

APPENDIX No. 7

SELECT STANDING COMMITTEE

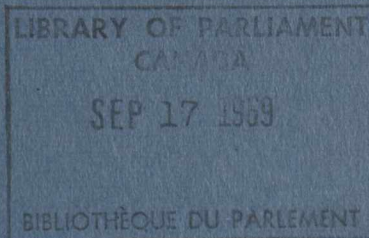
ON

AGRICULTURE AND COLONIZATION

**MINUTES OF PROCEEDINGS AND EVIDENCE
AND THE REPORT**

In the matter of an Order of Reference respecting the Grading and Inspection of Wheat and the feasibility of utilizing the Protein Content as a basic factor in the grading of wheat

SESSION - 1928



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
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APPENDIX 267

STANDING COMMITTEE

AGRICULTURE AND COLONIZATION

MINUTES OF PROCEEDINGS AND EVIDENCE
AND THE REPORT

In the matter of an Order of Reference regarding the Growth
and Importance of Wheat and the Possibility of raising the Domestic
Content of a Flour Supply in the growing of wheat

SESSION 1948



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In the matter of an Order of Reference respecting the Grading and Inspection of Wheat and the feasibility of utilizing the Protein Content as a basic factor in the grading of wheat

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OTTAWA
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1928

ANNUAL REPORT

Board of Commerce
Washington, June 6, 1923

ORDER OF REFERENCE

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ORDER OF REFERENCE

THURSDAY, 16th February, 1928.

Resolved,—That whereas the protein content is an important factor in the value of wheat.

Therefore be it resolved that in the opinion of this House, the National Council of Industrial and Scientific Research in conjunction with the Board of Grain Commissioners be asked to investigate and report on the feasibility of utilizing the protein content of wheat as a basic factor in the grading of that product.

And further be it resolved that this resolution be referred to the Committee on Agriculture and Colonization for consideration and for such suggestions in connection with the grading and inspection of wheat as it deems advisable to pass on to the said National Council and Board of Grain Commissioners.

Attest.

ARTHUR BEAUCHESNE,
Clerk of the House.

NINTH REPORT

HOUSE OF COMMONS,

WEDNESDAY, June 6, 1928.

The Select Standing Committee on Agriculture and Colonization begs leave to submit its Ninth Report as follows:

Your committee have had under consideration a Resolution and Order of Reference dated February 16, 1928, whereby it was resolved: "That whereas the protein content is an important factor in the value of wheat.

Therefore be it resolved that in the opinion of this House, the National Council of Industrial and Scientific Research in conjunction with the Board of Grain Commissioners be asked to investigate and report on the feasibility of utilizing the protein content of wheat as a basic factor in the grading of that product.

And further be it resolved that this resolution be referred to the Committee on Agriculture and Colonization for consideration and for such suggestions in connection with the grading and inspection of wheat as it deems advisable to pass on to the said National Council and Board of Grain Commissioners."

Pursuant to the said Resolution and Order of Reference, your committee has agreed to the following conclusions, which it has passed on to the said National Council and the Board of Grain Commissioners, viz:

1. From a price standpoint baking strength is an important element in wheat, and in the Canada Grain Act definitions of our higher grades, baking strength is determined by two factors—variety and percentage of hard red vitreous kernels.

2. In the resolution submitted to your Committee it is proposed to amend the Grain Act so as to determine baking strength by the two factors—variety and quantity of protein—the latter to be determined by a chemical test and to be expressed in percentages.

3. In Canada, Great Britain, the United States and probably most other countries that consume Canadian wheat, baking strength is an important factor in determining its value; by strength is meant the quantity and quality of protein.

4. Except in the case of Durum wheat, which at present is graded in a class by itself, and possibly one or two other varieties that are grown in relatively small quantities, the protein in the contract grades can be assumed to be of good quality.

5. All things considered, the amount of gluten, that is, of protein, seems, in the light of present day knowledge to be the nearest approach to an ideal index of baking strength available.

6. The cost of making the protein tests would range from 50 cents to 75 cents, and is not considered a serious difficulty notwithstanding the fact that laboratories would necessarily have to be installed at all inspection points. We would suggest that data be obtained as to cost of installing and maintaining laboratories.

7. The time required to make an individual test would be from one and a half hours to two hours. However, as daylight is not required for laboratory testing, and as a large number of tests may be conducted simultaneously, under sufficient organization operating 24 hours a day, no difficulty would be encountered in testing of cars and no delay in despatching cars to terminal points may be anticipated.

8. The definite proposal contained in the Resolution could be put into effect in so far as car-lot shipments are concerned, but your Committee is not yet satisfied that wheat sold locally in wagon-loads could take advantage of this scheme. A practice in vogue among members of the Kansas Wheat Pool whereby the farmer and elevator man forwarded samples jointly to the laboratories would seem to point the way to a solution of the difficulty concerning street wheat and this system should be investigated.

9. The introduction of protein as a factor in wheat grading would be an incentive to grow the best milling varieties of wheat. This we consider of great importance.

10. According to Mr. L. H. Newman, Dominion Cerealist, Ottawa, and in the opinion of this Committee, the following varieties are classed as desirable: Early Red Fife, Marquis, Ruby, Red Bobs, Selections, Renfrew, Kitchener, Garnet and Reward.

11. It is highly desirable that the Cereal Division of the Federal Department of Agriculture, and the several Provincial Governments working jointly, continue in their efforts to zone Canada's wheat area with a view to advising as to the variety, or varieties, most likely to prove satisfactory in each case.

12. So far however, as our export trade is concerned there was not sufficient evidence submitted to the Committee relative to the effect of the proposed change in the basis of grading to warrant your Committee recommending its adoption at present. However, your Committee recommends that a full enquiry into this phase of the question be instituted.

13. *Re Garnet Wheat*—In so far as evidence would show we are of the opinion this wheat which has hitherto been excluded from No. 1 Northern should be eligible for that grade.

14. *Re Complaints of Liverpool Corn Trade Association.*

Your Committee believes that the complaint in the matter of No. 3 can be in some measure sustained, due principally to the inclusion in this grade of a large volume of improperly dried wheat.

Respecting the complaints regarding the general lowering of the standard of respective grades other than No. 3 we find that the evidence does not bear out this complaint.

Regarding the situation with respect to No. 3 we find that the Board of Grain Commissioners and the Department are now fully alive to this situation. We recommend that steps be taken to prevent a continuation of this condition.

We recommend that the Department of Trade and Commerce and the Board of Grain Commissioners keep a careful check upon the quality of export wheat, and that samples of export shipments should regularly be secured and sent to the chief inspector and retained in his office for purpose of comparison; and also that the laboratory be required to make baking tests and report on samples of shipments regarding which complaint has been made.

15. The Committee recommends:

- (a) Temporary interchange of Inspectors, between the several inspection points in the Western Division.
- (b) Uniformity of standards of grades from year to year is most necessary and for the purpose of comparison standard samples should be preserved for at least five years.

16. In order that the high quality of our export wheat be maintained, and in order to discourage as far as possible, the growth of undesirable varieties of wheat, we would urge that one or more seed warehouses be established for the purpose of collecting and distributing seed of approved varieties, and that an experimental flour mill of sufficient size be established in order that experimental work in milling and baking may be conducted on a scale that will give results in line with those obtained in commercial mills.

The Committee would suggest that the cost of construction and equipping these facilities may well be taken from surpluses of revenue over expenditures in the administration of the Grain Act and the revenue from terminal elevator overages in the western inspection division.

17. The Committee recommends that the protein map prepared by Dr. Birchard exhibited to the Committee be printed for distribution and that a similar map be prepared by the research laboratory for distribution as early as possible in each year.

18. This Committee recommends that Inspectors be appointed at all transfer points between the head of the lakes and the seaboard, whose duty it will be to prevent any mixing of wheat so that the quality and condition of grades as fixed by final inspection will be maintained.

19. Your Committee recommends that the said National Research Council and the Board of Grain Commissioners report, as by the said Resolution instructed, to the Minister of Trade and Commerce, and that the said report be made before the next session of Parliament.

A copy of the printed evidence taken by the Committee in respect to the foregoing subject, is appended hereto for the information of the House.

All of which is respectfully submitted.

W. F. KAY,
Chairman.

A. A. FRASER,
Clerk of Committee

House of Commons

Ottawa, March 14, 1935

The committee met to order at 11 a.m. Mr. Kay presiding

Mr. Kay informed the committee that he desired to attend a meeting of another committee and nominated Mr. Brown to preside.

Mr. Brown took the chair.

MINUTES OF PROCEEDINGS

HOUSE OF COMMONS,

WEDNESDAY, February 29, 1928.

The meeting came to order at 11 a.m., Mr. Kay presiding.

Members present: Messrs. Bouchard, Carmichael, Charters, Coote, Donnelly, Dubuc, Garland (Bow River), Hodgins, Kay, Lucas, McPhee, Maybee, Millar, Motherwell, Ross, Senn, Sinclair (Queens), Spotton, Stewart, Stirling, Tolmie, Totzke, Young.

The committee took under consideration an Order of Reference from the House,—“That in the opinion of this House the National Council of Industrial and Scientific Research in conjunction with the Board of Grain Commissioners be asked to investigate and report on the feasibility of utilizing the protein content of wheat as a basic factor in the grading of that product.”

“And further that this resolution be referred to the Committee on Agriculture and Colonization for consideration and for such suggestions in connection with the grading and inspection of wheat as it deems it advisable to pass on to the said National Council and Board of Grain Commissioners.”

Professor T. J. Harrison, of the Agricultural College, Winnipeg, was called and addressed the committee on the subject of grading and inspecting wheat by its protein content. At the conclusion of his remarks, questions and discussion followed.

The meeting then discussed the question of the further consideration of this subject and decided that further witnesses be called and examined.

The Chief Grain Inspector and the Chief Chemist, officers working under the Canada Grain Act, were, in the opinion of the committee, desirable witnesses.

