent meadows and pastures like those so common in Europe.

And now to apply the principles we have been studying to a

II.—SYSTEM OF CULTIVATION ON A DAIRY-FARM.

In the first place, we must not lose sight of the class of farmers to which I propose this system. I am addressing only those farmers who have exhausted their land by bad farming, by routine work, i. e., by continually extracting something from the land and returning nothing to it. I speak to farmers who have impoverished themselves, and who have no power to lay out any large sum of money for the restoration of their ruined land. This is what I want to show these people; that by carrying out their farm-work properly with the animals and implements they already possess, and by following the rotation I am about to submit to them, they will see their farms begin to improve, though gradually, so as yield profits which will allow the owner to enter thereafter into those more extensive improvements that make of the farmer's business a really profitable trade.

So, you will not expect to hear me dilate on drainage, on silage, on the purchase of costly implements, of the large breeds of cattles, &c., &c. No, I only speak of the ordinary farmer, with farm of 2 arpents in front by 40 in depth, with his two horses, a few cows, ploughs, harrows, &c., such farmers, in fact, as we generally find hereabouts. Of course, this man begins, by cleaning and water-furrowing his land, if it is troubled with stones, bush, &c., for without means of getting off the water. and with a fourth, and often more, of the land covered with brush and heaps of stones, besides ditch-banks that retain the water, &c., it is impossible to carry on any profitable system of farming.

I propose to the farmer, whose land had been thus got into order, a system of cultivation that, I had better say at once, will not perhaps be absolutely suitable to all kinds of soils, but which, according to my acquaintance with all parts of the province, may prove fitted to the needs of the majority of farms. Besides, the system itself admits of the making of alterations that may be required by certain special soils, without destroying the principle of the general order of the rotation I am going to propose: it is a

with 12 divisio
arpents for buil

We begin

First year.
land by harrow

If only oat:
and if the land
of 34 lbs each
and 17,000 lbs
weighs twice as

If pease are
course pre-supp
bushels may be
6,000 lbs of pul

But supposi
calculations, tha
and 3,000 lbs of
haulm.

14.

Second year.
be in potatoes, a
equal to 15 or 16

in preference to r
and of all other n
and a horse-hoe, t
mon among us, th
ing been well pre
pent may be reck
12 inches in the r
arpents, 650 bush

For corn, sow
quantity of dung
coming up, and ar

12.—ROTATION OF TWELVE YEARS

with 12 divisions of $6\frac{1}{4}$ *arpents* each, making in all 75 *arpents*, leaving 5 *arpents* for buildings, yards, garden, orchard, avenues, &c.

We begin the rotation with the first division in pasture, and we say :

13.—FIRST DIVISION—OATS AND PEASE.

First year.—Land ploughed last fall; spring-work, the fitting of the land by harrowing; sowing oats or pease, or *gabourage*, the two mixed.

If only oats are sown, about an average of $2\frac{1}{2}$ bushels to the *arpent*, and if the land was well prepared there should be a yield of 40 bushels of 34 lbs each, which gives for the $6\frac{1}{4}$ *arpents*, 8,500 lbs of grain and 17,000 lbs of straw, on the calculation that in a crop of oats the straw weighs twice as much as the grain.

If pease are taken, about $1\frac{1}{2}$ bushels are sown to the *arpent*, and of course pre-supposing good working of the land, an average crop of 16 bushels may be expected, weighing each 60 lbs, that is, for the $6\frac{1}{4}$ *arpents* 6,000 lbs of pulse and 15,625 of haulm, at 2,500 lbs to the *arpent*.

But supposing, as I am doing for the purpose of certain subsequent calculations, that *gabourage* is preferred, there will then be 4,250 lbs of oats, and 3,000 lbs of pease, with 8,500 lbs of oats-straw and 7,812 lbs of peahaulm.

14.—SECOND DIVISION—HOED-CROPS, DUNGED

Second year.—Hoed-crops, with manure. The half of this division to be in potatoes, and the other half in fodder-corn. Here, 40 loads of dung, equal to 15 or 16 tons, will be applied. I advise the growing of

15.—POTATOES

in preference to roots, such as mangels, turnips, &c., because it is easier, and of all other needs the least manual labour. With the plough, harrow and a horse-hoe, that only costs \$7.00, the use of which is becoming common among us, the work can be done quickly and cheaply. The land having been well prepared, and well manured, a crop of 200 bushels to the *arpent* may be reckoned upon, by planting, under the furrow, at 27 inches by 12 inches in the row, ten bushels to the *arpent*. This will give for the $3\frac{1}{8}$ *arpents*, 650 bushels, which at 60 lbs, to the bushel, is equal to 37,500 lbs.

16.—FODDER-CORN.

For corn, sow at the rate of $1\frac{1}{2}$ bushels to the *arpent*, with the same quantity of dung as for potatoes. A stroke of the harrows as the corn is coming up, and another when it is 4 or 5 inches high, are all the work it

will need before harvesting. Sow in rows, under the furrow, 24 inches apart and one may expect the yield of an average crop to be 20 tons to the arpent, equal to about 63 tons or 126,000 lbs. from $3\frac{1}{8}$ arpents.

“Before quitting the consideration of this hoed-crop division, we will consult the opinion of that great agronome, whose still recent loss we lament, the late Mr Barnard, on the so important subject of

17.—HOED-CROPS.

Hoed-crops form the basis of all improving cultivation, and of all really profitable farm-work. They afford an opportunity of deep pulverisation of the land and the best means of cleaning it, and by that the whole series of preparatory work required for full success. They demand emphatically careful and repeated hoeing by which the weeds are destroyed as soon as they show themselves, and before they gain any height and strength of growth. They invariably produce crops of much greater abundance and value than those that can be grown without hoeing. Lastly, by the care they exact, they ensure during the remainder of the rotation, at whose base they lie, and without needing greater expenditure of labour, fuller and cleaner crops, that are, in consequence, grown at a cheaper rate. Now, to produce at the lowest possible cost, that is the sole means of contending with the strong competition we encounter on all the great markets of the world to which our chief products are sent.

18.—HOW TO TRIPLE OUR CROPS.

It is by multiplying our average of hoed-crops well managed, and by manuring the land with commercial fertilisers as well as with farm yard dung, that the best farmers of those countries that are now celebrated for their agriculture have succeeded in tripling and quadrupling the average yield of their countries, and that after centuries of exhausting harvests. It will, positively, be the same with this province, from the day when our farmers shall give room and the necessary care to large fields of hoed-crops, and to commercial manures, as complementary to farm-yard dung.

19.—THE FAULTS OF OUR FARMING.

Our farms are, in general, badly drained ; they are hardly pulverised at all ; the pulverisation, in farms apart from towns, hardly reaches to a depth of more than 4 or 5 inches from the surface. Hardly any of these farms have ever grown a hoed-crop, or any other really cleaning crop ; in consequence, weeds of all kind are every where in possessing of our land. Indeed, at least three-fourth of our occupied farms have never been properly manured, not even once perhaps, since they were cleared from the bush. While we are discussing the best way of preserving dung, it is being wasted every where, a great deal of it running through the floors of our cow-

sheds, and does find its way into an exaggeratin

Let us grow tificial manure t with courage an without allowing shall follow thes yield double and several successiv a few hundred without fear of c tance to all the fi what follows, we

And to thes manage ; preserv sal ; after the ho bly manage it ; l those that do not buy a little lime ; your crops, if you economise in eve bit ; do everythin few years, you wi comfortable circo

There are fou should at once pu ing to his power, 1. What hoed-cro shall I manure the these fields from t

22.—WHAT HOE

As regards th has endowed us wi plants. Thus, sev rious kinds, more c ble to the peculiar these are easy to g

sheds, and does not a notable part of the dung, when thrown out of the stable, find its way into the nearest brook? Who will be bold enough to say that I am exaggerating, and that farmers do not suffer by these faults?

20.—THE CHIEF, THE ONLY REMEDY.

Let us grow hoed-crop, as many as we can; let us fearlessly use the artificial manure best suited to them; let us carry out this improved farming with courage and energy and economy; let us feed our stock intelligently, without allowing manure to be wasted, and before long, those farmers who shall follow these counsels will see their fields, thus improved by hoed-crops, yield double and triple crops compared with their former yield, and that for several successive years, without additional outlay, except for the purchase of a few hundred weights of artificial manure. We may therefore affirm, without fear of contradiction, that hoed-crops are of the very greatest importance to all the farmers of this province, be they rich or be they poor. In what follows, we shall adapt our advice to the wants of the poorer class.

And to these we say: Grow as many acres of hoed-crops as you can manage; preserve carefully all the manurial matter you have at your disposal; after the hoed-crops, let green-fodder follow as far as you can profitably manage it; breed good stock and keep them well; sell off at once all those that do not pay, and only keep the really good ones; do your best to buy a little lime and phosphate, manure that alone will double the yield of your crops, if your cultivation is well done and your seed free from weeds; economise in every way, so as to find means to improve your farm bit by bit; do everything at its proper season and as well as possible; and, in a few years, you will have mastered your work, and be on the road towards comfortable circumstances.

21.—FOUR QUESTIONS FOR SOLUTION.

There are four questions that every thoughtful farmer, rich or poor, should at once put to himself, and which he should quickly answer, according to his power, his resources, the extent and the requirements of his farm: 1. What hoed-crops can I grow? 2. How many acres each year? How shall I manure the piece thus cleaned? 4. What crops will pay me best on these fields from the present time to the recurrence of the cleaning crop?

22.—WHAT HOED-CROPS ARE SUITED TO THE MEANS OF A POOR FARMER.

As regards the economical feeding of men and farm-stock, Providence has endowed us with very favourable resources in certain especially hardy plants. Thus, several sorts of haricot-beans and broad-beans; pease of various kinds, more or less hardy; as well as different strains of maize, suitable to the peculiarities of different soils and districts of the province; all these are easy to grow in rows for horse-hoeing and require much less ma-

nure than root-crops, yielding products most useful to man and beast, while they tend to the perfecting of the cleanness of the land, providing the proper amount of work is expended on them.

COMPARISON OF CERTAIN HOED-CROPS

A crop of early dwarf haricot-beans, with the rows two feet apart, in such prepared land, may yield 45 bushels an arpent (= 53 to the acre)⁽¹⁾. The whole crop, beans and stems, will average in weight 4,000 lbs. and the value of the food-elements therein may be \$30.95. The commercial value of the manurial matters carried off from the foil in this crop is \$4.53; but the nitrogen taken from the air by this legumen, and left in the land is worth \$25.60. By growing beans, and returning the potash, phosphoric acid, and lime they take from the land, the farmer has enriched his land by the pure nitrogen of the air to the amount of \$21.00, all expenses paid.

An average crop of mangels, about 15 tons, with their leaves $7\frac{1}{2}$ tons, 45,000 lbs. in all, contains food-elements worth \$32.20. But it robs the land of manurial elements worth \$25.87, without imparting anything to it, as mangels cannot utilise the nitrogen of the air. This will show what science has not yet given us, i. e., the exact value of the nitrogen imparted to the soil by the legumens, the whole of which nitrogen is taken from the air; but, everything considered, we believe that our valuation is about right.

More profitable a crop of beans is, all things being equal, than a crop of mangels. And so with all leguminous plants, which are capable of conveying great richness to the land.

Moreover, every one knows how hardy a plant is the bean, how easy to grow, coming up vigorously in a few days and soon covering the whole ground; while the mangel and most of the other roots take a long time to come up, and are more subject to the attacks of insects than the bean. They (the roots) are much more easily smothered by weeds; they need more hoeing and thinning, wherein the hand-hoe must be employed; so, we may boldly affirm that one man alone with a good sowing-machine and a horse-hoe, can hoe and clean thoroughly ten arpents of beans, pease, or corn, sown in rows, more easily than he can cultivate properly one solitary arpent of mangels, or even turnips, roots much more easy of cultivation than carrots, parsnips, &c.

24.—A COMPARISON OF OUR PRINCIPAL CROPS

It is useful to observe that the food-value of a crop by no means depends upon the number of bushels or pounds taken from the land, but entirely upon the quantity and comparative value of the digestible matters of crop contains. In order to prove this to demonstration, we give in the follow-

⁽¹⁾ We grew at the rate of 80 bushels of haricot beans to the acre, at Joliette in 1869. A. R. -F.

ing table (No. . the carbo-hydra digestible fat at allow as the po that good timot The quantity of estimated at dou remain in the la equal to that in of manurial mat price. This tab

For the abo are the plants th he may, if he ch And more, if he part at least, the ed so large a par

Roots have it is not to be est cattle show when as straw, &c., the value. But we n class, are yet in a quently, it would kind a sufficiently hoed-crops. it is i profits from it. I have the same va maize-fodder for s cleaned every yea

27.—HOW MAN

It is a difficul pay on land that i free from any larg wood, &c., &c. I farmer can, with p for horse-hoeing a grain after grain w grows for green-m the sooner will he

ing table (No. 4 p. 94) the comparative value of our different crops, taking the carbo-hydrates at $\frac{1}{2}$ a cent a pound, digestible protein at $2\frac{1}{2}$ cents, and digestible fat at 3 cents. These are the proportions that men of science allow as the points of comparison for these values, under the supposition that good timothy hay is worth \$9.45 a ton, as it is calculated in the tables. The quantity of nitrogen, derived from the air by the legumens, is here estimated at double what the crops contains, on account of the roots that remain in the land, which are estimated in the table, generally, at a price equal to that in the crop itself. Lastly, the same table gives the quantity of manurial matters taken from the soil, and their value according to market price. This table is very useful and deserves a thorough study.

25.—PEASE, BEANS AND MAIZE.

For the above reasons, it seems clear to us that pease, beans, and corn are the plants the poorer farmer should select for his hoed-crops. With these he may, if he chooses, clean perfectly a considerable part of his arable land. And more, if he sows clean seed, he may hope to see disappear, in great part at least, the weeds that have heretofore infested his farm, and smothered so large a part of his crops.

26.—SILAGE AND ROOT-CROPS COMPARED.

Roots have a special value ; this is not mentioned in the table because it is not to be estimated in weight or in money. It is the thrift that the cattle show when they are fed upon them, and the quantity of *roughage* such as straw, &c., they consume, when they get plenty of roots, that show their value. But we must not forget that few of our farmers, even of the richer class, are yet in a position to grow large fields of roots, and that, consequently, it would be almost impossible for them to clean by hoed-crops of this kind a sufficiently large part of their farms. Now, without a sufficiency of hoed-crops, it is impossible to clean a farm and obtain the largest possible profits from it. Neither must it be forgotten that the legumens ensiled will have the same value as roots in cattle-feeding, and that these legumens and maize-fodder for silage will allow of a sufficient proportion of land being cleaned every year.

27.—HOW MANY ACRES OF HOED-CROPS SHOULD BE GROWN YEARLY.

It is a difficult question to answer exactly, since hoed-crops can only pay on land that is well drained, well worked, sufficiently manured, and free from any large and serious obstructions, such as rocks, roots, brush-wood, &c., &c. But it may be freely stated that the more land the poorer farmer can, with proper cultivation, put into pease, beans, and corn, in rows for horse-hoeing and sufficiently manured, the less land will be put into grain after grain without hoeing ; the more clover, vetches or lentils he grows for green-meat, &c., the more profit will he derive from his stock, and the sooner will he and his family attain to a comfortable state of prosperity.

leaves.....	116	15,000	.....	780	270	30								
Total.....		48,000	550	3915	666	93	39.01	.....	133	84	188	151	35.70	
Mangels.....	134	30,000	500	3000	330	30								
" leaves.....	95	15,000	.....	600	150	60								
Total.....		45,000	500	3600	480	90	32.70	.....	95	5	189	37	25.27	

Carrots.....	150	22,000	366	2376	264	44								
" leaves.....	178	7,500	.....	532	202	60								
Total.....		29,500	366	2908	466	104	29.31	.....	72	31	97	81	18.21	
Potatoes.....	250	12,900	215	2657	258	38	20.87	.....	57	27	83	18	14.63	
Cabbage.....	180	60,000	.....	7140	540	120	52.80	.....	139	117	243	139	41.46	
Wheat—seed.....	860	840	14	518	138	15								
" straw.....	857	2,000	.....	652	30	10								
Total.....		2,840	14	1170	168	25	10.80	.....	28	12	15	5	5.99	
Barley—seed.....	857	1,200	25	760	110	27								
" —straw.....	857	2,000	.....	724	42	14								
Total.....		3,200	25	1490	152	41	12.48	.....	27	13	25	6	6.32	
Rye—seed.....	857	1,064	19	717	112.7	20								
" —straw.....	857	2,600	.....	774	28.6	15								
Total.....		3,664	19	1491	141.3	35	12.03	.....	29	14	27	10	6.82	
Oats—seed.....	857	850	25	473	91	45								
" —straw.....	857	1,500	.....	513	25	15								
Total.....		2,350	25	986	116	60	9.63	.....	23	9	19	6	5.03	
Buckwheat—seed.....	860	1,107	23	653	105	18.8								
" —straw.....	840	1,400	.....	422	25	9.8								
Total.....		2,507	23	1075	130	28.6	9.46	.....	30	9	23	29	6.49	

TABLE I.—CONTINUED

(1) The crop-yields in this table are not to be taken as the average of what the land can give. In many cases, much heavier yields can be grown. But these data allow us to calculate exactly how much is removed from the land in a given quantity of produce, together with the nitrogen conveyed from the air to the land by the growth of legumens. The table is also useful for comparing the total weight of the crop with the total of the various food-matters contained in the same crops.

(2) The manurial matters "soluble in water" are here valued: nitrogen, 16 cents a pound; phosphoric acid, 7 cents a pound; potash $4\frac{1}{2}$ cents a pound; lime, $\frac{1}{2}$ a cent a pound.

TABLE II.—ROTATION OF 12 YEARS AND CROPS ON 60 ARPENTS, MANURIAL MATTERS.

Years	Arpents	KIND.	CROPS				MANURIAL MATTERS REMOVED			
			Bushels	Tons	Bushels	Tons	From the air	From the soil	Acid phosphoric	Potash	Lime
1st	5	{ Oats.....	40	1	200	P. 5.00	lbs. 178	lbs. 72	lbs. 146	lbs. 48
2nd	{ 4	Beans.....	40		{ 160	P. 3.00	.....	123	229	188
3rd	{ 1	Potatoes.....	215	0.7	{ 215		{ 502	27	83	18
	5	Barley and Rawdon Clover.....	40		200		218	98	196	48
4th	5	Straw.....		1.25		P. 6.25	.....	.....	.....	.....
	5	Red Clover—silage.....		12.50		E. 62.50	.....	140	488	480
	{ 4	Corn—silage.....		15.00		E. 50.00	.....	116	328	88
	{ 1/2	"—seed.....	46		23		296	15	39	11
5th	{ 1/2	Straw.....		1.25		P. 0.65	.....	37	.....	.....
		Lentils or vetches.....	20		10		64	15	18	36
6e	{ 4	Peas—silage.....		1.00		P. 0.50	.....	.....	.....	.....
	{ 1	" seed.....	30			E. 40.00	546	159	312	408
		Straw.....		1.25	30		.....	.....	.....	.....
7th	{ 1	Wheat.....	25		{ 25	P. 1.25	.....	.....	.....	.....
	{ 1	Rye.....	30		{ 30	P. 2.50	.....	.....	.....	.....
	{ 3	Wheat, rye, straw for silage with seed for meadows and pastures.....		10.00			.....	.....	.....	.....
8th	5	Clover—silage.....		12.00		E. 30.00	128	72	105	10
9th	5	Mixed hay.....		2.00		E. 60.00	474	132	464	16
10th						F. 10.00	.....	285	75	98
11th							.....	.....	.....	.....
12th	15	Pastures, or hay, as required					.....	.....	.....	.....
		Totals	893		893	281.65	2214	1086	2827	1970

Recapitulation—215 bushels of potatoes and 678 bushels of grain, &c.—10 tons of hay, 19.15 of straw, and 252.50 tons of silage. In this table, the nitrogen extracted from the air, valued at the same price as before, represents a gain of \$144.24, and the matters taken from the land, a value of \$407.78. In principle, it would seem that the addition of \$552.24 worth of manure should suffice to replace in the soil the balance of manurial matters removed in the crop; but, as the atmospheric nitrogen can by no means supply the mineral matters wanting, the experiments mentioned further on must be made, in order that the soil may furnish to the plant all that is required for its perfect development.

The following grown if the principle probable, that, in the table, but you improvement on the continue the rotation hoed-crops than an essential thing is that the care needed to ones.

In order that repeated in the same the weeds that infest tire benefit of the between each two crops pease, vetches, red shall adopt a system shall be numerous comprised at the profits profits that will increase same time, to the last returns.

And now let us

32.—T)

Third year.—T of barley with clove from which we may arpent, or, 187 bush generally producing

I spoke of clove in fact, find our division clover, 15 lbs. must three kinds as follow

R
W
A

Complaints are often heard that clover-seed does not come up ; and the reason frequently is that it is buried too deep. On well-fitted land, not too moist, a rolling will be sufficient to cover it. At any rate, it will never need more than a stroke of the lightest harrow.

Another complaint is made that the clover freezes ; this is in some cases unfortunately true. Thus, every time there is a heavy thaw in the winter, which lays the ground bare, a coating of ice is formed on its surface when the cold comes back and destroys the roots of the clover. It has been noticed, in this case, that along the

34.—FENCES.

where the snow was deeper, and in consequence the ground was not laid bare, the clover did not freeze. This led to the conclusion that if, instead of putting a fence only at each arpent, as is the custom, one was put one at every half arpent, the heaping up of the snow would be assisted, and, in consequence, the uncovering of the ground would be prevented, and, with it, the freezing of the clover. Practice has confirmed this theory, and now, wherever fences are multiplied in this way, the crop of clover has been doubled and its success assured, only these numerous fences are objected to on account of their cost. But, as in this part of the country timber is not very scarce, and a good cedar fence lasts from 40 to 60 years, according to the ground, the slightest calculation will show that this extra fence for every half-arpent will soon pay for itself.

35.—FOURTH PIECE.—CLOVER CROP

Fourth year.—We are now for this year with one piece of land in clover. This clover, for the first crop, ready to be taken up with us, about the second week in July, will give, whether it be used for fodder, fed green to the cattle or turned into hay, 550 bundles per arpent, 1,562 bundles for $6\frac{1}{4}$ arpents, or 24,430 lbs. As for the second crop, it will be ploughed in by the farmer rather than have it eaten. It is claimed, and rightly I think, that the crop gives more profit, if used by the cattle, than if ploughed in as manure. But it must be borne in mind that I speak here of a class of farmers who have a prejudice against buying any chemical manure. Now to get from the second clover crop a profit which may not be injurious to the land, by having it consumed by the cattle, we must restore, by means of a chemical manure, what this second crop has taken from the soil. While by having it ploughed in, the ground is prepared for a good wheat crop, as experience has amply proved, and in this way one can avoid clashing with a prejudice which in many people, is irremovable.

Fifth year.—
previous year, with

A bushel and
red for the present
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With our wheat

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Sixth, seventh,
piece of land, by sowing
for four years. During
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gives shelter to weeds

36.—*Fifth piece.*—WHEAT AND FODDER-SEEDS

Fifth year.—We find our soil prepared by the fall ploughing of the previous year, which served to bury the clover, for a crop of

37.—WHEAT

A bushel and a half is sowed for every arpent, and with the care required for the present system of rotation, an average crop of twenty bushels of 60 lbs. each can be raised, or, for the $6\frac{1}{4}$ arpents, 7,500 lbs. of grain, and 15,000 lbs. of straw, which latter, in wheat, is in the proportion of 1 lb. of wheat to 2 lbs. of straw, in weight.

With our wheat, we also sow

38.—FODDER-SEEDS

for meadows, as the land should be left in meadow the next year. In the eastern part of the province, no other fodder-grains are known than timothy and the three kinds of clover I have already spoken of above. As, in explaining my system of rotation, I endeavor to speak as little as possible of innovations, I will mention the quantity of these four kinds of seeds, which is required for a good arpent of meadow, while I state for the information of farmers who have courage enough to go in quest of the unknown, that there are other fodder-plants which give a fuller and better return of superior hay than the timothy seed and the three clovers sowed alone can produce. Here is the mixture of timothy and clover in question :

Timothy (3 gallons).....	15 lbs.
Red clover.....	5 “
White “.....	4 “
Alsike “.....	2 “

Total 26 lbs.

These quantities, as well as those of clover given above, may appear exorbitant to many, and yet they are necessary to ensure success. Besides any intelligent farmer can raise upon his own land the seed he requires, and in this way avoid an outlay which he may not always be in a position to make.

39.—MEADOWS

Sixth, seventh, eighth and ninth years.—The meadow formed on our piece of land, by sowing the fodder-seeds mentioned already, is intended to lie for four years. During these four years care must be taken not to allow the meadow to become bare, for any spot on which good grass ceases to grow gives shelter to weeds. The frost sometimes raises up the roots, which after-

wards wither. To avoid this, heavy rolling must be done as soon as the land is firm enough in the spring. If the ice has left some bare spots, they must be broken up with an iron toothed harrow, we must sow fodder-seeds on them and then roll. If weeds appear they must be weeded out by hand, and if that is done as soon as they show themselves they will not spread. Above all, cattle must never be allowed to graze on the meadow.

40.—MANURE ON MEADOWS

After the third year's crop of hay, the meadow must be covered with rotten manure, in the proportion of ten tons to the arpent, equivalent to about 16 tons of green manure. This will ensure an excellent hay crop for the fourth year's meadow land.

Meadow land treated thus way will easily yield an average of 250 bundles to the arpent, or 1,562 bundles for $6\frac{1}{4}$ arpents, which, multiplied by four for the four acres of meadow, gives a total of 6,248 bundles, or 93,720 lbs. of hay.

41.—PASTURES

Tenth, eleventh and twelfth years.—During the last three years of the rotation, the soil, which has been four years in meadow, is given up to pasture. To have this in good condition the dung dropped on it by the cattle must be carefully spread, to prevent the grass from being burned at the place where the excretions fell. The blades of grass which, from one reason or another, the cattle leave untouched here and there, must also be mowed. These blades, if allowed to grow, ripen and exhaust the soil. In spring, the care I have mentioned above for meadows must be given to pasture lands.

The question of the fences, about which I spoke in connection with clover, also applies to meadow and pasture lands.

Three years of pasture furnish in grass, for stock, as much as the 3 years in meadow, or 70,290 lbs.

Before leaving the subject of meadows and pastures, we will insert here the opinion of the eminent botanist and entomologist of the Experimental farm at Ottawa in this matter :

42.—GRASSES THAT ARE GOOD FOOD FOR STOCK

“ In my opinion, there are, at present, hardly any subjects connected with farming more important to agriculturists, and especially to dairymen, than an accurate knowledge of the numerous varieties of the grasses on which their cattle feed. If certain districts have earned a reputation for the excellence of their dairy-goods, they owe it chiefly to the quality of the grasses that grow there. In all habitable parts of the earth grasses of some sort or other exist, that are good food for stock, and which are naturally able to

stand the inclemence with more than 6. tinot species grow by far the most u: *bushy fescue*, which more than a hundred we reflect that all grasses, as well as

At Ottawa, we to ascertain if they have been working as we have examined of Europe, and grow each species ing, cutting, and the chemical value of stock for it ; and from what we have found in the mixture grown with profit country so extensive are unsuccessfully

No grass is better. It is upon its great advantage (*talles*)(1) its heavy waste, and the fact any trouble. It's y clean, and to treat,

But timothy hay late in spring, and never is fit to cut; when of the stalks are injured suffer from the attacking, as horses, sheep being killed by the these characteristics grass, and it would ment of their meadows time have been sadly shows that timothy grasses.

(1) *Taller*, in French, i

stand the inclemency of the climate. Botanists are said to be acquainted with more than 6,000 species of grasses, and, in Canada, more than 300 distinct species growing wild. There is not the least doubt about the grasses being by far the most useful of all vegetables; they vary in height from the little *bushy fescue*, which grows on the mountain-tops, to the gigantic bamboo more than a hundred feet high. Their importance is acknowledged when we reflect that all grains, or Indian corn, wheat, barley, oats, millet, are grasses, as well as the sugar-corn and many others.

At Ottawa, we are studying a great number of fodder-grass, in order to ascertain if they are fit for hay or as pasture grasses in this country. We have been working at experiments on these for four years. Among the grasses we have examined, are comprised most of the more highly valued grasses of Europe, and many of our indigenous ones that are promising. We grow each species separately, and take notes of the date, of sowing, flowering, cutting, and of the aftermath; of the weight of fodder to the acre; of the chemical value of the plant as stock food; of the more or less appetite of stock for it; and of its hardiness. We have, at Ottawa, 150 species, and from what we have seen up to the present time, many of the kinds that are found in the mixture sold by seedsmen for permanent meadows cannot be grown with profit in this climate. Besides, we must not forget that in a country so extensive and so varying in climate as Canada, many plants that are unsuccessfully tried at Ottawa, may succeed in other districts.

No grass is better known or more esteemed than timothy, *Phleum pratense*. It is upon the whole, the most useful grass for hay that can be sown. Its great advantages are: its sturdy growth, the great number of its shoots (*talles*)(1) its heavy yield, the ease with which it is made and pressed without waste, and the fact that its value is so well known that it can be sold without any trouble. Its yield of seed is great; and nothing is easier to harvest, clean, and to treat, besides it can always be bought if wanted.

But timothy has some faults that must not be lost sight of; it shoots late in spring, and does not come to the scythe when the common red-clover is fit to cut; when mown too early, the bulbous formations at the bottom of the stalks are injured, and the aftermath is then poor. These bulbs, too, suffer from the attacks of insects and of field-mice. It is of no use for grazing, as horses, sheep, and pigs crop it too close, and it is then in danger of being killed by the frost. There is no second cut, practically speaking. All these characteristics show that timothy is by no means a perfect fodder-grass, and it would be well for all Canadian farmers to sow, as the complement of their meadows and pastures, other varieties that up to the present time have been sadly neglected; and the more so, since universal experience shows that timothy does not succeed in some places so well as other grasses.

(1) *Taller*, in French, is the same as *tiller* in English. A. R. J.-F.

Every one knows that the grasses for hay, and those for pasture, are not necessarily the same. For hay, we need those that come, as much as possible, to their best condition at the same time, and their best condition is when they contain the greatest quantity of the nutritive elements, and are most bulky. They are in the best condition for mowing, as soon as they are in bloom; at that moment, everything they have derived from the soil, or from the air, is more equally distributed throughout the whole plant than at any other period of their growth. The plant may grow and increase in size and weight, but, all the time it is busy in drawing from the stem and leaves their precious constituents, and passing them on to the seeds; these efforts tend to the preservation of the species, to the cost of the nutritive qualities. The seed then taken takes possession of a large proportion of the virtues of the plant, and if it ripens sufficiently to fall off when the hay is being made, the loss thus incurred is considerable. My advice, then, is in every case: *Mow as soon as possible after blossoming.*

There is another point, doubtless of minor importance, but that I may as well mention. Most Canada farmers say that, the best time to cut timothy is "between the first and the second bloom". This is an excellent rule, although, in reality, there are not two distinct blossomings. The ear of timothy is composed of numerous separate little flowers, some of which open early, and the rest in succession during three or four days. Early in the morning, about six o'clock, the timothy seems to have a violet tinge; about nine, it seems white, because the *anthers* have shed their violet pollen; later in the day, these anthers become yellow, and the next day brown. The appearance of this brown colour is what is called "the second bloom;" so, if you want the best hay, cut your timothy as soon as the majority of the flowers are brown.

This is a good thing to know; and if all would follow this rule, our hay-market would be all the better for it; for people would very soon remark the improvement in quality. Now, there is a great deal of inferior hay made, because it is allowed to stand too long. This may proceed from various causes; the farmer may have more hay to make and not enough men to make it in time; again, it may happen, naturally, that another may prefer getting more money for a large quantity of inferior hay, and he lets it stand, instead of cutting it at the proper time. By leaving it there longer, he gets more hay, and therefore more money; but the purchaser finds that he has bought fodder inferior to what it would have been, had it been cut at the right season. Do you want to have timothy hay of the best quality? Cut it as soon as possible after all the flowers are out and have shed their pollen.

In a pasture, we want grass of different kinds, that, one after the other, at all seasons of the year, come to their best condition. If you can make a mixture for hay and a mixture for pasture, so much the better. Two grasses

that I think, show that Canada, are "well with clover. of its entering in best of hay, and of that important we can grow; it that it enriches the soil; important that all farmers their land should first, a good crop

Which grass chiefly experience always yield a point out a mixture for the last four sixth more for an

Some of you remark one of the principal not sowing seed early

If clover and timothy mend 12 lbs of timothy Mammoth and the bloom at the same time

With the common meadow-fescue.

"Having finished we are about to re-described by M. Ad the other as connect English Journal of Province, Mr A. R.

that I think, should enter into all the mixtures that are sown in this part of Canada, are " meadow-fescue " and " Orchard-grass ". And these two do well with clover. The importance of having clover in a mixture and also of its entering into every rotation of crops, is that, first, it makes about the best of hay, and is also a valuable fertiliser. Indeed, clover absorbs more of that important element of manures, nitrogen, from the air than any plant we can grow; it thus takes nitrogen from the soil; and much more than that: it enriches the soil instead of impoverishing it. It is therefore most important that all farmers should adopt a system of rotation of crops, in which their land should be, every few years, sown with clover: this plant gives, first, a good crop of hay, and then ploughed in, it enriches the land.

Which grasses are most suitable to any specific soil, is a question that chiefly experience must decide. But there are some which will certainly always yield a paying crop all over this province; and I will in conclusion point out a mixture that all who try will find successful. I have sown it for the last four years, and always with good result. For an *arpent*: (*one sixth more for an acre. A.R.f.-F.*)

Timothy.....	6 lbs
Meadow-fescue	3 "
Orchard-grass.....	2 "
Blue-grass.....	1 "
Franc-foin.....	1 "
Red-clover	2 "
White-clover (Dutch).....	2 "
Alsike-clover.....	2 "
Lucerne.....	2 "

21

Some of you may think it rather too heavy seeding; but I am sure that one of the principal cause of failure in laying down land to grass is due to not sowing seed enough.

If clover and timothy are sown together without other grass, I recommend 12 lbs of timothy and 8 lbs of clover to the *arpent*. For this the Mammoth and the Rawdon red-clovers are the best, as they come into bloom at the same time as timothy.

With the common red-clover, it is better to mix orchard-grass and meadow-fescue.

"Having finished the description of M. Chapais' system of cultivation, we are about to review two others systems of rotation: one for settlers, described by M. Adélarde Caron, a young settler in the county of Mégantic; the other as connected with dairying in general, by the learned editor of the English Journal of Agriculture, of the Department of Agriculture of the Province, Mr A. R. Jenner-Fust."

43.—THE SETTLER AND DAIRYING.

I have been warring with the forest for the last ten years, and I should like now to give certain pieces of advice to settlers, to enable them to avoid the blunders and errors I have myself made; and to show to the directors of the association a novel mode of dispensing their benefits around them.

The settler, as well as the established farmer, must follow a certain rotation, and he who starts for the bush, with a determination to hew out of it a patrimony, must arm himself with courage and energy. For, when the first din of war shall resound, when the murderous axe shall have awakened the slumbering echoes of the forest, the settler will see, ramping against him, obstacles and difficulties of all kinds. His daily bread must be moistened with the sweat of his brow; he will have to contend unceasingly with weariness, that mortal enemy of the clearer of the bush. Still, if he keeps up his courage, the settler will always contend energetically and successfully against these impediments, and his efforts will soon be crowned with success. When spring arrives, fire will come to his aid, consuming the remains and fragments of the battle, and, before long, a rich harvest will conceal the ragged stumps, and cast the veil of oblivion over the struggles of the weary warrior.

The first year, the settler should sow wheat and barley, with plenty of clover and timothy. Potatoes too, I suppose, and for the winter-keep of his cows—the bush will serve them in summer—he will plant a piece in corn and turnips. I have often heard these crops talked about on the old farms; there, they must be manured, ploughed, hoed, &c.; but the settler need not take such trouble: let him sow broadcast, like other seed, $\frac{1}{4}$ bushel of corn, and $\frac{1}{2}$ lb. of turnip-seed to the arpent, and nothing more is required except plenty of harrowing, and a full trust in the blessing of Providence.

In this way, I have, myself, harvested 25 tons of fodder corn and 500 bushels of turnips to the arpent, and I am not the only successful one.

The settler builds himself a cabin and a barn of round logs; the saw-mill is perhaps 60 miles off, so he covers his cabin in with birch and spruce bark, and under that humble roof he sleeps as securely as under a costly covering of slate.

He will also want a small silo for his corn; and, for this, he will square a few logs and lay them one over another, stuffing the interstices with dried moss and tempered clay. This he will again cover in with bark, and then he is as well “fixed” as if he had a full set of farm-buildings.

The second year, the pieces that bore potatoes, corn and turnips will be sown with oats and grass-seeds. The fields in which he grew barley and wheat in the previous year will provide him with capital meadows for

several years, a piece prepared for and another for 1 manure, which he be spread on the year bore potatoes should, if possible, sow grain. If he piece, he should soil.

The third year ions; friends and ows are superb; he will find very that new land yield his farm.

“After a brief duction of meat, M

If grain and n is carried on as it farmers, the dairy pursuit, it does not be followed, to still cereals on most of

For, where the manure there is no ably produced, unless not empirically selected are working, and the plants we cultivate

You all know, food. Wheat does food as clover, neither is upon this difference utterly ignorant of their own country have for the white-straw crop an unlike nature.

several years, and with good pastures afterwards. He will also have a new piece prepared for wheat and barley, sown down with clover and timothy, and another for potatoes, corn and turnips. Immediately after harvest, the manure, which he has put under the shelter of a rough shed of bark, must be spread on the oat-stubble, that is, on the piece which in the previous year bore potatoes, corn and turnips, thereby securing good meadows. He should, if possible, sow clover and timothy, at once, in the first season he sows grain. If he is compelled to sow grain two years running on the same piece, he should manure it, as I said, in order to retain the fertility of the soil.

The third year, the clearing will have attained to pretty large dimensions; friends and relations will come and start alongside of him; his meadows are superb; he must enlarge his barns, make fences. &c.; a chaff cutter he will find very handy, considering the immense bulk of hay and straw that new land yields; his stock has increased; now, at last, he his master of his farm.

44.—A ROTATION FOR A DAIRY-FARM.

“After a brief allusion to the crisis in grain-growing, and in the production of meat, Mr Jenner-Fust continues as follow :”

If grain and meat will not bring us in much profit, if their production is carried on as it usually has been up to the present time by most of our farmers, the dairy industry still remains to us, and, in connection with that pursuit, it does not seem to me to be impossible, if a well studied rotation be followed, to still make some fair profit out of the production of meat and cereals on most of our farms.