Further consideration was then postponed for a subsequent meeting to be called by the Chairman.

Professor Harrison was then recalled and addressed the committee on the subject of grading of barley. Questions and discussion followed.

The Chairman extended the thanks of the committee to the witness for his instructive address.

The committee adjourned to be reconvened for the consideration of this order of reference at the call of the chair.

A. A. FRASER,
Clerk of Committee.

HOUSE OF COMMONS,

THURSDAY, March 15, 1928.

The committee came to order at 11 a.m. Mr. Kay presiding.

Mr. Kay informed the committee that he desired to attend a meeting of another committee and nominated Mr. Brown to preside.

Mr. Brown took the chair.

Members present: Messrs. Benoit, Bowen, Brown, Coote, Descoteaux, Donnelly, Dubuc, Fansher, Kay, Lucas, McKenzie, McMillan, McPhee, Millar, Motherwell, Ross, Seguin, Senn, Sinclair (Wellington North), Spence, Spotton, Totzke, Vallance.

The committee again proceeded to the consideration of the Subject of Reference,—respecting the Grading and Inspection of Wheat by Protein Content.

Dr. J. F. Birchard, the chief chemist under the Board of Grain Commissioners, was called and examined.

The Hon. Mr. Malcolm, Minister of Trade and Commerce, addressed the committee on the subject then under consideration and submitted a number of questions to the witness, Dr. Birchard.

At the hour of one o'clock the witness was retired and requested to attend again on Thursday the 22nd inst.

The committee decided to take up the subject under consideration again on Thursday, the 22nd inst., when the Chief Grain Inspector and Dr. Birchard will be in attendance.

The committee then adjourned to again consider this subject on Thursday, the 22nd inst., at 11 a.m.

A. A. FRASER,

Clerk of Committee.

HOUSE OF COMMONS,

THURSDAY, March 22, 1928.

The meeting came to order at 11 a.m., Mr. Kay presiding.

Members present: Messrs. Bancroft, Brown, Campbell, Carmichael, Coote, Donnelly, Edwards, Fansher, Glen, Kay, Lanctôt, Lucas, McGibbon, McPhee, Millar, Motherwell, Sinclair (Queens), Spence, Totzke, Vallance, Young.

The committee again took under consideration the subject of the Grading and Inspection of Wheat by Protein Content Method.

Mr. Millar obtained the consent of the committee to substitute this subject-matter for that of immigration at the next meeting of the committee on Friday next.

The question of when the committee should again meet for the consideration of the subject of immigration was deferred till Friday's meeting.

Dr. Birchard was then recalled and briefly examined as to portions of his evidence given at a former meeting.

The witness retired.

Mr. James D. Fraser, Chief Grain Inspector, was then called, examined and retired.

Witness to appear again on Friday next.

The committee then adjourned till Friday, March 23rd, at 11 a.m.

A. A. FRASER,

Clerk of Committee.

HOUSE OF COMMONS,

FRIDAY, March 23, 1928.

The meeting came to order at 11 a.m., Mr. Kay presiding:

Members present: Messrs., Bancroft, Boulanger, Brown, Campbell, Carmichael, Charters, Coote, Donnelly, Dubuc, Fansher, Garland (Bow River), Glen, Kay, Lanctot, Lucas, McKenzie, McPhee, Millar, Morin, Motherwell, Tolmie, Totzke, Vallance, Young.

The committee proceeded again to the subject respecting the Grading and Inspection of Wheat by the Protein Content Method.

Mr. J. D. Fraser, Chief Grain Inspector was recalled and examined.

Witness discharged.

Dr. Birchard, Chief Chemist was then recalled and examined.

Witness discharged.

Reference was made to a Report of the Liverpool Grain Exchange alleged to have been received by the Hon. the Minister of Trade and Commerce (Mr. Malcolm), and it was decided to request the Minister to file the same with the committee.

The committee decided to sit again on Monday the 26th inst. for the further consideration of this subject and that a member of the Board of Grain Commissioners be summoned to attend.

The committee also decided that consideration of the Report to be made to the House would be in order at Monday's sitting if time would permit.

The committee adjourned till Monday the 26th, inst. at 11 a.m.

A. A. FRASER,

Clerk of Committee.

HOUSE OF COMMONS,

Monday, March 26, 1928.

The meeting came to order at 11 a.m. Mr. Kay presiding.

Members present: Messrs. Bancroft, Boulanger, Brown, Carmichael, Charters, Coote, Donnelly, Edwards, Fansher, Garland (Bow River), Glen, Gott, Kay, Lucas, McKenzie, McPhee, Millar, Motherwell, Spotton, Stewart, Tolmie, Totzke, Vallance, Young.

The committee proceeded again to the consideration of the Subject respecting the Grading and Inspection of Wheat.

Mr. M. Snow, a member of the Board of Grain Commissioners, was called, examined and retired.

Witness discharged.

On motion of Mr. Motherwell, a subcommittee was appointed to draft a Report to be submitted to the committee at its next meeting.

The members appointed to the subcommittee were as follows, namely: Messrs. Millar (Chairman), Coote, Garland (Bow River), Brown, Carmichael, Lucas, Vallance, Motherwell, McPhee and Fansher.

(With power to add to its numbers).

The committee then adjourned for the further consideration of this Subject Order of Reference, at the call of the chair.

A. A. FRASER,
Clerk of Committee.

HOUSE OF COMMONS,
MONDAY, April 23, 1928.

The Committee came to order at 11 a.m., Mr. Kay presiding.

Members present: Messrs. Bancroft, Brown, Campbell, Carmichael, Coote, Donnelly, Fansher, Garland (Bow River), Garland (Carleton), Glen, Kay, McKenzie, Millar, Motherwell, Ross, Senn, Totzke, Vallance, Young.

The committee again took under consideration the Subject of Wheat Grading.

Mr. L. H. Newman, Dominion cerealist, was called, examined and retired.

Mr. Newman and Mr. G. H. Clark, seed commissioner, to attend as witnesses at the next meeting.

The committee ordered that A. J. Sproule of LaFleche, Sask., a director of the Wheat Pool be summoned to attend on Monday, April, 30th.

The committee adjourned till Tuesday at 11 a.m.

A. A. FRASER,
Clerk of Committee.

HOUSE OF COMMONS,
TUESDAY, April 24, 1928.

The Committee came to order at 11 a.m., Mr. Kay presiding.

Members present: Messrs. Brown, Carmichael, Coote, Donnelly, Dubuc, Fansher, Garland (Bow River), Kay, Lucas, McKenzie, Millar, Motherwell, Spence, Totzke, Young.

The Committee again took under consideration the subject of Wheat Grading.

Mr. L. H. Newman, Dominion cerealist, was recalled before the Committee, was examined and retired.

Mr. G. H. Clark, seed commissioner, was called, examined and retired.

The Committee then adjourned till Wednesday, April 25th, at 11 a.m.

A. A. FRASER,
Clerk of Committee.

MONDAY, May 7, 1928.

The Committee came to order at 11 a.m., Mr. Brown, presiding.

Members present: Messrs. Bancroft, Bouchard, Brown, Campbell, Carmichael, Coote, Donnelly, Fansher, Lucas, Millar, Stirling, Tolmie, Totzke, Tummon, Vallance.

The Committee again took under consideration the subject of Wheat Grading.

Mr. E. B. Ramsay an officer of the Wheat Pool, was called, examined, and retired.

The Committee then adjourned till Tuesday, May 8, at 11 a.m.

A. A. FRASER,

Clerk of Committee.

HOUSE OF COMMONS,

TUESDAY, May 8, 1928.

The Committee came to order at four o'clock in the afternoon, Mr. Brown, in the absence of Mr. Kay, presiding.

Members present: Messrs. Boulanger, Brown, Coote, Donnelly, Dubuc, Fansher, Forke, Glen, Lucas, Ralston, Stewart, Totzke, Vallance.

The committee again took under consideration the subject of Wheat Grading.

The Hon. George Langley of Regina was called, examined and retired.

It was decided that no further evidence would be taken in respect to this subject of reference and that the committee appointed to draft a report would proceed to business.

The committee then adjourned for further consideration of this subject, at the call of the chair.

A. A. FRASER,

Clerk of Committee.

HOUSE OF COMMONS,

MONDAY, May 14, 1928.

The committee came to order at 11 a.m., Mr. Brown, in the absence of Mr. Kay, presiding.

Members present: Messrs. Brown, Campbell, Carmichael, Charters, Donnelly, Fansher, Garland, Glen, Lucas, McKenzie, Millar, Motherwell, Ross, Rowe, Tolmie, Totzke.

The committee again took under consideration the subject of Wheat Grading.

Mr. Millar, M.P., appeared before the committee and produced and read documents and excerpts from documents relating to the subject under consideration; the said productions to be part of the record of evidence.

The committee adjourned *sine die* pending the drafting of a report by the sub-committee.

A. A. FRASER,
Clerk of Committee.

HOUSE OF COMMONS,
TUESDAY, June 5, 1928.

The committee came to order at 10.30 a.m., Mr. Brown, in the absence of Mr. Kay, presiding.

Members Present: Messrs. Brown, Campbell, Coote, Donnelly, Fansher, Garland (Bow River), McMillan, McPhee, Millar, Motherwell, Ross, Sinclair (Queens), Totzke, Vallance, Young.

The committee again took under consideration the subject of Wheat Grading and Inspection.

Mr. Millar, chairman of the sub-committee, appointed to draft a report for submission to the main committee, presented a draft report which was thereupon read, considered paragraph by paragraph, amended and finally adopted as amended.

Upon motion made the chairman was instructed to present to the House the report as adopted.

Upon motion of Mr. Millar the chairman was instructed to present a motion to the House, that 20,000 copies in English and 5,000 copies in French of the evidence and the report, be printed in blue book form, and that free distribution be made thereof, by the Department of Trade and Commerce.

The committee then adjourned *sine die*.

A. A. FRASER,
Clerk of Committee.

MINUTES OF EVIDENCE

HOUSE OF COMMONS,

WEDNESDAY, February 29, 1928.

The Committee met at 11 o'clock a.m., and were addressed by Professor T. J. Harrison, Winnipeg. Mr. F. W. Kay, Chairman, presided.

The CHAIRMAN: Gentlemen, we have met this morning to consider a reference of the resolution made by Mr. Millar in the House, and this is the order of reference:—

Therefore be it resolved that in the opinion of this House, the National Council of Industrial and Scientific Research in conjunction with the Board of Grain Commissioners be asked to investigate and report on the feasibility of utilizing the protein content of wheat as a basic factor in the grading of that product.

And further be it resolved that this resolution be referred to the Committee on Agriculture and Colonization for consideration and for such suggestions in connection with the grading and inspection of wheat as it deems it advisable to pass on to the said National Council and Board of Grain Commissioners.

This is rather in the nature of an impromptu meeting this morning. Professor Harrison, of Winnipeg, happened to be in Ottawa in connection with some other matters, and he was prevailed upon to stay over and address this meeting this morning. I would suggest that any questions which the members wish to ask Prof. Harrison should be held until he has concluded his address. I will ask Professor Harrison to address the meeting now.

Professor HARRISON: Mr. Chairman and Gentlemen, I appreciate very much being asked to appear before you on such an important subject as this. I would like to say this at the outset, however, that I am not as well prepared for this subject as I might have been had I come from home expecting to have to give evidence before this committee. Having come to Ottawa on another matter of business I have no data on this matter and what I am going to give you on it will be of a general nature.

Now, in connection with the whole problem, as I understand it,—the value of the protein in the grading of wheat—I might say that in the first place you have to get a proper perspective of the whole thing before going into the phase of protein. I would like to have you—stand back, as it were, and have a look at it in a very general way, and then come down to the more technical parts of it. In connection with getting the proper perspective, let us just look for a moment at our present system of evaluating wheat, then endeavour to arrive at some better scheme of evaluating it for the purpose of flour making. In our present plan which is known as the visual grading system; take one grade, Number One Manitoba Northern, there are four things that the Act says one must look for and if you will look at the definition you will find those terms form difficulties to-day. The first thing is soundness of the grain, and the second is cleanness. The third is the weight per measured bushel, and the last is the percentage of hard wheat. Now, I am going to use two terms, and I think it proper at this time that I should define what I mean by them. For example, I use the words

[Prof. T. J. Harrison.]

"hard wheat." Now, that does not mean the actual hardness of the wheat, but it refers largely to the density of the wheat, and that is in part the measure of the protein content. Hard wheat makes strong flour, and a strong flour makes a large well piled loaf. The first two requirements, soundness and cleanness, are made solely by visual examination. The weight per measured bushel is a simple test, and the percentage of hard grain is also made by visual examination. The hardness depends on the chemical composition. It is difficult looking at the outside of a thing to estimate its chemical composition.

The ideal plan, since we are going to make bread of the wheat eventually, is to have a milling and baking test made on every sample. There are, however, many difficulties in the way. In the first place, there is the matter of time. It would take altogether too long to make a milling and baking test of every sample. After you have made a milling and baking test it is difficult to get a numerical value, so that you could say, that is Number One and that is Number Two and so on. The whole system of milling and baking is not yet thoroughly standardized. There may be an experimental miller or baker working here who will come to different results from another over there on the same samples, because his methods are different. The milling and baking test, while it may seem ideal, has many shortcomings.

You would like to have some definite test, so you would not have to depend on the human element, because there is danger always of error in that connection. Now, I would like to see a simple chemical and physical test that could be made. It must be simple because it must be quick. These simple tests should show us two things, because there are two things that the miller and the baker are concerned about—or I should say the miller: he is concerned in regard to, first the cost of production and, second the quality of the flour.

Let us consider what effects the cost of production. In the first place, there is the cleaning of the grain. Suppose grain comes in containing a large number of impurities, the cleaning will depend on the kind of impurities and the amount and value of those impurities. Now, this can be arrived at very well by means of screens, balances and examination. Next there is the quantity of flour that you can get from a bushel of wheat. That, of course, depends largely on the size and shape of the kernel. You can understand quite readily that if you have a lean, long, narrow kernel the bran is greater in proportion than if that kernel was round. So the miller wants a plump, short kernel. That can be determined very accurately by the test weight per bushel. Another thing that cannot be determined so well, but fortunately is not so important, is the thickness of the bran. There is no way, other than a distinct milling test.

We now come to the second phase of the problem the quality of the flour, according to its value for bread-making purposes. It might, at the outset, be well to spend a few minutes to see what takes place when bread is made. I presume everybody here has seen bread made in some form. You know they use flour, water, yeast and sugar, and some other ingredients, but these are the essentials. These are mixed together and put in a warm place. The yeast attacks the sugar, and, breaking down the sugar, it evolves a gas, and that gas begins to form in little pockets all through the dough. This is punched or kneaded to make the walls of the cells finer, and when you have it at the finest stage, it is then baked.

Now, the thing that a baker looks for when he buys flour is first the colour. Colour is important because, for some reason or other, everybody insists on white bread. The colours one is likely to get other than white are yellows and grays. We know that flour when correlated with varieties, we know that certain varieties give certain definite colours, and if we can determine the varieties we can pretty well determine the flour colour. Two good examples are Marquis, on the one hand, which makes a white flour, and Axminster which makes quite a yellow flour.

The next matter the baker is concerned with is water absorption. By that we mean the amount of water used in making the dough. Some flours require a great deal more water and come out with the same consistency as another, with much less water. Naturally the baker wants a flour where you can use the largest amount of water, because it is cheaper to sell water than flour, and if you have that you have also got a bread that has a better quality. We had an example. "Ceres" a wheat produced in North Dakota which has a high water absorption in comparison with variety-like quality which is quite low in water absorption. We cannot determine water absorption by external means.

There is another factor, diastatic activity. This factor is of some importance in evaluating the flour. There is enzyme that is called diastase. This enzyme is the thing that attacks the starch and turns it to sugar. Now, the yeast uses sugar to produce gas. If sugar is not present no gas will be evolved. You will sometimes get a sample of wheat that will make a good looking flour, but it has not sufficient diastase and you get a very low loaf volume; that is a loaf that does not rise. You have heard of a flour being gluten bound. There is no way I know of determining this. It has caused confusion in the minds of some people, because occasionally you can overcome it by adding some sprouted wheat.

Mr. Ross: A heavily bleached wheat.

Professor HARRISON: Yes, or a heavily bleached wheat in which sprouting processes have started—a small amount of either will overcome the difficulty of gluten bound flour, and for that reason some people think that our sprouted wheat is more valuable than unsprouted. It is not more valuable in itself.

This brings us to the gluten content. Now, let us look at the function of the gluten. The function of the gluten in bread making is to retain the gas in small cells. The quality of the bread depends, therefore, upon the high quality of gluten. If it is of good strength it will stretch and you get a thin walled cell; if it is not good, the cells break one into the other and you get a coarse texture in your bread.

Now, what is it composed of? It is composed largely of proteins, and I use that word in the plural. A good deal of work has been done on the chemical composition of grains, and they know that there are five proteins in wheat. The scientific names of these proteins are albumin, globulin, proteose, gliadin and glutenin. The first three are in very small proportions. The last two are the most important. They are the proteins that give gluten its value. You may have observed that we do not make white bread from any other cereal than wheat, and the reason for that is, that wheat is the only cereal in which you find the substance we call gluten, and it is the only grain in which we find one of these substances. For example, rye is the other competitor as far as bread making goes, and you all know what a rye loaf is like. Most of the rye bread we get has wheat flour in it. Rye makes a very heavy loaf, and it is due to the fact that there is no gluten in it. You have in gluten two proteins, gliadin and glutenin. Therefore, the quality of gluten depends upon the proportion of these two proteins.

Now, we come to the determination of this gluten. Many years ago in practically all of the up-to-date mills they had a means by which they washed the gluten out of the flour. In Western Canada, children in the fall will take wheat and chew it and eventually they get a sort of gum in their mouths. This gum is the gluten from which the starch is washed. In some mills the gluten is determined after washing the starch out with water. The gluten is weighed both wet and dry. The reason this method went out of use is because it was open to many errors. So they finally came to the conclusion that the best way to determine the gluten is to use what we call the Kjeldahl method. The

Kjeldahl method is an accurate determination of the nitrogen. Proteins are made up of a small portion of nitrogen. So they determined the nitrogen and multiplied it by a factor and stated the result as protein. If there are other nitrogenous substances in the material it will be included as protein. Chemists state that 17.3 per cent of all protein found ordinarily in wheat is composed of nitrogen. Therefore, they multiply by the factor 5.7. Some of you who have had to consider other material may have seen the factor 6.25 used.

Now, I would like to discuss briefly the limitation of the Kjeldahl method of determining the actual protein in wheat. The first limitation is that it only gives you the measure of the quantity and not the quality. A good example of this is Durum wheat and Marquis wheat. If you were to analyze these wheats you would probably find that Durum wheat would give you under the Kjeldahl method a greater protein content than Marquis, but you would get a higher, better piled loaf from the Marquis wheat, so it does not, in that case, give you a proper measure.

Another example: take very plump frosted wheat, and analyze by the Kjeldahl method, and you will find probably that the frosted wheat will give you just as high a protein content as your unfrosted wheat. The fact is that the nitrogen must be in some other form in the frosted wheat.

There is another limitation to this method, bringing it into the practical phase of grading, and that is the time element. It takes time to perform the operation. The time is probably not so great. I can conceive where the laboratory is well organized samples could be analysed in from two to three hours. It does not mean that it takes one man all that time; he would run several tests at the same time.