For, where there is no stock, there is no manure; where there is no manure there is no crop; and neither stock, manure, nor crop can be profitably produced, unless the land be subjected to a proper rotation, a rotation not empirically selected but one that is suited, practically, to the soil we are working, and theoretically adapted to the various demands for food the plants we cultivate make upon that soil.

You all know, that every genus of plants asks, for special kinds of food. Wheat does not insist upon being supplied with the same special food as clover, neither does barley need the same special food as pease. And it is upon this difference in the requirements of special foods that, though utterly ignorant of the theoretical reason for their practice, the farmers of my own country have for some 90 or 100 years, been accustomed to separate the white-straw crops they grow by the interposition of some other crops of an unlike nature.

Hence, arose the Norfolk or 4-course system; in which barley or wheat is grown every alternate year, but separated by intermediate crops of roots and clover. It stands thus :

1st year	.....	Roots, turnips, mangels, rape, &c.;
2nd "	.....	Barley;
3rd "	.....	Clover, standing only one year;
4th "	.....	Wheat.

Now, the practical English farmer was not quite such an unthinking creature as he seems to be considered by some people. He worked away at this rotation for many years, until time bringing changes, he found that there were certain defects in the yield of certain of his crops, the reasons for which had to be discovered. For instance; the clover crop, all of a sudden began to refuse to grow: a sad thing indeed; for a good plant of clover, mown two or three times, according to the season, hardly ever failed to produce a good crop of wheat. He soon found out—more than 50 years ago—that if the clover, and by clover I mean the *trifolium pratense*, or common red-clover, were sown so often, either the condition of the land, or its mechanical state, rendered that plant unsuitable to it. Some other crop, then must take its place: what shall it be? Too many grain-crops would clearly not answer, even if the terms of their agreements—leases were very rare in those days—would admit of their succeeding one another, which they did not. They tried pease on light and beans on heavy land, in place of half the clover—both being leguminous or pod-plants—and though the following wheat-crop was not so good as heretofore, it was very little inferior, and the pulse being both hand and horse-hoed, the land benefited considerably by the extra cultivation it received.

Thus, the 4-course system was converted into an 8-course one, and things went on as well as ever.

Another difficulty arose, some 20 years later. Malting barley always sold well, but in time, the very high state of cultivation to which our best farms had been brought by the year 1850 made the growth of a good sample of malting barley—and there was always, or almost always, a difference of at least 50 to 60 cents a bushel between grinding and malting barleys—almost impossible if that grain were sown after a heavily manured crop of roots fed off, as was and is the custom, by sheep eating additional food: cake or grain, or pulse, or all three.

What was to be done? The remedy was simple: wheat was sown after roots, followed by barley and clover seed, and the wheat as usual, after the clover, completed the course. This could only be done on very well farmed

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land, but there the sample of barley was as bright as ever, and this is the form in which the original Norfolk course or rotation now stands in all but the most backward districts of England viz :

1st year.....	Roots;
2nd ".....	Wheat;
3rd ".....	Barley;
4th ".....	Clover: half pease or half beans ;
5th ".....	Wheat.

There being, as above, in reality, ten limbs to the rotation instead of the original four. And there things remain, the produce of the land having increased in acre-yield, for whereas the average yield of wheat 50 years ago was only 26 bushels an acre, it is now, as nearly as possible, 30 bushels, taking all sorts of land together.

Thus, I think you will see that a sensible attention to the advantages and a sensible amendment of the defects of the common rotation of crops in England, have resulted in a marked improvement in the average yield of the most important crop of that country.

In presenting you to-day with my ideas as to the rotation best adapted to a dairy-farm in the province of Quebec, I must beg you to observe that I speak in general terms. Silo-corn will not mature sufficiently at Métis, but their swedes are superb and the Belgian carrots too, and vetches do well; so, in the districts below Quebec, those who desire to employ ensilage for the winter supply of their dairy-cows, must substitute vetches or clover for corn.

The number of years that land should lie out in grass, again, is another point to be determined by the situation of your farms. Those who are fortunate enough to be within reach of an unlimited supply of dung, can break up their pastures sooner than those who are entirely dependent on the home production of that description of fertiliser. But, I may state positively, the addition of a moderate ration of extra food, such as cottonseed-meal, pease-meal, crushed oats, &c., to the scanty food afforded by your pastures in July and August, will prove, in all cases, highly remunerative.

You will not, of course, neglect giving your milch-cows a portion of green-meat, mown for them every day. No better use can be made of the early cut of clover. For, I need not tell you that if once a cow begins to fall-off in her yield of milk, it a mighty difficult thing to restore the original flow.

Two or three years ago, I had the honour to contribute to the Report of your Association an article on the best provision of green meat for dairy-cattle, so I shall not go over that matter again, but will lay before you the rotation that, generally speaking, I think you will find suitable to the farms of, at all events, the Eastern part of the province.

The rotation I propose is calculated for a farm consisting of 100 acres of land under cultivation. The first limb is, of course, a hoed or green one, comprising roots, part of which may be sugar-beets, if things go well with the factories, as I hope they may, (1) green-meat, such as vetches, early rye to be cut *very* green; fodder-corn; my own mixture of two bushels of oats, one of tares, one of pease, and 2 lbs of rape, the last of which will be found very useful for your sheep to pick over after the crop is cut.

This will be followed, in the 2nd year, by barley, or wheat, sown down with grass-seeds. Of what mixture you ought to use for this purpose I say nothing: *soil and situation* must be your guides; but Mr. Evans, (2) the seedsmen at Montreal, is fully informed of my ideas on this subject, and, if you ask him, he will give you a list of such seeds as will be found suitable to your farms. These seeds I propose to let lie out for 4 years, so the rotation will be ten years in extent. In it there will be no cramming of two-grain-crops one on another, and in the middle, that is, in the 8th year, provision is made for a partial cleaning of the land; for, in such a long rotation, unless something of the sort is done, the land will become frightfully foul before the course is finished:

	Acres.
First year, a cleansing or hoed-crop.....	10; roots, corn, pease or beans, with oats, tares and rape.
Second year, grain.....	10; 7 in barley or wheat, 3 in flax all 10 with grass-seeds.
Third " meadow.....	10;
Fourth " ".....	10;
Fifth " pastures.....	10;
Sixth " ".....	10; to be broken up for bastard fallow, about 10th July.
Seventh " grain.....	10; oats with 14 lbs red-clover an acre.
Eighth " clover.....	10; to be mown for hay, for silage, or for green-meat.
Ninth " grain.....	10; oats.
Tenth " pulse.....	10; pease on light and horse-beans on heavy land.

100

Thus, you will have 40 acres in grass, 10 acres in pulse, 10 acres in clover, 10 acres in hoed-crop, 27 acres in grain, and 3 in flax.

As regard the first limb of the rotation, the hoed or cleansing crop, the preparation of this ought to be begun in the previous fall, after the crop of grain or pulse is severed. Plough or grub shallow, harrow and horse-rake the rubbish, couch, &c., and burn it, before laying up the land for the winter. The roots and corn should be sown on the land that is the least clean, as the first lot of green-meat, vetches &c., must be sown as early as possi-

(1) But which they did't ! No fault of the farmer or of the land. A.R. J.-F.

(2) Now, Messrs Ewing & Co. A.R. J.-F.

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ble, and there will be no time to clean it ; sowings should follow at intervals of, say, a fortnight. Pray do not fancy that 4 bushels an acre of the mixed grain and pulse are too much ; it should be begun to be cut when the vetches are just showing bloom.

I have taken 3 acres of the 2nd limb for flax. The crop may yield, if well treated, 12 bushels an acre, and as the pulse-crop of limb 10 ought to give at least 18 bushels, a very fair mixture can be made of the two in the proportion of 5 of pulse to 1 of linseed, which, for milch-cows, or fattening beasts, will not be found out of the way if ground.

As for the sixth limb, the fourth in grass, I propose to sacrifice the pasture from the 1st of July, and make what we call in England a *bastard fallow* of it. The land should be ploughed shallow, cross-ploughed, two weeks later, a little deeper, by which the grass, &c., will be brought to the surface and the weeds killed, after a good tearing about with the grubber and harrow, if the month of August is as hot as usual : a fair dressing of dung lightly ploughed in will fit it for the following crop of grain.

Do not stint the clover-seed in the seventh limb ; 14 lbs. an acre are not too much. The clover in the eighth limb may be mown for green-meat generally by the first week in June ; it may be cut for hay ; the first-cut may be hayed and the second-cut ensiled ; or it may be done whatever you like with, except ploughed under. It is, believe me, far too valuable to be treated so contemptuously. If you must bury anything, take vetches, pease, any pulse crop, except clover. As for buckwheat, green-rye, mustard, &c., I do not believe that any good is derived from interring them unless the trifling *mechanical* effect they have may be beneficial.

As to the pulse-crop, in the tenth and last limb of the rotation, if you would only treat it as you treat a crop of potatoes, you would find it profitable. But I fear it will be a long time before I shall see here a field of pease or horse-beans drilled, hand-hoed, horse-hoed, as it is done at home. At all events you can harrow them once or twice after they have come up, particularly after a fall of rain on heavy land, if it be only to break the crust.

A propos of the horse-bean : it will not answer on light land, and it *must* be sown early. Mr. Dawes of Lachine, upon whose recent appointment to a seat in the Council of Agriculture I beg leave to congratulate him, grew these beans this year successfully ; they were drilled and horse-hoed and yielded 20 bushels an acre. No food like them for horses in cold weather, and they keep the flesh on heavy milking cows better than anything grown. I have seen them 8 feet high, on our low-lying Glo'stershire lands, and yielding 80 bushels, of 68 lbs, to the acre. Half a bushel of beans takes the place of a bushel of oats in our farm-horse rations, and other hard workers have them all through the winter ; only don't give them to an idle horse as they are pretty sure to cause *farcy*.

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You see that we have got a pretty good lot of food together on our supposed 100 acre farm. Let us see :

Ten acres of green-meat, roots, &c. at 15 tons an acre.....	150 tons.
“ “ green clover at 12 tons an acre.....	120 “
	—————
	270

To say nothing of the 27 acres of straw from the grain-crop, 10 acres of most valuable pease straw, and the two years' hay of 20 acres, all of which may amount to some 110 tons of dry fodder, making in the whole about 380 tons of bulky food. To this add the grain, equal to at least 25 bushels an acre, or 675 bushels ; 180 bushels of pease and 36 bushels of linseed (which you will reserve for the calves and down-calving cows), and if you cannot make butter in winter, and plenty of cheese in summer, I have no means of showing you how to do it.

Lastly, do not stay at home so much. You may, and probably will, think I have exaggerated things, but if you would only look about you a little, if you would visit the farms of the best men to be found in the province, if you would inspect the cultivation of the Compton people, who showed forth in such glorious colours at the distribution of the “ Order of Merit ” this year, the farms of Mr. Fisher and Mr. Foster of Knowlton, of the Messrs. Dawes, of Lachine, and of various others too numerous to mention ; if you would take a month or so, “ between haying and harvest,” though the habit of late haymaking here brings those labours too near together I fear, to look over some of the farms I have mentioned, you would find that other men are doing better than anything I have brought before you to day ; and I need not remind you that, all other things being equal, what one man has done, another man can do.

45.—OBJECTIONS.

Such then is the system of rotation which I recommend for the eastern portion of the province of Quebec. Some persons to whom I took occasion to declare that this system or something like it is the only one I think fit to improve the farming in this section, objected that it was bad for two reasons.

The first is that only a few farmers can practise this regular rotation, because they have not suitable lands. Notwithstanding this, any farm, large or small, can be adapted to the rotation, if not wholly, at least in part. A hilly or rocky land will always remain a pasture, because it is good for nothing else. Another piece of land, forming a natural meadow, enriched

every year by the river, will always farm which are s

The second the farmer to put derived from it. whether butter or for sale, and is at not studied the hand instead of o with which he can

Thus, for ins and the farmer, it lessen that feed by this third of hay i fit, while feeding tion to profit by a as I have just said

Let us now su perfcies, on which a list of its product

Pieces.

No. 1.....

No. 2.....

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No. 4.....

No. 5.....

Nos. 6, 7, 8, 9

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47.—VALU

Now that we kn that the produce of cows.

every year by the rich sediment deposited on it by the overflowing of a river, will always remain a permanent meadow ; and the other parts of the farm which are suited to rotation, will be subjected to it.

The second objection urged is that it would have a tendency to allow the farmer to put on the market only one product, milk, and the articles derived from it. It is asserted that in the years when the products of milk, whether butter or cheese, do not sell, the farmer has nothing else to offer for sale, and is at a loss. Evidently those who have made this objection have not studied the system, for, as we shall see, it puts in the farmer's hand instead of only the products of milk, various other kinds of produce, with which he can always meet the requirements of the market.

Thus, for instance, one year hay will sell dear and oats will be cheap, and the farmer, instead of giving his cattle a complete ration of hay, will lessen that feed by one third, sell the third of his hay, buy the equivalent of this third of hay in oats, to replace the hay sold, and make a handsome profit, while feeding his cattle well. He will, in the same way, be in a position to profit by any other fluctuation of the market, as he will always have, as I have just said, various kinds of produce at his disposal.

46.—SUMMING UP OF THE HARVEST.

Let us now sum up what is produced by the farm of 80 arpents in superficies, on which we have just applied a rotation of twelve years. Here is a list of its products :

Pieces.	Produce.	Lbs.	Lbs. of Straw.
No. 1.....	{ Oats.....	4,250	8,500
	{ Pease.....	3,000	7,812
No. 2.....	{ Potatoes.....	37,500	.....
	{ Indian corn.....	126,000	.....
No. 3.....	Barley.....	9,350	18,282
No. 4.....	Clover.....	23,430	.....
No. 5.....	Wheat.....	7,500	15,000
Nos. 6, 7, 8, 9.....	Hay.....	93,720	.....
Nos. 10, 11 and 12.....	Pasturage.....	70,290	.....

47.—VALUE OF THE PRODUCTS COMPARED WITH HAY.

Now that we know what our plan of cultivation has given us, I suppose that the produce of the farm is hay, and is used only to feed the milch cows.

According to the best agricultural chemists, it may be estimated approximately that, taking a relative value of 100 of ordinary good hay, it takes the following proportion of each of the products which we have taken from our soil to give the equivalent of one hundred pounds of hay.

Hay.....	100 lbs.	Indian corn.....	287 lbs.
Oats.....	55 "	Barley.....	47 "
Peas.....	37 "	Clover.....	90 "
Potatoes.....	200 "	Wheat.....	40 "

According to the equivalents we have then :

Produce.	Weight.	Value in hay.	Produce.	Weight.	Value in hay
Oats...	4,250 lbs.	7,727 lbs.	Clover.....	23,430 lbs.	26,033 lbs
Pease..	3,000 "	8,101 "	Indian corn..	12,6000 "	43,900 "
Barley..	9,350 "	19,893 "	Hay.....		93,720 "
Wheat.	7,500 "	18,750 "	Pasturage.....		70,290 "
Potatoes	37,500 "	18,750 "			

The whole harvest is then equivalent in hay to 307,166 lbs., or, in round numbers, to 153 tons.

48,—COMPLETE TABLE OF THE SYSTEM OF ROTATION.

To be able, later on, to establish the net profits of our method of farming, deducing the outlay for labour required to realize them and for the earth for producing them, I will now establish the amount of nitrogen and phosphoric acid, the two most costly elements taken from the soil, by the plants contained in our 307,166 lbs. of hay. I establish this amount in the annexed table containing the full details of our system of rotation, of its produce, of their value in hay, as also their chemical value in nitrogen and phosphoric acid.

On referring to the 12th and 13 columns of this table, it will be seen that the 307,166 lbs. of hay have taken from the soil, by the plants which have grown on it, 3,384 lbs. of nitrogen, supposing that the agriculturists, who assert that clover derives a great portion of its nitrogen from the air, are mistaken, and 1152 lbs. of phosphoric acid.

Pieces	Arpents	Produce
1	31	Oats.....
1	3	Pease.....
1	6½	Barley.....
1	6½	Wheat.....
1	31	Potatoes.....
1	6½	Clover.....
1	31	Ind. corn fodd
7	43½	Hay and Pastu
12	75	

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Let us now asc as the basis of this c of a combined chees where I live, it will

Pieces	Arpents	Produce	Bushels per arpent	Pounds per Bushel	Total Bushels	Total Pounds	Equivalent of 100 lbs of hay	Total value in hay	Nitrogen per 1,000 lbs	Phosphoric acid per 1,000 lbs	Total Nitrogen	Total of phosphoric acid
31		Oats.....	40	34	125	4,250	55	7,727	18.0	5.8	76.5	24.7
30		Pease.....	16	60	50	3,000	37	8,108	35.5	7.5		22.5
6		Barley.....	30	50	187	9,350	47	19,893	20.0	8.7	187.0	81.3
6		Wheat.....	20	60	125	7,500	40	18,750	21.0	9.0	157.5	67.5
3		Potatoes.....	200	60	625	37,500	200	18,750	4.5	1.0	168.8	37.5
6		Clover.....				24,430	90	26,033	17.0	4.2		98.4
3		Ind. corn fodder..				126,000	287	43,902	3.2	1.3	403.2	163.8
43		Hay and Pastures..					100	164,010	11.5	4.0	1508.9	656.1
12	75							307,173			2501.9	1151.8

As I wish to convey as exact an idea as possible of the net profit to be derived from the method of farming which I have just explained, I will begin by assuming that the whole produce of the land is applied to the

49.—PRODUCTION OF MILK.

It is now agreed on all hands, from the experiments made by different farmers, in several countries, that 100 lbs. of hay eaten by a good milch cow will produce 40 lbs. of milk, after allowing the animal her food of support. At this rate 307,166 lbs. of hay will produce 122,866 lbs. of milk,

50.—VALUE OF THE MILK.

Let us now ascertain the value of our 122,866 lbs. of milk. Taking, as the basis of this calculation, the average profits obtained by the patrons of a combined cheese and butter factory during six years, in the country where I live, it will be found that 100 lbs. of milk give an average of pro-

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duce, in butter and cheese, of 85 lbs., leaving, besides, 107,850 lbs. of whey worth ten cents per 100 lbs. The 122,886 lbs. of milk can thus give a return of

Butter and cheese to the factory.....	\$1,044 36
Whey for feeding animals.....	107 85
Total return.....	\$1,152 21

51.—MONEY VALUE OF THE PRODUCT

We will now calculate the value of the product of the land as reduced to hay, so as to see what is the net profit left by our system, to the farmer, deducting this value of the hay. We have just seen that 307,166 lbs. of hay contain 3,384 lbs. of nitrogen and 2,152 lbs. of phosphoric acid.

Taking nitrogen at the price it is worth in sulphate of ammonia, for instance, which contains 20 per cent of it, its real value is found to be 15 cents a pound, calculating sulphate of ammonia at \$50.00 a ton.

In the same way, calculating phosphoric acid at the price it is really worth, for instance, in bone powder, its value is ascertained to be 5 $\frac{11}{16}$ cents, supposing that bone powder contains 23 per cent of it, and that it is worth \$26.00 a ton.

These figures give us, then :

3,384 lbs. of nitrogen at 15 cents a pound.....	\$507 60
1,152 " of phosphoric acid a 5 $\frac{11}{16}$ cents a pound...	65 52

or, value of the hay as to what it removes from the soil.. \$573 12

As 307,166 pounds of hay make in round numbers 153 tons, it will be seen that our hay is worth, outside of what it costs for labour, \$3.25 a ton, or \$2.82 for a hundred bundles.

52.—LAW OF RESTITUTION.

To find the net profit from these figures, it must not be forgotten that if we wish the land to continue producing, without becoming exhausted, we must return to it what we take from it. Now, we have seen that our crop has taken from the 75 arpents of land, 3,384 lbs. of nitrogen and 1,152 lbs. of phosphoric acid.

What then, all, we have the of hay produce 4 go partly to feed

We are now in manure. Far weight of stable food consumed as liquid contained i of weight between admitted, that, fo of the food given, remembered that the other hand thi field where it will crop has given us, amply sufficient fo

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thus obtained, on ti chemists tell us tha and well kept, cont phoric acid, which, 2,854 lbs of nitroge deducted the

What then, must we do to restore these elements to the soil? First of all, we have the manure produced by the cattle. We have seen that 100 lbs of hay produce 40 lbs of milk. There remain 60 lbs of nourishment, which go partly to feed the animal, and the remainder is turned into manure.

MANURE

We are now going to examine what the produce of our land gives us in manure. Farmers are pretty nearly all agreed in admitting that the weight of stable manure produced on a farm is equal to twice that of the food consumed and of the litter put into the manure, the great quantity of liquid contained in animal excretions forming the apparent abnormal excess of weight between the food consumed and the manure produced. It is also admitted, that, for cattle, the litter should be in the proportion of one-fourth of the food given, to allow the absorption of all the urine. But, it must be remembered that if we have calculated our crop in its equivalent of hay, on the other hand this equivalent will be eaten during nearly five months in the field where it will not require any litter. The 49,544 lbs of straw which our crop has given us, as will be seen in a little table which we give below, are amply sufficient for all the litter we require.

To show our richness in manure, we say, then:

Hay.....	307,166 lbs
Straw litter.....	49,544
Total litter and straw..	350,710 lbs
Multiplied by.....	2
Gives, for the weight of manure produced...	713,420 lbs

or 356 tons. But let it be remarked at once that more than the third of this manure will be applied by the cattle themselves on the soil, while they are grazing. This accounts for the difference there is between these figures and that given as the quantity to apply on the ground when hoed and when it is in meadow.

Let us now see the

54.—CHEMICAL VALUE OF THE MANURE,

thus obtained, on the score of nitrogen and phosphoric acid. Farmers and chemists tell us that the manure of the different cattle on a farm, if mixed and well kept, contains for every 1000 lbs, 4.0 of nitrogen, and 1.5 of phosphoric acid, which, for 713,420 lbs, which we have, gives us a total of 2,854 lbs of nitrogen, and 1,070 lbs of phosphoric acid, from which must be deducted the

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55.—CHEMICAL VALUE OF THE STRAW

which enters into the manure, and whose richness in nitrogen and phosphoric acid has not been added to the quantity of these same elements, which we have found in the hay, in the calculation made above.

Produce	Lbs per arpent	Total in pounds	Nitrogen per 1,000 lbs	Phosphoric acid per 1,000 lbs	Total in nitrogen	Total in phosphoric acid
Oat Straw	2,720	8,500	2.8	1.3	24.8	11.0
Pease "	2,500	7,812	17.9	2.4	140.0	18.7
Barley "	2,925	18,232	2.3	1.2	41.9	21.8
Wheat "	2,400	15,000	3.5	1.5	52.5	22.5
		49,544			259.2	74.0

Taking always the calculations of the chemists, which we have already used, we find on examining the above table, which gives the quantity and chemical value of each kind of straw obtained in our rotation, that the total of 49,544 lbs of mixed straw gives 250 lbs of nitrogen and 74 lbs of phosphoric acid, which are valued at \$43.06 according to the price mentioned above.

If we deduct from the 2,854 lbs of nitrogen and 1,070 pounds of phosphoric acid of the manure, the amount of 259 lbs of nitrogen and 74 lbs of phosphoric acid of the straw, we restore to the earth 2,596 lbs of nitrogen, and 966 lbs of phosphoric acid, by the manure which is found to be worth \$444.19, or \$1.25 a ton.

56.—FERTILIZING ELEMENTS TO BE RESTORED TO THE SOIL.

By comparing these quantities with those taken from the soil by its produce, we find that the manure does not (and it is impossible that it should) restore to the soil all that it has taken from it, in fact,

The crop has taken from the earth,				
In nitrogen	3,384	lbs,	and in phosphoric acid,	1,152
And the manure has only restored	2,595	"	"	966
Leaving a deficit of nitrogen	789	"	"	186

which must be continued giving t

If we calculate 5 11/16 cts a pou profits that we ha

For 789 lbs of
For 136 lbs of

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As to this rest to do it during the to its deep roots, plants of the rotat trogen which it co soil. We have so nitrogen, and the to be dealt with is

We may say, chemists maintain from the soil, take of the graminaceo forget, however, th by refusing to gro nures, which seem the soil.

After the second my opinion, to rec a certain proportio the soil.

Now that the c culation so to arriv purpose let us exa in its cultivation, a farmer and his cattl

First of all, let

In our section pent, including the pents, \$2.400

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which must be restored to the earth in some way or other, if we wish it to continue giving the same return without becoming exhausted.

If we calculate the nitrogen to restore at 15 cts and phosphoric acid at 5 11/16 cts a pound, as we have done above, the farmer must take on the profits that we have mentioned :

For 789 lbs of nitrogen, at 15 cts a pound\$118.35
 For 136 lbs of phosphoric acid at 5 11/16 cts a pound.... 10.60

Or a total to be restored in nitrogen and phosphoric acid..\$128.95

As to this restoration, the second crop of clover ploughed in will suffice to do it during the first and second year of the rotation. The clover, owing to its deep roots, plunges down into the soil, far below the space where the plants of the rotation find their food, in quest of the great quantity of nitrogen which it contains, and its ploughing in benefits the upper layer of the soil. We have seen that the first crop of clover produced nearly 400 lbs of nitrogen, and the roots also furnish a great quantity of it. But, if the land to be dealt with is already exhausted, restitution must be made at once.

We may say, without fear of contradiction, that many agricultural chemists maintain that clover, instead of drawing its surplus of nitrogen from the soil, takes it from the air, owing to its leaves, utterly unlike those of the graminaceous species, by electric influence or otherwise. Let us not forget, however, that the lands in which clover is cultivated too often, finish by refusing to grow it any longer, despite the application of powerful manures, which seems to prove the first theory that it finds all its nitrogen in the soil.

After the second round of the rotation, it will probably be necessary, in my opinion, to recommence restoring the nitrogen and phosphoric acid in a certain proportion, varying with the greater or less primitive richness of the soil.

Now that the question of manure is explained, let us continue our calculation so to arrive at the conclusion, namely, the net profit, and for this purpose let us examine what is the sum invested as capital by the farmer in its cultivation, and what is the sum represented by the work done by the farmer and his cattle.

First of all, let us establish the amount of the

57.—CAPITAL INVESTED IN THE FARM.

In our section of the country land is worth, on an average, \$30 an arpent, including the value of the farm buildings, or, for one farm of 80 arpents, \$2.400

With the 307,166 lbs. of hay, the farmer can keep 34 cows, weighing,

nitrogen and phosphoric elements, which

Total in nitrogen	Total in phosphoric acid
24.8	11.0
140.0	18.7
41.9	21.3
52.5	22.5
<hr/> 259.2	<hr/> 74.0

we have already the quantity and on, that the total 174 lbs of phosphoric mentioned

pounds of phosphoric and 74 lbs of nitrogen, and to be worth

E SOIL.

in the soil by its possible that it

acid, 1,152 lbs
 " 966 "

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on an average, 600 lbs., supposing that each of them eats $4\frac{1}{2}$ tons, or 600 bundles of hay a year. These 34 cows are worth, on an average, \$20, or, in all, \$680.

To do his farming, the farmer requires implements to the value of \$200 to which I add \$20 for unforeseen items.

This makes a total capital of \$3,300, which requires, at 6 per cent, an interest of \$198.

Let us now see the cost of

58.—LABOR

to utilize this capital. The work to be calculated is that of sowing and harvesting, and of the care of the cattle only ; for, as to the work required to make the milk into butter or cheese, we have, in the calculation that we have made of the money value of the milk, given the net produce sold from the creamery, after paying all the costs of making, selling, etc.

For the farm of 80 arpents, for which our calculations are made, the labor of two men is sufficient, and this labor is worth, with us, \$18 a month, namely : \$10 for wages, and \$8 for board, \$216 for each man, or \$432 for two men for the year.

We must also calculate the work of two horses of 1,000 lbs. each, which, counting their full ration of $3\frac{1}{2}$ per cent of their weight, in hay, every day, will eat about $6\frac{1}{4}$ tons of hay each, or $12\frac{1}{2}$ tons for both, every year. This hay, estimated as above, at \$3.75 a ton, represents for the work of the horses, \$46.88

These calculations are based on the assumption that the farmer employs strangers for his hired labor. If he does the work himself, with his son, as in generally the case, he will have in hand the \$10.00 a month, say \$120.00 a year for each man, or \$240.00 for the two men, which sum he will have earned with his son.

If we further suppose that he is arrived at the period when he must restore to the soil, in chemical manure, the deficit left by the animal manure, which we have shewn to be \$128.95, we balance our accounts as follows :

EXPENDITURE.	RECEIPTS.
Interest at 6 p. c. on the capital of \$0300.00.....	Value of crop in hay.....
\$198 00	\$ 573 12
Price of the labor of two men....	“ milk produced.....
432 00	1,152 89
“ “ “ horses..	“ manure “
46 88	444 49
Value of the manure put on the land.....	“ litter straw.....
444 49	43 06
Value of the litter straw.....	Total receipts.....
43 06	\$2,213 56
Surplus of chemical manure furnished....	“ expenditure....
128 95	1,865 60
Value of feed consumed.....	Balance of net profit..\$
573 12	347 96
Total cost.....	
\$1,865 60	

If to this manure which is rotation, and then and consequent when the rotation

59.—

We now have part of the Province of Kamouraska, and the River St. Lawrence there have to nearly every spring to spawn on the is cast up in ground of May. These are to increase his

60.—COMPARATI

If we compare substances contain

Nitrogen
Phosphorus

The only thing to get, and immediately ; for, other, sea-weed, etc. As to the sea-weed or when it comes manure if it is mixed allows of its being

61.—

Need I tell you and enter in the paper not undertake to compare ? No. Every although they are which allows of the

If to these \$347.96 of net profit, we add the \$128.95 of chemical manure which is perhaps not necessary during the two first periods of the rotation, and the \$240.00 of wages which the farmer will earn with his son, and consequently keep as profit, in most cases, we arrive at a net profit, when the rotation has been fully successful, of \$716.91.

59.—MANURE TAKEN FROM OUTSIDE OF THE FARM.

We now have a possible result. I will here remark that in the eastern part of the Province of Quebec, starting from the upper end of the County of Kamouraska, going downwards, for the parishes along the shore of the River St. Lawrence, the profit may be more considerable, because the farmers there have two precious sources of manure, which are within their reach nearly every spring, I mean the small fish called capelin, which comes up to spawn on the shore as soon as the ice is gone, and the sea-weed, which is cast up in great quantities on the beach by the high tides of the month of May. These two supplies of manure, if well employed, enable the farmer to increase his harvest enormously almost every year.

60.—COMPARATIVE VALUE OF FISH, OF SEA-WEED AND OF STABLE MANURE.

If we compare fish and sea-weed with stable manure, we see that these substances contain per 1,000 lbs. :

	Fish.	Sea-weed.	Stable manure.
Nitrogen.....	28.0	5.4	4.0
Phosphoric acid.....	2.5	0.6	1.5

The only inconvenience offered by these substances, which cost scarcely anything to get, apart from their conveyance, is that they must be used immediately ; for, otherwise, one of them, fish, putrifies and is lost ; the other, sea-weed, dries up, or it heats when piled up and loses its qualities. As to the sea-weed, it must absolutely be buried in the ground while fresh or when it commences to heat ; but fish can be made into a powerful manure if it is mixed in a compost with dried black earth and plaster. This allows of its being gathered in great quantities and kept for future use.

61.—PUTTING THE SYSTEM INTO OPERATION.

Need I tell you that the farmer who wishes to reform his bad tillage, and enter in the path of improvement suggested by the present work, must not undertake to carry out this reform at one stroke and in a radical manner ? No. Every one will understand that the returns I have indicated, although they are not the highest that may be obtained, and the rotation which allows of their attainment, cannot, from the first year of commencing

this reform, be considered as certain of success. The farmer must consider his means, and commence his rotation on only a single portion of his farm, if there is not manure enough to undertake more. Little by little he will extend his rotation over a greater space, and finally succeed in applying it to the whole farm, as his cattle, and manure, and consequently his profits, increase.

62.—NECESSARY EXPLANATION.

It is well understood that farming is not usually devoted entirely to hay, and that milch cows alone are not kept on the farm. We have made this supposition in the present work, so as to be able to give approximate figures only. According to the figures given, the farmer, will see, that for the region now in question it is better to refer everything, as far as possible, to the production of milk. It is understood, then, that only the number of horses necessary, and pigs to utilize the waste milk and grain will be kept, sheep for pasturage unsuited for anything but sheep, and also fowls to consume so many things, which, without them, would go to loss. But the greater portion of the cattle, which will be the base of every system of cultivation, will be made up of good Canadian milch cows. This can readily be understood, as they are the best breed for our country.

63.—RULES TO FOLLOW FOR OBTAINING SATISFACTORY RESULTS-

Before finishing my work I have yet to lay down for you certain strict rules which must be followed out exactly in order to attain the results already indicated. These rules, moreover, contain nothing new. They contain principles applicable to all good cultivation, whatever may be the system in vogue.

64.—CLEANING UP OF LAND.

The first thing to be done by a farmer who wishes to alter his method of farming and enter upon the true path of progress, is to clean and clear up his land. Piles of stones, roots of brushwood, banks of ditches, broken bits of fences, such as ends of stakes, posts, withes, pins, etc., all must be removed. The piles of stones will be disposed symmetrically, as far as possible, in rows, instead of being heaped up in the middle of the field. Instead of ten small piles let there be only one or two large ones. Later on, if the land is suitable, that is, if it does not lift with the frost, these stones can be piled into walls for fences. If the land is bad, and there is no useless land close by, where these stones can be got rid of, they must be buried in deep trenches made in rows, and which will serve to drain the land. But this will only be done when the farmer has realized profits enough to enable him to pay for this work, out of the money made from the farm.

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Any shrubs or brushwood must also be removed. They occupy ground which they render useless, cast a shadow over the vegetation which surrounds them, and contribute as much as the piles of stones to diminish the quantity of the harvest.

Any piece of wood lying on the ground is in the way of the proper working of the farm implements, and a mowing machine which cost fifty or sixty dollars, has been broken by an end of a picket left carelessly in the field. Therefore, let there be a complete cleaning up of the land.

65.—DRAINAGE.

A badly drained farm cannot give good profits. The crops are drowned in the pool of water. Water lies stagnant in the meadows, and develops moss, the sorrel plant spreads all over, and in winter the ice destroys the roots of the grass. What is required to drain it properly? Good ditches, with sloping edges, so as to prevent their giving away, and being filled up by the frost; good wide ridges, not less than 16 feet, well rounded off, furrows well drawn, trenches well made, the edge of which is spread upon the ridges, instead of forming a rim near the trench wherever the water threatens to lie, embankments of ditches also spread over the middle of the ridges; a good drain ditch at every half arpent, water courses or gulleys always well cleaned, deep enough not to overflow in heavy rains. With this, there will be no need of the numerous cross ditches, which are only too often to be seen in our region.

Above all, the farmer must be sure of the water course, so as not to make ditches, such as we see only too often, in which the water can only circulate by running uphill.

66.—FENCES.

I have already mentioned fences when speaking of clover. The fences should be made without sparing. A bad fence is always more costly than a good one. Has not the farmer who neglects his fences, on one or more occasions, seen a beautiful field of grain destroyed by his herd of cattle, escaping, on some fatal night, from the adjoining pasture. Cedar, if it can be had, although somewhat costly, is the most suitable timber. The pin is now replaced by wire, and the change is very much for the better. The pickets are less broken by the wire than by the large hole required for the pin. If care is taken to have the wire galvanized, and every Spring the precaution of steadying the posts displaced by the frost is attended to, a cedar fence can now be made which will last sixty years. I know some that are as old which are still in good enough condition.

67.—WEEDS.

The curse of our agriculture. Nobody can deny this assertion. The plan of rotation which I have just proposed, has the great advantage of securing the easy destruction of weeds. In fact the manure put on the ground in the Fall after hoed-crops, consists of manure which has fermented, and in which consequently the seeds of the weeds are destroyed. Hoeing prevents the weeds natural to the soil, or those which have come from elsewhere, from spreading. The manure put in the Fall on the meadows is also decomposed, and contains no bad seed.

If care has been taken to sow only fodder and grain seeds, well cleaned and containing no foreign seeds ; if, moreover, people observe scrupulously, and see that others do the same, the law about weeds along the roads and elsewhere ; if care be also taken to destroy, as soon as they appear, the weeds which grow generally in heaps of stone, and those which always find their way, notwithstanding the greatest attention, here and there, on the meadows, it is certain that the land will never be infested by weeds.

68.—CHOICE OF THE SEED.

The success of the harvest, depends, in a great measure on the judicious selection of this.

The first rule to observe is to sow only fodder seeds or others scrupulously cleaned. To my knowledge, a parish has been invaded by the daisy, the chicory or thistle, for having taking part in a distribution of fodder seed sold by an unscrupulous dealer who sold uncleaned seed. A special law should be enacted, to send the author of such a fraud straight to the penitentiary.

The second rule is to sow only such grains as suit our climate. A certain kind of grain may succeed well in Ontario, and come to nothing here.

The third rule consists in avoiding the bastardising, the degeneration of the seeds. This is done by renewing them. By force of circumstances, a variety of wheat, which, when first imported, gave great crops now gives only slender ones. People wonder at this, and yet it is not strange. A bad year has come ; the grain has ripened badly, has perhaps been touched by the frost, been gathered in a bad state, perhaps damp. The result is that the seed is weakened, and will in turn give but a poor crop. This is a cause of degeneracy, which will be more and more felt from year to year, if the weakened seed is not changed for another in good order, whose value is unimpaired.

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Oats
Pease
Potatoes

Indian corn ..
Barley
Fodder plants
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I will now proceed to enumerate a choice of varieties of different seeds comprised in our system of rotation, which, in this section, has given general satisfaction.

- Oats* Black Tartar oats.
- Pease* Golden Vine.
- Potatoes* Early Rose (if the seed is good ; with us it has degenerated and now only gives poor crops). Beauty of Hebron, for ordinary crops. White Elephant for abundant crops.
- Indian corn* Canadian yellow. Western.
- Barley* Chevalier barley, (two-rowed.)
- Fodder plants* Timothy, with the kinds of clover mentioned above.
- “ “ Mixture recommended, which gives much better results.

Names of the seeds.	Light soil. pounds.	Medium soil. pounds.	Heavy soil. pounds.
Timothy.....	4	5	6
Red clover.....	1	1	2
White “	2	1 1/2	2
Alsike.....	1	1 1/2	1
Orchard grass....	4	6	6
Red top.....	3	5	6
Blue grass.....	10	3	4
Ray or rye grass..	0	1	1
Meadow fescue... .	2	3	3
Hart “ ...	1	1	1
Yellow oat grass..	1	1	1
Meadow fox-tail..	1	1	1
Total.....	30	30	34

Mixture of about 30 lbs. for an arpent, and worth from 15 to 16 cents a pound, or \$4.80 an arpent.