Another thing is the cost. I know that during the time we were exporting wheat to the United States, it was being bought in the West on protein content, and there were several private laboratories started up that charged from seventy-five cents to a dollar a sample for the determination, I think, probably, if it were being done in a large way it might be done for much less than that.

These are the disadvantages. First, there is the disadvantage that it is a measure of quantity and not of quality. Second, there is the matter of time and cost.

The advantages. The first advantage, I would say, is it gives a much more accurate test than the visual examination. I may say this that our inspectors have become very apt in looking at a sample and telling you whether it is a good milling wheat or not, but it is very difficult to look at the outside and to say what it is composed of inside. So, if you can get some test for that particular thing, it is sure to be better than the present way.

Another advantage that I see is that it would give an inducement to the grower to produce high protein wheat. That may not seem very important to some, but to those who are in the rust area where so many different sorts are being tried out to overcome the rust, you can see the value of such a procedure. It would mean that the premiums would be paid to the districts producing wheat of high protein. It very often happens that in these high protein areas the yield is not quite so high and where you get a high yield there is very often low protein. Western Canada's wheats are valuable to the miller because of their high protein content.

I am giving my own opinion when it comes to the application, because we can never know how this scheme will work until it is tried. But it seems to me that in applying it, it might well be applied to some grades and not to others. For example, One, Two and Three Northern wheats are graded very largely on the quality of the wheat, while Four, Five and Six wheats are graded on soundness and weight. So, there would be no advantage in applying this

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test to those low grades; they are down in Four, Five and Six because of another reason.

The Kjeldahl test is a measure of quantity. What is wanted is a measure of quality. The viscosity test was supposed to do this. The point I wish to make is that, as it is arranged now, it does not give definitely this measure; it does not check up, in other words, with the baking test.

Now, gentlemen, I do not plan to take up any more of your time. I thought the best scheme was to outline the problem in this way and let you ask any questions. I thought, Mr. Chairman, that the whole grading system was being discussed and I could bring up the matter of grading barley, but understand from the resolution that only wheat is to be considered.

The CHAIRMAN: Our reference is only to the grading of wheat; but if the committee wishes to hear from Professor Harrison—

Mr. Ross: I think it would be better to take the question we have; it is big enough to take two or three days.

Mr. DONNELLY: You referred to frosted wheat and said that frosted wheat might have a great deal of protein and not make good bread. You said that there was a difference in the protein. Don't you think the difference may be because the enzyme is killed in the frosted wheat and therefore the wheat does not make good bread?

Professor HARRISON: No, I think not. As far as the enzyme is concerned, frost does not kill it. This is what happens. Many of you who have had anything to do with baking from frosted wheat flour know how it performs. You put your yeast in and it will rise up nicely. When it goes into the oven the cells start to break down and dough goes over the edge of the pan. There is something wrong with the gluten, and, as we are using the words "gluten" and "protein" synonymously here to-day. There is something wrong with the protein. The nitrogen may not be in the form of protein.

Mr. Ross: In regard to grading out grain, the reason that our wheat is more valuable than other wheats is because of the protein—the kind of protein that is in it. Is that it? It is a stronger baking wheat than the average wheat of the world, and when you start to make a grading system that will give the most benefit to the man who is growing the best wheat then the only things we have to take into consideration are the flour, the amount of protein, and the kind of protein that is in the wheat, besides such things as moisture which can be determined very easily. We should grade our wheat on the yield of flour, which can be very easily determined by research, by a comparison with the weight per bushel, and by the amount of protein which we can find to-day. That test is easily made. The only tests that we have to find are the tests to determine the kind of protein and the kind of gluten that is in the wheat. These are the only kind of tests that we have to make, because if we have a high gluten or a high protein wheat, we get gluten in it, regardless of the fact that it will not make as good a loaf baked by itself. Improvers can be put in with it, such as malt, and really it makes no difference whether the flour has high diastatic power or not; that can be added. The real factors that have to be got at are the amount of protein and the kind of protein that is in the wheat. Don't you think that our wheat should be graded according to the wheat with the highest protein and the strongest gluten? That should be the factor for the Number One grade, and from there on down? Don't you think that should be the first factor that should be considered in our grain? Because, regardless of the fact whether it will make a good flour or bake a good loaf by itself, when you can put an improver in with that flour then you have the best flour for blending purposes, and that is what our wheat is largely used for in other

markets. It is the high protein wheat with the strong gluten that they want, and therefore we should base our Number One grade and all our grades on the amount of protein and the strength of protein that is in them; is that right?

Professor HARRISON: I think you are quite right. If you remember I said: "If it was desirable to segregate our wheats according to the protein content." That is what I had in mind—for its blending purposes. If it is desirable to do that, I think it goes without saying then that this test is a valuable test to make.

Mr. DONNELLY: I understood you to say that Durum wheat was very high in protein content and yet it was not a good baking wheat. Is it because it does not contain the right kind of protein?

Professor HARRISON: I do not know that it has been ever definitely investigated. When you make the Kjeldahl determination and multiply by your factor you have protein. In the Durum wheat it is just as high as the protein in the common wheat, but when they are baked, it is distinctly different. As I said before, one gives you a high loaf and the other a low loaf. It is not a matter of improvers. Improvers do not improve it. It is different in the constitution of the protein or the nitrogenous substances of the wheat.

Mr. DONNELLY: Does it hold up to the density test?

Professor HARRISON: That is one of the weaknesses of the viscosity test; it does not measure these things as it should.

Mr. GARLAND (Bow River): I think there has to be a definite question there from the practical application of the best implement to determine the quality of the grain itself. Durum is recognized as not the equivalent of Marquis wheat for baking purposes. If it reacts to a test and shows as high a protein content as the other, some question arises there.

Mr. MILLAR: Would not the variety test—not coming up to the Marquis—put it into a lower grade?

Professor HARRISON: Durum wheat is not graded in the same class of grades as common wheat. There is a class of grades known as Canada Western Durum grades. The question is, could not the quality of gluten be determined by the variety. As I said before, these wheats are for another purpose and should not be confused with the Northern grades.

Mr. GARLAND (Bow River): It answers the question as far as I am concerned. What I am wondering is if it answers the question as far as the man who grows Durum wheat is concerned. There are two practical questions arising out of this discussion. You said the cost of the test at the present time carried on by commercial resources was from seventy-five cent to a dollar a test, and you thought that with volume that could be reduced. In your opinion, supposing we applied the protein content test to western wheat, what would be the cost?

Professor HARRISON: I could not answer that definitely. For this reason: It is a thing that we have not worked on in this country—this test in volume. You understand when I make a test one man carries the whole thing all the way through. I could conceive if the tests were worked out in a general way, one man doing a portion of the work, another man doing another portion, the samples flowing in, the cost could naturally be cut down considerably by doing it in that way. You would not require such highly skilled men or such highly trained men for that. It would become a piece of routine work for each man doing one thing to the sample as it went along. That is why I think it could be done considerably lower than my statement, but how low I do not think can be said until it is put into operation.

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Mr. GARLAND: We will have to have some kind of estimate before we will be warranted in changing. Would you be willing to give an estimate?

Mr. MILLAR: In the United States it goes as low as forty cents—from forty cents to one dollar.

Mr. GARLAND: Mr. Millar realizes that it is an important question. The next practical question is as to time. How long would it take to make the tests, and really assure Canada of a bucking up of the low grades, during the rush season of the year. That is the one great difficulty that has been held out to everyone who wanted to apply this scientific method of grading. Now, have you anything to say on that?

Professor HARRISON: That is pretty definitely worked out. We know pretty nearly the time it takes. You have to grind the sample at the sample grinder. It is a small sample. It would not take a great length of time. Let us say ten minutes. Say ten minutes to grind it and weigh it into the bottles. It will take probably two hours—to digest after adding the sulphuric acid. It will take thirty minutes, I should say, for the distillation. It would then take 10 or 15 minutes to calculate the results. That would be the maximum time.

Mr. TOTZKE: About three hours?

Professor HARRISON: That is the Kjeldahl test.

Hon. Mr. MOTHERWELL: In the higher grades does the quality rank high with the highness of the quantity?

Professor HARRISON: Yes, with the varieties that are allowed into the Northern grades.

Mr. MILLAR: Before we leave that point of time. From several concerns I have gathered this information that the test can be made fairly accurate, perhaps accurate enough for all practical purposes, in very much less than that time—say an hour and a half. Is that correct?

Professor HARRISON: I have given you about what it takes to make this test in our own laboratory. You want the time where there is an ideal arrangement for bulk work. If I said three hours, it takes us about two or three hours to make the test. Three hours is the maximum. I think I said two hours for digestion. If we can get a little more heat to it; you cut down the time there. I think you are safe in saying from one and a half to three hours.

Mr. GARLAND (Bow River): Can the Minister of Agriculture tell us the actual time it takes to inspect a sample of grain and report it graded?

Mr. ROSS: I can answer that. The actual time taken now to grade a sample of grain is much more than three hours, as a matter of fact. The time of grading the sample itself has nothing to do with the grain movement. For this reason. When cars come into the inspection yard samplers are sent there to stab cars for the sample of the grain. They get an average sample of the grain from the cars and the samples are then taken to the inspection office and handed over to an inspector, and the inspectors under the present system of grading can only grade grain between nine o'clock in the morning and three o'clock in the afternoon. That is the maximum. During the darker days of the winter months they cannot grade for that length of time. Cars are running all the twenty-four hours; samples are taken at the inspection point and the cars go on to destination. The samples are taken to the inspection office, but if a sample comes in at four o'clock in the afternoon it cannot possibly be graded until the next morning at nine o'clock. Now, these samples are taken to the inspection office and the inspector and grader does not do anything to grade it under the present system. That car has been held up for twenty hours—seventeen to twenty hours before it can be graded. Under this system that we are speaking of these samples can be stabbed and taken in

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the same way as to-day, then taken to the inspection office. If it takes ten hours to get the grade on the sample it makes no difference to the car, because it is on its way to destination and the grade is wired on. Even if we had the full mill baking test it would not make a bit of difference. That is an old story in the grain trade. Under any system it does not make any difference whether they take three, six or ten hours to do the grading. There will be a test in each case under the new system, but certainly not any loss of time to the railways. The grading can be done as to-day, without any holding up other than there is to-day.

Mr. MILLAR: Regarding the time needed, I think you gentlemen will agree with the information I have from Minneapolis, Chicago and Kansas City where they give the time. I think this would perhaps give a better guide to the time than the test made in the laboratory. I think the time ran only one and a half to two hours. Now it requires time for drawing the sample and making all the records. One would have to allow a little longer time than that; but as Mr. Ross says, time is scarcely a factor until you come to the question of the cars of wheat that will be sent to the mills at or near Winnipeg. That creates another example. We had better leave that for a moment.

Mr. BANCROFT: Mr. Ross made the statement that I think I would like to have corrected in the record. He said that under the present system the car was held up for fourteen hours. I think he meant the sample; the car is not held up all.

Mr. Ross: The car is not held up at all. The sample is taken. It may take fourteen hours to get the sample tested but the car goes on.

There is another factor in the time element. If you come down to the chemical analysis for the grading system then you have a twenty-four day to work, whereas, under the present system they have from nine o'clock in the morning until three o'clock as a maximum to grade grain. If you can come down to mechanical and chemical analysis you have twenty-four hours to grade instead of six hours.

Mr. CARMICHAEL: I would like to ask the professor a question. In regard to the protein testing of wheat, would it be necessary, for instance, in a favourable year, a year that there is not much wet weather, to test every car from, say, certain localities. For instance, you can conceive that certain localities in the prairie are composed of some kind of heavy clay soil, some open prairie, and some low land, and all these different factors would enter into the kind of wheat. Is it not a fact that practically all the wheat from a certain section of the prairie like that would grade almost the same in protein content?

Professor HARRISON: No, no, I do not think it would all grade the same.

Mr. CARMICHAEL: I am referring not to when there is wet weather. I can understand that the damp grain, the wet grain would grade differently; but I am referring to all One Northern coming from a particular section of the prairie?

Professor HARRISON: No, I do not think it will, because you get quite a variation just in the one district, because at one point, for example, there may be a certain soil condition on this side which is different from the soil condition on that side. That would be a very dangerous procedure to follow, I would imagine, to take two samples from a district and say they are all according to them.

Mr. Ross: Even between stubble and summer fallow?

Professor HARRISON: Yes.

Hon. Dr. TOLMIE: Is it not a fact that you would find a variation even on the one farm? I wanted to ask the professor how long this has been in practical

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application—this system of testing—and in what countries, and about what percentage correct is it found in practical application?

Professor HARRISON: I cannot give you offhand the date when this test was first put into operation. This test is used very largely in the United States. They have used it probably longer—I will not say longer—they have used it more extensively than any other country that I know of. Great Britain is also using it, and it has been used to a limited extent—in this country there are certain industries that are using it all the time. Take our own flour mills, they are using this test all the time in segregating their wheat. I do not say all of them; but a great many of them.

Mr. Ross: Certain mills are grading every car on that basis.

Professor HARRISON: They are storing their grain on that basis.

Mr. Ross: I know of one particular instance. This is one practical instance. I know of one mill that bought 300,000 bushels of wheat. They tested it for protein and for the kind of protein with the best tests they had, and they turned back into the ordinary trade 200,000 out of the 300,000 bushels that they bought for the reason that it was not strong enough in protein and it did not have strong enough gluten in it. These people are actually in this position that they are to-day paying a premium for high protein and good gluten wheats. They are not paying the farmer the premium, but it is costing them more to get that kind of wheat. Our mills are practically all doing that to-day—the better mills in this country. They are buying their wheat on the grades, and after it is taken into the mill, or taken to the mill, without unloading the cars, in a great many cases, they stab the cars and make a protein test and turn the grain back into the ordinary channels of trade if it does not come up to the standard they want. In other words they are shipping the poor stuff to the European market and keeping the best stuff for here.

Mr. MILLAR: I would like to ask you with your knowledge of the trade in Winnipeg, whether this would work a hardship on the mills picking the cars at Winnipeg and sending them to their mills at or near Winnipeg. They have their experts there now, as I understand it, picking the cars that they believe are suitable for their purposes—the strong cars. They have all the knowledge that our grain inspectors have and they are bound to be hampered by the conditions of the Inspection Act. Now, if in case a car that they selected were to be stored immediately, it is just possible that that car would have to be held up for a little while or else they would have to store it without knowing the actual grade. But would it be any hardship on them in selecting a car they really need—would it be a hardship on them if they did not know whether it would be one price or two prices?

Professor HARRISON: Well, knowing the trade somewhat there, it seems to me it would not be very much of a hardship, because these cars are not shipped direct to the mill. It takes some time for the railway to switch a car from the yard and over to the mill, and I imagine in that time the grading could be done. Just as has been brought out here to-day, cars come in at night and are sampled and again sealed up and sent along. The samples must be held over until there is good light for grading. I do not think it would hold it up providing your protein "lab" was running twenty-four hours a day and had a sufficient installation to take care of the samples as they came along. I think if these things were safeguarded it would not be a hardship on the mills, because they would have their grade as soon as they got their car.

Mr. Ross: As a matter of fact, the protein test is not a difficult test. One man can handle forty or fifty tubes in making a test, and that part of that test takes forty-five minutes to make, so it only amounts to two minutes a test.

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Mr. DONNELLY: How many tests could one man make in a day?

Professor HARRISON: We do not work twenty-four hours a day. It is difficult to answer that due to that fact. I have been in the "labs." at Minneapolis and Kansas City where they do this work, and it is a matter of proper organization of your work. If you ask me to go out and go through all the processes, I think if I ran thirty a day—that is what I ordinarily do and not overwork myself. I think a good technician could probably run more than that. But the point is if you take ten men and have each man doing a piece of work, the work would travel that much faster, and you would have a greater number of samples per man.

Mr. DONNELLY: What would be a good average?

Professor HARRISON: I could not say.

Mr. MILLAR: Would this statement I have be correct: that a gang or staff of six will test four hundred—I am not sure whether it is twelve or twenty-four hours or whether it is two gangs working day and night producing four hundred tests, or whether it is one gang in twelve hours producing four hundred tests?

Mr. ROSS: The only difference in that is the kind of machinery and appliances and the number of men. One man making the protein test with the test tubes, distillation test tubes—one man in Winnipeg to-day has 48 machines, has he not?

Professor HARRISON: I don't know. I imagine a man could handle about 30 flasks and do it thoroughly.

Mr. ROSS: Suppose he could do thirty. He runs that off in from thirty to forty-five minutes for that number of tests. Say you put in five of these machines, five men working in shifts of eight hours each you can get an enormous number of these tests made. There is no reason why this should hold up the grading of the grain. There is no time factor whatever, and the cost factor is very low.

Mr. MILLAR: Another objection, Professor, is that there are some cars that are loaded too full to get an accurate sample, a fair, accurate sample at Winnipeg. They draw the best sample they can and leave it to be checked over in Fort William. Would that occur frequently in the higher grades of wheat?

Professor HARRISON: You are referring now to the whole full cars?

Mr. MILLAR: Yes.

Professor HARRISON: The whole full cars will not appear very often in One, Two and Three Northern because they are heavy per bushel. The whole full cars refer more to oats and barley and some of the rye. But I do not see why that should be any more difficult than under the present system, because they do not issue a certificate until they have checked that at the other end. At the time they issue some sort of certificate, and when it is regraded at Fort William and unloaded at Fort William they check back to that. The man does not get his final out-turn until the sample has been checked. I do not see why it should be any more difficult.

Mr. ROSS: He gets an out-turn grade two?

Professor HARRISON: Yes.

Mr. ROSS: And the out-turn grade has got to be graded between nine in the morning and three in the afternoon?

Professor HARRISON: Yes.

Mr. DONNELLY: Is it not a fact that though we may have different wheat coming from the same district, high and low in protein, yet for all that there are certain districts where you get wheat higher in protein than others, and

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these districts are known to the milling concerns and marked out by them, and they get most of their wheat from these districts for testing?

Professor HARRISON: I think it is an open secret that the mills know where the good wheat is coming from. All you need to do is to be observant as you go through the country and you will see where they have their line elevators to buy for them. I think that answers the question.

Mr. ROSS: Dr. Donnelly has one case in his own constituency where there were fifty-five applications for elevator sites in one small town, for the simple reason that it was in a high protein area.

Mr. CARMICHAEL: Are the high protein areas in the open prairie sections in the west rather than bluff areas?

Professor HARRISON: I haven't done a great deal of testing outside of our own province because I haven't had access to the samples, but I have done some samples of barley, and it is a fact that in the south there is a high protein and in the north low protein.

Mr. CARMICHAEL: In the north, when you get outside the open prairie section?

Professor HARRISON: Yes, when you get outside the open prairie section.

Mr. CARMICHAEL: Under our present grading system the open prairie settlements are losing?

Professor HARRISON: Yes, in the open prairie sections they are not getting the returns that they are entitled to.

Mr. CARMICHAEL: Under the present grading system?

Professor HARRISON: I suppose you might put it that way.

Mr. DONNELLY: Previously we had a sample of wheat brought out here which was a hard spring wheat. Can you tell us regarding the protein content of that? Was it the gliadin or glutenin that was lacking or what was it?

Professor HARRISON: Mr. Chairman, fortunately, as I said before, I work in Manitoba. That wheat has not got down to Manitoba. I do not know anything about it.

Mr. COOTE: The professor might tell us something about Garnet wheat, and why it is not allowed to be graded as No. 1. Is it because of its lack of protein or of colour?

Professor HARRISON: Well, I do not know that I can answer that question because this wheat has been distributed very largely through our provinces and it has been grown and it is liked in certain districts; but I understand it is not being graded higher than No. 2. I do not know what the reason is.