69.—FARMING IMPLEMENTS.

The wheel plough yet holds its way in many places in the eastern part of the province ; (1) let us hope that before long it will disappear. Good ploughs can be had almost anywhere, for moderate prices and within the reach of any one's means. The wooden toothed harrow is rapidly disappearing. It should everywhere be replaced by the iron toothed harrow. Every farmer should also have a good roller, a horse hoe, &c.

(1) This refers, of course to the old French, not to the modern iron plough with 2 unequal sized wheels. A. R. J.-F.

As for the mowing machines, horse rakes and reapers, these are costly implements, and are not within the means of farmers who wish to commence the reform I suggest, without making any outlay upon their lands. They can do, as is done in a great many localities. Farmers who own such implements, go to their neighbours, and for a price of so much per arpent, mow and reap for those who have none. At our place, the price is 50 cents for mowing and 80 cents for reaping. There should also be in each range a good fanner for separating and cleaning the seed.

Lastly, whenever a farmer buys any one of the implements indispensable to his business, he should aim at buying a good one, for a bad implement never does good work.

70.—CHOICE OF CATTLE.

As we are now considering farming for the production of milk, cows will be the most numerous cattle on the farm. The Canadian cow improved by careful selection, or crossed with the Jersey breed, is the most suitable, not only for our district but for the whole Province of Quebec. She is hardy, easily fed, a good milker, stands ill-treatment, and supports the hardship of the seasons better than the imported cows of any breed whatever. And, as I believe I have shown you that the heavy cattle for the slaughter-house cannot be profitable for us, I maintain that the Canadian cow is, above all, the cow for us.

As for sheep, the trials we have made with the Cotswold, have shown that this breed does not suit our climate. It is subject to many drawbacks and degenerates very rapidly. In fact, by the third generation it has lost more than half its value. Besides, long wools are no longer sought after. We must therefore turn our attention to the short wools, which are the most hardy, and, consequently, the best suited to our climate. The breeds most suitable for us are the Southdowns and Shropshire.

For pigs, the Berkshire seems to be the best breed, although the white Chester also gives good results. As to fowl, the Plymouth-rocks are the real fowl for the farmer. A good layer, hardy, large enough, not too good a sitter, not a rambler, such is this hen which is very pretty in appearance. Geese with us are in their real element. A Quebec goose is always better than a Montreal one. The duck is also specially suited to our climate. As for the turkey, I do not recommend raising it amongst us, especially below, from the county of Kamouraska downwards. The climate does not suit it, and it does not succeed well here.

I have not spoken of horses. They will not be numerous on the farm. We should strive to restore our breed of small Canadian horses, lively, active, hardy and untiring. They suit us much better than heavy horses for

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our deep winter snow, and for our roads during the long muddy seasons in the Fall and Spring. They do better on our clay lands than too heavy a beast.

71—MANURE

If we take for the farmer's motto: "No manure, no crop," we can easily convince ourselves that the question of the preservation of manure is one of the most important which claim our attention. The greatest fault with our farmers of the eastern part of the Province of Quebec, and this they share with many of those of the western, is that they allow one half, and even three fourths of the manure produced on the farm, to go to waste. What do we see, in fact, with nearly all our farmers? A heap of manure, put directly under the edge of the roof, so as to receive all the rain that falls from it. This heap, exposed to the winter's snow, to the rain, &c., is composed in the spring time of alternate layers of snow, manure, ice, which, from the first thaw, begin to melt, to become diluted, and to allow the continuous escape, under a liquid form, of all the fertilizing elements of the manure. At intervals, the heap is frozen into a solid mass; at others, it becomes so heated that the air is saturated with the ammonia which it allows to escape.

How can these evils be remedied? The thing is quite easy: First of all, the manure must be put under shelter, in such a way as to receive neither rain nor snow, and not be exposed to the drying rays of the sun. Then it must be kept from becoming too much heated, and the best way to do this is to press it down well. A good way is to have several pigs in the building or cellar where it is kept. The bottom of this building or cellar should be so arranged as not to let any liquid escape. In this way, the manure keeps all its value, and instead of carting on the fields loads of washed out and useless substances, the farmer will have a good manure by which the plants will benefit in such way as to amply repay the care bestowed on the mixen.

I conclude these remarks on manure, by laying down as a principle, that the farmer should avoid the use of green manure, not heated, on the field in the spring time. It is the worst way of producing weeds.

72—CARE OF CATTLE

The question of manure is important, but that of the care of cattle is not less so. They require food and shelter. We must give them four things which are indispensable to them: good air, light, suitable warmth and proper food. Good air can easily be had by ventilation. Light is necessary, and easily procured. The temperature, without being too warm should be even, and it must not be forgotten that cattle suffer from cold as well as from heat.

Now as to their food. The farmer thinks that the animal which receives a good feed of hay has all that it needs, except a little oats for the horses. The horse readily suits itself to this diet, but not so the milch cow. A feed composed partly of hay, partly of ground peas, oats and barley or of a mixture of these, and partly of roots such as potatoes, is what milch cows require to make them give milk during the winter, and enable them to retain their good milking qualities. Hay, alone, makes cows run dry. Dry hay of any kind increases its value by one-third if it is chopped up, a little in advance, moistened and piled in a heap a couple of days before being used, so as to let it undergo a slight fermentation.

Cattle should be fed in proportion to the return which it is desired to obtain from them, and it is better to keep fifteen cows well fed than to keep thirty suffering from want of food.

73.—EMPLOYMENT OF THE PRODUCTS.

I have said that all the products of our system of rotation should, as far as possible, concur in the production of milk, except during years when dairy produce commands little or no price on the market. Let us examine briefly what is the most profitable way to dispose of the milk produced on the farm. It may be done in four ways: 1st. Keep a dairy and make butter in it; 2nd. Send the milk to a butter factory; 3rd. Send it to a cheese factory; 4th. Send it to a combined butter and cheese factory.

Let us examine, for a moment, each of these ways:

1st. Dairying and making butter at home.—Dairy butter is to-day depreciated by the presence in the market of factory butter, which is nearly always superior to it. It follows that dairy butter is always worth a fifth, and often, one-fourth less than factory butter. Again, at the dairy, the milk generally yields one-fourth less of butter than the same milk would have given at the factory. Lastly, the making of good butter in the dairy is very difficult, owing to the general absence of ice, to the ignorance of the proper way to make butter, and to the difficulty of keeping the butter good, when it is made. And, moreover, if we take into consideration the labor saved by sending the milk to the factory, it will not take any long discussion to prove that it is not profitable for the farmer to keep his milk at the dairy when he has a factory within reach.

2nd, Sending the milk to the butter factory.—For all the reasons mentioned above, there can be no hesitation about giving the preference to the butter factory, as compared with the dairy. But there still remains the question: which is better for the farmer, the butter or the cheese factory? There are arguments in favour of both, but I will say that for the farmer who has a prejudice against giving the milk left from the cheese to his

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3rd. Sending that the cheese fact, if we take that factory but for the 4 lbs., w Cheese, on the farmer, which, leaves a balance from the cheese of ground grain brium. There costs as much as

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As regards t introduced them ate figures. He as indisputable, for their conclusions. of the substances tance, amount to for the same'reas lime, which are a phoric acid. The order to establish require a consider restitution. Bone: ashes and plaster

We conclude with, as a corollar agricultural lectur

young cattle, which prejudice, by the way, is groundless, it is better to encourage a butter factory, because it leaves him buttermilk, which seems to be better suited to his young stock.

3rd. Sending the milk to the cheese factory.—In average years I think that the cheese factory will pay somewhat better than the butter factory. In fact, if we take the prices of butter and cheese for the last six years, we find that factory butter was worth, on an average, 18 cents net to the farmer, or, for the 4 lbs., which is the average produce of 100 lbs. of milk, 72 cents. Cheese, on the other hand, gave an average of 7 cents a pound net to the farmer, which, at 11 lbs. of cheese for 100 lbs. of milk, gives 77 cents. This leaves a balance of 5 cents in favor of the cheese. It is true that the residue from the cheese is worth far less than that from the butter, but some pounds of ground grain mixed with that from the cheese soon restores the equilibrium. There would remain the calculation whether this ground grain costs as much as the surplus of five cents per 100 lbs. which the cheese gave.

4th. Sending the milk to the combined butter and cheese factory.—And, first of all, what is a combined butter and cheese factory? It is a factory which has the apparatus required to make either butter or cheese, or butter and cheese from the same milk. During years when butter sells much better than cheese, only butter is made. When cheese sells much better than butter does, cheese alone is made.

74.—A WORD ON THE SUBJECT OF THE CHEMICAL QUESTION

As regards the chemical questions, in the present work, the author has introduced them only incidentally, to have a basis for arriving at approximate figures. He does not assume to give the chemical quantities indicated as indisputable, for he is well aware that agricultural chemists often differ in their conclusions. The differences that might be established in the valuation of the substances mentioned by different farmers would, in the present instance, amount to no more than a variance of from 6 to 8 tons of hay. It is for the same reason that the lecturer has omitted speaking of potash and lime, which are as indispensable to the life of plants as nitrogen and phosphoric acid. These elements are much more common and this is why, in order to establish his figures, the author has spoken only of those which require a considerable outlay on the part of the farmer to obey the law of restitution. Bones, sulphate of ammonia, superphosphates cost dear, whereas ashes and plaster are relatively very cheap.

We conclude this abstract of the system of cultivation on dairy-farms with, as a corollary, the lecture of Mr. O. E. Dallaire, our earnest official agricultural lecturer.

75.—ECONOMICAL PRODUCTION OF MILK.

After having advised farmers to keep their eyes open in every way, the lecturer describes the means of lowering the cost price of milk and points out the fourteen following ones :

1. Proper rotations for dairy-farms.
2. Careful treatment of pastures.
3. Subdivision of pastures.
4. Green-fodder crops.
5. Water, salt, shelter for cattle, and other special treatment, such as gentleness, exercise, the way to milk properly, etc.
6. Proper mode of wintering stock.
7. Prudent practice of silage and its positive advantages.
8. Roots, and their judicious expenditure.
9. Utility of the chaff-cutter for rough-fodder.
10. Grinding (or bruising) grain for milch-cows.
11. The maintenance of ratio, and its proportionate production for each head of stock.
12. Proper care of cowhouse, stable, etc.
13. A convenient and fair-sized piggery.
14. Especial attention to selection of cows.

Each of these means would supply the subject for a very interesting lecture ; but I must observe that most farmers are now acquainted with all these improvements.

People know, with more or less certainty, what there is to do ; still, it is a very different thing to say that they all do their best to put what they know into practice.

Still, I will make some remark on the *system of cropping*.

How comes it that there are farmers who keep with profit one head of stock to 2 or 3 arpents, *i. e.*, 30 to 40 head on the 100 arpents, while the majority only keep one head to the 5 and 10 arpents ?

How comes it that those who keep the fewest cattle are those who have the most trouble with them ?

It is because dairying ought not to be a secondary part of the business of the farm.

As Shakespeare says, *to be or not to be* ; since cattle are indispensable on a farm, let us try to manage so that they do not consume more than they pay for.

No use asking if dairying pays or not ; whether one likes it or not, cattle must be kept, or the land will go to ruin very quickly. We cannot get out of that.

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Therefore, a good system or rotation is necessary, and will be established, without doubt, to supply plenty of grass, clover, green-meats, silage, roots, pulse, &c.

In every trade, it is the large supply that makes cheapness.

76.—ON ENSILAGE.

I am glad to see a favourable reaction going on in the building of siloes. Many farmers are to-day becoming acquainted with their value. It is doubtless regrettable that several have not understood how to avail themselves of the advantages of the system. The want of knowledge of most of those who have spoken about it, and of those who have tried it, has greatly injured this improvement; but it must be learnt: We have learnt it.

We affirm then that silage of maize is the only means by which more than one head of cattle can be kept to the 5 arpents with any profit. Every county of the province proves this to those who do not keep their eyes shut. All the objections possible are not worth one good feed of silage for the economical wintering of stock. Let us then follow good examples.

77.—MAINTENANCE RATION AND NUTRITIVE RATION.

It is only needful to open the agricultural papers, the interesting reports of this Association, and a pile of other books, pamphlets, &c., to be found in the hands of the members of the farmers' clubs to-day, to see examples of these rations.

In the first place, the animal eats to maintain life; if he eats more, the surplus goes to the more abundant supply of meat, fat, milk, eggs, wool, &c.

The important, though often difficult point is, to have enough judgment not to give an animal more food than it can utilise profitably.

One cow can make good use of lots of silage; another will pay better if fed on dry oatmeal.

It all depends upon constitution, and this would lead me to speak of the importance of uniformity in a herd.

In all this then, a great deal of the spirit of observation is wanted; the result is called—experience.

Perish, then, the man of routine!

In this matter, the success obtained and the quality of the manure are the most natural guides.

78.—THE SELECTION OF MILCH-COWS.

How happens it that most of the men, who have been farming for 25 or 30 years, have not even now more than 2 or 3 good cows out of 10, and even fewer?

In the Provincial Competitions of Agricultural Merit, we have had the advantage of visiting many of the best farmers in the province.

Out of the 15 marks allotted to stock, it seldom happens that we give more than 9 to 10.

It is then difficult to provide ourself with good dairy-cows.

This is, and will be for many a day, the cause of most of the failures, or rather of discouragement, to a very large number.

Doubtless, the prices of butter and cheese are rather lower; but I often beg *men of good will* to make a *slight calculation* in their parish, and find out what is the average yield of milk from the cows.

Well! There are parishes, and therefore farmers, where the average of the cows is not more than 8 to 10 pounds a day.

Is it surprising that dairying ruins some men and pays others?

Let us then keep good cows.

To hear some men talk, one would think that each has better cows than any one else!

Just make that little calculation; that will open your eyes as much as any amount of big talk. It is so simple, that there must be something in it.

Oh yes! but whence are we to get the good cows?

All men of experience know; I will not tell; but I may add that it would perhaps be as well to inquire.

How keep good cows, when we have them?

My goodness! Don't sell them, and treat them properly.

The trouble is, that if a man wants some thirty dollars or so, in a hurry, the best cow is picked out, and sold to a town milkman, to the village tradesman, or even to one's neighbour.

Who can reckon up the number of first-rate cows sold to town milkmen, and sent to the butcher the following year.

Cannot we, somehow or other, amend this?

A little less extravagance in dress, carriages, houses, etc, would often prevent this misfortune. Let us practise economy more.

Sell one's best cows! As well sell the farm at once.

What would pay for a piano?

No one would done by many a

Let us then Providence.

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Is there any true interest, and

Can we not whose meetings a the lot of the farm

Do the farmer

Let us put an honourable position

Let us inform the more we learn country.

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What would one think of a carpenter who should sell his best tools to pay for a piano ?

No one would confess himself guilty of such a crime : still it has been done by many a one !

Let us then be in earnest, and use wisely the gifts bestowed upon us by Providence.

79.—OF THE SPIRIT OF COMBINATION.

Is there to-day a class of professional people or of tradesmen that forms a greater and more perfect association than the farmer-class ?

Is there any organisation more powerful, more capable of studying its true interest, and of making better use of its resources ?

Can we not reckon upon more than 500 parochial or farmers' clubs, whose meetings are held with a view to the instruction and improvement of the lot of the farmer ?

Do the farmers, as a body, understand this thoroughly ?

Let us put new life into our zeal, gentlemen, and be worthy of the honourable position we hold in society.

Let us inform ourselves better concerning the things that affect us, and the more we learn, the more attached shall we become to the soil of our country.

Let us be men of courage, prudent and earnest, proud of the products of our good sense and our labours; let us be proud of the good repute of our province; let us make it still more grand by a novel gallantry, and to our children let us leave as a heritage the recollection of passages of glory and of inexpugnable honour !

80.—OF PRIMARY INSTRUCTION.

The Dairymen's Association being the greatest and most distinguished expression of the great agricultural family, I beg respectfully to express a desire: that in conjunction with religion, agriculture may occupy the leading position in the rural primary school.

To explain:

I wish, if ever the uniformity of school-books is the rule, a matter, now, very much in discussion, that the reading-books be filled with agricultural matter.

That the arithmetics and book-keeping forms be crowded with problems in agriculture, in land-measuring, &c.

That the examples given in grammar, and the exercises in grammar and style, be chiefly on agricultural subjects.

And, lastly, that the text books be, as far as possible, saturated with things pertained to rural life.

This subject is in exhaustible and full of all manner of attractions.

I would not have a dry, entirely material science, but that everything should be treated from a point of view purely Christian.

The child would thus be accustomed to observe, always and everywhere, the admirable unity of the works of the Almighty.

Both his mind and heart would become filled with love for the manifold wonders and blessings he sees around him.

He could not avoid admiring the infinite and provident wisdom of Divine Providence.

He would all the more believe in the care that the Creator is taking of all things, and his life-long experience would keep him safe under the eye of his God.

Oh ! how grand and practical would be the teaching in our rural districts were it given from this point of view.

Without reckoning that, with text books worthily prepared, the teaching of our masters and mistresses would be all sketched out beforehand.

What grand chapters have been written, by how many great men, on the happiness and blessings of a country life !

Did not our Lord himself draw some of his finest illustrations from the book of nature ?

Let us imitate, to the best of our ability, his method of teaching ; then shall we succeed in retaining our rising generation in the pleasant paths of agriculture.

They will wander far less from that pure and Christian life, which forms the chiefest adornment of our good Canadian homes, and gave to the country those men whose advent forms an epoch in history.

Then, let us love agriculture, let us love it practically, let our children study, again and again, the successes of our model farmers and settlers.

Let them have constantly before their eyes the grand examples of laborious exertions, management, and justice ; then will they continue the wholesome traditions which make nations happy and prosperous.

SUBSC

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M. J. C. Chapala laid down, a rule, that Barnard, when speaking "badly dried and bits duty to follow up already published in crops," (1)

1. Mr. J. B. A. and XVIIIth Rept.
2. Mr. Ant. Cas
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80. Lucky and luck of Mr. Richard up the ridges. (Mr. Rept. 1899, pp. 140). Quebec ; 89. What 92. Moist land ; 93 95. What land needs explanation ; 98. At

The Governmen Sirois ; Rept. 1st Co 101. Preparation lance-sheet. (XV Re

(1) Assainissement mouths, &c. Ameub grubbing, &c.

DRYING OF THE LAND

DRAINAGE

SUBSOILLING AND PULVERISATION

Condensed and Reviewed by M. E. Castel.

M. J. C. Chapais having, at the opening of the description of his "System of cultivation," laid down, a rule, that the farmer must begin by "drying and cleaning-up his farm" and Mr. Ed. Barnard, when speaking of the defects in our farming, having stated that our farms are, as a rule, "badly dried and by no means properly prepared," the Dairymen's Association has thought it its duty to follow up the "System of cultivation suited to a dairy-farm" by reviewing the essays, already published in previous reports, on the drying-up of land, on subsoiling, and preparation for crops," (1)

1. Mr. J. B. A. Richard, laureate of agricultural merit : XVth Rept. D. Ass. 1896, pp. 167, and XVIIIth Rept. 1899, pp. 161.
2. Mr. Ant. Casavant, Member of the Council of Agriculture ; Vth Rept. D. Ass. 1886, pp. 30.
3. Mr. W. Ewing, Rept. 1st Congress of farmers, Supp. XIth Rept. D. Ass. pp. 275.
4. Mr. L. P. Sirois, L. L. D. ; same Rept. pp. 272.

SUMMARY.

80. Lucky and unlucky ; 81. The secret of luck ; 82. How one becomes unlucky ; 83. The luck of Mr. Richard ; 84. The drying of the soil ; 85. Plan of M. Richard's farm ; 86. Shaping-up the ridges. (Mr. J. B. A. Richard, XVth Rept. D. Ass. 1896 pp. 175 to 181, and XVIIIth Rept. 1899, pp. 140). 87. Historical sketch of drainage : 88. Need of drainage in the province of Quebec ; 89. What drainage really is ; 90. The work of water on vegetation ; 91. Cool land ; 92. Moist land ; 93. Consequences of an excess of water in the land ; 94. Effects of drainage ; 95. What land needs draining ; 96. Personal experience ; 97. Plan of Mr. Casavant's farm with explanation ; 98. Abstract of discussions. (Mr. Ant. Casavant; Vth Rept. D. Ass. pp. 30 to 40).

The Government and Drainage (Mr. Wm. Ewing) ; 100 The law and drainage (Mr. L. Sirois ; Rept. 1st Con. of Farmers).

101. Preparations ; 102. Subsoiling ; 103. Richard's trenching-hook ; 104. Richard's balance-sheet. (XV Report).

(1) Assainissement is, as opposed to drainage, drawing water-furrows, opening ditch-mouths, &c. Ameublissement, we should call in England fitting the field, or fields, by harrowing, grubbing, &c.

80.—LUCKY AND UNLUCKY.

One of the most frequent obstacles met with is this ; every one complains of the want of proper food for our stock. Unfavorable seasons, disease, grasshoppers, hail, late or premature frosts, low prices for our products, are so many reasons to which our want of success is assigned. Hence, complaints ; sometimes, entire discouragement.

Still, in every district are found some farmers who appear more favored, whose crops are more abundant, who sell their goods for higher prices, who are, in fact, *lucky*. So the entire agricultural class may be divided into two categories ; the lucky and the unlucky.

81.—THE SECRET OF LUCK.

While admitting that the circumstances in which each individual is situated have a great influence on his luck or want of luck ; in my humble opinion I believe it to be possible, with reflection and careful consideration, to lessen considerably the number of misfortunes. Not all, but a great many of the obstacles that are most frequently encountered in our paths, may be got out of the way ; we may produce with greater regularity if not more abundant harvests, at least fair ones, crops that will allow of our giving our stock better and fuller keep, and in that way to profit by the great advantages offered by dairying.

I am not however, going to insinuate that we can and ought to be invariably successful. No, as I said just now, circumstances have too much to do with that, and I know that for the farmer who is not well off, the slightest accident, the sickness of a draught horse or ox, the breaking of an implement, etc., etc., may sometimes endanger the safety of a crop. I would only ask, with you, how to find the fittest means to diminish the risk of failure in our agricultural exploitations.

As I said above, we have plenty of subjects of complaint ; some of them beyond our control, others preventable, or at least reducible to smaller dimensions. In this category, I will enumerate excess of rain, droughts, frosts, etc., etc.

I shall perhaps be told that, to undertake the prevention of accidents that appear to be beyond our control, is to greatly increase the difficulty of my task, which I began by stating was a very difficult one. Well, Gentlemen, I have succeeded, and, when I have told you the secret, you will agree with me that the thing is easier than it appears to be.

In spite of my deep convictions, based on an experience of 20 years, I do not feel myself to be entitled to lay down the law positively ; but I do not mind being contradicted ; opposition may bring on a profitable discus-

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sion. There can be no circumstances more favorable to the considering and, if found advisable, of condemning as heretical, certain agricultural principles, than a meeting like this of men who, by their theoretical and practical studies, have earned the right to deliver such judgment.

My secret, Gentlemen, is the drying of the soil.

82.—HOW ONE BECOMES UNLUCKY.

I am the son of a farmer, who was said to be one of the best of his day. I worked with him on his farm till I was 20, and he taught me all he knew about farming. My father had three distinct farms. You will allow me to describe the one on which we lived.

This farm, situated at St. Jacques, Montcalm county, was 90 yards broad by 1900 in depth ($1\frac{1}{2}$ arpents x 30). It was divided lengthwise by a fence, and a ditch, called in our parts a middle ditch (*fossé de refente*, or, *de milieu*). Six arpents from the end there was a cross-fence, toward the middle of this piece, six arpents deep, there was a movable fence that was shifted every two years, and here had been grown for some 50 years or more, continuously, potatoes, corn, and a few mangels; the part of these six arpents nearest the buildings served for a pasture for pigs, calves, and for the cows at night. We usually kept 20 to 24 head of cattle, 4 horses, sheep, pigs, and poultry. These animals made a certain quantity of dung, which was mostly placed under the eaves of the cowhouse, the balance being used to fill up a hollow before the stable door. I learned to skate round this mixen. After seed-time, this dung was carried out, the greater part for potatoes, and the rest was laid down, in heaps of a load each, in that part of the six arpents that served for the cow's night-pasture. In those days, never was a load of dung carted further off than that!

As to the other part of the farm, divided in two, lengthways, by a fence and ditch, one side was kept for two years in pasture, the other was sown to oats. As to drainage, (1) the whole farm was divided into plots of from $1\frac{1}{2}$ to 2 arpents, with a ditch as a termination and a *cheintre* (*sic*) at each side; and several water-furrows crossed the plots.

The earth from the ditches, which were regularly cleaned out every 7 or 8 years, was left on the ditch-side, and formed all round the plot an embankment 12 to 15 inches high, and this made the ditches seem deep enough, whereas they were on a level with the centre of the piece, which was in reality a regular basin.

The soil was loam, with a subsoil of stiff clay; the ploughing was done in the fall, and generally the furrow-depth was 5 or 6 inches; the frost pulverized this soil superficially and the harrowing was easy enough to do. As

(1) *Egouttement* means surface-work more than the other kind, which in French, as in English, is called *drainage*.—A. R. J. F.

I said, oats were sown from one end of the fields to the other, with clover-seed every two years for pasture. My father was prodigal in this respect, sowing as much as 2 lbs. to the arpent ! The roller was an unknown implement, and would have been difficult to work, as the lands or ridges were no more than 6 or 7 feet wide.

After seed-time, the two most respectable old men of the parish went from house to house and collected 15 francs. A high-mass was sung for the benefit of the crops, and tranquillity reigned for the rest of the year.

And I must needs say that, thanks to that good action, Providence sent us far better crops than, after such vile cultivation, we had any right to expect.

Many of you would certainly be surprised, were I to say that the dreary picture ; which is far from being overdrawn ; is the portrait, with a few variations, of a great number of farms in our older parishes.

And yet we dare to grumble at the smallness of our crops ! ! !

84.—M. RICHARD'S GOOD LUCK

Need I draw a comparison between farm-management like this, and the farming of the *lucky ones* in the different parishes ? The variation is sufficient to open the eyes of the blindest, and it is with pleasure I say, that I need need not go out of the parish of St. Jacques to establish the difference. I could produce a great number of examples in the same place, on the same style of land even, that would compare advantageously with the finest and best managed farms in the province.

But as I began with the history of my father, you will allow me to finish with my own story.

About 20 years ago, I became the proprietor of about 30 arpents of land, here in Joliette. The soil was a white sand, every fine, 4 to 5 inches in depth, subsoil a ferruginous schist, called here *tufe*, and vary hard. It had been left to itself for 4 or 5 years.

A few field-mice constituted its *fauna*, and all its *flora* was a few stunted white-birches, 15 to 20 inches high, and a wild blackberry bush or two ; and even they did not thrive, so poor was the soil.

The divisions, as far as regards the ditches, were about the same as those I described before. The load of agricultural knowledge I had received from my father seemed to me to be enough to enable me to manage this small estate ; I spread on it 40 to 50 loads of dung to the arpent, and in the fall I ploughed the land 4 inches deep, the *tufe* preventing my going deeper. In the following spring, I planted tobacco and potatoes : result, *nil*. Far from being discouraged, by this want of success, I planted the same crops again, with more dung.

The crop poor. Only pointed, I sowed straw ; for 25

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The crop appeared pretty fair when standing, but the yield was very poor. Only 300 lbs. of tobacco instead of 800 to 1,000 lbs. Rather disappointed, I sowed oats; the season being favorable, they did well, especially in straw; for 25 loads only yielded 52 bushels, of 12 to 15 lbs a bushel. (1).

At that time, nitrogen and phosphoric acid were unknown in this parts; and potash and lime had not come within the purview of the farmer: one was for making glass, the other for mortar, and that was all they knew about them.

Had I known at that time the fertilizing power of these matters and the special needs of the different crops I had so unsuccessfully tried to grow, I should probably have profited by my knowledge and, after having conquered the physical faults of the land, have come to the conclusion that: 1. the complete failure of my first crop of tobacco and potatoes was due to my land being very poor in potash, which both these crops are excessively fond of; 2. the comparative failure of my second crop arose from the dung, in spite of the large dose applied, not supplying the tobacco and potatoes with the food they required; and, 3. that the immense yield of straw and the poverty of grain in my oats, in the third year, were due to the fact that though the 100 loads of dung an arpent that had been given to the land had begun to give it nitrogen enough, it was still poor in potash and phosphoric acid.

My crops, my land, had spoken, but I did not understand their language.

I give you these details, in order to show you presently, when dealing with results, that I am one of the *lucky ones*.

My first *piece of luck* was to enter the agricultural society, which gave me the *Journal of Agriculture*.

My second *piece of luck* was to read that publication attentively, and to try to extract as much information as possible from it; the ideas about the drying of the land by open ditches or by under draining, caught my attention, and I resolved to go to work at once: third *piece of luck*, which I call my secret.

85.—THE DRYING OF THE LAND

To dry the land and by deep-ploughing to grow heavy crops, therein lay my whole plan. The cleaning off of all water from the soil is a most important point. Many will say: but our farm is already well drained. We were told just now about a man who did wonders in his meadows by making ditches and water-furrows, but this is but imperfect work, and I am about to prove this to you at least as concerns ditches and water-furrows as

(1) Can this be so? A. R. J. F.

usually made. I am not talking of our hill-sides but of the flat level land, where ditches are never made more than 7 or 8 inches deep, and the water-furrows seldom exceed 2 or 3 inches below the level of the furrows between the ridges. Such depths will have no effect except to dry the first soil-layer of 6 or 7 inches deep, and even that is something gained; but the moisture, that the sun carries off in a few dries when my plan is followed, remains when the other is practised, in the land, and it is especially this that requires to be dried, i. e., the subsoil a layer of earth, of the same thickness as the plough-furrow reaches. It is emphatically this that needs drying because this it is that retains the rain-water. It is in this layer that the water spreads itself and the roots of the plants must be freed from its influence.

I divided my land through the middle, i. e., into two pieces one of 7 arpents long, the other of 8, by following a slight depression that gave a fall of nearly $\frac{1}{2}$ a foot to the arpent; with the horse-shovel and the plough, I sunk, along the dividing line and following the depression, a ditch $4\frac{1}{2}$ deep. Next, I divided each of these pieces into four ridges 90 feet wide each, with water furrows emptying into the collecting ditch; these furrows, in the lowest part, that is, near the collector, are nearly 4 feet deep. but sides are so gently inclined that I can plough to their bottom, and cross them with loaded carts any where. The ditches at the end of each piece are gone, as have the open furrows. The mowers, reapers, etc., etc., work there most comfortably.

But these advantages are nothing, compared with those I gained in doing the work.

My object was to drain the land thoroughly, as well as open ditches can do it. I wanted to get rid of the excess of moisture from the land to a depth of 12 to 15 inches, and I succeeded.

86.—PLAN OF M. RICHARD'S FARM

A.—Woody ground.

B. B.—Field cultivated in 90 feet beds.

F. F'. F''. F'''.—The collecting ditch, into which the water-furrows empty.

r. r. r.—Water-furrows, deeper at the discharge than at the other end. The figures show depth in feet at the discharge.

P. P. P.—Ridges 90 feet wide.



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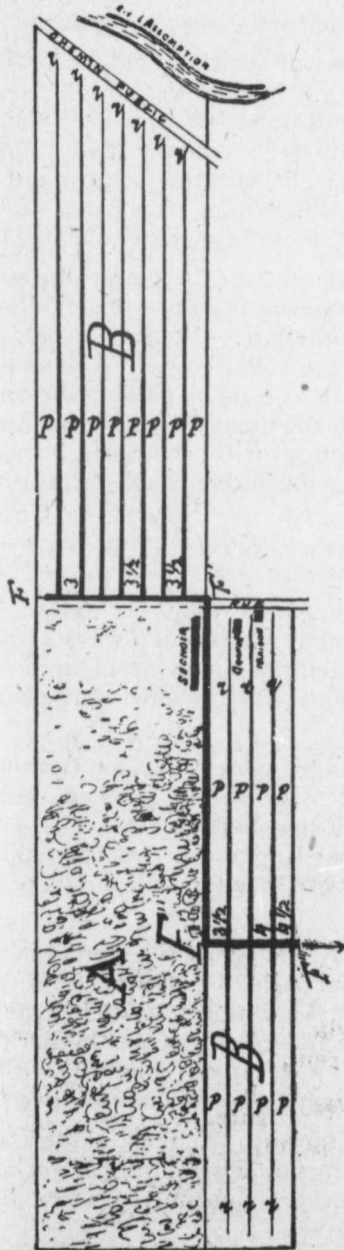
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87.—THE MAKING OF THE RIDGES

The ditch and water-furrows were made by the *horse-scraper*.

A less costly way would be as follows : divide the field, according to its width and the natural fall, providing for inequalities in the land, if any, into ridges 40, 60, or 90 feet wide, with poles set up where you want to make the furrows ; there, make two or three bouts of the plough, turning to the right or gathering (*en endos*) ; carry off with the scraper the earth thus thrown up, and lay it on the middle of the ridge ; this earth should be spread as fast as it is laid down by passing the empty scraper over the heaps.

Making the ridges.—This work is done all over the piece, of course including ditch banks ; plough as usual, *gathering* (1) up to the middle of the ridge, and always turning the horses to the right. When the ridges are done, and the "crumb-furrows" ploughed, it would be well to clean out the last with the double mould-board plough, or at least by passing the common plough several times through them ; then, the great ridges are formed. By following this plan for several years, the ridges will become high and rounded, the furrows deep, and the thickness of the arable couch increased.

88.—A SKETCH OF THE HISTORY OF DRAINAGE

Before entering on the study of drainage, it would be well to notice that in Europe it has been carried on for many years and always with satisfactory results. Many governments have, from the commencement, foreseen, all the future effects of this improvement, and have devoted large sums to its development.

It is a matter of history what a drainage system did for Britain, but specially for Scotland, because of the first £4,000,000 granted, Scotland took half of the amount, and with the result that Scotland to-day is, I think, abreast, if not ahead agriculturally, of either England or Ireland, taking into account the comparative general quality of the land of the three kingdoms.

The British Government made a yearly charge of 6½ per cent, which in twenty-two years wiped out the original debt. Latterly, however, as money got cheaper, landlords were glad to lend money to their tenants for drainage purposes at four to five per cent, and even that was higher than it should have been, considering the rate of interest on money invested in consols, and draining their own land was surely a safe enough investment.

About the beginning of the last century (19 th), most of the drainage done was only partial, the cutting-off of springs or the draining of wet hollows such as I have previously referred to. However, about the year 1823, the late

(1) This I think is the proper technical word for "endosser." A. R. J.-F.

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Mr. Smith of land by head the mischief, in have a complete that the land slc to carry off, qui as the surplus v of course being ed, and he gave these distances.

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James Smith, of Deanston, near Stirling in Scotland, commenced his draining crusade; and the Deanston system is to this day the system that obtains as the correct principle of land drainage, though it was clearly outlined by Capt. Blithe, 270 years before.

Mr. Smith, instead of recommending the plan of draining large areas of land by heading off springs, that may have been the principal cause of the mischief, insisted that every field that required to be drained, should have a complete system of parallel underground drains, running the way that the land sloped, and these drains were to be so near each other as to be able to carry off, quickly, all the rain falling at any time upon the surface, as well as the surplus water carried in the soil; the distance between the drains of course being regulated by the porousness or retentiveness of the soil drained, and he gave 10 feet as the minimum and 40 feet as the maximum of these distances.

Mr. Smith thought that a depth of $2\frac{1}{2}$ feet was sufficient for the parallel drains, but latterly 3 to 4 feet has come to be considered better. I think in this country a drain should be 3 feet deep anyway; there are, however, differences of opinion about this, because some assert that in the case of a shallow drain, the frost getting out of the ground earlier down to the level of the drain, enables it to act quicker in spring.

Before the invention of drain-tiles, broken stones were used and filled into the drain to the depth of 12 inches, and either stones or boxes could be used here, if impossible to get tiles.

The following are some figures, applying to Belgium, which show clearly how rapidly drainage has spread. "In 1850, when it was introduced into this country, it was applied to an extent of 450 arpents only; the following year upwards of 1,800 arpents were drained, and in the course of 1852 a superficial extent of 4,464 arpents at the least was drained. The number of persons who purchased drain tiles was 205 in 1851, and it was as high as 599 in 1852! Moreover, at the end of 1850 there were only nine establishments in which drain tiles were made, while there are now (the author writes in 1867) as many as 33, among which 12 were started entirely at the cost of private persons. These establishments delivered to agriculturists, in the course of the year 1852, 4,585,565 tiles. On the other hand, the amount of money which the Belgian proprietors have devoted to drainage during the same year, reaches the high figure of 60,000 dollars." From this it appears that the practice of draining moist lands makes rapid progress, as the farmers learn to appreciate its importance and merits. Even England, which abstains almost invariably from any interference in private business, thought proper to vote, on several occasions, large sums of money for draining lands, especially for those in Ireland.

89.—DRAINAGE IS NEEDED IN THIS PROVINCE OF QUEBEC

You all know, Gentlemen, in what a state is the greater part of the land of the province ; there is too much water, and it lies too long for good yields to be expected. We have all seen in this province too many farms that are crying out imperiously for drainage. For instance, take that valley that lies to the South and Sout-East between Montreal and Richmond ; and there are other districts well known to us all ; if these farms were drained, no better land could be worked ; and only reckon what has been lost by their lying comparatively idle for so many generations !

Those farmers, who have not yet adopted the wide ridges of M. Richard, generally plough their land in 12 foot ridges, which, well gathered up, carry off some of the rain-water. The grain is usually good in the middle of the ridge, but there are about 3 feet out of 12 that produce nothing. If, by means of drainage, one could safely widen the ridges to 25 or 30 feet would it not pay to do so ? Yes, indeed, as the Welshman would say. Besides the loss of surface caused by the narrow ridges, observe how the open furrows wear out the carts or other wheel-machines, such as the self-binders and pea-harvesters, which are absolutely impossible to be used there. It cannot be beneficial to a plant that its roots should be in cold water and its stem in tropical heat ! Still, that is what is the case in our burning summers on the soils of which we are talking.

Here, in Canada, and especially in the Province of Quebec, the need of drainage cannot be denied. I am not afraid to say that at least one tenth of the cleared lands give little or no returns because they have too much water. Yet proprietors could not invest their money at better interest. In France and in Belgium drainage on lands moderately moist has always yielded a return of twelve to fifteen per cent. What would it then yield on lands of good quality which are almost entirely submerged ? At St-Jacques (Montcalm) I know several farmers who have in this way changed inferior farms into real gardens. Mr. Cochrane, at Compton, has rendered all his lands equally productive by means of drainage. I have seen at his place the most beautiful crops of hay, grain, and grass that could possibly be seen. The uniformity in the vigor of the vegetation was particularly remarkable. In the environs of Montreal, the Messrs. Drummond, Louis Beaubien, and other have drained their lands and found them very much improved by it.