Mr. YOUNG: The colour of the flour has something to do with it.

Mr. COOTE: I am trying to find out why it is not graded No. 1. It is very satisfactory in the district from which I come. I believe it is better to grade it No. 1 Garnet than No. 4 something else. We want to find out why it cannot grade No. 1. If it is not because it is lacking in protein, it is because of some other reason. If our wheat is to be graded on the basis of protein content, this Garnet would be likely to be graded 1 Northern, would it not?

Professor HARRISON: We must keep this in mind: we are not going to grade entirely on protein. You have these other things that must be taken into consideration; first, the variety, equal to Marquis; second, it must be clean and it must be sound; it must have the weight per measured bushel. The protein content would be the fourth one. It is one in four, or five, if you consider variety.

Mr. CARMICHAEL: Would you explain "sound"?

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Professor HARRISON: It is a term used in defining Canada Western wheat to indicate that it is not frosted, sprouted, smutty, etc.

Mr. BANCROFT: Could it not be shrunken and still be sound?

Professor HARRISON: Yes, you could have a shrunken grain and it could still be sound. You may have a horse so poor you can see his ribs, but still he is sound. He is just lean, but quite sound.

Mr. COOTE: Has the colour anything to do with the soundness?

Professor HARRISON: It depends on what you mean by colour. When you speak of colour, probably I am thinking of something different from you. I may be thinking of hardness; you may be thinking of bleaching or weathering. The latter would be a matter of soundness.

Mr. ROSS: Is not the real reason that the colour of the flour from the Garnet is a little more yellow? Is not that the reason why they put it into No. 2?

Mr. MILLAR: Does the Grain Act provide for that?

Mr. ROSS: No; but they don't follow the Grain Act.

Professor HARRISON: I do not know whether that is the reason or not. I presume there is some reason of that sort.

Mr. EVANS: You say it must be equal of Marquis, instead of the protein test. What do you mean?

Professor HARRISON: The protein test will only give you the amount of protein. We take Marquis as our standard of the quality of protein. It is the quantity of protein in the one case against the quality of the protein in the other. The protein test gives you the amount, with some limitations; it does not give you the quality. We try to protect the quality by saying certain varieties, and the standard is Marquis so far.

Mr. MILLAR: Is it not possible under our present system of grading that a field of wheat, if it could be marketed immediately after it is threshed would grade One Northern, but a shower of rain has discoloured the bran considerably, and it would be put down to Three, and yet, under a baking test, and all the accurate tests you apply it still proves to be a Number One wheat, good enough in quality to be a Number One wheat?

Professor HARRISON: If it is a high quality wheat and you get rain on it it may deteriorate it to a certain extent; but not to the extent of two grades. Well the present system is not able to determine the actual value of the wheat for the colour has been destroyed by which we determine the hardness.

Mr. EVANS: Does bleaching lower the quality?

Professor HARRISON: These terms are all relative. You can bleach sufficiently to lower the quality. I presume that any bleaching in that way would lower the quality, but it is so very small that it would not make very much difference; but still it may be sufficient to mask the colour to such an extent that it will put it down.

The CHAIRMAN: What is the wish of the committee in regard to this reference? Do you wish to call other witnesses?

Mr. MILLAR: As I am responsible for the resolution, Mr. Chairman, I would ask the committee to be so good as to call other witnesses in regard to this matter. It is an important matter. I can think of two witnesses that should be brought here: The Chief Grain Inspector, and Dr. Birchard.

The CHAIRMAN: Well, let us decide what our future course will be. As you know, we have possibly quite a large order in taking up this reference. I would like, if this question will not take a great deal of time, to finish this before we start on Immigration, so that when we start on Immigration we can go on continuously with it. What is the view of the committee?

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Mr. Ross: Mr. Chairman, in regard to that it will take some time to get Dr. Birchard and the Chief Inspector here, if we can get them here.

The CHAIRMAN: Where is the Chief Inspector—in Winnipeg?

Mr. Ross: Yes, and so is Dr. Birchard. In regard to that, I have another resolution in connection with flax that I hope will be sent to this committee, and could be taken up; and I would like to have Dr. Birchard and the Chief Inspector here at that time. If they are called, I would like to have them at a far enough date so that both resolutions could be taken up at the same time.

The CHAIRMAN: I noticed that the Minister when he was speaking suggested calling Dr. Shutt, Mr. Newman and Dr. Harcourt of Guelph.

Mr. CARMICHAEL: Why not proceed with the Immigration matter and hold this situation in abeyance until all can be disposed of at the same time?

Mr. COOTE: To us, this is a more important question even than immigration. We should arrange it in whatever way will best suit the committee in the calling of our witnesses. I think Mr. Millar is right; we should have the Chief Inspector and the Chief Chemist from Winnipeg.

The Committee then adjourned to meet at the call of the chair.

Mr. McMillan: To make bread that will rise? Yes, to make bread that will rise. Gluten is the substance that holds the gas and makes it possible to bake a loaf of bread. Now the gluten is associated with the hard endosperm kernels and in all definitions of the grades that are standard for Manitoba as each of the first two grades must contain a certain or minimum percentage of the hard endosperm kernels. The production of hard endosperm wheat depends chiefly upon climatic conditions. Hot weather early in the growing season, high rainfall and low evaporation and a short ripening period are the most important factors. An abundant supply of nitrogen in the soil is also necessary. The protein content also depends upon the variety of wheat. It should also be noted that as a rule the climatic conditions which are conducive to high yields of wheat also tend to produce low protein wheat, and this is seen a hour in Canada. There are two things which must be considered with regard to protein; and these are quantity and quality. A certain amount of gluten or protein is [but we measure] some this wheat but each raised jewel a little.

HOUSE OF COMMONS,

THURSDAY, March 15, 1928.

The Select Standing Committee on Agriculture and Colonization met at 11 a.m., the Chairman, Mr. Kay, presiding.

The Committee proceeded with the consideration of the grading of grain.

The CHAIRMAN: This morning we have Dr. F. J. Birchard, Chief Chemist of the Board of Grain Commissioners, to address us. Dr. Birchard will give us an address on the grading of wheat in respect to its protein content. I am now going to ask Mr. Brown (Lisgar) to take the chair.

(Mr. Brown (Lisgar) takes the chair.)

Dr. BIRCHARD: I may say that I have not prepared any address. I was called at rather short notice and I rather expected I would be asked questions regarding the grading of wheat in respect to protein content. I hardly know just how I should start. You have had Professor Harrison here describing protein content as related to the grading of grain, but I haven't had an opportunity to look over his address; and I do not think I should take the time of the committee in duplicating anything which has already been said. I would propose that I give a short statement as to the meaning of protein and to what extent it is already a factor in grain grading, and then if you will ask me questions I will be very glad to answer them as best I can.

Protein, I may say, is a general term which includes a large variety of substances widely distributed in nature, and occurring in a great number of forms. The nature of these substances may be best illustrated perhaps by referring to the white of egg and casein of milk; two typical proteins. The most important proteins occurring in wheat are known as gliadin and glutenin, which are the chief constituents of gluten, the common term for protein, when referring to wheat and flour. Gluten is the well known tenacious elastic mass which is formed when a dough is washed in running water, the gliadin and glutenin remaining behind together with a certain amount of starch, fat, and mineral matter. It is well known that the most characteristic property of wheat flour is due to the presence of gluten, since without this substance it would not be possible to make a loaf of bread at all.

Mr. McMILLAN: To make bread that will rise?

Dr. BIRCHARD: Yes, to make bread that will rise. Gluten is the substance that holds the gas and makes it possible to bake a loaf of bread. Now, the gluten is associated with the hard, red, vitreous kernels, and in all definitions of the grades that fact is accounted for, inasmuch—as each of the first two grades must contain a certain or minimum percentage of the hard, red, vitreous kernels.

The production of hard, glutinous wheat depends chiefly upon climatic conditions. Hot weather early in the growing season, light rainfall and large evaporation and a short ripening period are the most important factors. An abundant supply of nitrogen in the soil, is also necessary. The protein content also depends upon the variety of wheat. It should also be noted that as a rule, the climatic conditions which are conducive to high yields of wheat also tend to produce low protein wheat.

There are two things which must be considered with regard to protein, and these are quantity and quality. A certain amount of gluten or protein is

[Dr. F. J. Birchard.]

absolutely necessary for baking; too much, however, may be a disadvantage just as well as too little. If there were a large excess of high protein wheat in the world we probably would have to pay more for low protein wheat. However, in the world's markets the reverse is the case and the great value of high protein content in wheat is due to the fact that in the world's markets there is a dearth of wheat of this character.

Now I will say something as to quality. The quality varies in the sound wheat according to the variety and the locality where it is grown. It also varies, naturally, with the grade. The quality of the gluten is different in sound wheat than in damaged wheat. The quality in frozen and green wheat is very different from that found in normal grain. It may be higher in quantity; as a rule it generally is higher, as found by the method we have of testing it. The protein content from feed wheat is often as high, or even higher, than that found in No. 1 Northern.

Hon. Mr. MOTHERWELL: How do you account for that?

Dr. BIRCHARD: That is accounted for by the relative rates at which the starch and the protein are deposited at the time of growth. When wheat is frozen that means that it is immature, and the protein at that point is being deposited at a greater rate than is the starch.

Mr. DONNELLY: Are glutenin and gliadin in the same proportions?

Dr. BIRCHARD: No, the proportion varies. However, I do not think that that is of as much importance as we used to believe. The relative proportions of gliadin to glutenin do not seem to be of such importance as was formerly thought. The quality, apparently, is due to the physical condition of the gluten, but, unfortunately, we have no really satisfactory method of measuring the quality. It can be done best by a baking test, and that is the only real method we have now. That is not altogether satisfactory.

Mr. DONNELLY: You can distinguish it from the other kind of gluten that you get from hard, red, spring wheat. One Northern; is there any chemical test that you can make to distinguish the protein that you get from frozen wheat?

Dr. BIRCHARD: Yes, that can be distinguished, but it is a very difficult test; it takes a long time. It is not practicable for commercial purposes at all.

Mr. MILLAR: Would this be true, doctor? Reverting back to your statement about the higher percentage of protein in the lower grades of immature wheat, that percentage is higher simply because the starch has not had time to get in?

Dr. BIRCHARD: That is one reason, yes. The protein in the frozen form or in the immature form is in a quite different condition. It is in a condition one might say that would be true protein if it were allowed to develop, but growth was stopped before it really became protein, so it is really undeveloped protein; and, perhaps, one could say that for that reason it is not so valuable as the normal protein. However, it appears possible that protein can be even over-developed; that is, if its ripening takes place too quickly by hot winds then the protein becomes changed—its physical condition is altered; it is over-ripe, so to speak, and when in that condition it does not give as good a loaf as when the protein has had time to develop at a normal rate. It is over-developed.

Mr. MILLAR: In such a case as that, how would it act under the baking test?

Dr. BIRCHARD: Well, it has to be conditioned, and it has to be mixed with a lower protein wheat, and perhaps with some sprouted wheat.

[Dr. F. J. Birchard.]

Mr. DONNELLY: It could be counteracted by sugar or something of that kind?

Dr. BIRCHARD: Yes, by putting in some sprouted wheat which contains diastase. This would help it along. It is an exceedingly complicated problem, and it is not completely understood. There has been a great development along that line in the last ten years, but it is a problem still which requires investigation. The exact nature of the physical condition of the gluten in the different varieties of wheat is not yet understood.

Mr. COOTE: While you are on that point, Dr. Birchard, would you kindly tell us whether the protein—the quality of the protein in wheat, if allowed to stand and get perfectly ripe—ripe enough to thresh—is as good as it is if it is out at a little earlier stage, and hardens in the stock?

Dr. BIRCHARD: I think the milling and baking test has shown that there is very little difference.

Mr. McMILLAN: You think it develops just as good a wheat to cut it a little on the green side?

Dr. BIRCHARD: Personally, I have had no experience with it. I can only say what has been done in other research institutes and my recollection is that the consensus of opinion is that there is very little difference.

Mr. McMILLAN: It does not injure it?

Dr. BIRCHARD: Within reasonable limits, it does not.

Hon. Mr. MOTHERWELL: When you say that there is very little difference in letting it stand until it is perfectly ripe, hard and ready to thresh—

Dr. BIRCHARD: A lesser yield per acre may be obtained by cutting before it is ripe.

Hon. Mr. MOTHERWELL: You think the protein is just as good?

Dr. BIRCHARD: It will probably be a little different, but the test does not show this difference to be very marked.

Mr. ROSS: In regard to protein-bound wheat, for blending purposes, that is really more valuable than the wheat which is not so high in protein; is it not?

Dr. BIRCHARD: Yes, if it is high in protein; but it must be, as the miller says, conditioned. The English miller treats that wheat rather differently from the way in which it is treated in this country; he washes it and it is water-soaked. It goes through, one might say, an incipient germination; and then the diastase which is necessary for the development of sugars for food for the yeast to act upon is developed in this process. Now, if the wheat is not subjected to a process of that kind, you get a very low volume; that is, a very small loaf. That is one reason why the baking test is not always satisfactory. One man may try a baking test with wheat of that nature, and he gets a bad result, and he says that that is no good, while another man will temper it differently before he mills it and he will get a different result.

Mr. ROSS: You are speaking of using that wheat alone? In that case he would have to use commercial improvers and temper his wheat differently?

Dr. BIRCHARD: Yes.

Mr. ROSS: My point is this: You can take a certain amount of the starchier wheat and mix it with that wheat, if you have a protein-bound wheat—a very high protein wheat—you can use a much larger amount of the low protein wheat in your blend?

Dr. BIRCHARD: Yes, that is true.

Mr. ROSS: But the protein-bound wheat is more valuable than the ordinary fairly high protein wheat for blending purposes?

Dr. BIRCHARD: Is more valuable than——?

[Dr. F. J. Birchard.]

Mr. ROSS: If you get a very high protein wheat, which, by itself, is protein-bound, and has to have a commercial improver to use with it, you can use that wheat to blend with more soft wheat than you can with the other?

Dr. BIRCHARD: Yes, that is true.

Mr. MILLAR: Are there any mills in Canada who condition their wheat for milling in the way you spoke of?

Dr. BIRCHARD: Yes. I understand this method is introduced in Calgary now by the Spiller people who adopt the same methods as they do in England. The wheat there is washed I believe in some way, and the wheat that goes to the rolls is hardly recognizable as Canadian wheat after it has gone through that process.

Mr. MILLER: How would that grade according to our present system?

Dr. BIRCHARD: Well, it would necessarily reduce it pretty low, I should say—about a Four.

Mr. MILLAR: It is conditioned?

Dr. BIRCHARD: Yes.

Mr. COOTE: If I might go back to the other question I asked. Very often we get a higher grade for our wheat if we cut it before it is ripe enough to thresh. We cut it, I should say, before it reaches that stage and put it in the stook. When it is threshed we get a better grade for it than if we had allowed it to stand uncut and get hard enough to thresh—we would not get as good a grade then as if we cut it at an earlier stage. I suppose it is on account of the colour. I was anxious to know whether the wheat that we allow to get hard before it is cut at all—get quite matured—whether it is quite as good so far as protein content goes as the wheat that we cut a little sooner and allow it to colour in the stook?

Hon. Mr. MOTHERWELL: Has there been any research work done in that way?

Dr. BIRCHARD: Oh, yes.

Hon. Mr. MOTHERWELL: What is the result?

Dr. BIRCHARD: As I said previously, as I recollect it the consensus of opinion is that there is very little difference in the baking and milling results, although the one may have a little better colour than the other. The colour, I do not think is a factor at all. The stress that is placed on colour in grading is due to the fact that it is assumed, and with some justice that wheat is bleached, or which has lost its colour, partly, has been in some way affected by rain or exposure to the elements, and as such exposure naturally, in many cases, might bring injury, then it is assumed that all wheat which has been exposed to a shower of rain and lost its colour must also be injured.

Mr. COOTE: It is not necessarily so?

Dr. BIRCHARD: It is not necessarily so. Because, in any case, the wheat must be treated with water before milling and it undergoes thereby a loss of colour, which is very similar, and in doing so it loses two grades—for instance, if a No. 1 Northern is tempered in the ordinary way for milling, and is graded before as No. 1 Northern, after it is tempered and treated to bring it up to, say, fifteen per cent moisture and allowed to stand over night, it is automatically reduced to No. 3 Northern although nothing serious has happened to it.

Mr. DONNELLY: You say that the Spiller people and the English millers treat their wheat and put it through a process. They must increase the moisture content.

Dr. BIRCHARD: All wheat, before it is milled, must be dampened on the outside. It must be brought up to 14½ or 15 per cent, though a certain percentage of that water is naturally lost during the milling operation by evaporation.

Mr. DONNELLY: I understand you to say that in Calgary—

Dr. BIRCHARD: They dry it again.

Mr. DONNELLY: They dry the wheat?

Dr. BIRCHARD: It would be dried afterwards.

Mr. DONNELLY: They moisten it and start it to grow?

Dr. BIRCHARD: I would not say "start it to grow". It goes through an incipient change akin to germination.

Hon. Mr. MOTHERWELL: How many hours would it be in that incipient stage?

Dr. BIRCHARD: Every miller has his own ideas as to that. They are all very different. Some use heat and some do not use heat. Those who use heat would take a shorter time. It may be twenty-four hours or it might be less. It might be forty-eight hours. It depends on the nature of the wheat; very hard wheat would take longer than softer wheat.

Mr. FANSHER: Take wheat treated to a late shower and has bleached the kernels on the outside of the sheaves, would that sample of wheat be treated in the way you have stated. Some of that wheat has been unstained. In the mills would they distinguish them?

Dr. BIRCHARD: No, I do not think they would.

Mr. FANSHER: Does that deteriorate its value for milling purposes very materially?

Dr. BIRCHARD: I think that would depend very much on the extent. I do not know that one could answer that in a definite sense. If the change were very serious, I think it would. The character of the wheat might be altered.

The Acting CHAIRMAN: That, of course, is the most serious problem that concerns the farmer. He thinks he suffers a most serious loss in regard to that wheat that is slightly discoloured.

Dr. BIRCHARD: I do not mean slightly discoloured.

The Acting CHAIRMAN: That is where he loses.

Dr. BIRCHARD: My point is that wheat which has been slightly discoloured on account of a shower or rain does not lose very much, if anything, in its actual milling value, simply on account of the loss of colour.

Hon. Mr. MOTHERWELL: Does it lose anything in yield of flour?

Dr. BIRCHARD: It does not lose anything in yield in one shower or two showers—not anything that can be measured. Now, theoretically, one would say that it had. No doubt, this is a progressive change, and if this goes too far there is a loss of yield; but the wheat could lose a lot of colour and there would be no change that one could measure.

Mr. ROSS: The only change is the change in the colour of the bran.

Dr. BIRCHARD: Yes, the colouring matter is washed out of it.

Mr. McMILLAN: The real object of the meeting is to find out whether it is a practical proposition to sell wheat according to its protein content. Now, Doctor, do you think it is a practical proposition to do that from what you know?

Dr. BIRCHARD: I was leading up to that. I can go into that and skip the other if you like.

Mr. McMILLAN: Go ahead. Lead up to that.

[Dr. F. J. Birchard.]

The Acting CHAIRMAN: I think it is valuable to get Dr. Birchard's opinion on that point. The real extent to which actual damage takes place in one, two or three showers of rain—that is the important point to my mind.

Mr. VALLANCE: Do you contend, Doctor, that grain in the stook that is subjected to some moisture is not to any great extent deteriorated; it has not lost any of its value?