90.—DEFINITION OF DRAINAGE

If we consider the word *drainage* in its narrowest meaning, we can say that it constitutes the sum of the processes followed for removing from the soil all injurious water which has a tendency to lie there and to prevent the growth of plants.

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91.—IMPORTANCE OF WATER TO VEGETATION

Water fills a most important and most active part in the phenomena of vegetation. It does not suffice that a soil should contain the mineral matter necessary to feed plants ; there is also required the presence of a certain quantity of water to dissolve all these elements and afford them, as it were the means of conveyance to the interior of the plant.

The quantity of water which plants require for the growth is not always the same ; it varies with their nature, the degree of their development, the climate, the nature of the soil, &c. It is thus impossible to determine it with mathematical precision. We will merely remark that the degree of moisture of the soil cannot go beyond a certain limit, without the soil and the plants suffering from it.

It becomes important, therefore, to determine as clearly as possible, the point at which the water is too abundant to allow vegetation to continue in its normal state.

92.—MOIST LAND

Considered mechanically, the soil is made up of an infinite number of *particles* of very variable forms and size, from the large grains of sand to the almost impalpable parts which compose clay. These particles, united to each other as they are in the earth, leave, however, small spaces between them, little channels, which are called *interstices* to distinguish them from the other spaces which are found in the inside of the particles themselves, and which are called pores. When rain falls upon a dry soil, composed as we have just stated, it first filtrates into the interstices, and then it passes slowly into the pores. The earth in this state has lost none of its porosity, for the interstices are empty again. It is called *moist*, and it is under this form that it is most suitable to plants. When taken up in the hand and kneaded a little, it should cake without soiling the hand. Put into the fire and dried, it loses a quantity of water, varying from 15 to 23 per cent.

93.—WET LAND

If now, another shower of rain falls on a moist soil, the liquid must lodge in the interstices, without the latter being able to empty themselves as before, owing to the pores being already saturated. The constitution of the earth will then be greatly altered. From *moist* it becomes *wet*. In this latter state it is no longer porous. The air cannot penetrate through it, and all the evil consequences of want of air soon make themselves felt. This is not all. The constant presence of this water in the soil prevents it from becoming heated ; all the heat absorbed by the earth is in fact employed in the partial evaporation of the moisture. As a consequence, no field whatever, under such conditions, can receive any dew, because during the night

the different bodies placed on its surface do not give out any heat upwards, the layer of air in contact with these bodies does not cool, and the moisture it contains cannot condense.

94.—CONSEQUENCES OF EXCESS OF WATER IN THE SOIL

The following are the two first consequences of an excess of water in the soil :

- 1st. Want of air.
- 2nd. Cooling.

If matters remain long enough in this state without any remedy being devised for their relief, other and more palpable effects do not fail to show themselves. Not only does the vegetation change in colour ; it gradually changes its nature. In a meadow, for instance, instead of seeing clover grow (a plant which plays one of the chief parts in feeding milch-cows at pasture as well as in the stable) and timothy, and other plants of as good quality, it will be noticed that rushes, sedge and fox-tail grass invade the land and finish by completely displacing the former occupants. Farmers know very well what influence the quality of the hay has upon the supply of milk given by milch-cows. Nobody will therefore doubt that the quantity will be considerably diminished. On the other hand, the cattle pastured there are not in as good hygienic condition ; sickness makes more ravages among them because they are more feeble and their food is less succulent.

We often hear it said that a certain soil is "warm and early". Well the chief aim of a farmer should be to bring all his land into that condition, and thus judicious drainage would change the whole nature of cold late soils. I cannot expatiate on the purely scientific reasons for this, but will limit myself to the mentioning that an excess of water chills the ground, while the water is constantly carrying off its natural warmth from the soil under the duplex action of radiation and evaporation. It never warms the soil, because the water that is nearest the surface is, up to a certain point, warmed by the sun, and consequently lighter than the colder water below. It therefore remains floating on the surface and naturally gives up its heat to the atmosphere without doing an atom of good to the soil.

On the other hand, when rain-water can sink freely into the soil to the depth of two or three feet, and then find its way into drains, it carries down with it the natural heat acquired from the atmosphere, and from the sun-heated surface of the land, warming the soil, and, as it were, opening the pores of the soil to the admission of air and the drawing up of necessary moisture afterward, thus imparting vigor and growth to the roots of the plants growing on the surface. It has also been proved, by a series of experiments, that drained land, seven inches below the surface, has, on an aver-

rage, ten degrees of heat at the surface, but would make ten degrees less, that wet land of grass. As it grows naturally fatten, and the cows feeding on drained or porous reals or roots—by which the bu

As a proof of fact showing clearly and its products from the neighbour butter always feeds myself have sold others got for the higher price.

There are several by agriculturists strikingly apparent the depth of land surface to the level subsoil to that depth ploughing, harrow what is a great profit drained and wet.

Not only is there an increase of crops farmers are perfectly nary to good culture

In cultivating the soil must be t this cannot always that working land spring, the work is generally a couple work again after the it for a week, and e to such land is to

rage, ten degrees more heat than the same land at the same distance below the surface, before being drained—that is, in the natural state—and this would make ten days difference in ripening a cereal crop. Another point is, that wet land, though producing quantity, does not produce quality, even of grass. As a rule, only the coarser and semi-aquatic varieties of grasses grow naturally on wet land, and though these grasses fill up, they don't fatten, and the quality of milk is very different from that obtained from cows feeding on the tender, succulent grasses, which grow naturally on well-drained or porous land. Some people think that it is only when crops—cereals or roots—are grown, that draining is an advantage, but this is a fallacy which the butter-makers found out long ago.

As a proof of the truth of what I am saying, I will only quote a single fact showing clearly what is the effect of drainage on the quality of milk and its products. About 1870, the market at Granby used to receive butter from the neighbouring hill-farms and from the valley-farms. Well, the hill-butter always fetched six cents a pound more than that from the lowlands. I myself have sold butter on that market for 10 cents pound more than many others got for theirs. Of course, the making had something to do with the higher price.

95.—EFFECTS OF DRAINAGE.

There are some agricultural theories that are not very quickly admitted by agriculturists, but the beneficial effects of thorough draining are at once strikingly apparent. The removing of stagnant water from 3 to 4 feet of the depth of land, thus following a free passage for water and air from the surface to the level of the bottom of the drain, speedily improves the soil and subsoil to that depth, and renders it more friable, and the operations of ploughing, harrowing, and tillage generally, are easier and better done, and what is a great point, can be commenced much easier than when land is undrained and wet.

Not only is the cultivation of land rendered easier by draining, but the increase of crops is so apparent that the most experienced and best practical farmers are perfectly agreed that good draining is an indispensable preliminary to good cultivation.

In cultivating for such crops as carrots, mangels, turnips or potatoes, the soil must be thoroughly tilled to respond profitably, but with wet land this cannot always be accomplished in the proper season, and we all know that working land when it is wet is worse than useless. If it be a rainy spring, the work is often delayed, but with naturally dry or drained land generally a couple of days delay is enough to enable you to go on with your work again after the rain, but with wet land you may be unable to work on it for a week, and even then the labour is increased, and the manure applied to such land is to a certain extent wasted, and later cultivation does actual

harm, causing such wet land to hold even more water than it would do if left alone. Looking at the matter all round—taking into account the extra cost of labor, and the risk in cultivating wet land—I think it would in most cases be the wisest course to lay such land down permanently in grass, if not possible to drain it.

Though I state that clay land, as a rule, shows most improvement by drainage, we must not jump at the conclusion that it will be as friable and as easily wrought as naturally porous soil. Such is not the case, and clay soils, even if drained, can't be worked immediately after rain—if they are, we suspect the result would be, *clods*, and very hard ones at that.

96.—WHAT SOILS REQUIRE DRAINING.

Let us now see what kinds of soil particularly need draining. They can be divided into three principal categories :

- 1st. Wet, cold, marshy meadows ;
- 2nd. Argillo-silicious, cold soils ;
- 3rd. Slightly hilly lands.

In the first the hay is scanty. We have already seen what are the causes which impair its quantity and quality. Drainage properly executed has a remarkable effect on it. The meadow lands on my farm have all been deeply drained as shewn on the plan. I have obtained first quality hay at the rate of two tons and a half per arpent. This quantity was kept up from eight to ten years without the meadow requiring to be renewed. During all this time I put manure supplemented with lime to hasten the decomposition of the plants and neutralize the acidity always found on soils of this sort after they are drained. Considered as a speculation I succeeded well, for previously I had not obtained a half ton of bad quality hay.

In clayey cold soils, the results of drainage are not so evident, yet they are not negative. The seeding in these lands is generally made late, and vegetation is slow. The result is, that the crop is often lost because it does not ripen in great droughts. Drainage here allows these lands to be tilled at least two weeks earlier, an immense advantage, when we bear in mind the shortness of the season of vegetation, and that the supply of cultivated plants is always proportionate to the time they have been in the ground. Finally I must not forget to add that by draining an excess of moisture in the ground is not to be feared, principally in the month of May, at which time the rains are often so abundant.

We now come to the lands which we have called slightly hilly. At first sight it might be believed that owing to their slope they could be easily drained. Yet such is by no means the case, and without drainage it is impossible to obtain good crops. These lands dry but slowly in the Spring-time because the water from the higher parts descends and filtrates between

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the soil and the sub-soil. The sub-soil is generally composed of an argillaceous or flinty gravel. On the contrary, the arable layer is nearly always formed of vegetable detritus kept almost intact, owing to the permanency of the water. In the early heats this land dries up, the crop suffers, the plants turn yellow and give a return which scarcely pays the cost of cultivation.

Dryness of the soil rapidly supervenes, because these lands are generally shallow. Drainage improves them greatly by making them deeper. It is true that on the other hand, the water takes away with it some fertilizing matter held in suspension or dissolution, but, by making the drainage deep, this objection can be remedied to a certain extent. From the surface of the ground the water descends slowly, and so has time to deposit all the elements it contains.

If a meadow or pasture land covers the soil, the effects of the frost and of the premature thaws in the Spring are disastrous. The earth being soaked with water, swells up; the long roots, such as those of the clover, for instance, do not follow the stem by rising with it, and the latter is broken off at the bottom. All that these have is torn roots and the soil is quite bare.

97.—EXPERIENCE AND ECONOMY.

I have drained these lands myself. I had noticed in them all the drawbacks I have described, and I succeeded in obtaining from them paying crops of wheat, hay, and even of lucerne. I mention the last plant as one of the best suited for feeding milch cows. I have had as much as two crops a year. Notwithstanding its abundant yield, lucerne hay is far from exhausting to the soil. Its roots, like those of clover, are long, tap-roots, and seek their nourishment deep down in the sub-soil. The top of the soil, therefore, keeps all its nourishment, and this is why wheat, barley, and all plants that have spreading roots succeed so well after it. But it thrives only in good deep soil. The first thing to be done here for its cultivation will be to see to its drainage.

I have endeavored, in this lecture, to sum up, to concentrate, as far as possible, all the benefits of drainage, and the injurious effects of allowing water to remain in the ground. In conclusion, I recommend the drainage of the soil to all farmers who have at heart the success of our rural industry.

I commenced draining nearly 33 years ago, so that I think I can speak of it with some experience, and I say unhesitatingly that all who wish to do it carefully, without neglecting their previous studies, and taking into account the information given in works devoted specially to the subject, will be amply repaid for their trouble and outlay. They will also have the credit of introducing into their parish or county a useful improvement, and thus contributing within their ability and means to the welfare of their country.

In farming, as in all other undertakings, a wise man will always count the cost before commencing any operation, and try to find out whether or not the cost will over-run the profit. This point as regard draining deserves special attention in a country where land is plentiful, as well as comparatively cheap. Still, my contention is that most wet lands will make paying returns for the cost of draining ; and here I will give you the *gist* of a conversation I had not long ago with a farmer, and a most practical man, who has drained quite a large acreage with tile.

I don't remember the distance apart of the drains, but I think the cost was \$40.00 per arpent. He told me of a field he had that he never could get wrought in proper season. If he sowed grain, it generally got stunted and yellow, and yielded poorly ; if potatoes, the seed often rotted, or if the weather were favourable and a good start got, the tubers generally rotted in the fall. When in hay, this field never produced the crops got from his land that was not so wet. Well, he tile-drained this field, and ever since it has been as good a field as he has on the farm. This \$40.00 at 6 per cent interest cost \$2.40 acre. Well, 6 bushels of oats, $\frac{1}{4}$ ton of hay, 4 or 5 bags of potatoes of an extra crop over the old average, paid the interest, whereas in fact his crops were about doubled.

This is no exceptional case, and I am sure many of you can corroborate it by cases coming under your own notice, and I am also sure that many of us can point to fields cultivated for generations, that this \$2.40 of interest per acre, spent on draining, would nearly have doubled their producing power every year. I mention this actual case merely to show the possibilities of draining, and how that, if only a ten percent profit would result, it would be correct financing to borrow money to make drains. Any one, whose land requires draining, and who has money invested or lying in bank, at three per cent, say, would find his best bank and his most profitable investment in draining his own land.

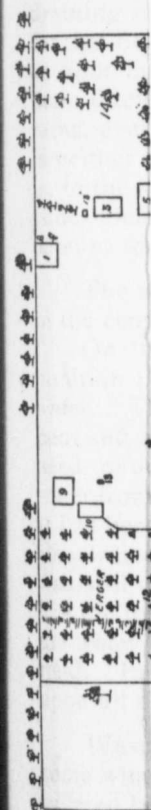
98.—PLAN, AND ITS EXPLANATION, OF M. CASAVANT'S FARM

With your permission, gentlemen, I will now give you some explanations as to the plan of my farm, which you see before you. I have drained on this farm considerable spots of sufficient importance, which were utterly unproductive before I used the only real means of reclaiming them. I have no pretention to show you a model work. When I started, thirty-three years ago, drainage was but little known, and I had to make up for my want of knowledge by greater initiative. So that I am not ashamed to tell you that I learned experience at my own expense, and if I was sometimes mistaken, I at least always did my best, so that others as well as myself might profit by my lessons.

My first drain, of boards, was laid in 1854, in the field No. 1; I looked over it last fall and found it as good and sound as the day it was laid.

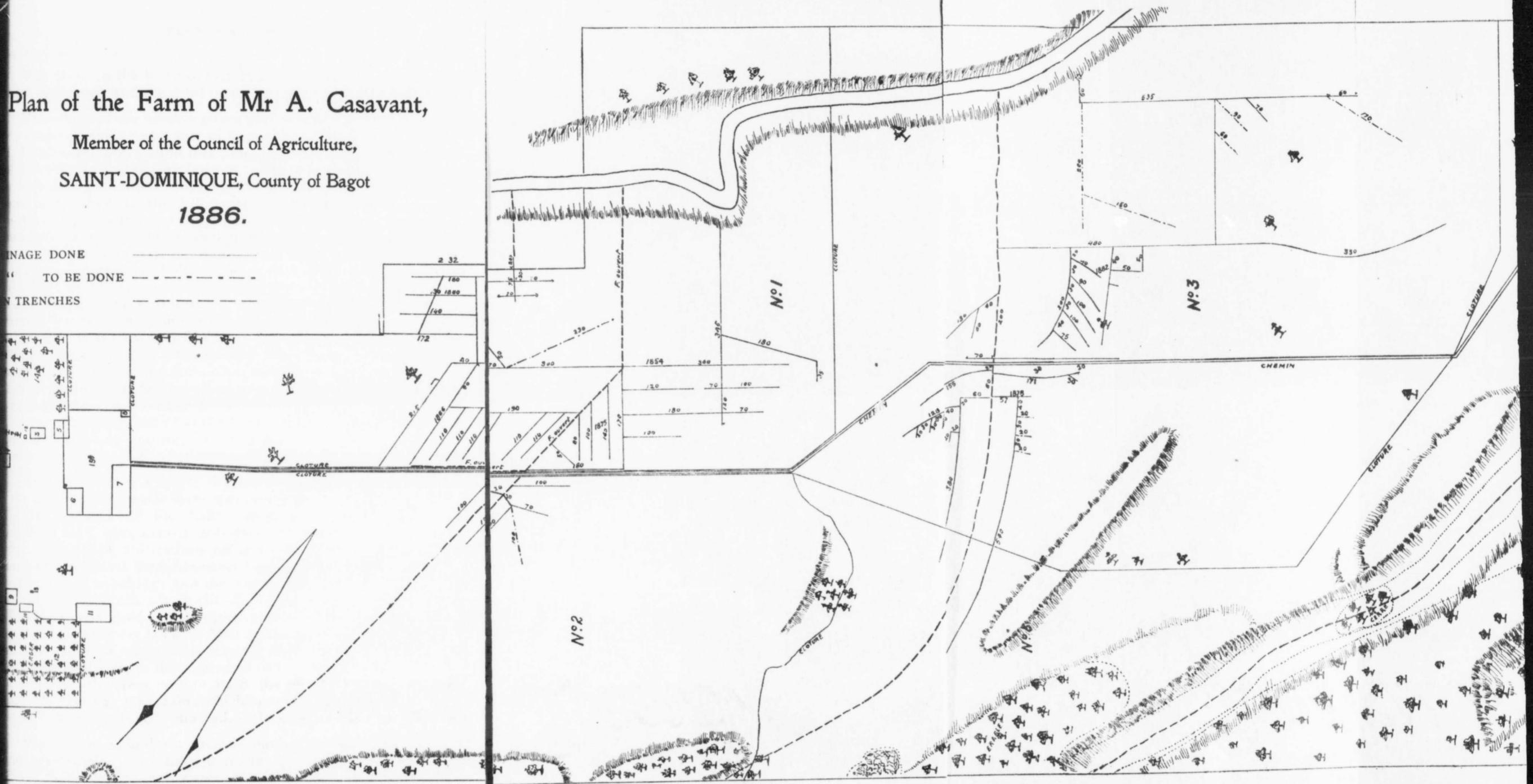
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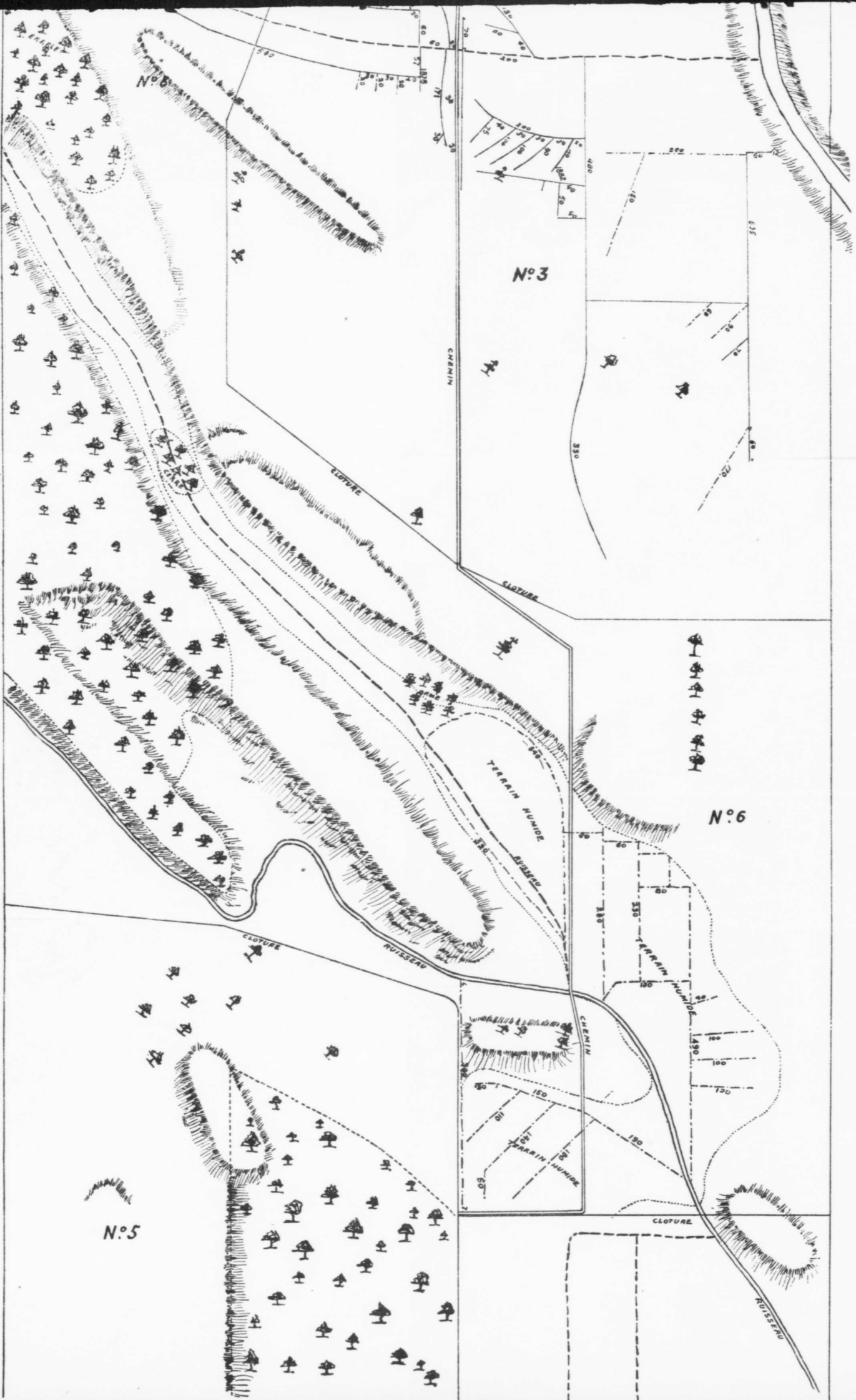
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Plan of the Farm of Mr A. Casavant,
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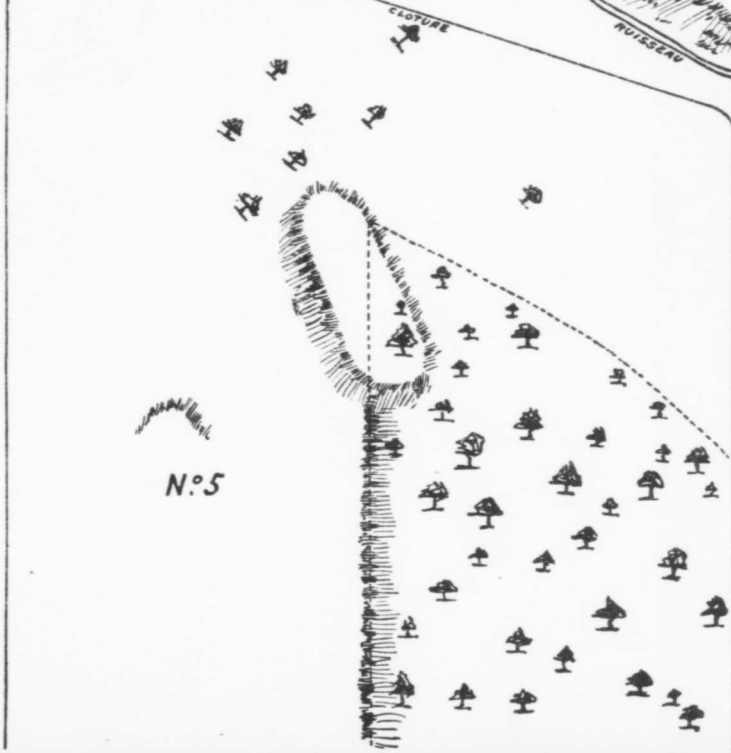
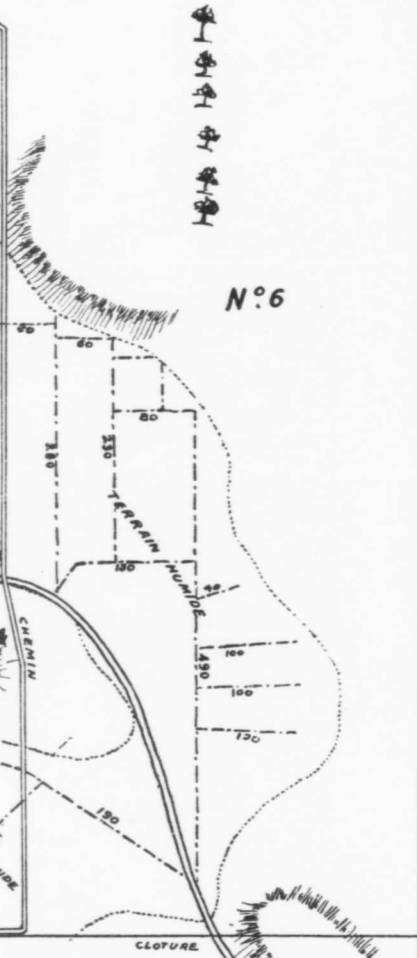
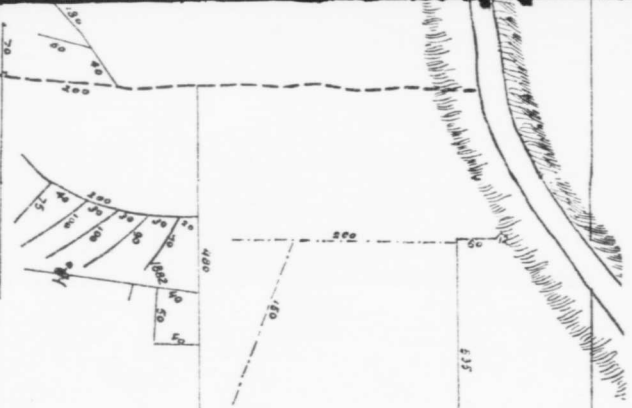
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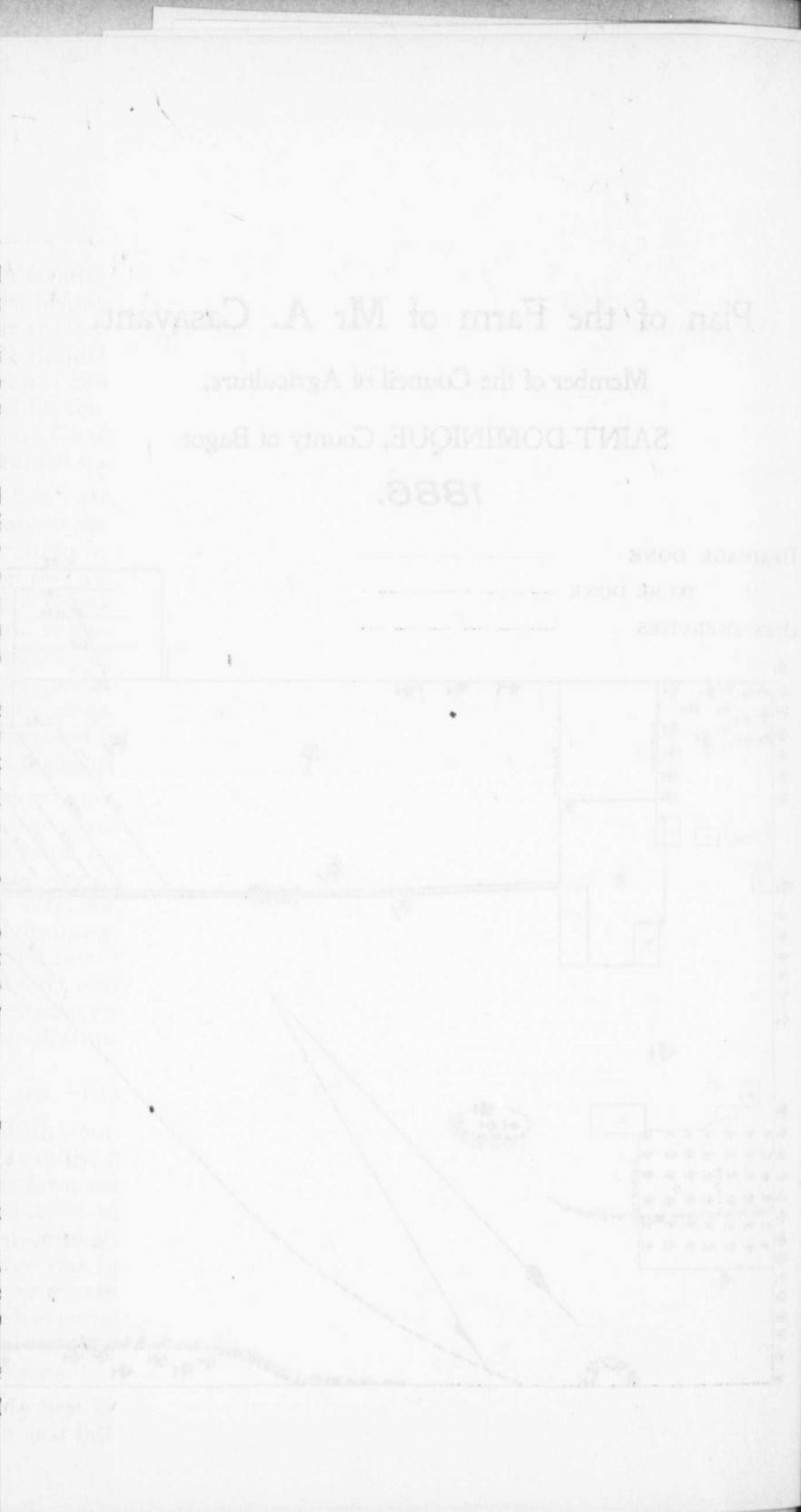
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The drain on the West of this is also of wood, but of cedar-poles, two beside each other and the third on the top so as to form a cover.

The whole of the north-western part of that field, where the ditches are very close together, was a sort of unproductive marsh. To drain the water off, I had to dig down eight feet; the land was completely flooded. I must tell you that the soil is very uneven. This is why the several lines are under very different forms. It is one of the first parts I drained. We next come to the foot of the hill, where there was a spring. The ditch was four feet deep. The water could not run off, because there was already an abundance of it lower down, so that it reached a certain height on the hill. I drained not only this part, but twenty feet at least, on each side and far enough to rejoin the heights which did not suffer from the moisture. In this way I have actually obtained, from a field which was utterly unproductive, hay which succeeded well after this draining. I must state that I have not succeeded in draining it completely; only when the snow melts, a little water lies on it, for this field is at least four feet lower than those adjoining it. I then decided upon making another ditch across it, towards the south, to empty into the main ditch. During the remainder of the year, in the summer and fall rains, even if it rains for the whole day, I never find a drop of water. There is neither trench, nor surface drain, and the ground in field No 1, the soil is, to the 5 E. composed of sandy loam and was formerly hardly dry before June. Before being drained, I never got but one good crop out of it, one of oats; as for hay there was never any. This part of the field I drained in 1860.

The soil of No 3 is *gray*. I made there all the drains needed to collect in the centre all the water there may be there.

On the east of the field where we were a while ago, you see no drain; yet I have neither side-canal nor ditch. I have only cut off the water. This field is three hundred feet wide, something more than an arpent and a half, and there has never been a drop of water on it. I have no need of doing anything, and the vegetation does not suffer, because the water from the hills has been cut off. The ground is easily dried by the air. It has become as good as the higher places. The drainage done here has also drained the lower lands. After I had got thus far, I noticed that there was still one place where there was too much water. I then dug a drain below the former ones, to the south-east of the main drain, so as to carry off the water into the creek and to drain the whole south-eastern part of the field. In this way the drains which are such as you see them have acted upon all the parts directly drained. My drains empty into the creek.

West of the main drain there is another system. The lands there are some what sloping, as I have stated in my remarks above. The ground suffered being flooded with water. But by sowing somewhat later I obtained good returns. After making a pasturage and a meadow of it the first year, I obtained a good crop. The second year, the water rose to the surface

and kept the ground always too moist. I sowed clover, which fared well enough the first year, but the second year the water raised the ground up and tore out the roots of the clover, because, when the ground thaws at the surface and is not thawed at the bottom, the roots remain caught at the bottom and are cut off at their base by the next Spring thaw. Since I drained it, I have got as fine crops of wheat as can be wished for, twenty-two bushels to the arpent. However, in the middle, at the foot of a hill, I was obliged to make a ditch which ran inwards, because the fall was not great enough to tap the water on this hill. Here again I succeeded in effecting a partial drainage. I hoped to succeed all through. The drain reaches a depth of eight feet. But at the end of the year, I found that there were still some spots rather moist. I decided upon making a ditch, the course of which is traced in dotted lines on the plan. I have not yet been able to reach the lower part with this immense ditch which is eight hundred feet in length. I have still six lengths in ditching to finish all this drainage which would make about eighty arpents. It is in field number one, that the greatest number of them are placed. In field number two, there is only a small number. In the field number three, there are many, and in the field number six, scarcely any at all. In the field number three, as you see, there are a great many small ditches, because it is a hill that slopes very gently downwards. To receive the water from all the higher grounds, ditches had to be made which received the water in different ways.

I have a ditch of 540 feet long. It is at the foot of a hill in field No 3. The hill is quite steep. By running the ditch at the foot of the hill, the space between it and the open ditches is thoroughly drained, as is also the one separating the ditch from the hill. There used to be formerly at least eighty feet of land which was lost.

I should tell you that the last two fields were drained not long since, in 1878. It is now thirty-four years since I come to this farm, and before they were drained I could never get a single good crop from any of these fields. The ground was so wet that the cattle drowned there. By draining them I now get the best hay and grain crops that can be desired. I can cultivate any kind of plants with as much facility and advantage as on any other land; I will go further and say, with even more advantage.

In draining land, it is important to put lime on it for the first year, to decompose the nutritive substances. By taking this precaution you will at once obtain the best results.

South of field No. 6 there is a shallow creek. This is the hardest part to drain because there is not enough depth. This year I finished the West part of the same field, and succeeded in making a ditch of four feet deep. But on starting from the creek it was a level plateau, and I was obliged to

make it with planks and planks. Hemlock plank enough. With forty feet which allowed me depth

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make it with planks and I have only a foot and a half of soil on my cedar planks. Hemlock planks placed almost on the ground do not last long enough. With forty feet long of cedar I had enough to reach a small height, which allowed me depth enough to make a good stone drain.

On the plateau to the East I adopted still another system. I found a soil easier to drain, and I made a special plan. My drains go to tap the water on the slope. Here there was a sort of spring, and I was obliged to turn my drain off in such a way as to cut the water below that height. For this land I do not think it is necessary, at least for the present, to incur any more expense.

On the North I have a small gully which will always be hard to drain. I consider that the cost of draining would be too considerable for the importance of the land which is only fit for pasturage. On the south of the said gully water remains continually. Cattle cannot go there. It is a sort of marsh.

On the plan, my drains are run so as to go round this marsh and arrive at the same place, where I have height enough to make them connect with the creek. It is always a matter of great importance to have a sufficient fall to empty the drains.

Now, here, I give a few remarks on the general laying out of drains :

The shorter the length of a drain, the narrower it may be made ; if it be long, it must be wider, so as to allow of the easier flow of the water.

In board-drains, the scantlings are to be so placed that the boards may be nailed on to them, the joints being broken ; thus, a sort of trough will be formed, to be placed upside down.

In drains laid with poles or stones, it is always right to put turf on the conduits, if it can be easily procured ; so that the water before it reaches the drain may filter through the turf and leave in it all the earthy particles it held in suspension. Thus there will be fewer obstructions to the free passage of the water. Turf, bark, or such things, should cover all conduits, to keep out the earth therefrom.

In a field with a gentle slope, the drains should run up the slope so that the water may travel with equal ease on either side. If you do otherwise, the low parts will suffer. When the drain follows the slope, it will act more easily, and run less risk of getting choked.

When you have made a drain, and want to see if the land is dry enough for sowing, visit it in the morning, and you will see which parts are too moist. Later in the day, the sun will have dried the ground and it will more difficult to decide the point. Again, if you want to study *rolling* land : there are spots moister than others, bore a slight hole here and there, not only to determine the height to which the water will rise, but also the form of the general water level.

Any one can see that a soil that has been wet for many a long year must contain more plant-food, more organic remains than a soil always exposed to the air. The use of lime the first year will decompose these matters and you will reap better crops at once.

Stones are thus used in drains: make the drains about 8 inches in width, though this may depend upon the stone that can be had. Flat stones are selected, and laid in cones, with a round stone on each side to strengthen the first ones, then lay a row of small stones, and finish by using the finest so as to close the openings as much as possible. Eighteen inches in the thickness suitable to the making of a good stone ditch. When stone drains are used, the slope or fall must be greater than with tiles, because the holes are more liable to be blocked, and with a gentle slope there is risk of more inconvenience than with tiles. The following are the figures generally adopted in practice for the inclination to be given to drains, 4 inches per arpent; stone drains, 8 to 10 inches per arpent. This is also the reason why I made a portion of my ditch in planks; the remainder was in stone, in the West of field No. 6.

All the blue lines which you see on the plan are open ditches. I made the outlet at the head of my drains, of stones and at a great cost. This, however, I found out to be useless, for the frost disarranged everything. For several years past I have made the head of my ditches of cedar. I take three inch planks, wide enough for the quantity of water to be drained. This I prefer to stones, which get loose and obstruct the water-course. I make these remarks with a view to prevent persons, who wish to make drains, from making the same mistakes and being obliged to begin again.

The few observations I have just made to you are of small consequence, yet they may be of use to any one undertaking drainage. If any person present has any remark to make or any question to put I shall be happy to answer him to the best of my ability.

99.—DISCUSSION ON M. CASAVANT'S LECTURE

The following extracts are from the discussion that took place on M. Casavant's lecture :

The average distance between the drains on M. Casavant's farm is 40 feet.

Two-inch scantlings and six-inch board will give a passage of $2\frac{1}{2}$ to 3 inches, enough to pass a small quantity of water.

It seems best that drains should be 4 feet deep. In many cases, $2\frac{1}{2}$ feet drains have been failures.

Pipe-drains should be covered with a board to keep them in place.

An instance is mentioned, $2\frac{1}{2}$ deep at intervals of a foot.

Four-foot drains will

The deeper the drains

Before beginning to dig the course be studied, and c

99.—TH

Before closing I would think should be undertaken and this I think you will find in my paper. There is a large amount for the benefit of the farmers and the inhabitants of the colony to undertake a drainage scheme, good, both for the present and for some of the money

And now, to come to the subject, should be brought under the consideration of representatives :

I don't know what is the state of the province yearly for the amount of a very good amount—but which is advantageously diverted and spent on drainage. The proportion in taking out the rivers that happened to be done, and this being done which otherwise would be done by the tax-payers, nor increase our province is very important. I am an engineer and oversceer for a year, and another next year, before you.

The Government cannot issue year bonds. Let them be found necessary, at the same time money to be borrowed by the Government, and that alone, and rigidly enforced, as to the purpose of draining, and

An instance is mentioned of stone-drains costing 30 cents a foot ; another, $2\frac{1}{2}$ deep at intervals of 20 feet, costing 10 cents, and a third, 6 cents a foot.

Four-foot drains will dry land at 40 feet intervals.

The deeper the drains the more lasting they will be.

Before beginning to drain a farm, the practice of draining should of course be studied, and competent persons consulted.

99.—THE GOVERNMENT AND DRAINAGE.

Before closing I want to say something in reference to a plan which I think should be undertaken by either the local or Dominion Governments, and this I think you will admit is the most important recommendation in my paper. There is a large amount of money spent by both governments for the benefit of the farmers, and of course indirectly for the benefit of all the inhabitants of the country. I think that if the Government would undertake a drainage scheme, that it would show its wisdom, and do more good, both for the present and the future, to agriculturists, than results from some of the money that is at present debited to agriculture.

And now, to come to a practical proposition, and one which I think should be brought under the notice of the powers that be, by farmers' representatives :

I don't know what is the amount that is purposed to be spent in this province yearly for the advancement of agriculture, but it should be a pretty good amount—but whatever it is, a fourth of it could, I think, be very advantageously diverted from the present channels through which it flows, and spent on drainage. I mean that the Government should spend this proportion in taking out leading mains or levels, deepening creeks or small rivers that happened to be natural out-falls for some sections of undrained land, and this being done, proprietors could in many cases, drain their land, which otherwise would be impossible. This would put no extra burden on the tax-payers, nor increase the expenditure of the Government, which in our province is very important. The Government, in order to employ only one engineer and overseer, might do this work in sections—one county this year, and another next. Then I come to the main point that I want to bring before you.

The Government can procure money by the sale of say, twenty-six year bonds. Let them borrow such a sum specially for drainage, as may be found necessary, at three per cent, which I suppose can be done. This money to be borrowed by farmers from the Government for drainage purposes, *and that alone, and the Government of course laying down rules to be rigidly enforced, as to the money borrowed by the farmer being employed for the purpose of draining,* and let it be a debt against the land still paid.

man having interfered. The lower proprietor cannot raise an embankment to prevent this overflow; the upper proprietor can do nothing to render more grave the servitude of the lower land."

In the terms of this article, the lower lands are obliged, as regard those that lie on a higher level, to receive the water that flows from them *naturally*. The expression is general; there is no distinction made as to whether the water is derived from rain, from springs, or from melting snow. And if the lower lands must receive this water it is clear that with it they must receive the stones and sand it carries with it. It is possible that from this the proprietors must suffer, but they can recover no indemnity. It is only one of the laws of nature in its operation.

Art. 501 imposes, however, an essential condition, the water must flow from the higher to the lower lands "naturally, without the interference of the hand of man." Whence it follows that the upland owner cannot change the natural course of the water which flows over or through his property, so as to direct its course on to the lowlands that were free from it; should he change the state of his premises, the lowland owner may insist upon their being returned to their former state. The hand of man must not interfere with the discharge of the water. Therefore, it follows that, if the discharge of the water is not purely natural, Art. 501 will not apply to the case. Such would be the predicament had the water been collected into an aqueduct or canal; this would not be nature's work, still more would it be so when the works constructed by the upland proprietor have the effect of changing the course of the water by throwing it over the land of the proprietor who would not have received their discharge had it not been for the works in question.

With these data before us, we must reply to the question we just put to ourselves in the negative. I cannot in virtue of our law, as it exist, compel my neighbour, whose land lies lower than mine, to receive the water I may see fit to send through a drain. Drainage creates an artificial discharge of water, and consequently the lower owner is not obliged to receive it. I cannot compel him to do so.

If I want to discharge water in this way on to lower lands, I must necessarily agree with their proprietor, make a bargain with him, and by this means obtain the desired right. Without a covenant, even if I offered to pay an indemnity, I could not compel him to receive the water, for anyhow he is his own master, and is not obliged to accept the indemnity. If, without a previous agreement, I thus, by means of a drain, discharge the water of my land on his, he has two remedies; he can by a possessory action cause to be arrested the passage of the water and make me restore the original conditions of the premises, and claim from me the damages I have caused to his property.

We may then conclude that no *servitude de drainage* exists in our law.

It would seem that this interpretation is in contradiction to Art. 882 of the Municipal Code, which says: "The proprietors of low-lying, marshy lands may make water courses in the neighbouring lands or make use of those already made, may deepen them if not deep enough, repair them or keep them in such a condition as is necessary to the drainage of these low, marshy lands. The work to be done on these water courses may be adjusted by bye-laws, a report of proceedings, or by agreement."

But there is really no contradiction, for Art. 882, does not, properly speaking, constitute the *servitude de drainage*, as it exist in France. It only grants it to the proprietors of low, marshy land, and even in that case, the proprietors can only exercise the right if there exists a Municipal bye-law, official report of proceedings (*procès-verbal*) or an act of agreement.

Is it desirable and even essential that this liability (*servitude*) be recognized by our law?

You will, doubtless, gentlemen, all reply with me, in the affirmative.

Drainage ought to be pushed. It is no trifling aid to agriculture to give vent to the water that keeps the land in a continuous state of too great humidity, and thereby impoverishes the soil; so in England, France, Belgium, the need of drainage has been recognised, and laws in its favour have been passed. In this they have followed in the footsteps of the Romans, who had their laws on drainage.

Let us examine for a moment the law in operation in France, passed in 1854:

Art. 1.—Every proprietor who wishes to dry his land, either by drainage or any other process, may, on payment of fair and reasonable indemnity, carry off the water from it, either in underground drains or open ditches, across the properties that separate the land in question from a water-course or any other means of discharge.

Exceptions: houses, yards, gardens, parks⁽¹⁾ and closes (*enclos*) belonging to inhabited houses.

This article then constitutes the obligation of drainage in France. But on what condition? On condition of a "fair and reasonable indemnity."

As regard the natural discharge of the water, the low-land proprietor must receive them without any indemnity. Nature, that compels him to receive the water that flows of its own accord on to his land, recompenses

(1) In England, a *park* signifies a large extent of enclosed land, from 100 to 2,000 acres, generally occupied by deer and other game. In Scotland, a *park* varies in extent from 4 to 15 acres, and is the same as the French *enclos*. Here, as in numberless other cases, we may recognise the still remaining influence of the friendship existing between the French and the Scotch during the 16th century.—A. R. J.-F.

him mostly by the beneficial obligations of drainage until after he has received. In this latter case is considered a partial expropriation. That principle must the *lex*, A. R. J.-F.) consecrated on expropriation: that in part, without the payment.

Art. 2 of the same law or intervening plots (*travaux*) in virtue of the preceding land.

"In such cases the works by which they benefit the portions which the exercise of a tributary share in the property."

Thus, this article allows water flows to profit by such an arrangement made.

Art. 5.—Any disposition of the exercise of the obligation of drainage, the execution of maintenance, are carried out by the canton, who, in his capacity, done with the respect due to a single surveyor may be.

These are the chief obligations, I think, in the in accordance with the French law. V made in other countries, the right road and so eas

M. J. B. A. Richard respective farms, the former the other by drainage, be

To diminish as far as possible the cultivation, by breaking up the soil and penetrate more deeply in se

him mostly by the benefits this water brings in its train. But as regard the obligations of drainage, he cannot be compelled to receive drainage-water until after he has received a fair and previously paid (*préalable*) indemnity. In this latter case is concerned a sort of expropriation for the public benefit: a partial expropriation it is true, but one that must convey an indemnity. That principle must then be applied of the public French law (*jus not lex, A.R.J.-F.*) consecrated by the Code Napoléon and by all public laws on expropriation: that no one can be deprived of his property, wholly or in part, without the payment of a fair and previously payable indemnity.

Art. 2 of the same law read thus: "The owners of neighbouring land or intervening plots (*traversés*) have a right to make use of the works done in virtue of the preceding article, for the discharge of water from their land.

"In such cases they pay: 1. a share proportioned to the value of the works by which they benefit; 2. the expenses resulting from any modifications which the exercise of this right may render necessary; and 3. a contributory share in the keeping up of the works now become common property."

Thus, this article allows the proprietor of the land over which the water flows to profit by the drainage, on the condition therein explained. Such an arrangement must be beneficial to agriculture.

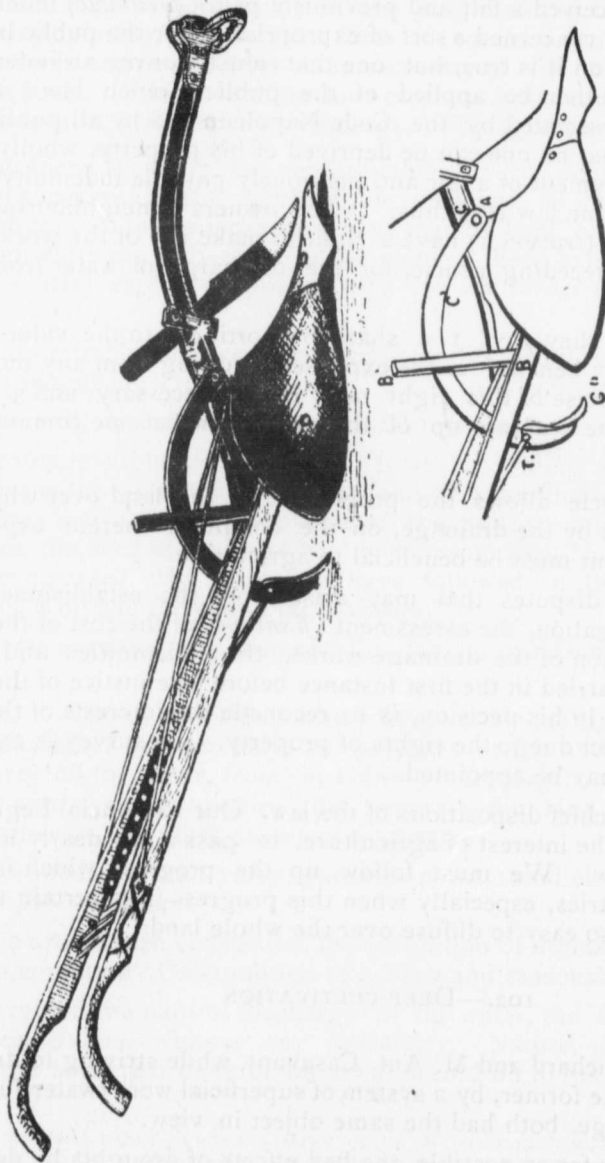
Art. 5.—Any disputes that may arise from the establishment and exercise of the obligation, the assessment (*fixation*) of the cost of the water courses, the execution of the drainage-works, the indemnities and cost of maintenance, are carried in the first instance before the justice of the peace of the canton, who, in his decision, is to reconcile the interests of the work done with the respect due to the rights of property. If a survey is required, a single surveyor may be appointed.

These are the chief dispositions of the law. Our Provincial Legislature ought, I think, in the interest of agriculture, to pass a law nearly identical with the French law. We must follow up the progress which is being made in other countries, especially when this progress is so certain to be in the right road and so easy to diffuse over the whole land.

102.—DEEP CULTIVATION

M. J. B. A. Richard and M. Ant. Casavant, while striving to dry their respective farms, the former, by a system of superficial work (water-furrows,) the other by drainage, both had the same object in view.

To diminish as far as possible the bad effects of droughts by deep cultivation, by breaking up the soil so as to allow the roots of the plants to penetrate more deeply in search of food, and especially of moisture.



SUBSOIL-HOOK OR GOOSE NECK

C. C. C'.—Richard's subsoil hook.

A.—Pin to fasten the hook to the beam of the plough.

B. B.—Brace, in which the hook is raised or lowered, and kept in place by the regulating bolt T.

And by this same course an issue for the superfluous layer of soil, in immense quantity, thus causing the soil to be also tried, by this ditching into the land of air and thus preventing the damage on badly farmed land, especially tobacco grown—especially tobacco

The results obtained were less and less frequent

If the work of drying which is absolutely sterile with a clay subsoil, full

No serious objections new as they are to our day made, and they have turned in many instances in Montpelier friend Mr. Chas. Rivet, who found fault with my method it out on a very heavy deep water-furrows; the furrows that cut up his land thoroughly destroyed all food for plentiful crops; complains of any shortness the numerous advantages

The act of subsoiling whose effects are, and will be done in a variety of ways Brabant—is used, that to other less weighty ploughing depth. These would not be able for the work.

Besides, bringing to "weathered," and whose condition before they are fit for crops, until this transformation ought to do the work of the surface, and the subsoiler plough without a mould follow the common plough up to the desired depth a

And by this same cultivation I aimed at securing, in case of heavy rains, an issue for the superfluity of water, and not to allow it to remain in the upper layer of soil, in immediate contact with the roots, that it soaks, too much, thus causing the injuries I had met with in my preceding crops. I also tried, by this ditching and deep cultivation, to facilitate the entrance into the land of air and heat, elements indispensable to the life of plants, thus preventing the damage done by cold and bad weather in spring, which, on badly farmed land, delay the seeding, and expose many of the crops grown—especially tobacco—to the early frosts in the fall.

The results obtained surpassed even my hopes ; bad seasons are becoming less and less frequent.

If the work of drying land has paid so well on a soil, the subsoil of which is absolutely sterile, what profit could not be made on heavy land with a clay subsoil, full of matters fit for plant-food.

No serious objections can be made to these methods, comparatively new as they are to our young country. Conclusive trials of them have been made, and they have turned out most satisfactorily. I could give a good many instances in Montcalm and other counties, but I will only quote my friend Mr. Chas. Rivet, a farmer and breeder of reputation, who, after having found fault with my plans, subsequently adopted the system. He worked it out on a very heavy soil, drying it by means of very wide ridges and deep water-furrows ; the ditches were abolished, as were the cross-water-furrows that cut up his land ; he pulverized it deeply. By these means, he thoroughly destroyed all the weeds ; he converted part of the subsoil into food for plentiful crops ; he is one, at least, who, as far as I know, never complains of any shortness of keep for his large herd, and who can profit by the numerous advantages that the carrying on of dairying offers him.

The act of subsoiling, become practicable by perfect drainage, and whose effects are, and will always be, a benefit to cultivation in general, is done in a variety of ways. In some parts of Europe, a subsoil-plough—the Brabant—is used, that turns over a furrows from 12 to 15 inches in depth ; other less weighty ploughs do the work in the same fashion, but to a less depth. These would not answer here, at least on most farms, as the teams are not able for the work.

Besides, bringing to the surface a lot of subsoil that has never been "weathered," and whose fertilising constituents need chemical transformation before they are fit for plant-food, would cause the loss of one or more crops, until this transformation took place. I think, indeed, that here we ought to do the work of deep-stirring without bringing the subsoil to the surface, and the subsoiler is perfectly adopted to this purpose. This is a plough without a mould-board, with a long and narrow share, made to follow the common plough in the furrow it has just turned over. It breaks up to the desired depth a layer of soil that can afterwards be brought up by

degrees to the surface. It requires two horses and a driver, and I strongly advise all those who can get this implement to do so, for its beneficent effects will amply repay the cost and the labor it demands.

Another implement, whose work is not so thorough or so complete, but which in many cases has been satisfactory in its working, is a plough of my own invention. As you know, poverty is ingenious. Not being able to afford a regular subsoil-plough, I had a goose-neck (*crochet*) made, in the shape of a tooth of the "spring-tooth harrow,"—ending in a point $2\frac{1}{2}$ inches wide, and fitted to the plough. A very simple little piece of mechanism enables the ploughman to make it penetrate the ground to the required depth. A pair of good horses can draw it on my land. Any ordinary blacksmith can make and fit up the whole. As you see, it is simple, low-priced, and within the reach of any one. With this implement, it is easy to thoroughly complete the work of making the land dry, to which, as I said before, I attach the greatest importance,

I am, then, convinced, and by my own experience, that work of the kind I have described diminishes labour, assists in the destruction of weeds, and increases the yield of every crop, but especially of hoed-crops and roots, without which dairying cannot thrive.

I should also have a word to say about artificials and especially on farmyard dung, not so much for the purpose of giving information as for obtaining it; manures are so important in farming in general, and especially on such naturally poor land as mine, that I should have liked to be enlightened on these points: the production, preservation, and more particularly the best way to use dung: but I have already taken some useful notes on the subject, and I hope to take still more.

104.—BALANCE SHEET OF M. J. B. A. RICHARD FOR THE YEAR 1895

Before closing my address, I beg to put before you my balance sheet for the year 1895:

RECEIPT		EXPENDITURE	
7,600 bundles of hay, at \$6.00.....	456.00	Interest on capital.....	300.00
700 bushels of oat, at 30 cts.....	210.00	Wages.....	318.00
225 " of potatoes, at 35 cts....	78.75	Taxes, rates, etc.....	88.00
30 " of corn, at 30 cts.....	15.00	Implements and repairs.....	24.75
21,650 lbs. of tobacco, at 8 cts.....	1,082.50	Purchase of manure.....	76.50
	<u>\$1,842.25</u>	Depreciation on cost of implements..	50.00
		NET PROFIT.....	985.00
			<u>\$1,842.25</u>

In adducing, as an example, not by any means tried to do better years than that, with a garden 39 x 45 feet Merit for 1895:

On September 20th. 1895 of Joliette. It contains 100 with a garden 39 x 45 feet

For some years, M. Richard latterly he has taken to the rotation he follows is the rotation he follows year, dung ploughed in, tobacco and the other hoeed with the disc-harrow, at 6 arpents with clover, sown pent; this he ploughs in in the village, he buys 40 tobacco averages 20 to 25

Last year, M. Richard \$2,242.00; with the other ting all expenses of cultivation

The division of the farm every respects a good one. good order. The fields are plenty of agricultural implements to those who grow that perfection, that one would

M. Richard has built a my and well ventilated, an lbs of fine tobacco, which cts a pound all round. Hi in buckwheat, 1 in potatoes 60 in bush-pasture and a good

The stock is Canadian cows and a fattening beast, ted to M. Richard 85.07 ma diploma of the highest merit

In adducing, as an example, his accounts for 1895, M. Richard has not by any means tried to pass himself off as a very *lucky man*. He has had better years than that, witness the following report of the judges of Agricultural Merit for 1895 :

On September 20th. 1893, we visited the farm of M. J. B. A. Richard, of Joliette. It contains 140 arpents, of which 90 are under crop, 50 in bush, with a garden 39 x 45 feet. The soil is fine sand and very poor.

For some years, M. Richard carried on his farm in the usual way, but latterly he has taken to tobacco-growing on a large scale. The following is the rotation he follows : 1st year, after grass, wheat and oats ; 2nd year, dung ploughed in, tobacco, corn, and potatoes ; 3rd year, the same, dunged, and then 3 years in meadow ; then the rotation is repeated. For tobacco and the other hoed-crops, he ploughs in the dung, and works it in with the disc-harrow, at the rate of 35 to 45 loads an arpent. He manures 6 arpents with clover, sowing the seed at the rate of 6 to 8 pounds an arpent ; this he ploughs in in the fall. Besides 800 loads of dung that he buys in the village, he buys 40 bushels of lime, and ten barrels of plaster ; his tobacco averages 20 to 25 arpents.

Last year, M. Richard realized, from the sale of his tobacco alone, \$2,242.00 ; with the other sales, he realised, in all, \$2,285.00 ; after deducting all expenses of cultivation, his net profit was \$1,575.00.

The division of the farm into fields is well arranged ; the house is in every respects a good one. The farm-buildings are sufficient and kept in good order. The fields are well managed and free from weeds. There are plenty of agricultural implements, which are well cared for. We saw here a new machine for planting tobacco, which must be of the greatest utility to those who grow that plant on a large scale. It works to such a degree of perfection, that one would think it was endowed with intelligence.

M. Richard has built an excellent drying-house for his tobacco ; it is roomy and well ventilated, and when we saw it, there were hanging in it 26,000 lbs of fine tobacco, which he expected to sell at an average price of twelve cts a pound all round. His crops are very fine ; there are 8 acres in oats, 5 in buckwheat, 1 in potatoes, 1 in silage-corn, 22 in tobacco, 41 in meadow, 60 in bush-pasture and a garden of 30 x 45 feet.

The stock is Canadian : one brood-mare, 3 plough-horses, two milch-cows and a fattening beast, two pigs and 61 head of poultry. We have awarded to M. Richard 85.07 marks, which entitles him to a silver medal and a diploma of the highest merit."

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FARMYARD MANURE

Abstract by M. C. E. Mortureux, B. S. A.

As the "system of cultivation for a dairy-farm", which we have been investigating, proposes for the second year of the rotation a hoed-crop with manure, we must not any longer remit the treatment of that most important question "Farming and manure"; and the more so, since one of the defects already pointed out in our agriculture is the little care taken of our dung. This subject had been previously treated, in the reports of the Association, as follows, by :

1. M. I. J. A. Marsan, professor of agriculture ; VIth Report D. Ass. pp. 400 et seq.
2. M. J. B. A. Riehard, Laureat of Agricultural Merit ; XVIth Report D. Ass. 1897, 155 et seq.
3. The Hon. Louis Beaubien, VIIth Report D. Ass. 1889, pp. 178 et seq.

SUMMARY

106, Share of the soil in the nutrition of plants ; 107, Principal elements in the nutrition of plants ; 108, How to restore them to the soil ; 109, Farmyard dung ; 110, Its value ; 111, Value of humus ; 112, Where to find it ; 113, Advantages and asserted inconveniences of farmyard dung ; 114, Money-value of it ; 115, Its average annual production on a farm ; 116, Possible losses in dung ; 117, Loss of urine ; 118, Its preservation, tanks, absorbents ; 119, Losses of dung in heaps ; 120, Means of preserving it in heaps, liquid manure, fermentation ; 121, Conclusions ; 122, Fresh and rotted dung ; 123, Making and care of dung-heaps ; 127, The treatment of dung at Guelph ; 128, Moderate and heavy dressing of dung ; 129, Farmyard dung and worn-out land ; 130, Commercial manures.

106.—THE PART PLAYED BY THE SOIL IN THE NUTRITION OF PLANTS

In unfolding to farmers the mysteries of the nutrition of plants and by establishing the principle of the restoration to the soil of the elements of fertility, carried off by previous crops, science has rendered to agriculture one of those services by which, little by little, it has acquired that confidence so long denied to it by practical men.

The men of old had but a vague idea of the part played by the soil in the nutrition of plants. They thought that they imbibed from the surrounding air the material necessary for their growth, but it also struck them that, somehow or other, land seemed to acquire, by a rest from cropping, a renewal of force. "Every two years", had Virgil already remarked, "after

the crop is severed, leave came the custom of fallow time, and has only disappeared.

Though not gifted with observers, and in spite of "ed", as the poet said, they dung the arid soil", a phrase justified by saying : "My land". To-day we know with certain elements, that transforms into food for the

107.—THE CH

The elements of plant mineral ; of these fourteen need not trouble ourselves with phosphoric acid, potash, and lime soil to maintain its fertility. The deficiency of lime, we shall observe

108.—HO

As to the nitrogen, perhaps be restored to the land in two ways of doing this : but in this essay, we shall only touch

Like everything here its defects. Such as it is, among all the manures which have been greatly disputed. The only success of their brilliant heralded the exclusive use but that is all over and done with. Jocularly, that many Canadians have applied the application of dung to the land in answer better to cart it on to the land. It has been said in their excuse that the bank is inexhaustible. Well : sooner than was expected. and without repaying to it the bank keeps on drawing

the crop is severed, leave the land in fallow, that it may be at rest". Then came the custom of fallowing, which has lasted through the ages up to our time, and has only disappeared under the discoveries of agricultural chemists.

Though not gifted with scientific knowledge, the ancients were great observers, and in spite of "the land being made grateful by the rest accorded", as the poet said, they did not fail to "saturate with a dressing of rich dung the arid soil", a precept that Olivier de Serre, in the 16th century, justified by saying: "Manure soothes, renders easy and propitious all land". To-day we know, thanks to the chemist, that it supplies the soil with certain elements, that, aided by the air, by heat, and by moisture, it transforms into food for the plants growing on it.

107.—THE CHIEF ELEMENTS OF THE FOOD OF PLANTS

The elements of plant-food are 14 in number, four organic, and ten mineral; of these fourteen ten are furnished by the air and the soil, and we need not trouble ourselves about them; the other four, nitrogen, phosphoric acid, potash, and lime, are the only ones that have to be added to the soil to maintain its fertility. But as most good arable soils contain a sufficiency of lime, we shall only treat here of the other three elements.

108.—HOW TO RESTORE THEM TO THE SOIL

As to the nitrogen, phosphoric acid, and potash, they must necessarily be restored to the land if we seek to reap profitable crops from it. There are two ways of doing this: by farmyard dung and by commercial manures. In this essay, we shall only treat of the former way.

109.—FARMYARD DUNG

Like everything here below, farmyard dung has its good qualities and its defects. Such as it is, however, it is still fully entitled to the first place among all the manures within the farmer's reach, though this rank has been greatly disputed. Learned men, for a time led blind-fold by the early success of their brilliant theories, have contemned the homely dung and heralded the exclusive use of commercial manures; a sad mistake it was, but that is all over and done with. It has been related, but perhaps only jocularly, that many Canadian farmers only recognised one effect of the application of dung to the land, i. e., the production of weeds, and found it answer better to cart it on to the ice than to spread it on the land. But it must be said in their excuse that, in those days, the fertility of our soils seemed to be inexhaustible. Well: the end of that fertility was soon reached, much sooner than was expected. Men treated the land without any calculation, and without repaying to it its due, like a man who, with a good deposit in the bank keeps on drawing cheques without hesitation, trusting that the de-

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PLANTS

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posit will never be exhausted, until at last he is brought-up all-standing by having payment of a cheque refused. Such is our case, Gentlemen; we are, it is true, on a better road to-day, and dairy-farming has restored to our land a little of its fertility. We make more dung than our predecessors, and throw none of it into the river. But do we take proper care of it? That is what we have to consider to-day. We must remember that we have to trust for the restoration of fertility to our land, not only to liberal dressings of dung, but that the dung employed must be good and rich.

110.—VALUE OF DUNG

Let us first consider the value of dung, and the reasons why it has a right to the first place in the numerous fertilising matters at the disposal of farmer.

In the first place, dung is a complete manure, i. e., it contains a certain quantity of all the fertilising elements in which plants revel. I do not mean to say by this that dung alone can impart to plants all they require, but that it contains a little of each sort of food they need, more or less, according to the quality, rich or poor, of the food of the animals that produce the dung, and according to the care that has been devoted to its preservation.

111.—VALUE OF HUMUS.

Dung has also, a component that neither of the artificial manures contains. It furnishes to the soil that vegetable matter that when decomposed forms humus, or that black-earth that is found in great quantities in our virgin soils. This is purely the result of the decomposition of vegetable and animal remains, of the leaves of trees, &c.

A remarkable influence is exercised by humus on the fertility of our soils, an influence long unrecognised, but now universally acknowledged. It disintegrates heavy soils, rendering them more friable, easier to work, and yet imparts body to light soils. By its spongy, pervious nature, it absorbs and retains in the soil great quantities of moisture, dealing it out to the plants in times of drought. Its color, too, enables it to absorb heat. A soil that contains lots of humus is earlier in getting warmed-up in spring, and the germination and growth of crops on it are in consequence more rapid. When, by the act of ploughing, &c, this *humus* is brought into contact with the air, it is oxidised, burns slowly, and in decomposing liberates the acids that attack the dormant plant-food enclosed in the soil, and renders it assimilable and fit for the appetites of the crops. It is also sometimes called the reservoir of nitrogen in the soil, because it fixes it, retains it, and only surrenders it up to the plant by degrees, as it becomes decomposed. *Humus* constitutes the basis of the fertility of our farms, and it is no exaggeration

to say that if our crop instead of 25 bushels they yield so much to the exhaustion to the disappearance of the

111

Whence shall we draw our fields and that must be re- farmyard dung. Doubtless by growing leguminous crops in, but in the common practice that we have recourse if we

Farmyard dung, though necessary elements of plant that improves its physical qualities. It possesses, besides

113.—ADVANTAGES OF

The advocate of artificial too slow to act, and does it may be slow, which I action of its action; extending manures is generally exhausted

Allow me to recount at the Rothamsted Experiment the same quality throughout. On one of these plots was of 14 tons of farmyard dung the two plots barley was grown

The manured plot yielded bushels to the acre, while 20 bushels. In order to former plot during the 20 years, the experiment was any manure during the namely the manured one, average of the other only been applied during the 20 to compel the land to yield

Again, owing to its slow that by decomposing so slowly can appropriate. Such is the

ration to say that if our crops are no longer what they used to be, if, instead of 25 bushels they no longer yield more than 12 or 15, it is due, not so much to the exhaustion of the nitrogen, phosphoric acid and potash, as to the disappearance of the *humus* of the soil.

112.—WHERE TO FIND HUMUS

Whence shall we draw our supplies of that *humus*, so necessary to our fields and that must be restored to them, at any rate? In no other form than in farmyard dung. Doubtless there may be other means more rapid to win it: by growing leguminous crops, such as vetches, clover and ploughing them in, but in the common practice of agriculture, it is more especially to dung that we have recourse if we want to incorporate it with the soil.

Farmyard dung, then, is doubly precious, in that it contains all the necessary elements of plant-food, and that it supplies to the soil the *humus* that improves its physical properties and acts as a receptacle of those elements. It possesses, beside, other valuable qualities.

113.—ADVANTAGES OF FARMYARD DUNG, PRETENDED INCONVENIENCES

The advocate of artificial manures say that its action is sluggish. It is too slow to act, and does not afford food to the plant soon enough. Though it may be slow, which I admit, it atones for its slowness by the long duration of its action; extending over several years; while the effect of artificial manures is generally exhausted in one season.

Allow me to recount to you a most interesting experiment carried out at the Rothamsted Experiment-farm. A piece of land was selected, of the same quality throughout, and divided into two plots of equal superficies. On one of these plots was applied, every year for twenty years, a dressing of 14 tons of farmyard dung, the other plot received no manure at all. On the two plots barley was grown each year.

The manured plot yielded during the twenty years an average of $40\frac{1}{4}$ bushels to the acre, while the unmanured plot only yielded an average of 20 bushels. In order to find out if the effects of the manure applied to the former plot during the 20 consecutive years extended over the succeeding years, the experiment was continued for 20 more years, neither plot receiving any manure during that period. The average yield of the former plot, namely the manured one, during these 20 years, was $30\frac{1}{4}$ an acre, the average of the other only $13\frac{1}{4}$. Thus, after 20 years the dung that had been applied during the 20 preceding years, had retained sufficient influence to compel the land to yield 17 bushels to the acre more than the other.

Again, owing to its slow decomposition, dung has another advantage, that by decomposing so slowly it never offers more food to the plant than it can appropriate. Such is not the case with too soluble artificial manures, a

great part of which is often washed out and led away by the rains into the depths of the subsoil and the ditches.

114.—MONEY VALUE OF FARMYARD DUNG

Another important and interesting point is to ascertain the money-value of a ton of dung. Leaving aside the "humus" it brings on the land, the money-value of which is difficult to calculate, what sum represents the worth of a ton of dung, basing the calculation on the commercial value of the manurial principles that it contains, i.e., nitrogen at 12cts a pound, phosphoric acid and potash at 5½cts each.

Let us at once remember that there is dung and dung. The quantity of manurial principles which are found in dung vary, according to the age, the nature of the animal, the work it does, and above all according to the food it receives. I will not detain you over these details with which you are all familiar. At the Ottawa Experiment-farm the dung produced by the stock kept there contains the following in a ton:

Nitrogen.....	12 lbs
Phosphoric acid.....	6.2
Potash.....	15.2

while the average of the analyses of dung sent to the chemist was :

Nitrogen.....	7.8 lbs
Phosphoric acid.....	3.1 "
Potash.....	9.0 "

It is impossible to determine the value of any manure before it has been analysed, but the average of the analyses made have settled it that recent dung, mixed and well cared-for, may vary in composition within the following limits :

Nitrogen	may vary from 7 to 15 pounds in a ton;
Phos. acid	" " " 2 to 8 " "
Potash	" " " 8 to 15 " "

It is therefore clear that estimating nitrogen at 12cts and phosphoric acid and potash at 5½cts a pound, at the ordinary market rates, a ton of well cared for dung may vary in value from \$1.51 to \$3.08, that is to say that this is the sum we should have to pay if we were going to buy in the form of artificial manures the fertilising principles contained in a ton of farmyard dung.

115.—AVERAGE

The usual calculation produces about 5 or 6 to

Judging from the data of a farm during the winter months, estimates the value of seven months, by 4 horse power, this estimate is even a poor valuation.

116.—OF THE

There; that is the value. But the value of the same amount from it, depending as to what is received. It will have lost fourths of its fertilising power, may lose \$186.00 out of the amount to for the province

According to the census, 969,300 head of cattle and animals produced an annual value of \$1.90 a ton as the value of the sum represents the value of the winter months the share

Should the careless treatment of its value, as is too often the case of our province of \$2,198, a value of \$3,298,155. A value below the average. Do you know its business in such a far as a farmer does. Is it wonderful difficulty to make both ends

The diminution in the

- I. The loss of the li
- II. The excessive fer
- III. The washing of t

115.—AVERAGE ANNUAL PRODUCTION OF DUNG ON A FARM.

The usual calculation is, that, with proper food and bedding, a horse produces about 5 or 6 tons of dung a year.

A cow 12 to 15 tons;
 A hog 2 to 3 "
 A sheep $\frac{3}{4}$ of a ton.

Judging from the data, what is the total value of the dung produced on a farm during the winter months? Professor Roberts, of Cornell University, estimates the value of the dung produced on a farm during the winter seven months, by 4 horses, 20 cows, 50 sheep and 10 pigs, at \$250.00, and this estimate is even more than moderate, and by no means an erratic valuation.

116.—OF THE LOSSES THAT MAY BE SUFFERED BY DUNG.

There; that is the value of recent dung, that has undergone no loss. But the value of the same dung when spread on the land may differ greatly from it, depending as to the difference entirely on the treatment it has received. It will have lost often a third, a half, sometimes even three-fourths of its fertilising principles. That is to say that the careless farmer may lose \$186.00 out of the \$250.00. Let us see how much this loss will amount to for the province of Quebec.

According to the census of 1891, there were in Quebec 344,300 horses, 969,300 head of cattle, 730,000 sheep and 369,600 swine. These animals produced an annual average, at the very moderate rate of 2.14 tons a head, 5,888,940 tons of dung. Taking the very moderate estimate of \$1.90 a ton as the value of this dung, we reach a total of \$11,306,765. This sum represents the value of the dung produced during the entire year; for the winter months the share would be \$6,596,310.

Should the careless treatment of the dung cause it to lose one-third of its value, as is too often the case, that would be a dead loss to the farmers of our province of \$2,198,770. If the loss is one-half, it would represent a value of \$3,298,155. And these valuations I beg you to remark are very below the average. Do you think that a firm of tradesmen that conducted its business in such a fashion would pay? And yet this is what many a farmer does. Is it wonderful that they have, at the end of the year, a difficulty to make both ends meet?

The diminution in the value of dung is commonly caused by:

- I. The loss of the liquid part;
- II. The excessive fermentation in the dung-heap;
- III. The washing of the dung by rain.

117.—LOSS OF URINE.

The urine is, we must remember, by far the richest part of the dung. It contains nearly the whole of the potash and a great part of the nitrogen. By allowing it to escape, more than half the value of the dung is gone, and the more so, since, in the absence of the urine the fermentation of the solid parts goes on very much more rapidly and causes much greater losses.

These losses begin in the stable itself. As soon as emitted, the urine starts a fermentation that connects its nitrogen into a volatile compound called carbonate of ammonia. This compound evaporates, carrying into the atmosphere the chief fertilising principle of the urine, its highest priced, most soil-enriching constituent part: the nitrogen. You have all remarked in the cow-house, and still more in the stable, since the horse urine ferments more rapidly than that of cattle, that strong, penetrating smell that disengages itself from the urine. This smell is from the ammonia, and when you remark it, you may be sure that great losses are going on.

But, generally speaking, this fermentation has not time to take place. In too many of our cow-houses, for want of absorbents and on account of broken boards, the urine filters through the cracks in the floor and is lost. To a certain degree, to say that a hole in the cow-house floor is a hole in the milk-pail, is no exaggeration.

118.—PRESERVATION OF URINE, TANKS, ABSORBENTS

There are two ways to preserve urine :

Tanks :

The use of absorbents on a stanch flooring.

The liquid manure tank, once very fashionable, and highly recommended, has now gone out altogether ; there was first the cost, which was considerable when the tank was well built ; then, we must remember, that in hot weather the urine ferments as rapidly in the tank as in the stable, and thus very soon loses its nitrogen. By frequently pumping the urine over the dung-heap, this loss may be avoided, but when work presses on the farm, a common case, this precaution is too often neglected. The use of tanks has been recommended, so as to enable one to empty the liquid manure on certain fields of the farm. I am well aware that this may do good, especially on meadows, but it cannot be practised with out incurring a certain loss, for being very rich in nitrogen, the liquid manure supplies more of the element than the plants can absorb at once, and that which is not at once absorbed is washed out by the rain and of course is lost. Liquid manure is not a complete manure, and can only supply two of the elements needed by the crop, so it

should never be used : urine over the dung-heap, chemical, the most practi-

And now, we reach absorbents. We are advised in sufficient quantity in all the urine that finds try to escape from it. On this subject, to use not but all of you have not for my counsels. Let good as absorbents, and dantly at command. In all of which are capital too strongly advise you chaff-cutter. It is not of the straw be much it will be much easier to and will quite pay for t

The mixture with t fixing the ammonia, or t its fermentation, is a go best of these, but the pl retain it ; besides it is e Bog-earth, that I mentio great mistake on the pa not to use it. A heap c from which a few shovel rear of the cattle in the, elements will be avoided be added to your dung v

Lastly, if you have another material at hand the better. Doubtless t troublesome, as it grealy chard, who two years ag found the use of two or t daily, very handy. And but sand. Here, I cann dealers ; it is to take the age, if you leave them, a as absorbents during the ings, and take from it ev

should never be used alone. For all these reasons, then, pumping the urine over the dung-heap is by far the best way of using it, the most economical, the most practical.

And now, we reach a subject by no means devoid of complication : absorbents. We are advised to employ, as a general thing, certain substances in sufficient quantity in the passage in the cowhouse and stable, to absorb all the urine that finds its way thither, and so to fix the volatile gases that try to escape from it. Of course it would be easy for me to advise you, on this subject, to use nothing but bog-earth, as it is the best of absorbents ; but all of you have not that earth, so but a few of you would be the better for my counsels. Let us first say that all the refuse matters of a farm are good as absorbents, and the best are often those that we have most abundantly at command. In the first place, there are the different kinds of straw, all of which are capital absorbents ; and while I am on this subject I cannot too strongly advise you to cut all the straw for litter in to 4-inch lengths in the chaff-cutter. It is not much work, and not only will the absorptive power of the straw be much increased by the process, but the manure, when made, will be much easier to spread ; the difference you will find to be enormous, and will quite pay for the chaffing.

The mixture with the straw of some substance that has the power of fixing the ammonia, or the nitrogen which is escaping from the urine during its fermentation, is a good thing. Plaster has long been considered the best of these, but the plaster that fixes the ammonia would not be able to retain it ; besides it is expensive, and its use will be far from economical. Bog-earth, that I mentioned just now, is the next material. It is indeed a great mistake on the part of those farmer that have this earth within reach not to use it. A heap ought to be laid up, near the building, in the fall, from which a few shovelfuls can be taken every day to be spread in the rear of the cattle in the passage. By this means, a great loss of fertilizing elements will be avoided, and a considerable quantity of organic matter will be added to your dung which will increase its value.

Lastly, if you have no bog-earth, and cannot spare the straw, there is another material at hand, common earth, and the more humus it contains the better. Doubtless the employment of earth alone as an absorbent is troublesome, as it greatly increases the weight and the labour, but Mr. Richard, who two years ago gave so good a description of manures, said that he found the use of two or three shovelfuls of earth in the rear of the cattle, daily, very handy. And remark, too, that M. Richard's earth is nothing but sand. Here, I cannot do better than repeat M. Richard's advice to his dealers ; it is to take the ditch-scrappings that injure the working of drainage, if you leave them, as is too often done, by the ditch-side, and use them as absorbents during the winter. Make a heap of them near your buildings, and take from it every day what you need.

And we must not forget saw-dust, of which many of you doubtless have lots at your disposal. It makes capital litter and is, in itself, fairly rich in manurial matters. Besides, it acts in a mechanical way on the land by subdividing it, making it more friable, more mellow, and is thus peculiarly suitable to heavy land. Those of you who can get supplies of saw-dust should not neglect to use it.

Lastly, though I am not much in favour of liquid manure tanks, we must look out for cases, though there can be but few of them, where no absorbents are available. Here, we must sink a pit at the entrance of the cowhouse, under the flooring, or in the dung-shed, to collect the urine, and whence it may be frequently drawn to soak the dung-heap.

119.—LOSSES IN THE DUNG-HEAP.

Having taken every means of preventing losses in the cowhouse of the liquid manure, we must now look out for the safety of the dung-heap. There too, important transformations are going on and if we are not careful we shall lose the most important part of the remainder. In many of our Canadian farms, the dung is thrown out of the cow-house and stable through windows, and accumulates into a shapeless heap under the drip of the water from the eaves. The rains of autumn wash it, in winter the snow covers it, and when the spring-thaw comes, the dung suffers another lixiviation. Some farmers put out their dung on the land late in spring; others wait till the fall when they have more leisure. In most cases, then, little or no care is taken of the dung-heap or mixen. It is not that our farmers are ignorant of the loss this negligence inflicts on the dung: though they do not know its full extent, they have at least some, even if a vague, idea of it; but they fancy all this is mere theory, that the things advised are too costly, and in consequence impracticable, and that the remedy would be worse than the disease. Let us then examine the losses suffered by the dung in the heap mentioned above, and see if they can be economically avoided.

The losses suffered by the mixen carelessly put up occur in two ways: one by the loss of urine, the other by fermentation.

This brown liquid escaping from the mixen and running off into the next ditch or brook, is, so to speak, the essence of the dung. Here is the composition, according to the analysis made at the Ottawa Experiment-farm, of 4 samples of liquid manure:

Manurial elements...No. 1	No. 2	No. 3	No. 4
Nitrogen..... .511	1.140	1.60	.03
Phosphoric acid..... .104	.038	.10	.03
Potash.....2.660	1.980	4.90	1.89

This analysis is the loss of this liquid

At Cornell Univ posed to the air for s same kind. At the s \$2.30. At the end of \$1.32 thus showing a

In another exper heap for 6 months, wa a ton.

And in still anot only weighed at the e nal weight. Moreov nitrogen, 47% of pho value of \$1.74 a ton.

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The two lots were results were these:

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The unsheltered h lbs.; but it had lost 6 other, 29 p.c. of its nitr of its phosphoric acid, cts. a ton, instead of 20 other.

At the end of the dung was 36 cts. a ton tant changes took plac losses continued after t

This analysis is an ample proof of the vast importance of preventing the loss of this liquid manure.

At Cornell University, a ton of horse-dung, lightly packed, was exposed to the air for six months in a wooden box, surrounded by dung of the same kind. At the start, the dung was shown by analysis to be worth \$2.30. At the end of the six months it proved to be worth no more than \$1.32 thus showing a loss of 98 cts. a ton, or 46% of its value.

In another experiment, a mass of 5 tons of dung, exposed in a compact heap for 6 months, was reduced to a weight of 5,125 lbs. and had lost \$0.69 a ton.

And in still another experiment, 2 tons of dung exposed for 1 month only weighed at the end of that period 1,730 lbs., a loss of 57% of its original weight. Moreover, analysis revealed that the dung had lost 60% of nitrogen, 47% of phosphoric acid, and 76% of potash, a loss in money value of \$1.74 a ton.

In these experiments, the dung was left in an untrodden mass. An experiment with mixed dung, trodden down compactly by the hooves of cattle, only showed a loss of 9%.

But here is another, and a very convincing experiment, so convincing that I should hesitate to give it you were it not backed by the authorities of the Ottawa experiment-farm.

In this experiment, two lots of recent dung, from horse and cow, weighing each 4 tons, were selected. One lot was placed in a closed shed, the other in the open air, on a wooden platform made with double boards.

The two lots were analyzed every month for a twelve-month, and the results were these :

At the end of three months, the sheltered dung only weighed 2,980 lbs., instead of 8,000 lbs., a loss of 5,020 lbs. It had lost 55 p. c. of its organic matter, and 17 p. c. of its nitrogen, but its phosphoric acid and potash were intact: the money loss was 20 cts a ton.

The unsheltered heap, which had received the rain, still weighed 3,903 lbs. ; but it had lost 60% of its organic matter, or 5 p. c. more than the other, 29 p.c. of its nitrogen, or 12 p.c. more than the sheltered dung, 8 p.c. of its phosphoric acid, and 22 p.c. of its potash ; a total money loss of 64 cts. a ton, instead of 20 cts. more than thrice as much as that lost by the other.

At the end of the 12 months, the loss in money value of the sheltered dung was 36 cts. a ton, of the other, 95 cts. We see that the most important changes took place during the three first months of fermentation. The losses continued after the 3 months but in a less proportion.

These experiments also show us that the losses of phosphoric acid and potash are very slight in the sheltered dung, while in the other, they rise to the fifth and even to the third of the original content of these two constituents. This proves that the losses of these elements are due, not to fermentation, but to the washing of the mixture by the rains.

The two mixens contained, at first \$10.43 each of plant-food. At the close of the experiment, the sheltered one still retained \$9.63 worth, and the other \$6.65 worth.

The two heaps were reduced thus: the former to a weight of 2,120 lbs., the other to 3,038 lbs. Of this loss of weight there was a loss of 1,168 lbs. of organic matter in the former, and of 1,331 lbs. in the second.

Before drawing any conclusions from these experiments, I beg you to observe that the exposed mixen was in a much more favourable condition than dung is generally met with in our farms. It was on a double flooring, and was regularly pressed down. If, while being kept under these favourable conditions it met with such losses as I have specified, what losses must occur in our carelessly treated mixens where there is no attempt to hinder the escape of the liquid manure.

120.—MEANS OF SECURING THE MIXEN FROM LOSS.

By simply laying a bed of some inches of earth on the intended site of the mixen, this bed will retain all the liquid that would otherwise escape, and being full of the urine will be a manure as rich as the dung itself. Or, if it be preferred, a pit can be sunk to hold the leakage. The chief thing is to allow none of it to escape, and that, as you see, is by no means a difficult task.

Nor let us forget that, if dung is allowed to ferment without care it will lose a vast amount of its value, yet, these losses can be greatly lessened by : thorough pressure, so as to exclude the air that aids the fermentation ; by preventing the loss of liquid trying to escape from the mixen ; and keeping the heap moist, though not wet, which hinders too rapid a fermentation.

21.—CONCLUSIONS.

And, now, what conclusions are we to draw from the experiments we have been considering ?

We will limit ourselves to show that, even with the greatest care, dung, in fermenting, must lose a great deal of its organic matter, even if it retains its fertilizing principles. This organic matter would later have formed *humus*, a substance, as we have seen, of considerable value. Now, do the advantages the dung acquires by fermenting compensate for this loss ?

Here we arrive at us first examine the arg support of their method

1. The rotted dung, to the fields much easier

2. Being concentrated we saw by these experiments two or even three tons in soluble state, i. e., plant

3. It is easier to work equally.

4. The weed-seeds

5. Lastly, in this strawy dung, which would

But, we must say it still remains to be proved rotted than in recent dung show that the use of rotted quantity of plant-food it by the fermentation is, trowing will do the job in

That which is proved dung is not carried on w the best conditions. Do ation compensate for thirrities incline to the negadung is not advisable ex farm-practice, the sooner ground, the better. Our correctness of this idea, t ing it on the snow to lett theirs is only admissible and when the land is wel as it seems to me, a rem done in some parts of Qu

In the case then, wh until it is most convenient care to prevent the occur

122.—RECENT AND ROTTED DUNG.

Here we arrive at the relative value of recent and of rotted dung. Let us first examine the arguments brought by the advocates of rotted dung in support of their method.

1. The rotted dung is much reduced in bulk, which renders its cartage to the fields much easier.
2. Being concentrated, it is much richer. A ton of rotted manure, as we saw by these experiments, may contain as much fertilizing principles as two or even three tons of recent manure, and its plant-food is in a far more soluble state, i. e., plants can use it with much greater ease.
3. It is easier to work over and can be spread much more easily and equally.
4. The weed-seeds are generally destroyed.
5. Lastly, in this state it is better suited to sandy soils, than is recent, strawy dung, which would make light land more open than it is already.

But, we must say it, all the advantages are more apparent than real. It still remains to be proved that the fertilizing matters are more soluble in rotted than in recent dung. On the contrary, many experiments tend to show that the use of rotted dung does not supply results in proportion to the quantity of plant-food it contains. Besides, the destruction of weed-seeds by the fermentation is, to say the least, doubtful. Any how, a timely harrowing will do the job in a much cheaper way.

That which is proved, on the contrary, is, that the fermentation of the dung is not carried on without considerable loss, even when it is done under the best conditions. Do the qualities acquired by the dung by the fermentation compensate for this loss? At present, almost all agricultural authorities incline to the negative. It is generally thought that the fermenting of dung is not advisable except in exceptional cases, and, that, in common farm-practice, the sooner dung is incorporated in the fresh state with the ground, the better. Our Ontario neighbours are even so convinced of the correctness of this idea, that they prefer carting-out their dung and spreading it on the snow to letting it ferment in a heap. But this practice of theirs is only admissible where there falls but little snow, or rain in spring, and when the land is well drained. Here, in this Province, it would be, as it seems to me, a remedy worse than the disease. Though it might be done in some parts of Quebec, here, in the East, I do not recommend it.

123.—BUILDING AND CARE OF THE MIXEN.

In the case then, where we are obliged to keep the dung in the yard until it is most convenient to spread it, we must redouble the attention and care to prevent the occurrence of those losses that cannot fail to happen,

unless every care and precaution is taken in the building and preservation of the dung-heap. The following is the method I should advise you to follow :

First of all, at the site of the intended mixen, dig a pit from about a foot to a foot and a half in depth. You might go as deep as two feet, but the deeper the pit the more difficult will be the drawing-out of the dung. If the soil is clay, the job is done ; but if not, clay must be brought thither and beaten into the bottom of the pit to the depth of 6 or 8 inches. This will make an almost impervious bottom, and prevent the liquid manure from filtering into the subsoil. On this bed of clay it would be well to place a layer of earth, of any earth you have handy, though if it were turf or bog-earth, it would be all the better, seeing that their power of absorption is greater. This earth will imbibe all the liquid that escapes from the dung and, in itself, will be by no means a poor manure. Practical experience proves, that never mind how much absorbing material is used in the cow-house, &c., a quantity, more or less great, of liquid is sure to exude from the mixen, and this layer of earth will prevent its being lost.

Lastly, we have seen by the experiments I have mentioned to you that dung requires to be regularly subjected to pressure, to be kept as compact as possible, to exclude the entrance of air. The simplest way of doing this is to let the pigs run over it. This will give them healthy exercise, and compress the dung as much as is necessary. But if we allow the pigs to trot about over it, it must necessarily be surrounded by a wooden border. Put some posts round the mixen and nail boards to them, otherwise the pigs will soon scatter the dung all over the yard. If you have the material handy, a stone wall round the mixen will answer even better than the wooden border.

In taking care of the mixen, always remember that the less surface of it that is exposed, the less will be loss of valuable qualities ; so, we must take pains to cram our dung into as small a space as possible, so as to keep it from the influence of the air. The heap should be square, and the sides upright.

And it is a good plan, too, to put it under a shelter of some sort, to protect it from rain and snow. Of course I know it has long been asserted that the damper dung is kept the less active will its fermentation be, and that, on that account it is right to leave the dung exposed, always taking care to mix with it earth enough to absorb all the moisture it is likely to receive from natural sources. That is sound theory enough ; practically, I do not think that the cartage of earth to the mixen simply to absorb the water from above will pay. You will find it more profitable to shelter it under a rough, cheap shed. If the dung is well packed, and it receives all the urine from the stock, there will be enough moisture in it to ensure its regular fermentation. If horse-dung form the greater part of the mass, some more moisture

will be needed, as horse more frequent watering being moister and co the mixen.

Up to the present there is no need of experience I wanted to convince you get as good results as water termination. But if you the better ; they will be dung-cellar that I cannot is well trodden to prevent produced in the ferment cattle most injuriously. cement. Otherwise, when find yourself in a filthy load, which will prove to

I have also taken it spring, spread it and with the plough or the disc-harrow method. To begin with the farmer, but it is also time of year, you all know ground begins to thaw. I object, that he carts out his for spreading when the snow plan, and I advise you to by some of our best farm fields where the dung is in the plan, but practical. Still, for these field dung those in the yard : expose air, square them up well inches of earth to keep in

There is also another which I ought to have done animals should be mixed

will be needed, as horse-dung is much drier and hotter, needing therefore more frequent waterings ; but when cattle are in the majority, their dung being moister and cooler, even the rains need not be allowed entrance to the mixen.

124.—DUNG-PITS AND SHEDS.

Up to the present time, I have confined myself to proving to you that there is no need of expensive structures for the preservation of your manure. I wanted to convince you that, with a little good sense and industry, you can get as good results as with a large out lay of money. The main thing is determination. But if you happen to have a good shed, or a dung-cellar, all the better ; they will be all the handier. Still, there are objections to the dung-cellar that I cannot pass over in silence. First, unless the dung in it is well trodden to prevent the escape of the ammonia, the fumes of which are produced in the fermenting mass very rapidly, these fumes must affect the cattle most injuriously. Next, the cellar must have an impervious floor, in cement. Otherwise, when the time comes to cart out the dung, you will find yourself in a filthy pool, in which you will have to splash about every load, which will prove to be a horrid nuisance, and cause great loss of time.

125.—CARTAGE OF DUNG.

I have also taken it for granted that you cart out your dung in the spring, spread it and work it into the soil as quickly as possible, either with the plough or the disc-harrow. But I do not ignore the difficulties of this method. To begin with, spring is not only the busiest time of the year for the farmer, but it is also the shortest of the four seasons. Besides, at this time of year, you all know how hard this work is on the horses when the ground begins to thaw. M. Richard told us, in his last lecture on this subject, that he carts out his dung to the fields and puts it out in heaps, ready for spreading when the snow is gone and the land thawed. This is a good plan, and I advise you to adopt it. There is also the system, followed out by some of our best farmers, of making, in the winter, large mixens in the fields where the dung is to be spread in spring. There may be some loss in the plan, but practically, it is so handy that it, too, may be advisable. Still, for these field dung-heaps the same treatment must be adopted as for those in the yard : expose as little surface as possible to the action of the air, square them up well with upright-sides, and cover with a layer of some inches of earth to keep in the fertilising gases.

126.—MIXTURE OF DUNGS.

There is also another point to which I desire to draw your attention, which I ought to have done before. The dung of the different kinds of animals should be mixed together in one heap, and this for several reasons.

First, different kinds of dung do not all ferment at the same time. It is very hard to prevent the rapid fermentation of horse-dung when it is kept in a heap by itself. But if it is mixed with more watery dung of cattle and surne the too rapid fermentation will be checked. Moreover, dungs do not all contain the same proportions of fertilising elements; horse-dung is rich in some elements in which pig-dung is poor. So, when mixed together, they complete one another and form a more complex manure suitable to the varied demands of the different cultivated plants.

127.—METHOD ADOPTED AT GUELPH.

In treating of the application of dung to the land, there is one point to which I would specially draw your attention. It should not be buried deeply; in fact, the nearer the dung is kept to the surface the better. The earliest rootlets of the plants will thus more easily find their food, their growth will be more vigorous, and you know that the success of a crop depends greatly upon the first part of its life; moreover, rain passing downwards through the soil, has always a tendency to carry with it the plant-food of the dung into the subsoil; so it must be right to retard this descent by keeping the manure near the surface. The *humus*, too, produced by the dung gives better results near the surface than lower down. The more food there is at the disposal of the plant, the quicker will be its growth. I will describe to you the plan followed at the experiment-farm at Guelph in conformity with these principles. The manures got together during the summer are spread in the late fall on a clover-lea that was ploughed 4 inches deep at the end of the summer, and which is worked about during the early fall as often as possible to hasten the decomposition and transformation into humus of the vegetable matters the clover has brought to the land. Towards mid-November, the manure is spread at the rate of 15 tons to the acre. The land is made into slight-drills, with the double-mould-board plough, 21 inches apart, so that these drills contain all the manure brought on to the land, together with all the humus produced by the decomposition of the clover. In the spring, only a few strokes of the grubber and harrows are required to break down these drills, and thus to place at the easy disposition of the plants, at the very surface of the land, the fertilising elements they (the drills) contain. The dung made in the winter is spread over the land during the same season and in the early spring, and is incorporated with the soil by a light furrow with the 3-shared plough and repeated strokes of grubber and harrow.

This method ensures not only a complete mixture of dung and soil, but it also prevents the loss of all fertilising materials by the draining-off of water (through the furrows, &c), so it is carried out especially on the sloping parts of the farm. The dung is only spread in winter on those parts of the farm that, from their *lie* (position) have no reason to fear its washing by the waters of the spring thaw.

128.—AVEI

As to the proper quantity of that moderate dressing at longer intervals. If, indeed, the fertilising elements than a large part of them being lost, a common enough mistake in the small piece of land, leaving one fed a few beasts fully, it may be said that the dung thus benefits of subsequent crop nitrogen through the rain (rather kind to be feared. By application of very heavy dressing, i. e., that the nitrates offers itself to plants—are in free state. From all these dressings of dung are to be avoided a heavy dressing, the richness of the dung. The calcium dung, is the greatest quantity such as maize or roots.

129.—FARM

In speaking of the method of complete manure, and tried to use artificial manure. In advising so with the conviction that having, up to the present time out. What they chiefly need and humus, rather than manure, not on the surface at least initially, in a dormant state, and so warmth, and moisture to maintain

The land must be more fertile under these circumstances ends into the subsoil, open that it leaves on the surface

At the last meeting of the Cornell University, said: thing; the potential richness upper 8 inches of the soil the

128.—AVERAGE AND FULL DRESSING OF DUNG.

As to the proper quantity of dung to be applied to the land, let us say that moderate dressings at close intervals are better than full dressings at longer intervals. If, indeed, we supply to the land by heavy doses more fertilising elements than the plants can assimilate, great risk is run of a large part of them being lost, particularly of the nitrogenous matters. A common enough mistake in the country is to give all the available dung to a small piece of land, leaving the rest of the farm to do without. This is as if one fed a few beasts fully, and starved the rest of the herd. It may perhaps be said that the dung thus applied is not lost, as it is left in the soil for the benefit of subsequent crops. But beside the possible loss of some of the nitrogen through the rain of which I spoke just now, there is also loss of another kind to be feared. By German experiments, it has been shown that the application of very heavy dressings of dung to the soil encourages denitrification, i. e., that the nitrates of the soil—the soluble form in which nitrogen offers itself to plants—are decomposed, and their nitrogen returns to the free state. From all these considerations then, it appears that moderate dressings of dung are to be preferred to heavy dressings. As to what constitutes a heavy dressing, that depends a good deal on the condition, the richness of the dung. The calculation is that 15 tons to the acre, of average dung, is the greatest quantity advisable, even for the most exhaustive crops, such as maize or roots.

129.—FARMYARD-DUNG ; WORN-OUT LAND.

In speaking of the merits of farmyard-dung, I remarked it was a complete manure, and tried to show you its superiority, in this respect, over artificial manure. In advising you to use nothing but farm-yard dung, I did so with the conviction that our farms, in spite of the restitution principle having, up to the present time, been but little observed, are not yet worn-out. What they chiefly need is good cultivation, getting off the water; and humus, rather than manurial elements; for they have lots of these, if not on the surface at least in the subsoil, but these elements are, unfortunately, in a dormant state, and so not assimilable by plants. They need air, warmth, and moisture to make them soluble.

The land must be more actively worked. The best assistant to the farmer under these circumstances is clover, which, with its long roots, descends into the subsoil, opens it up, and draws from its recesses plant-food that it leaves on the surface for the succeeding crops.

At the last meeting of the Experiment Union at Guelph, Prof. Roberts of Cornell Universtiy, said: "Folk talk of worn-out soils; there is no such thing; the potential riches of the soil can hardly be calculated. In the upper 8 inches of the soil there are 3,000 lbs. of nitrogen, 4,000 lbs. of

phosphoric acid, and 16,000 lbs. of potash an acre. And still, though the soil contains all this, we go to Germany for our potash. This is just about as simple as if we were to go to town and buy condensed milk, while the milk was running out of the teats of our cows on to the cowhouse floor. But that is not the whole of the wealth of the soil. In the second 8 inches below the surface, there are 4,000 lbs. of nitrogen, 1,800 lbs. of phosphoric acid, 6,800 lbs. of potash. And we have no need to dig to get this fertility; all that we need do is to get the clover-plant to plunge its roots deeply into the soil, and whistle while we are sitting on the fence.

130.—COMMERCIAL MANURES

Not that I would by any means leave you under the impression that commercial manures are of no value. All soils are not so rich as that Prof. Roberts was talking about; some are naturally poor in one or the other of the elements of plant-food; for such soils dung alone is not sufficient. "Dung is, indeed, only the return (*reflet*) of the soil, and its greatest drawback is, that it restores to it a larger proportion of that which it does not want, and a smaller proportion of that which it does want." In this case, if we wish to grow heavy crops, we must employ chemical manures, whether potash or phosphoric acid, and to find out which of the two is needed by the soil, there is only one way, that is, by repeated experiments. If you think your land is weak in one of the elements, make several careful experiments on your fields, and do not use those manures until you are convinced that they are necessary. As to nitrogen, there is no reason for us to trouble ourselves about it, for the clover-plant will extract all that we want of it from the atmosphere without its costing us a cent. The great thing for us to attend to is to grow clover, and to look carefully after the treatment of our dung.

In the VIIth Report of the Association, the Hon. Louis Beaubien made certain remarks on the resources of the province of Quebec, in organic and mineral manures, which we think it our duty to condense here.

The refuse of our fisheries, and the small fish that at certain seasons of the year are abundant on our shores, supply cheaply and abundantly a manure of great value to the farmer, the most costly of all the constituents, nitrogen, being precisely the leading part of their manurial value. The ashes of our homes and of our forests, which so frequently figure in the advertisements in the agricultural papers of the States, are so rich in potash, that a knowledge of this ought to prevent any intelligent farmer from allowing a single bushel of them to quit the country.

Lastly, the *apatite* deposits of Canada, that contain an average of 40 p. c. of phosphoric acid, and 45 p. c. of lime, ought easily to furnish the province of Quebec with all the phosphoric acid it requires. It is true that the transformation of this *apatite* into superphosphate is rather costly, and

for that reason, or for some other, some what diminished.

M. Antoine Casavant, French paper, a statement of the value of dung, which rendered it (the Canadian *apatite* offered the same value.

Note by the Editor.—7
no answer in 1887, we have no answer to our researches :

It is true that the French phosphates with dung, and soluble phosphoric acid of the same kind in question are generally the same as rock, and not our *apatite* (Les Engrais de Muntz & Girard, Les Engrais).

Still, our Canadian manures with dung, at the Ottawa Experiment Station, of these farms for 1893 (see observations on these experiments).

It would seem that when mixed with farm-yard dung in a compost, better results are obtained from the dung alone; and it is true that phosphate is rendered soluble in a state of decomposition.

Our readers will find in (pp. 47 to 54) the results of 3/5 of the ration of farm yard manure (these experiments) were reduced to 15 tons, by 500 lbs. of naturally pulverised.

In the growing of silage, the dominant demand is for nitrogen, and is met from this substitution.

In the case of potatoes, the substitution of the yield was hardly

But in such crops as wheat, which is nitrogen, the yield is

for that reason, or for some other, the active work at these mines has, of late, some what diminished.

M. Antoine Casavant, in the VIth Report, related that he had seen, in a French paper, a statement that it paid well to mix *apatite* with all sorts of dung, which rendered it (the *apatite*) assimilable ; and he asked if the Canadian *apatite* offered the same advantage.

Note by the Editor.—To this question of M. Casavant, which received no answer in 1887, we have sought for a solution, and this is the result of our researches :

It is true that the French agronomes recommend the mixing of raw phosphates with dung, and have proved that this operation renders the insoluble phosphoric acid of raw phosphates partly soluble; but the phosphates in question are generally the coprolites of the green-sand, or of the Carolina rock, and not our *apatite* (P. P. Déhérain, *Agricultural Chemistry*, p. 756, Muntz & Girard, *Les Engrais*, Vol II, p. 515.)

Still, our Canadian mineral phosphates were tried with a mixture of dung, at the Ottawa Experiment-farm, for a series of years, and the Report of these farms for 1893 (p. 24 of the English edition) in some general observations on these experiments states as follows :

It would seem that when mineral phosphates finely ground are mixed with farm-yard dung in a state of active fermentation, and kept for several days in a compost, better results are obtained than might be looked for from the dung alone; and it is probably that in this case part of the mineral phosphate is rendered soluble by the action of the ferments in the dung in a state of decomposition.

Our readers will find in the Report of the Experiment-Farms for 1877, (pp. 47 to 54) the results of these experiments, in which $\frac{2}{5}$, $\frac{1}{2}$, and even $\frac{3}{5}$ of the ration of farm yard dung (that which gave the best results in all these experiments) were respectively replaced in the dressings of 20, 12, and 15 tons, by 500 lbs. of natural phosphates, not treated (with acid), but finely pulverised.

In the growing of silage-corn, carrots, and turnips, crops in which the dominant demand is for phosphoric acid, no injurious results has followed from this substitution.

In the case of potatoes, the dominant of which is potash, the diminution of the yield was hardly perceptible.

But in such crops as wheat, barley, oats, and mangels, the dominant of which is nitrogen, the yields were sensibly diminished.

It would, perhaps, be only fair to say that this substitution, carried on year after year for a pretty long period, of 500 lbs. of phosphates for 6, 8, and 9 tons of dung, lowering perceptibly the dose of nitrogen and potash, and exaggerating that of phosphoric acid, could not help affecting the yields. Still, it is clear that in the mixture our Canadian apatite showed good results.

Used alone, in competition with superphosphate, in the same experiments, it gave poor results ; and this led the Director of the farm to say, in the report for 1899, p. 26, that :

“ Ten years of experimenting on it have proved to us that the mineral phosphates finely pulverised but not treated (with acid) has no value at all as a manure.”

It is to be regretted that, in giving this conclusion, the Director did not recall the good effect of these same phosphates when mixed with dung, which must be still interesting to those farmers who have mineral phosphates at their command.

These will doubtless learn with pleasure that the recent experiments, 1892-99, M. Grandeau, at Parc des Princes, near Paris, found that fine ground apatite from Portugal, (the phosphoric acid in which is utterly insoluble in citric acid) has proved to be at one time equal, at another superior to the other phosphatic manures, comprising superphosphate itself. (L. Grandeau, Thomas' phosphate, p. 33, Paris, 1901.)

From this contradiction between the conclusions of the Ottawa Experiment-Farm and those of M. Grandeau, may we not conclude, as in other more or less contradictory experiments, with Muntz and Girard, the same volume p. 578, “ that all soils do not behave alike under the influence of different sources of phosphoric acid” ?

“ There is, therefore, good reason why experiments should everywhere be continued, as being of great interest, but in giving them a character of uniformity which would permit of the results being synthesised, and rules, useful to practical farming being drawn from them” ; bearing in mind the lessons of science, confirmed by practice, that superphosphates are specially suited to soils poor in organic matters, rich in lime, with a trifling per centage of phosphoric acid, while raw phosphates generally give fair results in soils rich in organic matters.

“ All sour soils; newly cleared land, moors, heaths, bogs, old meadows, all soils in which organic matters unsaturated with lime predominate, can work up mineral phosphates given in the raw state, the acidity of these soils rendering them able to act on the phosphates which there become rapidly assimilable. It is on such land that mineral phosphates are most telling.

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“ There are others which are equally capable of utilising natural products, though in a less perfect way. All soils rich in organic matters, even if they cannot be called sour, fall into this category; the organic matter acts, though slowly, on the phosphate and gradually brings it into a state of combination that facilitates its absorption by the plants. Clays, or calcareous clays, and, in general, heavy land in which the circulation of the air is less active and where, in consequence, organic matter tends to accumulate, may feed, with more or less appetite, on raw phosphates.

“ On the contrary, calcareous soils or calcareous-sands, especially if they are light and pervious, consume organic matter very rapidly, are poor in *humus*, and make use of raw mineral phosphates with greater difficulty. For such soils, the best qualities of that fertiliser should be reserved. To them superphosphates and precipitated phosphates are peculiarly suited; they give immediate, and, for the most part, very remunerative results.

CULTIVATION OF HOED-CROPS

Re-edited and condensed by **M. I. J. A. Marsan.**

The importance of hoed-crops in the rotation having been already demonstrated in the "Plan of Cropping," the members of the Dairymen's Association will see with pleasure that M. I. J. A. Marsan, ex-professor of the L'Assomption School of Agriculture, has been intrusted with the re-editing and condensing of the essays published in the older reports of the Association, by :

- 1st. M. Ant. Casavant, and the Abbé Chartier, agent of the Seminary of St. Hyacinthe, VIth, Rept. of the Association, pp. 41, 43.
- 2nd. Mr. A. R. Jenner-Fust, and Dr Bruneau, of Sorel, VII, Rept. D. Ass., pp. 51, 62.
- 3rd. M. J. E. Thibault, same report p. 71.
- 4th. M. Séraphin Guévremont, Sorel, IXth Report. pp. 162 and seq.
- 5th. M. I. J. A. Marsan, XV report, pp. 199 and seq.
- 6th. M. S. Guévremont, Sorel, and M. Charles Péloquin, St. Hyacinthe, VII Rept. pp. 59, 60
- 7th. M. J. B. A. Richard and the Hon. N. Garneau, M. L. C., XVIII, Rept. pp. 102, 142.

SUMMARY.

131, hoed-plants ; 132, advantages of their cultivation ; 133, kinds ; 134, Varieties ; 135, soils ; 136, manures ; 139, time of manuring ; 138^e fall-manuring ; 139, chemical manures ; 140, time to use them ; 141, how to spread them ; 142, indirect manuring ; 143, place in the rotation ; 144, preparation of the land ; 145, distance between the rows and the plants in the rows ; 146, selection and preparation of the seed ; 147, sowing ; 148, how to sow ; 149, depth ; 150, how much seed to the acre ; 151, cultivation ; 152, pulling the roots ; 153, yields ; 155, cost of crops of roots.

131.—HOED-PLANTS.

Definition. Hoed-plants or crops are all those that, grown in rows, require, besides deep and repeated ploughings, hoeings by horse and hand, or other cultivation, which has the effect of working the land, pulverising and cleaning it, frequently of enriching it by the manure given, and always of improving it so as to make it produce afterwards better crops of hay and grain. Considered in this light, they have been called "improving crops," and all lecturers have, with one consent, proclaimed

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132.—THE ADVANTAGES OF THEIR CULTIVATION

for the physical improvement of the soil, the utilising of the subsoil, and the production of abundant supplies of succulent food for the winter keep of all kinds of cattle, sheep and pigs.

M. Guévremont, taught by Mr Jenner-Fust, and speaking from his own experience, does not hesitate to state that "hoed-crops are profitable," and he seems to have proved his statement by his successful work.

Mr Barnard, for the under-mentioned reason, proclaims that hoed-crops form the "basis of all improved farming and of all really profitable systems of agriculture." "It is by the repetition of well managed hoed-crops, and by fertilising the land by artificial as well as by home-manures, that the leading farmers of the countries most celebrated for their agriculture have succeeded in tripling and quadrupling the average of their crops, and that, too, after centuries of exhausting crops. And so it will doubtless be in our province from the day when our farmers shall find room for, and devote the proper care to whole fields of hoed-crops, and use artificial manures as the aids to the manure of their stock. (14th Rep. p. 97.)"

Mr Barnard notices, p. 91 of the same report, the system, founded on hoed-crops, of M. Dauth, a former curé of St-Léonard de Nicolet, which system produced an increase of *fifteen-hundred per cent* in his crops. "Grow hoed-crops," he earnestly says to the farmers "as they are the great, the only means" of restoring worn out land, and making it yield double and triple crops, besides affording better food for the stock.

To this testimony, I may add that of your humble servant and of the numerous farmers who in this province have practised growing these plants with thorough and intelligent knowledge of the business.

133.—KINDS

The kinds of plants included in hoed-crops are: potatoes, corn, mangels, carrots, swedes, turnips, cabbages, parsnips, beans grown in rows, &c.

134.—VARIETIES

As we have to follow the above mentioned lecturers, we shall treat principally on the growing of roots.

The varieties they mentioned, without having utterly lost their value, are nowadays supplanted by others, some of which I mentioned in my lecture at Joliette, and a good many of these still retain their places in the first rank.

The varieties of the different kinds recommended at present as the most productive, are:

Potatoes :

Holborn Abundance, American Wonder, Semis No 230, Late Puritan, Empire State, Everett, &c.

Indian-Corn, for the grain :

The large white early, and the yellow early of Canada, appear to be still the best suited to the soil and climate of this Province.

For Silage-Corn :

Red Cob Silage, Giant Prolific Silage, Thoroughbred White Flint, Selected Leaming, Champion White Pearl, White Cap, Yellow Dent, Angel of Midnight, &c.

Mangels :

Gate Post, Giant Yellow Intermediate, Mammoth Long Red, Canadian Géant, Yellow Intermediate, Giant Yellow Globe, &c.

Sugar Beets :

Improved Imperial, Wanzleben, Improved Danish, Danish Red Top, &c.

Field Carrots :

Giant White Vosges, Improved Short White, Intermediate White Mammoth, Improved Half-Long White, Iverson's Champion, &c.

Turnips :

Selected Purple Top, Carter's Elephant, Perfection Swede, Mammoth Clyde, Skirving's Swede, &c., other varieties have also their relative value.

135.—SOILS.

Potatoes.—Land, light, tender, capable of preserving enough moisture during the summer-droughts to prevent the plants from dying of thirst, but not wet; fairly rich in potash. Good loam (*de coteau*). Still, potatoes do well in all kinds of soil except a dry sand and plastic clay, provided they are well water-furrowed, thoroughly worked, and properly manured. Though they are more liable to suffer from the *rot* in clays than in sands. They yield well in drained and manured bog, if treated with 'mendments such as lime, ashes, as well as with artificials, such as phosphate, &c.

Maize.—Every sort of land, except stiff clays, too turfy soils, and pure sands, provided it is well drained, deep enough in the staple, and well manured in accordance with the demands made by its composition and its natural richness.

Mangels.—Good deep land, friable and easy to work, suitably mixed with clay, rich enough in lime, potash and humus, well drained, rather

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warm than cold. About the same soil will do for cabbages and swedes; it may be a little colder for the two latter. Good light lands of the Quebec-groupe formation suit *swedes*.

Carrots prefer land a little lighter, finer, less warm than that given for mangels; a good light alluvial soil, provided it be not alluvial sand.

Turnips do best on a light, pulverulent soil, rich in lime and potash.

Beans (haricots) like a calcareous-sandy-loam, rather dry than moist.

Still, we say again, all these plants will do more or less well on any soil barring pure sands, plastic clay and dry turf, always provided that they get the manures, improvements, the treatment and preparation they require to bring them into that state of fertility and production each of these crops demand.

136.—MANURES.

Dung.—Dose: 10 to 20 tons to the arpent (12 to 24 to the acre) for the above crops. The following are the causes that affect the quantity to be used: the degree of richness and the nature of the soil, the quality and mode of application of the dung, as well as the kind and the dose of artificials added to the dung.

In light soils, the dressings should be less in quantity at a time, but more frequently repeated than on heavy soils, as the latter are more retentive than the former.

137.—SEASON FOR MANURING

As for the season for manuring, Spring or Fall, there is nothing absolutely fixed; only, Spring is more generally chosen, especially for potatoes and corn, but for carrots, I have practically found fall-manuring to give better results.

The way to apply the dung: in Spring, for potatoes and roots grown on drills, the dung is generally put into the drills; for maize, more frequently spread on the harrowed surface and ploughed in not too deep; though when corn is sown in drills, the dung is applied as for potatoes, as being more economical of the manure. Mr Jenner-Fust advises, as a more expeditious practice, that the cart should only deposit the dung in the middle drill of three (the common one here is the middle one of five, A.R.J.-F.) A man will then easily spread the dung in the other two furrows with a fork.

This practice of burying the dung in the drills is followed in this country by the best Scotch farmers. We generally call it the *English* method. There is no doubt about its utility, since Mr Hunter, Mr Ogilvie's *grieve*, (1)

(1) *Grieve*, Lowland Scotch, for a foreman on a farm, or as we call it in England, a farm-bailiff, is from the German *great a count*.—A.R.J.-F.

at Lachine Rapids, grew last fall 45 tons of mangels and 35 tons of swedes to the arpent ! Nevertheless, I have often, in spring, succeeded by spreading the dung on the fall-furrow, ploughing it in, both for potatoes and other crops. Many good farmers, too, practise this plan.

138.—FALL MANURING.

According to Mr. Jenner-Fust, the manure applied in the fall may be spread, after a deep ploughing has been harrowed, and ploughed in with a shallow furrow ; or on a stubble, after harvest, in which case it is to be mixed with the soil by a light-ploughing or grubbing, to bury it later with a deep but narrow furrow, so that the dung may be kept near the surface, if the soil is loose and friable enough to admit of such treatment.

That which we have just said only concerns direct manuring ; but when corn and potatoes are grown after grass, they do not, generally speaking, get any dung.

In whatever way dung is used, it must always be equally spread, well pulled to pieces, and well mixed with the soil. Dung should not be buried so deeply in sands and in clays. The nature of the plants² will guide you as to the depth to which it should be interred. Potatoes, turnips, and corn, that feed on the surface, need shallower ploughing-in of manure than do mangels and carrots that draw their supplies from a lower depth ; still, the nature of the soil must be always borne in mind.

The state of the dung when used. Fresh dung for potatoes, fairly rotted for roots, especially for carrots. The soil, again, must be the guide as to the state of the dung when used. Too strawy, recent dung is not suited to dry soil in spring.

139.—ARTIFICIAL OR COMPLEMENTARY MANURE.

Farmyard dung, in spite of its improving the texture of the soils and thereby increasing crops, independently of the food it furnishes directly to the plants, is not always sufficient to extract the greatest possible yields from hoed-crops. It is often necessary, with this in view, to establish the equilibrium of the different elements of fertility, by the use of artificial mineral manures. These manures vary according to the natural composition of the soil, its state of exhaustion, and the demand of the plant itself.

Potatoes seek chiefly nitrogen and potash ; corn, phosphoric acid and potash ; mangels, potash, nitrogen, and phosphoric acid ; carrots, less potash, but more nitrogen and phosphoric acid than mangels ; swedes demand heavy doses of the above, but especially of phosphoric acid and potash.

Mr. Jenner-Fust
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(1) Mr. Jenner-Fust

(2) M. Barnard

Mr. Jenner-Fust recommends, for mangels, 120 lbs. of sulphate of ammonia to the acre, in addition to the dung used, and 200 lbs. of superphosphate. Others give 150 to 200 lbs. of nitrate of soda, though 100 lbs. of this will be enough in certain soils already in good heart. In England, 200 lbs. of salt are used for mangels, and for swedes from 150 to 200 lbs. of plaster to the acre, for the leaves of that plant contain a large percentage of sulphuric acid which is supplied by the plaster (sulphate of lime). (1)

Numerous experiments have proved that potatoes yield better and are of superior quality with phospho-potassic manure than with potash alone. In Eastern-Canada, at least near the sea-shore, composts of fish, sea-weed, and bog-earth, with ashes added as the compost is about to be ploughed in, must be a very cheap and effective dressing; it might also suit meadows well.

The manure "Victor" has generally good effects on tobacco and roots.

140.—TIME FOR MANURING.

Phosphates, ashes, and other slowly soluble manures are applied in the fall; in spring, more soluble dressings, such as superphosphate, and nitrate of soda are used. The nitrate of soda is applied during the growing season. Unlixivated ashes too, are used in spring.

141.—HOW APPLIED.

Nitrate of soda is used on the surface along the rows as the plants are growing, the other dressings are applied on the surface or in the drills, and them in the former case, harrowed in before sowing.

142.—INDIRECT MANURING.

The data I have just given, on the manures to be applied direct to hoed-crops, are especially important when these crops are to play the chief part as cleaning crops; but when their cultivation is undertaken having in view their yield as the principal object, I prefer, as being more economical, more productive, and more profitable, indirect manuring, i. e., manure applied the year, or years preceding, to the meadow or to the clover-ley, either in the form of dung, of artificials, or of both combined, but especially in the shape of mineral manures: ashes, plaster, phosphates (2), &c. &c. This plan increases fodder-production and enriches the land in nitrogen and humus, which renders it unnecessary to bury nitrogenous manures, that are always costly, such as sulphate of ammonia and nitrate of soda. One is

(1) Mr. Jenner-Fust never heard of "land plaster" being used for any crop in England.

(2) M. Barnard recommends 300 lbs. of phosphates.

satisfied, at most, with adding a light dose of good dung to maintain the fertility of the soil. This proceeding answers perfectly for potatoes and corn which prove it adaptability by their good yields; it will do for mangels and swedes as well. Fodder-corn grown by Mr. Boden, manager of Mr. Reford's farm at Ste-Anne de Bellevue, on a meadow broken-up and dressed with liquid-manure (purinées) after the hay was cut, and the second-growth ploughed-in, yielded this fall from 30 to 40 tons to the arpent.

143.—THEIR PLACE IN THE ROTATION.

Beside the place already indicated for certain crops, the root-crop is usually grown on a clover-ley or other grass-crop, or after a stubble that follows a pasture or a meadow; then comes a grain-crop, barley or wheat for choice, sown down with grass-seeds. After dunged potatoes, carrots and onions are often sown, as, among others, by Mr. John Nesbitt, of Petite-Côte, Montreal.

144.—PREPARATION OF THE LAND.

In the first place the soil must be perfectly cleaned (assaini). Without this, it is impossible to succeed with hoed-crops.

Autumn: Stubble cleaning, or shallow ploughing of stubbles, meadows, and pastures (*friches*; land left to grow grass, *if it can*) after harvest, then harrowed, a deep furrow in the fall, as deep as 9 inches, according to Mr. Jenner-Fust. Trenching or subsoiling, when the subsoil is of good quality, greatly increases the yield of tap-rooted plants and has great influence for several years on the yield of the subsequent crops. The experience of Mr. Barnard and others, as well as my own, convince me that the crops of mangels, carrots, swedes, &c., may easily be doubled by this operation.

Spring: Harrowing or grubbing crosswise, cross-ploughing in the dung if any is to be used; harrowing and rolling to follow; drawing-out drills with the double mouldboard plough, or the rows with the marker (*rayonneur*) according to the proposed way of sowing or planting; the drills to be rolled before sowing.

145.—DISTANCE BETWEEN THE ROWS AND PLANTS.

Potatoes:—27 to 32 inches between the rows, and 36 inches in some cases, by 9 to 12 inches between the plants, and sometime more according to the soil, the variety, the selection and preparation of the tubers for seed. Dr Bruneau advises 24 inches between the rows for early sorts; but I find that too close for planting on a large scale. Like M. Richard, I prefer more space, giving more light, air, and more yield. Some Americans use whole tubers, of middling or less than middling size, with the upper part cut-off,

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and exposed to the light for some time before planting ; these sets are planted at 32 inches apart every way, after the land has been set out by the marker, lengthways and crossways, in squares.

Corn :—For the grain: 30 to 36 inches between the rows and 12 inches in the rows ; or in "hills" (*touffes*) of 3 or 4 plants each, at 36 inches apart in every way.

For fodder :—36 to 40 inches between the rows, by 4 to 6 inches in the row ; according to the soil and variety.

Mangels and swedes :—24 x 12 to 15 inches. Dr. Bruneau gives as much as 27 inches between the rows. (1)

We have seen some fine crops of mangels with the rows as far apart as Dr Bruneau advises, but I think 24 inches is far enough.

Field-carrots :—24 x 4 to 6 inches.

146.—SELECTION AND PREPARATION OF THE SEED.

Potatoes :—Middle-size, sound, well shaped, not grown-out in the root-house but taken from it in early spring, spread out in a shallow layer on a floor in full light in a place safe from frost; cut off the rose-end of the tuber, which thus, almost entire, is to be set, without being divided, at the above distance, or again, in ordinary practice, the tubers are to be divided, by oblique sections, into two or three pieces, each containing one or two sound eyes, strong and green in colour ; which pieces are to be sprinkled with plaster before being planted.

Corn :—The seed is to be taken from the finest ears, well ripened and preserved ; soak in a weak liquid manure for at least 24 hours, and let it lie in a damp state till germination shows itself ; then plaster and sow it. This plan is all right when the sowing is done by hand ; if sown by drill, use the seed dry.

Carrots and mangels :—Soak for 24 to 40 hours in a bag ; let the seed drain in the bag till the germ begins to show, then dry it up with plaster, fine sand, or a sifted ashes. Some drills will not sow seed with this preparation.

147.—SOWING.

Season :—When the land is dry and warm ; when this condition arrives, as early as possible, rarely after May 25th in the neighbourhood of Montreal, except for turnips, which are sown through June and July. Swedes are

(1) In England, mangels and swedes are grown "on the flat," at 20 inches apart, by many of the best farmers, and hoed with a steerage horse-hoe that takes 4 rows at once. A. R. J.-F.

sometimes sown in frames to be transplanted into rows, (1) but generally in the regular place where they are to remain. Corn may sometimes be sown in early June, and carrots for a horse-crop in July. Early sowings providing the land is in good condition and well worked, are in general the most productive, though they need an extra hoeing, which is said to pay well.

148.—WAY TO SOW.

Sowing is done with the the drill, hand or horse, or by hand. Mangels, carrots, and turnips are sown in drills; a shallow furrow is traced with the corner of a hoe, the seed dropped in it regularly, covered with the back of a rake, and then light rolled: a garden roller will do. This is rather a primitive method, slow and necessarily expensive, and only fit for farming on a small scale; on a large scale, a sower is used that opens the furrow, sows the seed, sometimes with artificial manures, buries and rolls it. It is important to use sowers fitted with the most improved apparatus, sowing regularly and firmly, and making no omissions. Two-wheeled hand-sowers are preferable, for sowing in drill, to seed-barrows with only one wheel. There are horse-machines that sow two rows at once. Beans and corn, on a large scale are sown with horse, as well as hand-machines. Some, for corn, sow in hills regularly at 3 feet apart, 4 and 5 seeds to a hill. From what we saw in the West, this plan of sowing seems to be the most productive and profitable. It admits of horse-hoeing lengthways and crossways and economises artificial manure, beside facilitating the circulation of the air.

The land must previously be well worked and made level; the implement does the rest and finishes the sowing.

Potatoes are planted in raised drills, made with the common or the double mouldboard plough; or in hills, as just described for corn, a very common practice in the States. Whole potatoes are placed on the surface of well prepared ground, 32 inches apart every way, at the intersection of lines crossing at right-angles, drawn by the tracer or marker, making 3 lines at once; the tubers are then covered, either with the hoe or the plough, with about 2 inches of mould. Artificials are often sown with the sets. In dry soils, the tubers, after being covered, are sometimes again covered with a little dung. The horse-hoe or "shovel" is then passed once a week crossways, so as to make a quadrangular hill of loose manured earth, in the middle of which a tuft of great stalks soon show themselves, the numerous roots of which are loaded with lots of big tubers. I have tried the plan, which I have heard greatly praised, and the results I obtained proved how true were the reports that reached my ears.

(1) But only for the table, I presume. A. R. J.-F.

This depends on the degree of moistness, and on the land retaining humidity or the land is in a dry case. This depends on the

For potatoes
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For carrots

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Potatoes, 1
Corn, 3 ga
Mangels, 6
Carrots, 4
Swedes or

These are sown in earthing-up potatoes

A few days after sowing, rows to kill the weeds and friable, then the soil. A good hoeing the land hoes with small share

(1) From $\frac{1}{2}$ inch
(2) In England
(3) $2\frac{1}{2}$ to 4 lbs. A

149.—DEPTHS OF PLANTING AND SOWING.

This depth varies for each kind as varies the state of the land, its degree of moistness, of pulverisation, of porosity, and its powers of absorbing and retaining humidity. All other things being equal, when the sowing is late or the land is dry, the seed is buried deeper than where the reverse is the case. This depth varies :

- For potatoes, from 2 to 4 inches ;
- For corn and beans from 2 to 3 inches ;
- For mangels, from 1 to 2 inches ; (1)
- For carrots, from $\frac{3}{4}$ to 1.

For turnips, about $\frac{3}{4}$ inch. Still, in practice we cannot attend to this minuti, the glance of an enlightened farmer and the kind and state of the land are better guides than theoretical figures. The main point, as to sowing, is that the land be well pulverised and freshly prepared ; that is, it is better to prepare only a small piece of land at a time, so that the seed may go into newly worked soil.

150.—SEED TO THE ACRE.

These quantities (see below) no doubt vary according to several circumstances, the quality of the seed, its variety and riches, the poverty or the reverse of the soil, distance apart, &c. The average would be about :

- Potatoes, 12 bushels ; (2)
- Corn, 3 gallons ;
- Mangels, 6 pounds ;
- Carrots, 4 pounds, or some less ;
- Swedes or turnips, sown where they are to stand, 1 to 3 pounds. (3)

151.—CULTIVATION DURING GROWTH.

These are such operations as : first and second hoeings, thinning, earthing-up potatoes, &c.

A few days after sowing, the horse-hoe should be passed between the rows to kill the newly sprung weeds, and to keep the surface of the land loose and friable, thereby retarding the evaporation of the moisture needed by the soil. A good horse-hoe should be furnished with two re-curved knives, cutting the land horizontally to within two inches of each row of plants, and with small shares stirring and pulverising the mould already moved. The

- (1) From $\frac{1}{2}$ inch to 1 inch and a quarter. A. R. J.-F.
- (2) In England we use 20 to 22 bushels of cut sets. A. R. J.-F.
- (3) $2\frac{1}{2}$ to 4 lbs. A. R. J.-F.

pulverising shares are to be changed in such way that each time the land shall be moved in the opposite way to that in which it was moved the previous time. No guide to the proper number of horse-hoeings except the requirements of the crop. All good farmers horse-hoe once a week until the plants are so far advanced that the horse and hoe would be likely to injure them. No need to fear abolishing the raised drills. "The best crop of roots," says Mr Jenner-Fust, "cannot be grown unless the drills are pulled down level with the dung, so that the plants are left so nearly naked that an inexperienced observer would think they must die from drought." Still, there is not the least fear of that in even our hot midday sun; the treatment only increases the crop. (1)

Singling and hand-hoeing.—The horse-hoe having left a narrow strip of earth, the plants occupying the middle of the strip, it is easy enough to set out the plants at the desired distance apart and to hoe the row by hand and hoe.

To single mangels at 12 to 15 inches apart, a common 6 to 8 inch hoe is used; it must be very sharp and is worked at right-angles across the rows; for carrots, Mr. Jenner-Fust recommends "a special tool, though still a hoe, made of the blade of an old scythe, and about 2½ inches wide." With this tool, "a woman can cut the plants out with great ease, pushing and drawing alternately; she is followed by a young boy or girl, who pulls out all the carrots in the bunch left by the hoer except one, and the job is done."

Still, most farmers use the hoe (the tool described is a hoe A. N. J.F.). Singling should be begun when the plants are from 2 to 4 inches high. A woman follows the hoer, and, with her hand plucks out the plants but one in the bunch left by the hoe, and Dr. Bruneau says that he has been told that, in ordinary soils, 4 women can thus single an arpent a day; some say more! This first hoeing is the most important, as all subsequent work is rendered easy and less costly if it is well done; besides, the growth of the crop is greatly expedited. It is after the first hoeing and thinning that nitrate of soda should be applied to root-crops, by spreading it broad cast round the plants without touching the leaves (especially when they are wet with dew or rain. A. N. J.F.)

Deep horse-hoeings do good to roots and other crops provided they do not cut their rootlets. Corn should therefore be shallow-hoed, for fear of injuring its little lateral roots. (2)

Earthing-up.—Properly speaking, this is only done to potatoes. It had better be done at two operations, at intervals of 15 to 20 days, the former when the plants are from 4 to 6 inches high. A passage of the horse-hoe

(1) Not of white turnips, I mean, but of swedes and mangels. A. R. J.-F.

(2) Deep the first time. A. R. J.-F.

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Then come not to injure the

The cutting field, as a rule, l dren, the whole c done under cover

Mangels-lea carrots are capital very best for milk

is given 8 or 10 days after the first earthing-up. The second earthing-up ends the work among the potatoes, except the pulling up of any weeds that may have escaped the hoers.

The mould stirred and thrown towards the rows by the double mould-board plough should be flat rather than peaked, so that it may absorb rather than throw-off the rain, allowed the superabundant moisture to filtrate away.

The success of the crops depends upon the above operations being performed as perfectly as possible and at the proper time. After a rain, when the land is sufficiently dry, is about the most propitious time.

After the hand-hoeing, the wide share of the horse-hoe should be used to mould-up the drills a little so as to form a slight furrow to allow the water to run off.

Care must be taken at the last horse-hoeings not to bruise the leaves of the plants.

Any void spaces in the rows of mangels and carrots may be filled up with advantage.

152.—HARVESTING THE ROOT-CROP.

Mangels should be pulled in the first half, and swedes and carrots in the second half of October.

When the roots cling too firmly to the ground to be easily pulled by the hand, a slight furrow should be drawn by the plough to the right of the rows, going as near the plants as possible without bruising or cutting them; they will then yield easily to the puller, who draws out the mangel by the neck, and twists off the leaves with a wrench off both hands. The swede is pulled with the left-hand, the roots cut off by a knife in the right hand, and a second blow or two gets rid of the leaves, the plant being previously shifted by a turn of the left hand. Carrots are deprived of their leaves either by a wrench or by the knife, and the whole of the neck of the *sugar-beet* must be cut off. The roots thus prepared are laid in rows, or in small heaps at the feet of the puller.

Then come the carts, or the men pile the roots, taking a great care not to injure them.

The cutting or pulling off the leaves of the root-crop is done in the field, as a rule, but when carrots have to be harvested by women and children, the whole crop is sometimes carted to the farm-stead and the work done under cover.

Mangels-leaves are not worth collecting, but the leaves of swedes and carrots are capital food for cattle, especially carrot-leaves, which are the very best for milch-cows.

Should the supply of leaves be superabundant, they may be preserved in a silo, or in thin layers alternating with thicker layers of straw.

153.—KEEPING.

To keep roots in good order till spring, they must be put into a cool, dry, well-ventilated cellar, which need not be under-ground, as a room in the barn or even in the cowhouse, &c., can easily be made frost-proof.

If you have several kinds of roots, reserve the mangels till the last, as they gain in alimentary value by keeping.

154.—YIELDS.—COMPARATIVE.

(The following table is to be read after the second paragraph of the next page.)

CROPS.	Yields in pounds to the arpent.	Digestible food.	Nutritive ratio	Equivalents in hay as regards total nutritive matters.
Hay.....	3000	1422	1 : 8	1.00
Clover dry, 2 cuts.....	5000	2315	1 : 6	1.62
Green meat.....	5000	2514	1 : 5 à 6	1.77
Green beans.....	20000	1480	1 : 2.8	1.04
Fodder-corn.....	fr. 40000	3720	1 : 13	2.61
“.....	to 30000	2790		1.95
Pease-seed }.....	1500	1117	1 : 2.8	1.43
“ straw }.....	2500	920	1 : 12	
Beans-seed }.....	1200	880	1 : 2.4	1.20
“ straw }.....	2000	814	1 : 7.3	
Oats, seed }.....	1020	581	1 : 6.8	0.40
“ straw }.....	2000	844	1 : 30	0.60
Corn, seed, 30 bushels.....	1680	1261	1 : 9.1	0.88
Stalks.....	4400	1688	1 : 34.4	1.20
Pumpkins.....	5000	355	1 : 6.5	0.27
Potatoes.....	9000	2169	1 : 10.6	1.52
Swedes.....	30000	2850	1 : 8 à 9	2.31
“ leaves.....	4300	296	1 : 4	
Mangels, 18 tons.....	36000	4032	1 : 9.3	2.40
“ leaves.....	15000	800	1 : 3.7	0.60
Carrots, roots.....	30000	4230	1 : 9 à 10	3.5
“ leaves.....	10000	970	1 : 4	à 3.75

The yield of the cultivation,

Potatoes
Carrots and
Mangels

Mr. Jenner to 36 tons to the arpent, the English

An arpent without doubt a succulent food. mangel—, no matter there are no vac

Observe, the values. The all hydrates of carbon narrower (the division an alimentary value). Thus, the (1 : 5 to 6), is against 1 for hay

We see, the yields the largest hay, with, too, the leaves of this plant than 2 4/5 times fact to be noticed ing the straw, the value of the hay is

So, from the following conclusion

1. As to the leguminous crops

(1) Nutritive ratio of carbon and fat, --no

The yield of roots varies according to the variety, the soil, the manure, the cultivation, and the season :

- Potatoes 100 to 400, even to 700 bushels ;
- Carrots and turnips 10 to 40 tons ;
- Mangels 12 to 36, up to 60 tons .

Mr. Jenner-Fust mentions a crop of 42 tons of carrots to the acre, equal to 36 tons to the arpent; M. Guevremont reports a yield of 21 tons of swedes to the arpent, equal to 25 tons to the acre ; but the Canadian ton is 2,000 lbs, the English ton, 2,240 lbs. Ordinary good crops are from 18 to 20 tons.

An arpent of carrots, averaging 1 1/4 lb. each, without misplants, would without doubt give 30 tons of roots and 10 tons of tops, or in all 40 tons of succulent food. An arpent of mangels, averaging 3 1/2 lbs.—but a small mangel—, no misplants, would weigh 31 1/2 tons of roots. So, take care there are no vacant places in the rows.

(Here should be read the preceding table.)

Observe, that in this table the figures in the column of the equivalents in hay as regards the total of the digestible aliments do not show the food-values. The albuminoids have, of course, a greater food-value than the hydrates of carbon i.e. starch and sugar. The crops whose nutritive ratio is (1) narrower (the divisor less) have to an equal quantity of digestible aliments an alimentary value higher than those that have a wider ratio (divisor larger). Thus, the alimentary value of green-fodder, whose nutritive ratio is (1 : 5 to 6), is narrower than that of hay (1 : 8), is more than twice that of hay, while the proportion of digestible aliments is 1.77 for green-fodder, against 1 for hay. (see table).

We see, then, that an arpent of carrots giving 15 tons, leaves included, yields the largest quantity of digestible aliments, i. e., 3 1/2 to 3 3/4 crops of hay, with, too, the greatest alimentary value; next come mangels, but if the leaves of this plant are omitted, then their proportion of aliments is no more than 2 4/5 times that of hay, with an alimentary value relatively less. One fact to be noticed, is that an oat-crop of 30 bushels, does not contain, including the straw, more than a crop of 200 bundles of hay, and the alimentary value of the hay is rather superior to that of the entire oat-crop.

So, from the *data* I have just brought to your notice, we may draw the following conclusions :

1. As to the rational feeding of cattle, with the roots must be grown leguminous crops, clover, pease, &c., that supply nitrogen, if we do not

(1) Nutritive ratio, or quotient of nutritive signifies 1 lb. of digestible albuminoids—or nitrogenous matter,—against the number of pounds and fractions of a pound of digestible hydrates of carbon and fat,—non-nitrogenous matter—contained in the fodder.

Equivalents in hay as regards total nutritive matters.

- 1.00
- 1.62
- 1.77
- 1.04
- 2.61
- 1.95
- 1.43
- 1.20
- 0.40
- 0.60
- 0.88
- 1.20
- 0.27
- 1.52
- 2.31
- 2.40
- 0.60
- 3.5
- à 3.75

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wish to have to consume great quantities of purchased or home-grown grain, or to get little profit from our cattle; better to grow plenty of pulse-crops without roots, than lots of roots without pulse-crops. 3. No more land must be sown in roots than can be worked to perfection, and manured in such a manner as to get from it the greatest possible yield; thus, only, can any profit be made. 3. Otherwise than on land worn out or foul with weeds and which must be improved in some way or other and where a summer-fallow is not indispensable for that purpose, the great utility of root-crops, as an economical food calculated to form milk and meat, is open to question; but that does not lead us to deny the real and numerous advantages of these crops. Still, I must admit that, at least on good, clean land, the careful and intensive cultivation of good hay, of clover and green-crops, for cattle-food, must generally be more profitable than growing roots. But as the well managed cultivation of roots must be an economical preparation of the land for a better yield of hay and clover, and the means of raising the yield of oats from 30 to 50 or 60 bushels an arpent, that of hay from 3,000 to 5,000 lbs., that of clover and green-fodder, from 5,000 to 7,000 lbs., then, the cost-price of 100 lbs. of nutritive matter will have been lowered.

But, when the scarcity of labour becomes an obstacle to the growth of roots, the judicious application of manures to the last mentioned crops will produce marvellous results: the land will become rich in *humus* and nitrogen, and the production of meat or milk will increase in proportion to the increased production of cattle-food.

155.—COST OF THE CROP.

Opinions do not agree on this point; few crops vary so much in the cost of their working as root-crops; it depends on a host of circumstances necessarily variable: the price, experience, skill, and activity of the labourer; the nature, condition, and richness of the land, the cost of manures; the weather; the fitness of the time when the work is done, &c.

Dr. Bruneau gives \$3.00 to \$3.50 as the cost of singling mangels, as practised by MM. Matte, Ferland and Guévremont, and Jenner-Fust. M. Antoine Casavant, \$8.00 to \$9.00; the Rev. M. Chartier, \$12.00; M. Denis, \$12.00. The Ottawa Experiment-farm expends \$30.00 to \$40.00 on these crops. I myself, have witnessed an expenditure of \$30.00 to \$32.00. It is indisputable that experience in growing these crops, on good land, where large roots at wider intervals can be produced, may save much time and outlay.

Here, according to M. Séraphin Guévremont, are the expenses incurred in the growing of an arpent of roots, the number of bushels obtained, and the money-value of the crops.

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	Mangels.	Swedes.
2 ploughings.....	\$2.00	\$2.00
2 harrowing.....	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-hoeing.....	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

\$130.00

Cost of growing, &c.....	35.00
--------------------------	-------

\$95.00

Hoed-crops pay.—Mr. Jenner-Fust considers that on light-land, carrots pay better than swedes or mangels, though their hoeing, &c., is a little more expensive. The carrot is the true food for the milch-cow, to whose milk it imparts colour, flavour, and richness. Still, mangels are good food for cows and other stock. Swedes answer for fattening beasts, young stock, sheep and hogs.

Carrots are good for horses, especially for colts and fillies.

Mr. Barnard recommends, instead of root-growing with the exception of potatoes, the cultivation of pease, beans, and maize on manured drills, as producing more food at least cost to the arpent, entering on the side of *legumens* the exhausting effects of tap-rooted plants and the property of the former of enriching the land with nitrogen. His figures and tables seem to prove the correctness of his statements, at least from a certain point of view. As for me, I have always considered that the most economical crops of fodder, the proportion and quantity of digestible food being considered, as well as their easy cultivation and preservation, to be hay and clover.

We have seen that crops of green-fodder—pease, oats, vetches, and horse-beans—yield returns whose food-value must equal that of a crop of fodder-corn or even of roots. Therefore, root-crops ought to have for their chief objects the production of a succulent and digestible food for milch-cows, young stock and pigs, and the best way of working up the *roughage* of the legumens, as well as the improvement and cleaning of the land and through that the increase, both in quantity and quality, of the subsequent crops, an effect that M. Guévremont has demonstrated in the essay mentioned in the summary at the head of the chapter :

“Here is an account of our operations in 1888 :

8 arpents of potatoes,	yield	1500 bushels =	194 bushels per acre
7 “ swedes,	“	4500 “	780 “ “
1 “ red carrots	“	350 “	410 “ “
1 “ mangels	“	400 “	470 “ “
½ “ white turnips	“	200 “	460 “ “
½ “ maize	“	15 “	36 “ “

18 arpents = 15.2 acres.

On the same land in 1889, we sowed :

13 arpents in barley	yield	450 bushels =	40 bushels per acre
2 “ wheat	“	40 “	24 “ “
3 “ oats	“	120 “	46 “ “

The whole was sown down in 1889 with timothy, and this year, 1890, off the same land, we carried 4,000 bundles of hay, equal to 30 tons, or 2 tons per imperial acre. We intend to leave this land in hay for two or three years more ; we shall then pasture it, for a year or two, and then begin the same rotation over again. We mean to change the land for our hoed crops every year, and followed the rotation above described.”

So, let us grow hoed-crops, suited to the nature of our land, as much can be well managed, everywhere the land requires levelling, aerating, pulverising, deeply stirring and cleaning ; by this means the returns from the farm must indisputably be increased.

As for the destruction of weeds through the well managed culture of hoed-crops, many farmers assert that it can be done as well and more cheaply by ploughing, at the end of June or the beginning of July, the older meadows or the stubble-pastures (friches) full of weeds, and sowing buckwheat, for grain or for ploughing in green, if the land has not been manured previously. As to the latter plan, it must be confessed that it is all the same as a long fallow, which is more costly than a hoed-crop, and is only resorted to when the land is too poor and manure is not at hand. Still, they say that couch-grass is destroyed by it, as it is rotted by the decomposition and fermentation of the sod. When the buckwheat has been manured and harvested, the improvement of the land and the destruction of the weeds is better insured by following the buckwheat with a hoed-crop the next year.

Abstract

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1. M. J. C. Ch...
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156, Soil best at the establishment of down to grass ; 159, tures ; 161, Orchard 165, How to manage ral meadows ; 168, (169, Composition, m 170, Artificial perma Permanent pastures i 174, Their value ; 1 Preparation of the soi tions of land ; 180, H 182, Lucerne ; 183, I 186, Sowing it ; 187, der-crops ; 191, Aim Cabbages.

GRASS-CROPS.

Abstract and re-arrangement by M. O. E. Dallaire.

The preference accorded by M. Marsan to the cultivation of good hay, clover and green-fodder, and the extent of the space occupied by these crops in our "Plan of cropping"—no fewer than 8½ limbs out of 12—show us the great importance of the subject ; in spite of which importance it has had to give place to the subject of hoed-crops, on account of the, so to speak, indispensable part the latter play in the preparation of good meadows. M. O. E. Dallaire, the well-known lecturer, the great promoter of the growing of clover, was clearly indicated as the fit person to arrange and condense the previous essays, on this matter, of :

1. M. J. C. Chapais, XVth Rept. D. Ass., pp. 146-67. end XIIIth Rept. pp. 131-135 ;
2. Mr. A. R. Jenner-Fust, Vth Rept. D. Ass. pp. 165-171 ;
3. M. Ant. Casavant, VIth Rept. D. Ass., pp. 80-82 ;
4. Revd. J. B. Chartier and M. O. E. Dallaire, XIIth Rept. pp. 80-82 ;
5. Revd. J. B. Chartier, M. Ant. Casavant, and M. Timothée Brodeur, VIth Rept. D. Ass., pp. 36, 38 ;

SUMMARY.

156, Soil best suited to the laying-down to meadow ; 157, Need of a system of rotation for the establishment of meadows and pastures ; 158, Proximate preparation of the land for the laying down to grass ; 159, On grass-seed — engraving ; 160, Mixtures of seed for meadows and pastures ; 161, Orchard-grass ; 162, Notices on the clovers ; 163, Selection of seed ; 164, Sowing ; 165, How to manage the meadow ; 166, Management of the pastures ; 167, Permanent and natural meadows ; 168, Composition, management and use of permanent meadows on the shore ; 169, Composition, management, and use of permanent meadows on the banks of rivers and lakes ; 170, Artificial permanent meadows ; 171, Seeding down permanent artificial meadows ; 172, Permanent pastures in uncultivable land ; 173, Permanent meadows in the Eastern-Townships ; 174, Their value ; 175, Their maintenance ; 176, Permanent pastures in cultivable land ; 177, Preparation of the soil—in advance,—proximate ; 178, Selection of seed ; 179, Favourable positions of land ; 180, How to utilise permanent pastures ; 181, Management of permanent pastures ; 182, Lucerne ; 183, Its advantages ; 184, What soils suit it ; 185, Preparation of the land for it ; 186, Sowing it ; 187, 188, Harvesting lucerne ; 189, Trial to be made of it ; 190, On green fodder-crops ; 191, Aim and advantages ; 192, Mixtures recommended ; 193, Indian Corn ; 194, Cabbages.

156.—SOILS SUITED TO THE FORMATION OF MEADOWS.

Among the varied soils of which arable land is composed, there are four principal ones. These four are : argillaceous (clay) soils ; calcareous (lime) ; silicious or sandy soils ; and turfy or boggy soils. Now, in every rotation, well conceived and well applied, these four soils are well fitted to form artificial meadows or pastures, as soon as they are qualified for the operations of the plough. They, of course, must undergo treatments, differing according to their nature, before they are converted into meadows. Thus soils of a turfy or boggy nature are generally cold, acid, damp, and though they contain great quantities of nitrogen, it is not a condition available for plant-food. They must, first of all, be drained ; then, their acidity must be modified by lime, which is the best agent for that purpose. An application of ten to fourteen bushels to the *arpent* (about 12 to 16 to the imperial acre), placed in small heaps covered with earth, in autumn, on the ploughed land, and then, in the spring, spread and well harrowed in, will produce the desired effect, and will last for some ten years or so. Silicious or sandy soils are improved by the addition of clay, put in small heaps on the land in autumn. The frost pulverizes it, and makes it easy to spread in spring just before ploughing. Should the silicious soils be very poor red, or inclining to white, sands, they need humus, and in that case bog-earth will prove a capital'mendment. (1) Calcareous land, very scarce in this province, may, in spite of its character, not possess lime enough in an assimilable state ; in that case, lime must be added, as above. They are improved by the addition of humus, of which they are usually nearly destitute, in the form of bog-earth, and by growing on them green-crops to be ploughed in. These constitute green manures, and this is about the best treatment that can be given to these soils. Heavy, argillaceous land must be treated to sand and bog-earth. Green-crops, for ploughing in, are grown in it to promote the divisibility of the land, thereby destroying its too great stubbornness. It is ploughed by subsoiling or trenching, to deepen and pulverize the space that the roots of the legumino are to occupy. Most of these soils also require lime.

157.—NECESSITY OF A SYSTEM OF ROTATION FOR THE FORMING OF MEADOWS AND PASTURES.

The 'mendments, of which I spoke above, are applied generally to the different soils, in this first limb of the rotation, which is supposed to begin on land in stubble, ploughed in autumn. On this furrow are applied the lime, etc., according the needs of the soils. A rotation is required in every system of good farming to obtain the various crops it is meant to yield ; but

(1) *Amendement* is, all but the first and sixth letters, the word Englishmen apply to all dressings that are neither dung nor chemical manures, such as lime, clay, bog-earth, turf, etc. A. R. J.-F.

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TIMOTHY.—*Phleum Pratense*.

it seems to be still more required for the formation of meadows and pastures. For in fact, land that is intended to be laid down in meadow must be '*mended, drained, worked, cleaned, and manured.*'

We have just seen what is meant by '*mendment.*' The other qualifications needed by the land are obtained by the rotation. This, which may vary in many ways, must invariably include a year of hoed-crops, which usually occurs in the second year, the *break* having, the first year, after the ploughing on which the '*mendments*' were applied, borne a crop of grain. The root-crop, in the second year, enables the farmer to bring the land into a regular trim. First, the drainage must be done, as the first operation in cultivation, for otherwise, the soaked soil would bear nothing, and would receive no benefit from the application of the '*mendments.*' To grow a good root-crop, a deep furrow is necessary, and where the subsoil is hard it should be subsoiled; next, a grubbing with the cultivator or drags, and thorough harrowing. A full dressing of dung comes next. Then, plenty of hoeings to kill the weeds and to keep the soil moist and the surface pulverised. Nothing can excel this growing of roots for cleaning and working the land, and it ought invariably to precede the laying down of land in grass.

158.—THE IMMEDIATE PREPARATION OF THE LAND FOR LAYING DOWN TO GRASS.

When, in the course of the rotation, the *break* is to be laid down to grass, it must first have a good autumn furrow, after the root-crop is harvested; if the land is light, nothing but simple stubble-cleaning need be done, to kill the insect-pests, such as maggots, cut-worms, etc. and the ploughing is to be done in the spring. But before this furrow, all largish stones, bush-stubs, must be cleared off, the rails, post-butts, that might encumber the field, must be taken off, so that, when the time comes to use the mower it may meet with no obstacles. The ridges or lands should be, where possible, made wide and well rounded, with the furrows between them well cleared out to allow the escape of the water. This will make the work of the mower much more easy, and in wet seasons, the grass will grow much more equally on wide ridges, well rounded up, than on narrow ridges, which multiply furrows in which the grass is never so strong, and which make the work of man and horse much harder, to say nothing about the wear and tear of the machine. Here on the ploughed land, may be applied the chemical manures, especially superphosphate, at the rate, when the previous root-crop was fairly manured, of 300 lbs. to the *arpent*. It may be affirmed without fear that a surplus of a ton of hay to the *arpent* may be expected from this dressing, and this certainly deserves the attention of all those who aim at the best results.



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PERENNIAL RYE GRASS.—*Lolium perenne*—Ivraie.

159.—A FEW REMARKS ON GRASS-SEEDS.

Before speaking of the sowing of grass-seeds, I will say a few words about the proper seeds for meadows. Here is a list of those that are generally offered for sale by seedsmen, and which ought, at least some of them, to be employed more than they usually are in the mixtures sown for laying down land to grass. As more of these are only known, most frequently, by their common French name, and some even by their English name, I append small table, giving with their botanical name in French and Latin, both their French and English common, or vulgar names. I also add the weight of a bushel of each variety, the number of seeds contained in a pound of each kind, as well as the percentage of seeds that may be expected to grow, if the seed is of the best quality. This latter point is important, for if it happens, especially when seeds of new varieties are in use, that one only finds that one-half of the seeds germinate, as is the case with orchard-grass, one is apt to think that the seedsman is a rogue.

In naming the different grasses in the table, I do not mean to say that they have in all cases the same value. Some of them answer best for meadows, others for pastures, and others again only appear in the table because they appear in the lists of the seedsmen, although they are not really worth much. Such are the "Sweet-scented vernal grass," and the "Meadow soft grass." Even Pacey's perennial rye-grass, so highly valued, and properly so, in Europe and the United-States, hardly succeeds in this province, except in the Montreal district. Many repeated trials, with mixtures containing this seed at the rate of ten pounds to the arpent, have only shown me a few stems of this plant, while of foxtail, the fescues, and specially of the orchard-grass, there was an abundance.

Red-top, orchard-grass, the rough meadow-grass, June-grass, timothy, alsike and white clover, do well on almost all kinds of soils.

Meadow fescue, the red clovers, and foxtail, prefer rich moist land.

Orchard grass and clover, are the best for pastures. All the others mentioned are suited to both pastures and meadows.

Blue joint-grass and the rush are exceptions to this rule, since they are plants belonging to natural permanent-meadows.

160.—MIXTURES OF SEEDS FOR MEADOWS AND PASTURES.

In the seedsmen's catalogues, and in the books of different authors, many mixtures of grass-seeds, varying in quantities and weights, are to be found. The chief defect in these recipes is that the seeds of plants valueless for fodder are often introduced into them. After having tried many, I ended by putting aside certain varieties of seeds that I considered useless, either because they were not suited to the climate, or they did not yield enough

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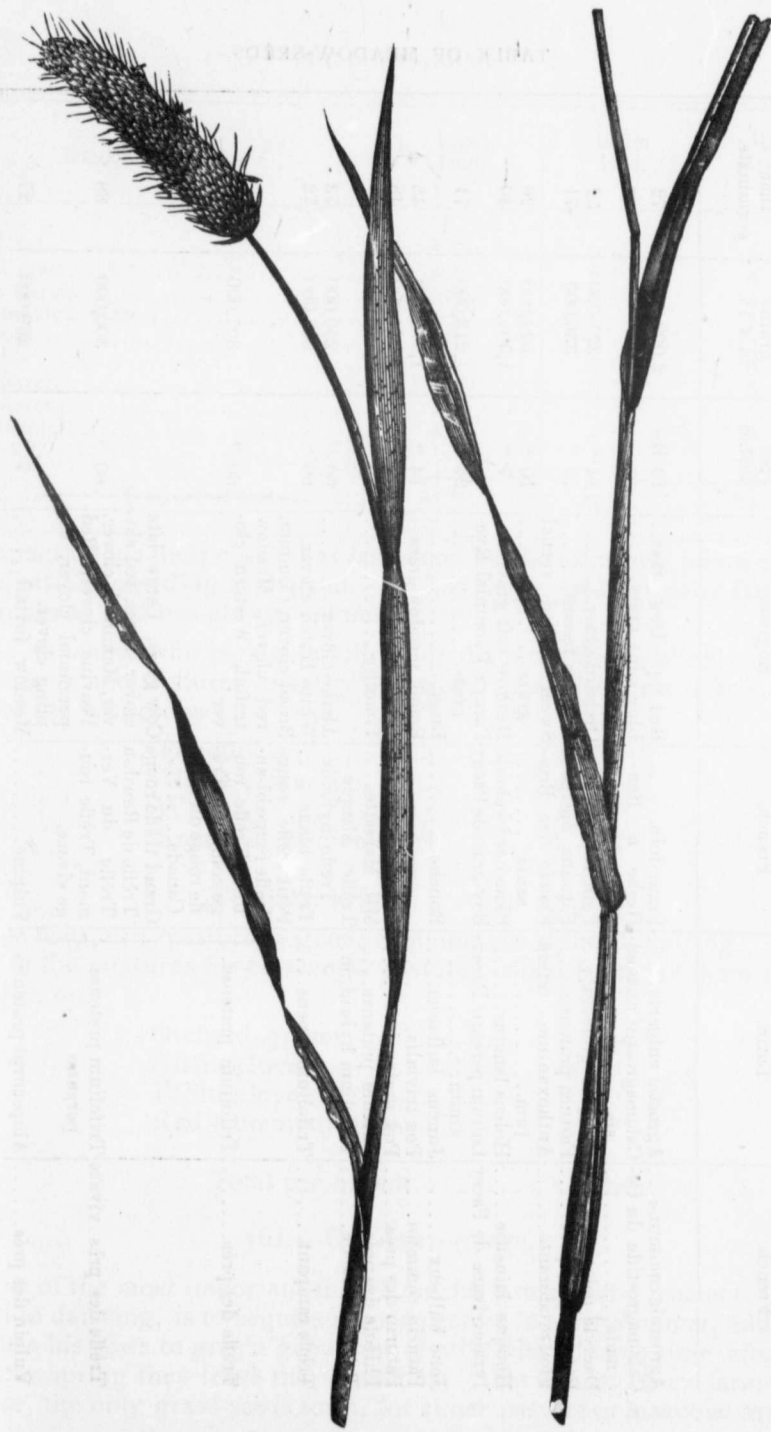
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MEADOW FOXTAIL.—*Alopecurus pratensis*.

Botanical name ; French.	Botanical name ; Latin.	Common name ; French.	Common name ; English.	Weight per bushel	Number of grains in a lb.	Percent age of grains that germinate.
Agrostide commune...	Agrostis vulgaris....	Franc-foin.....	Red top—Dew grass..	13 lbs	2,000,000	72
Calamagrostide du Ca- nada.....	Calamagrostis Canaden- sis.....	Herbe à lien— Foin-bleu.....	Blue joint grass.....	—	—	—
Dactyle pelotonné....	Dactylis glomerata....	Foin rude.....	Orchard grass.....	14 "	335,000	52
Fétuque des près.....	Festuca pratensis....	Fétuque élevée..	Meadow fescue.....	15 "	336,000	71
Flouve odorante.....	Anthoxantum odora- tum.....	Flouve des Bres- sants.....	Sweet scented vernal grass.....	10 "	924,000	26
Houque laineuse....	Holcus lanatus.....	Blanchard velouté	Meadow soft grass....	7 "	1,304,000	40
Ivraie vivace de Pacey	Lolium perenne Pacey- anum.....	Ray-grass de Pacey	Pacey's Perennial Rye- grass.....	24 "	213,000	71
Jonc bulbeux.....	Juncus bulbosus.....	Rouche.....	Rush.....	—	—	—
Pâturin commun.....	Poa trivialis.....	—————	Rough meadow grass..	14 "	1,575,000	45
Pâturin des près.....	Poa pratensis.....	—————	June grass.....	13 "	1,264,000	48
Phléole des près.....	Phleum pratense....	Mil, Marsette....	Timothy.....	45 "	1,120,000	85
Trèfle de Suède.....	Trifolium hybridum..	Trèfle alsique— Trèfle hybride.	Alsike clover.....	60 "	250,000	73
Trèfle rampant.....	Trifolium repens....	Trèfle blanc.....	White Dutch clover...}	60 "	603,000	72
		Petit trèfle rouge	Broad clover, Common			
		Trèfle rouge bi-an- nuel, Trèfle rouge commun, Trè- fle rouge du Haut Canada.....	red clover, Meadow trefoil, Western clo- ver	60 "	307,000	88
Trèfle des près.....	Trifolium pratense..	Grand trèfle rouge	Cow grass, Large late			
		Trèfle de Rawdon	clover, Large red clo- ver, Mammoth clover,			
		Trèfle du Ver- mont, Trèfle rouge vivace.	Peavine clover, Red perennial clover, sa- pling clover.	60 "	300,000	88
Trèfle des près vivace	Trifolium pratense perenne					
Vulpin des près.....	Alopecurus pratensis..	Vulpine.....	Meadow foxtail.....	7 "	269,000	27

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Red top.....
Orchard grass..
Meadow fescue.
Rough meadow
June grass.....
Timothy.....
Alsike clover...
White clover...
Red perennial...
Foxtail.....

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NAMES OF PLANTS.	Light land,	Loam land.	Heavy land.
Red top.....	3 lbs.	5 lbs.	5 lbs.
Orchard grass.....	6 "	8 "	8 "
Meadow fescue.....	3 "	4 "	4 "
Rough meadow grass.....	4 "	1 "	2 "
June grass.....	5 "	2 "	2 "
Timothy.....	5 "	6 "	6 "
Alsike clover.....	2 "	2 "	2 "
White clover.....	1 "	1 "	1 "
Red perennial.....	4 "	4 "	3 "
Foxtail.....	1 "	1 "	1 "
Total per arpent.....	34 "	34 "	34 "

to compensate for their cost. I at last stood by the following mixture, which can be varied according to the soil. It has been used by many farmers in this province, and has always answered.

As to those who persist in following the old practice of only sowing, for meadows and pastures, timothy and clover, I advise them to sow, if they wish for the best crops :

Timothy.....	15 lbs.
Alsike clover.....	3 "
White ".....	1 "
Great red or mammoth.....	7 "

Total per arpent..... 26 lbs.

For *temporary* pasture, a good combination is the following. I shall return to the mixtures for *permanent* pastures, when I treat of them specially further on :

Orchard grass.....	8 lbs.
Alsike clover.....	3 "
White clover.....	1 "
Red (common) clover.....	7 "

Total per arpent..... 19 lbs.

161.—ORCHARD-GRASS.

One of the most important things for the farmer who means to devote himself to dairying, is to acquire a good pasture in early summer, and thereby induce his cows to give a good flow of milk when, some time after calving in the spring they leave the cow-house. On almost every farm in this province, the only grass-seeds sown, for either pasture or meadow, are timo-

Vulpin des prés..... Alopecurus pratensis..
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 perennial clover, sa-
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 Meadow foxtail.....
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MEADOW FESCUE. — *Festuca elatior*.

thy and the varieties of grasses are valuable in pasture, and all the Farmers, and all the Farmers, a general measure, towards, a measure, operations of placing, a pounds of O might try it, ter such a tri- nue to use it

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Dactylis glori- Its botanical 'Canadienne' ves linear, pl- divided only- ed, greenish- tituting a uni- more or less- qual. Anthe- places, especi-

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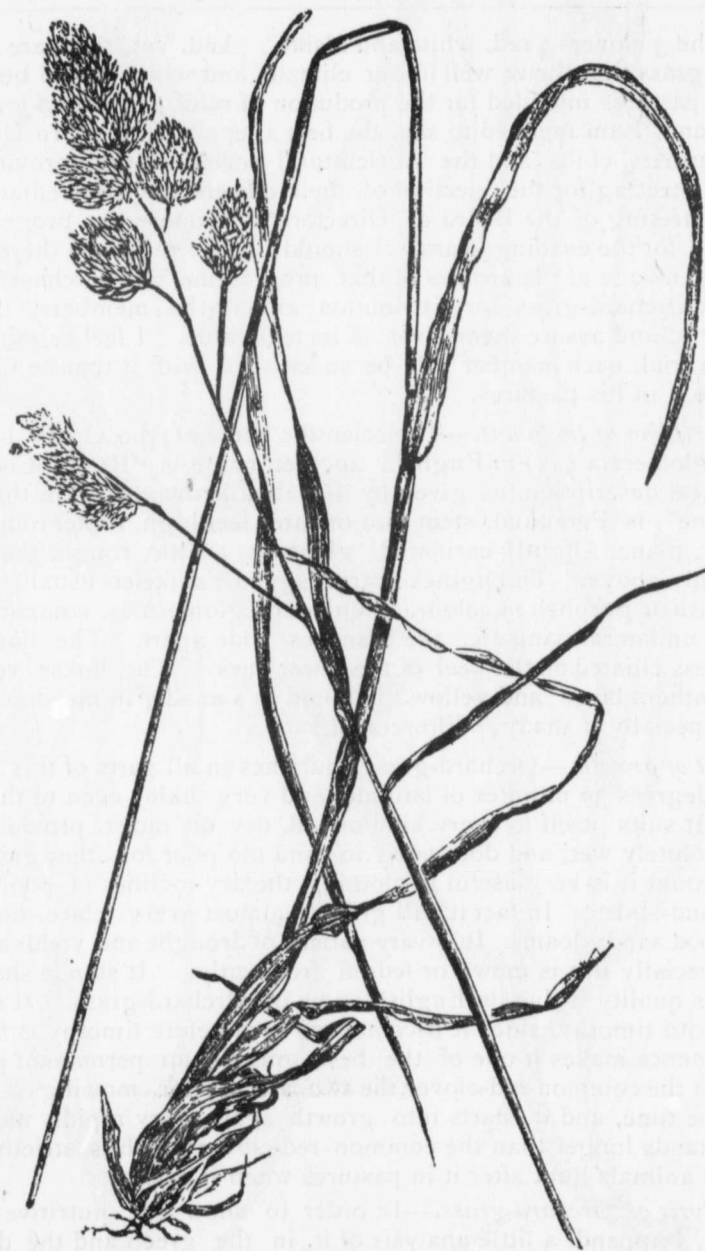
thy and the 3 clovers : red, white and alsike. And, yet, there are good varieties of grass that thrive well in our climate, and which would be very valuable in pastures intended for the production of milk. *Orchard-grass* is one of them, and, I am inclined to say, the best after the clovers. In December, all the Farmers' clubs and the Agricultural Societies of the province hold a general meeting for the election of their officers, and, immediately afterwards, a meeting of the Board of Directors to propose the programme of operations for the ensuing years. I should like to originate there the idea of placing, as one of the articles of that programme, the purchase of a few pounds of Orchard-grass for distribution among the members, that they might try it, and assure themselves of its real value. I feel certain that after such a trial, each member will be so satisfied with it that he will continue to use it in his pastures.

Description of the plant.—The scientific name of the Orchard-grass is *Dactylis glomerata*; (1) in English, another name is "Rough-Cocksfoot". Its botanical description, as given by the abbé Provencher, in the "Flore Canadienne", is Perennial, stem two or three feet high, rather rough. Leaves linear, plane, slightly carinated, glaucous, a little rough, the sheaths divided only above. The ligules sharp, jagged; spikelets usually 4 flowered, greenish or purplish in colour, in unilateral glomerules, compact, constituting a unilateral panicle, the branches wide apart. The flowers are more or less ciliated on the keel of the lower husk. The husks very unequal. Anthers large and yellow. Is found in Canada, in meadows, grassy places, especially if shady. Flowers in June.

Limit of growth.—Orchard-grass flourishes in all parts of this province up to 41 degrees 30 minutes of latitude, and very likely even to the North of that. It suits itself to every kind of soil, dry or moist, provided that it is not absolutely wet, and does fairly in land too poor for other grasses, on which account it is very useful in clothing the dry inclines of poor land, to prevent land-slides. In fact it will grow in almost every place, but it does best in good sandy-loams. It is very patient of drought and yields abundant crops, especially if it is mown or fed-off frequently. It stands shade well, and to this quality is due its English name of Orchard-grass. It must not be sown with timothy, since it becomes too hard before timothy is fit to cut. Its permanence makes it one of the best grasses for permanent pastures. Sown with the common red-clover, the two are fit for mowing or grazing at the same time, and it starts into growth again very rapidly after being cut. It stands longer than the common red-clover which is strictly a biennial. All animals hunt after it in pastures when it exists.

Analysis of Orchard-grass.—In order to show the nutritive value of the grass, I append a little analysis of it, in the green and the dry state, compared with that of clover in the same conditions.

(1) From the Latin *dactylus* a finger, and *glomerare* to roll up. A. R. J.-F.



ORCHARD GRASS.—*Dactylis glomerata*—Dactyle pelotonné.

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Protein...
Cellulose...
Non-nitrogen...
Fat...

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	Orchard-grass green.	Red-clover green.	Orchard-grass dry.	Red-clover dry.
Water.....	73.0	70.8	9.9	15.3
Salts.....	2.0	2.1	6.0	6.2
Protein.....	2.6	4.4	8.1	12.3
Cellulose.....	8.2	8.1	32.4	24.8
Non-nitrogenous matters	13.3	13.5	41.0	33.1
Fat.....	0.9	1.1	2.6	3.3

The seed.—The seed of Orchard-grass hangs a long time on the stalk after ripening, and there would be no need to hurry in harvesting it, were it not for the birds that are very fond of it and attack it as soon as it is ripe. It resembles a very small abortive oat; it is long, with a mossy point at one end and an elongated point at the other. It is about $2\frac{1}{2}$ lines long by $\frac{1}{2}$ a line wide, and so light that it only weighs 12 lbs. to the bushel. It is sold in the husk and is a whitish-gray in appearance. A good sample should give 50 per cent of fertile seeds.

Cultivation.—Orchard-grass is sown with grain-crops, like almost all grass-seeds are treated in the province. If clover is sown with it, they must not be sown together, i. e., not at the same cast. Supposing your land is well prepared and manured, first sow your grain, harrow thoroughly, then sow your orchard-grass, at the rate of 8 lbs. to the arpent, follow with one stroke of the harrows, after which sow the mixed clover at the rate of 10 lbs. of common red, 4 lbs of alsike, and 1 lb of white, covering with a turn of the roller. You will not see much of the orchard-grass the first year, as it only goes to seed the second, when you will see, here and there, a great number of its tufts, for it tillers a great deal and grows in tufts. If you mean to make it into hay, mow as soon as the spikelets begin to be visible, never later, for it would then be too hard to make good hay. It is not recommended to be sown with meadow-grasses, but if it is meant for hay, it should be sown thicker, about 25 lbs., i. e. 2 bushels, an arpent. (1) Hay from Orchard-grass loses 59 per cent in drying.

162.—ON THE CLOVERS.

Of late years, the Farmer's Clubs have been in the habit of buying a certain variety of grass-seeds for experiments; but unfortunately, there has been, in the delivery of these seeds, troublesome errors, caused by the want of knowledge exercised in the discrimination of these varieties. These errors have chiefly affected the clovers. This reminds me that one day one of my friends told me that he had determined to make an experiment on the different kinds of clovers mentioned in the seedsmen's catalogues. He had bought, he said, Rawdon, Vermont, Mammoth, giant red-clover and com-

(1) Three bushels are not too much. A.R.J.-F.



KENTUCKY BLUE GRASS.—*Poa pratensis*—Paturin des prés.

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mon red-clover. The following year, I asked him, foreseeing what his reply would be, how his experiment had turned-out. Pretty well, he replied; but in one particular I was greatly disappointed. While I fancied I had a great variety of clovers, I found I had only two !

In order to prevent farmers from falling into similar traps, into which several, to my knowledge, have been deluded, I am about, in this address, to point out the characteristics of the only two varieties of red-clover that exist, to wit : the common red-clover and the giant-red. (1)

In the seedsmen's catalogues we find the common red-clover, the small red-clover, under the following names : Broad-clover, Common red-clover, Meadow-trefoil, biennial red-clover, Upper Canada red-clover, *Trifolium medium*, *Trifolium pratense*, Western-clover. In the same catalogues we find the giant red-clover under the different names that follow : Cow-grass, Large late clover, Large red-clover, Mammoth clover, Red perennial clover, Sapling clover; Rawdon, clover, Vermont-clover, Perennial red-clover, i.e., *trifolium pratense perenne*.

Now, I am about to give you the chief characteristics, which, varying in the two clovers, enable us to distinguish the one from the other with ease.

Common clover.—Leaf large, not velvety, flowers a rather pale red and globular, flowers on short stalks, stalk hollow or pithy, two crops a year, early ; best for pasture.

Giant-clover.—Leaves long and narrow, leaves velvety, flowers a deep red, and rather oval than globular. Flowers long in stem, stem solid, only one crop a year, late ; best for hay.

The reason that led me to give, just now, as the characteristic of the common red-clover, that it is better than the other kind for pasture, is that it is earlier than the giant-clover by 3 weeks ; so that it can be sooner ready for feeding. Mixed with orchard-grass, it constitutes the best pasture that can be provided. They are two plants that nature seems to have made to exist together in the same field. Both grow rapidly in spring, both easily produce two cuts ; they flower at almost the same time as each other, are ready at the same time to make good hay, if they are mown young enough and before the flowers fades. Beside, they complete one another for pasture, in the sense that, if sown on the same field, the clover, that disappears at the end of two years, finds itself succeeded by the Orchard-grass which, at the expiration of that term is at its fullest development and producing an abundance of grass. I said, just now, that the giant-red was the better of

(1) There is another, the last mentioned in the lists, the *Trifolium pratense perenne* or *cow-grass*, that positively exists in England, and that I sowed on Mr. Dawes' farm, at Lachine, very successfully, in 1889, '90. A. R. J.-F.

the two for hay ; but that was not exactly that which I meant to express. The giant-clover is good, too, for pasture, since it is productive after the other has been consumed. But it is better than the small red for hay, because when sown with timothy it is fit for mowing for hay at the same time as that grass is, and greatly improves the quality of the timothy especially as a food for milch-cows. I know that on the market pure timothy sells best, but as I can never advise a farmer to sell his hay, I advise him to improve it for his cows by an admixture of giant-clover. The giant-clover yields fewer seeds than the other, wherefore in some seasons, its seed is much the dearer of the two.

Finally, then, we may conclude that the common red-clover is the kind best suited to pastures, and the giant-clover is the kind best suited to hay.

163.—SELECTION OF SEEDS.

In whatsoever manner we get our seeds, whether we buy them or grow them, there are three points that must be strictly attended to; they are these: they must be from a suitable soil; they must be sound if they are to germinate well; and perfectly free from mixed seeds. A word on each of these points: seed is from good soil when it has been grown on newly cleaned land, or on rich, cool land, that produces heavy crops of well grown fodder. In this, Horace's expression: "*Fortes creantur fortibus et bonis*", strong and upright men spring from the strong and upright, is true in this as in all other things. The seed germinates well, when it is fresh and well harvested. It too often happens that the seed is old. In the case of clover this is easy of detection, as old clover-seed is of a dull colour; the trade, though, renew its brilliancy by oiling it, but this fraud is easily found out by putting a little of the seed into boiling water; if it has been oiled, a slight film will rise to the surface of the water. Again, the seed may have been harvested before it was ripe, and then the germinating power will be weak. Only the lens, or magnifying glass, can detect this fault: the seed unripe when cut, will have wrinkles on it like an unripe pea. Lastly, the percentage of germination may be found by putting a hundred seeds between two pieces of flannel, to be kept warm and moist. We saw above the proper portion of seeds of the first quality that ought to germinate. As for the cleanness of the seed, its importance can be easily seen, as it is distressing to think of a farmer sowing the seeds of weeds, from carelessness or stinginess in buying cheap, bad, ill-dressed seed.

All that I have been saying about the care to be taken in the selection of seed shows how infamously bad is the practice of some farmers who take the rubbish at the bottom of their hay-lofts to sow their meadows with. They are certain to sow a great proportion of weed-seeds, if they sow those seeds that are commonly called "fleur de foin."

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164.—SOWING.

Grass-seeds are usually sown here in spring, and almost invariably with a grain-crop, that is, the grain is sown first, and the grass-seed immediately after it. The clovers and timothy should be sown together, and the long, lighter seeds, like orchard-grass, afterwards by themselves. The Cahoon broad-cast machine does its work well, except in wind, when it does not deposit the seed regularly; in case of wind, "Thompson's wheel-barrow seed-sower," made at Ypsilanti, Michigan, is better. It sows a space 16 feet wide, and is so arranged that, driven fast or slow, it always sows the same quantity, and the wind does not affect its regularity of deposition.

Grass-seed, too, may be sown in the fall, but I cannot recommend this for the Eastern part of the province.

Grass-seeds should be sown as early in the spring as it is possible to get them in, and when sown, must only have a light harrowing and a rolling. Frequently the seed does not take, either because it was sown too late, in a drought, or because the harrow has buried it too deeply, or because, in an imperfectly prepared and unpulverized piece of land, the rolling has been omitted.

165.—TREATMENT OF THE MEADOW

When once sown, no cattle must be allowed to pasture on it the first fall, nor in the subsequent springs and falls. The yield of a meadow is often reduced by a third, from cattle being allowed on it. If the thaws of winter, frost succeeding, have caused a formation of ice on the meadow, the spots where the ice has drawn out the roots of the grass must be watched for, and when found must be well harrowed and dressed with a compost of bog-earth, superphosphate or some complete chemical manure, like the "Victor"; a lot of seed, of the same kind as before, should be sown previously, and a good heavy roller completes the job, as soon as the land is dry enough to support the horses without their hooves poaching it. After the third year's hay-crop is carried, a good dressing of well rotted dung should be laid on. If weeds threaten to invade the meadow, the first that show their heads must be pitilessly eradicated as must be the others as well.

166.—TREATMENT OF THE PASTURE.

Besides the treatment, above described, for the meadow, and which applies equally to the pasture, except the top dressing of dung, the pasture is to be divided into several small enclosures to be grazed one after another by the stock. Every time the animals are removed from one piece, after grazing it for a fortnight or so, the droppings of the stock must be knocked about, and that for two reasons: first, because the dung being spread abroad manures the land, instead of burning up the grass where it lies, and, second-



RED TOP.—*Agrostis vulgaris*.

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ly, because by breaking up the droppings, the hatching of thousands of the eggs of the *horn-fly*, which are always laid in the cow dung, is prevented.

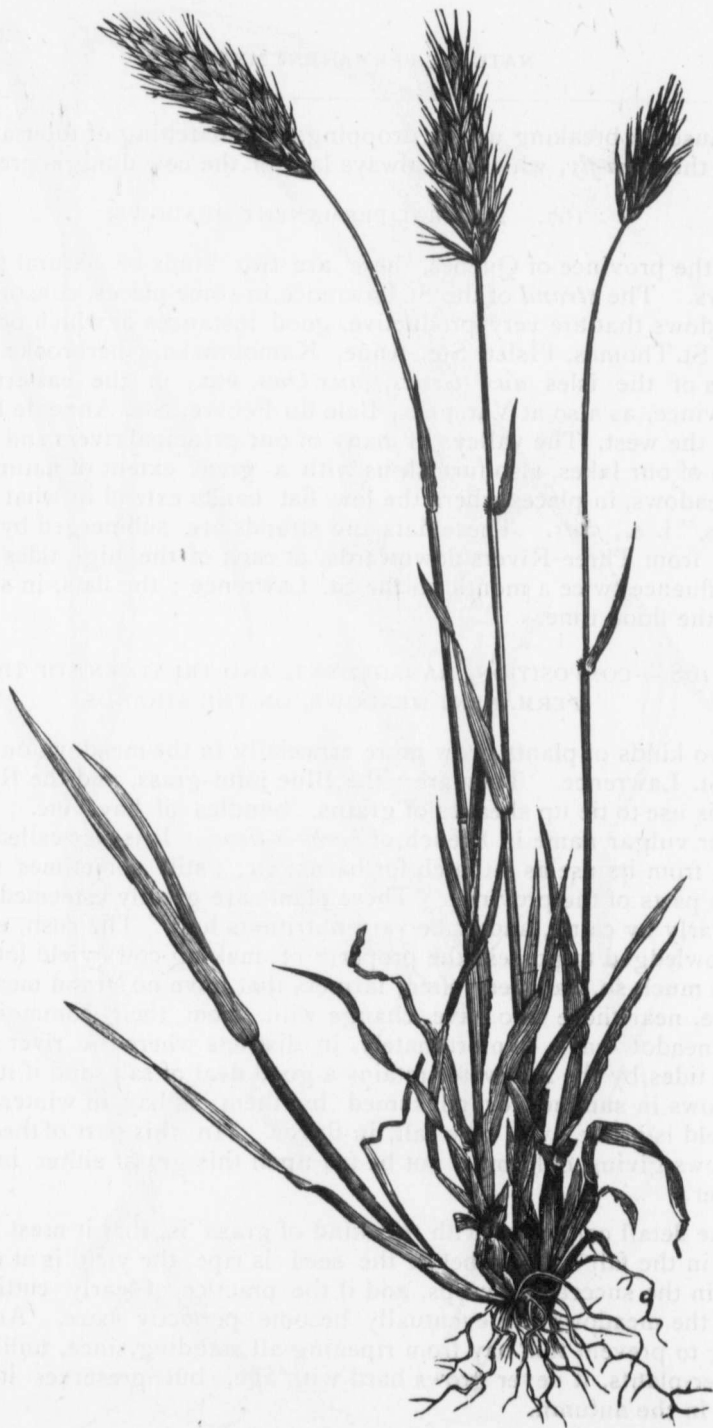
167.—NATURAL PERMANENT MEADOWS.

In the province of Quebec, there are two kinds of natural permanent meadows. The *strand* of the St. Lawrence, in some places, constitutes natural meadows that are very productive, good instances of which occur in the bays of St. Thomas, l'Islet, Ste. Anne, Kamouraska, Sherbrooke, etc., and the flats of the isles *aux Grues*, *aux Oies*, etc., in the eastern part of the province, as also at Varennes, Baie du Febvre, Ste. Anne de la Pérade, etc., in the west. The valleys of many of our principal rivers and the banks of some of our lakes, also furnish us with a great extent of natural permanent meadows, in places where the low flat banks extend in what are called "platins," i. e., *flats*. These flats and strands are submerged by water, the strands, from Three-Rivers downwards, at each of the high tides that exert their influence twice a month on the St. Lawrence; the flats, in spring and fall, in the flood time.

168.—COMPOSITION, MANAGEMENT, AND TREATMENT OF THE PERMANENT MEADOWS, ON THE STRANDS.

Two kinds of plants grow more especially in the meadows on the stand of the St. Lawrence. They are: the Blue joint-grass, and the Rush. The former is used to tie up sheaves of grains, bundles of hay, etc.; hence its trivial or vulgar name in French, of *herbe-à-liens*. It is also called, *herbe-à-couvrir*, from its use as a thatch for barns; etc.; still sometimes to be seen in some parts of the province. These plants are greatly esteemed by stock, particularly by cattle, and make very nutritious hay. The rush, especially, is acknowledged to possess the property of making cows yield lots of milk. And so much so, that, very often, farmers that have no strand meadows and who live, near those who have, change with them their common for the strand meadow-hay. Unfortunately, in districts where the river drenched, in high tides, by the salt water, retains a good deal of salt, and if it is browsed by cows in summer, or consumed by them as hay in winter, the milk they yield is briny, even very salt, in flavor. In this part of the province, then, cows giving milk must not be fed upon this grass either in summer or winter.

One detail connected with this kind of grass is, that it must not be cut till late in the fall. If cut before the seed is ripe, the yield is at once diminished in the succeeding crops, and if the practice of early cutting is continued, the meadows will eventually become perfectly bare. And there is nothing to prevent this hay from ripening all standing, since, unlike ordinary fodder-plants, it never grows hard with age, but preserves its verdure till late in the autumn.



SWEET VERNAL.—*Anthoxanthum odoratum*

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It happens sometimes that these meadows are torn up by masses of ice, carried by storms, which, thrown violently on the banks, plough up the land and destroy the grass over great extents of ground. When this arrives, the land must first be levelled, and those parts of the shore that have not been injured must be left untouched, by cattle or scythe, for two or three years. The grass will then seed itself down and the damage be thus repaired.

169.—COMPOSITION, UTILISATION, AND MANAGEMENT, OF PERMANENT MEADOWS ON THE FLATS OF RIVERS AND LAKES.

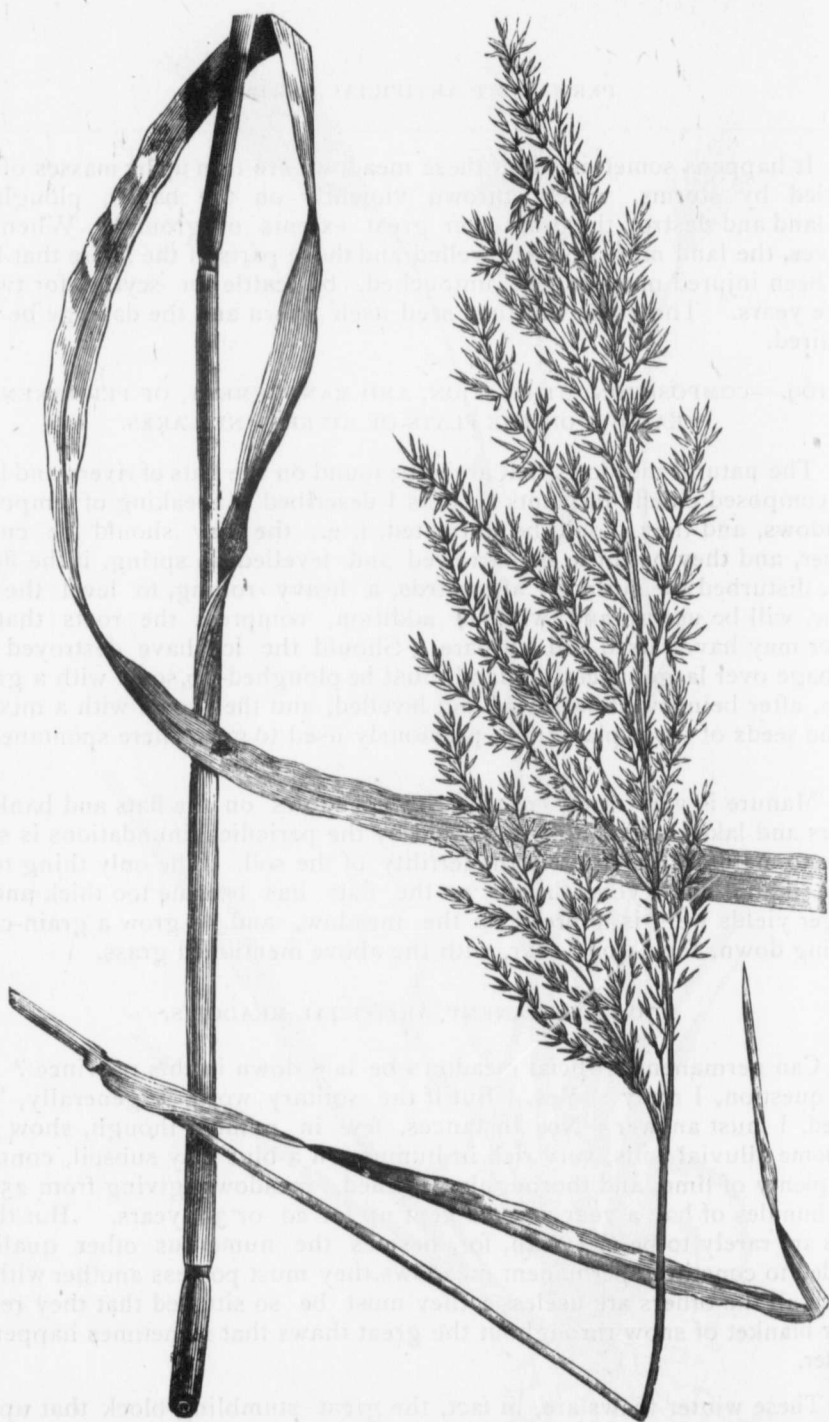
The natural meadows that are to be found on the flats of rivers and lakes are composed chiefly of plants such as I described in speaking of temporary meadows, and they should be so treated, i. e., the hay should be cut in flower, and they ought to be harrowed and levelled in spring, if the floods have disturbed the surface : afterwards, a heavy rolling, to level the turf anew, will be useful and will, in addition, compress the roots that the water may have raised and left bare. Should the ice have destroyed the herbage over large spaces, the land must be ploughed-up, sown with a grain-crop, after being well harrowed and levelled, and then sown with a mixture of the seeds of those plants that previously used to grow there spontaneously.

Manure is very rarely needed by meadows on the flats and banks of rivers and lakes. The mud deposited by the periodical inundations is sufficient to maintain indefinitely the fertility of the soil. The only thing to be done, if after some years the turf on the flats has become too thick and no longer yields well, is to break up the meadow, and to grow a grain-crop, sowing down, the second year, with the above mentioned grass.

170.—PERMANENT ARTIFICIAL MEADOWS.

Can permanent artificial meadows be laid down in this province ? To this question, I reply : Yes. But if the solitary word, "generally," be added, I must answer : No. Instances, few in number though, show that on some alluvial soils, very rich in humus, on a blue clay subsoil, containing plenty of lime, and thoroughly drained, meadows giving from 250 to 300 bundles of hay a year may be kept up for 20 or 30 years. But these soils are rarely to be met with, for, besides the numerous other qualities needed to constitute permanent meadows, they must possess another without which all the others are useless : they must be so situated that they retain their blanket of snow throughout the great thaws that sometimes happen in winter.

These winter thaws are, in fact, the great stumbling-block that upsets the farmer in his attempts to establish here permanent or temporary meadows



BLUE JOINT.—*Calamagrotis Canadensis*

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or pastures. It was well remarked, when speaking of what is being done in Normandy, that the large quantities of manure and lime applied there to the permanent artificial meadows make the soil warmer, and more able to resist the damage done by the frost. This is very probably so in that country, where the soil only freezes superficially, and that seldom and for only a short time. But make the soil here as warm as you can, by manure and 'mendments, and I defy any one to heat it up enough to foil the attacks of a frost of -25° to -30° that after a thaw in winter has covered the land with a layer of water that in eight or ten hours is converted into ice stuck to the surface.

171.—SEEDING DOWN PERMANENT ARTIFICIAL MEADOWS.

As a guide however to farmers who may have such exceptionally situated land as that I have just spoken of, as being suited to the establishment of permanent meadows; the following is a recipe for grass-seeds suitable for the purpose.

Orchard grass.....	4 lbs.
Meadow fescue.....	5 "
Common broad grass.....	4 "
Meadow grass.....	4 "
Timothy.....	4 "
Alsike clover.....	2 "
White clover.....	1 "
Red clover.....	4 "
Meadow foxtail.....	4 "

Total to the arpent..... 32 lbs.

The mode of preparing land for a permanent meadow is the same as that practised for a temporary one; except that the liming should be heavier as well as the dose of manure, and a greater dressing of artificials should be applied just before seeding. For, it must not be forgotten that land laid down for permanence cannot be manured for some time in any other way than by top-dressing. As soon as a permanent meadow is laid down, it is to be treated exactly like a temporary one, except as to certain top-dressings of which I shall speak when I am treating of permanent pastures.

172.—PERMANENT PASTURES.

All hilly soils, that cannot be ploughed, should be in permanent pasture; as well as rocky land, where stone-clearing is impossible or too costly, and all land that, for some reason or another, cannot be worked. The settlers in mountainous districts, such as are many townships in this province, on the slopes of the Laurentians and the Alleghanies, are the most in a position to convert all these declivities, recently cleared, into permanent pastures. For that purpose, it is only necessary to attack the soil at once, before

"stumping," after the first grubbing (with the mattock), when the ashes are most abundant, by sowing the proper pasture-grasses, in the following proportions :

Orchard-grass	6 lbs.
Meadow-fescue	6 "
Rough-stalked meadow	8 "
Timothy	6 "
White clover	3 "
Red clover (small)	3 "
	—
Total	32 lbs.

With the exception of timothy and the small red clover, all the grasses in the list are very persistent. The two former give a great deal of fodder during the first two or three years, and then the others, that have taken a little more time to install themselves, are ready to furnish an abundant yield, when the timothy and the clover are pretty nearly worn out. Some recommend that the pasture should not be fed off the first season, so that the herbage may get well established. The best way of burying the grass-seed is to drive a bullock drawing a bush-harrow between the stumps.

As to rocky or other unploughable soils intended for permanent pasture some advise the application to them of a compost prepared a year in advance in this fashion : plough a strip of grass-sod, and carry the turf off into the corner of the field ; on a layer of this place a layer of quick-lime, then another layer of turf, followed by a layer of dung, and another of lime, with, last of all, a layer of turf to top up with ; the heap should be five or six feet high. The compost should be cut down and turned two or three times in the fall, well mixed in the turning, and allowed to pass the winter in that state. When spring arrives, it is to be spread on the land intended for the pasture. The land is to be grubbed, or dug with a fork, breaking all the clods thoroughly and mixing in the compost. Then the grass-seeds are sown and dragged in with the bush-harrow. The compost should be made of $\frac{3}{4}$ of earth, and $\frac{1}{4}$ of dung, with 600 lbs. of lime for an arpent of land. Such a compost should be given to meadows and pastures at least every four years, and it is by this alone that their permanence can be secured.

Now, you will doubtless be surprised to hear of the composting of dung and lime together, for it is contrary to all theoretical ideas of the management of composts into which dung is combined. Still, the recipe must be taken as it is given, for Barral, Boitel, Gayot, Gobin, and other agronomes of France, recognize the good effects of composts thus compounded. When this is spread on well established meadows or pastures, it is done at the end of August in the year after it is made.