Dr. BIRCHARD: Yes, sir, if it has simply lost in colour with no further change. Change might take place with excess rain if the wheat were allowed to remain in a damp condition for a long time. Then there would be a change. For instance, we have found that tough wheat—wheat containing over 14½ per cent moisture—if allowed to remain stored for months, has not the same milling value, and baking value as wheat which has been kept at a normal moisture all the time. I do not mean that it has become mouldy or that it is heated or has undergone any other physical change that any one can see outside of the fact that it has excess moisture; but there is a progressive deterioration. We have noticed that in comparing the milling and baking values of tough wheat as compared with sound wheat. We also have noticed that the tough wheat when dried, and when dried properly, is improved; and I think, perhaps, it is as good as the natural wheat again, or pretty nearly.

Mr. TOTZKE: If it is dried within a reasonable time after being harvested?

Dr. BIRCHARD: After a reasonable time, and dried under proper conditions. In speaking of quality in wheat, and this bears directly on the question of grading wheat by protein content, it is quite possible to ruin wheat for bread making purposes entirely by improper drying.

The Acting CHAIRMAN: Too much heat?

Dr. BIRCHARD: Too high temperature, drying too quickly and removing too much moisture. If the grain is dried and too much moisture is taken out, it would appear that a physical change takes place in the gluten, and that change is very detrimental. This is a point which should be considered in connection with the problem of grading wheat according to protein content. Since the amount of protein present in any particular sample might be adequate, but if the sample had been improperly dried the quality of the protein might have been seriously impaired, and the flour ruined in so far as its bread making properties are concerned.

Mr. DONNELLY: That change is in the gluten, and not in the enzyme?

Dr. BIRCHARD: No, I do not think the enzyme is injured. It is a physical change apparently which takes place in the gluten.

The Acting CHAIRMAN: With regard to the question of colour, you say that the ordinary grain buyer would not be able to determine from the colour alone whether sufficient damage had taken place; that is, he would not be able to determine the exact damage that had taken place, and, consequently he does it on the assumption that it has been damaged?

Dr. BIRCHARD: Not exactly that. Other changes may have taken place, in addition to that of colour. The Kernels may have "sprung". The Inspection Department considers a kernel "sprung" when it has undergone a certain change which may be observed before actual germination occurs. The nature of this change is very similar to that which occurs during actual germination but in a lesser degree. It is not so advanced.

Mr. TOTZKE: Doctor Birchard, if tough wheat were put in a bin and frozen would that change take place in the protein content—the deterioration?

Dr. BIRCHARD: I did not intend to say that a change takes place in the protein content, but I did mean that a change occurs in the milling and baking quality of tough wheat when stored. Now, as to the exact nature of that change,

and to what it is to be attributed I am not able to say very much. A progressive change takes place which is not related to the amount of protein present in the wheat.

Mr. MILLAR: I think Mr. Totzke would like to know if that change would take place in the same degree provided the grain were frozen?

Dr. BIRCHARD: I can only speak theoretically, as I have had no actual experience, but I do not think it would. I might say that we examined a series of samples of tough wheat that had been in store for some months at the Government Elevator at Saskatoon, during the cold weather, and we noticed the change at that time. The grain, however, had not been frozen.

Now, as to the question of grading by protein content. It must be understood that this means re-writing the grades. It would be, one might say, revolutionary. Personally I think it could be done, without too much trouble. Whether it is practicable or not, I will discuss later. If it were practicable I would welcome it inasmuch as I think any definite addition to our knowledge as to the exact nature of our wheat is highly desirable. We should try to get away from tradition and to base our grading system on scientific principles, in so far as this is possible. As to whether it is practicable to make the protein a determining factor in the grade, I am unable to definitely say. It is a matter that would have to be very carefully considered and from a great many points of view. I can see a great many advantages, and also many difficulties. Whether these difficulties are insurmountable or not is the question to be considered. I do not think on the whole that they are insurmountable. Whether the advantages to be gained would offset all the difficulties, I am not prepared at the moment to say. We would have to feel our way to a certain extent: it would have to be tried out. Let us first consider what it would mean. As regards Winnipeg, the Chief Inspector tells me, that in certain years about ninety per cent of the crop might be expected to grade One, Two or Three Northern. In that case there might be 2,500 cars of wheat which would have to be tested between nine o'clock in the morning and some time before five in the afternoon. That is a pretty large order. It is not impossible but it certainly would mean an immense amount of work.

Mr. MILLAR: A double shift could be put on?

Dr. BIRCHARD: That could be done. I think the Inspector tells me that it might be arranged in most cases to make 1,500 tests between nine and four o'clock, and 1,000 tests during the night. Now if this method of grading were confined to the grades One, Two and Three Northern, then it would first be necessary to have the Inspection Department look over these 2,500 samples and select those which as regards other factors would probably grade One, Two and Three Northern. These would all have to be tested and a report made to the Inspection Department. On the results of these tests, combined with the grading factors now in use by the Inspection Department, the samples would be placed in the proper grade. I am assuming now that the weight per bushel and the other factors which now determine the grade, would remain unaltered. There would be no change in this respect.

As to the cost, which of course is an important item, this would depend very largely upon the volume of work. In any case it would be expensive. We would have to be prepared to test the maximum number of cars of contract grade which might be expected to pass through Winnipeg during any 24 hours. We would have to maintain an adequate staff from the 1st of September until, about Christmas, or the close of navigation. After that time no doubt the number of tests would decrease, but we could not dispense with all these men. No doubt there would be occasions when we would have a good many men with very little for them to do.

Mr. DONNELLY: How many do you think it would take?

[Dr. F. J. Birchard.]

Dr. BIRCHARD: How many men? I think we would have to have two supervising chemists with, perhaps, six assistants. Perhaps also, about a dozen other men who would have a status something above that of a labourer. We would also need possibly twenty additional labourers. We would also want a large number of stenographers and clerks to make the records and to get the reports out in time. It could be done very much cheaper were it not for the fact that the work has to be done in such a short space of time.

Mr. McMILLAN: How long does it take to make a test?

Dr. BIRCHARD: A test can be made in about an hour and twenty minutes; possibly a little longer.

Hon. Mr. MOTHERWELL: That is for quantity?

Dr. BIRCHARD: That is for one test. Another twenty-four tests could be made in perhaps half an hour longer. They would all be running at the same time. It is not necessary for me to outline the test.

Mr. DONNELLY: Yes, outline it.

Dr. BIRCHARD: The sample would first be ground in a machine something like a coffee grinder. One gram of this would be accurately weighed out put into what is known as a Kjeldahl flask together with some chemicals and twenty-five cubic centimetres of concentrated sulphuric acid. The flask and contents would be strongly heated for about forty-five to fifty minutes, by which process the grain is completely destroyed and the present nitrogenous substances changed into sulphate of ammonia. The flask is allowed to cool for about ten minutes, a cupful of water added, and then a strong solution of caustic soda. This is distilled whereby the ammonia is driven off. It is collected in an acid solution of known strength. The amount of acid so neutralized by the ammonia is a measure of the amount of nitrogenous matter in the wheat, and from this the amount of protein may be calculated. It entirely depends upon the amount of equipment which you have. In my own laboratory two men can make 100 tests in a day with twelve digesters and twelve stills. With two shifts we could easily make double that number.

Mr. MILLAR: If this were done by a commercial laboratory would the cost be greater?

Dr. BIRCHARD: I think it would cost about fifty cents for one test, if made by a commercial laboratory.

Mr. TOTZKE: That is only a quantity test?

Dr. BIRCHARD: Yes, a quantity test. We can only test for the quantity of protein.

The ACTING CHAIRMAN: You have no test for the other?

Dr. BIRCHARD: The tests are not altogether reliable.

Mr. McMILLAN: There is no practical test for quality yet?

Dr. BIRCHARD: No, sir.

Mr. TOTZKE: What about the baking test?

Dr. BIRCHARD: That is the best test we have. It is not completely satisfactory. At present, at any rate, a test for quality is out of the question.

Mr. ROSS: You say, Doctor, that there is no practical test for quality, nevertheless, with the test that you have in quantity and the tests that you have for quality to-day which are used in your laboratory you can determine a lot more accurately the value of that grain than can be done otherwise.

Dr. BIRCHARD: Decidedly. That is true enough. But I would not like to tie myself to any one test for quality.

The ACTING CHAIRMAN: If there is no test for quality, how does quality reveal itself? It is revealed some way?

Dr. BIRCHARD: Certainly it is revealed in the baking test.

Mr. DONNELLY: This viscosity test that is used in the United States, is that cheaper and quicker, and is it as reliable?

Dr. BIRCHARD: We had strong hopes two or three years ago that by the viscosity method it might be possible to measure gluten quality. There is undoubtedly something in it, but it is not yet possible by this means to obtain a numerical factor which may be regarded as a reliable index of the quality of any particular sample, of wheat or flour. Sometimes it works beautifully, and sometimes it does not. The whole problem of gluten quality and its measurement has been the subject of a great deal of investigation. It was first thought that the viscosity method could be applied direct, and the test carried out in a short time, but it was later found that to obtain reliable results a much longer time was necessary than was anticipated. I believe that after there has been time for more investigation and research a practical method will be eventually developed but at present there is no method I know of which could be applied.

Hon. Mr. MOTHERWELL: Does high quality of protein generally go with high quantity of protein? Would you confine yourself to the three top grades?

Dr. BIRCHARD: No, I do not think it does. Quality is often a question of variety. Durum wheat, for example, generally is high in protein, but the quality is poor.

Mr. DONNELLY: Did you test any of this Vermillion wheat?

Dr. BIRCHARD: Yes, sir.

Mr. DONNELLY: How was it in protein value?

Dr. BIRCHARD: Protein? I think it was low if I remember correctly; the baking quality was not good.

Mr. COOTE: Could you tell us what is meant by a wet gluten test?

Dr. BIRCHARD: Yes, sir. When making a wet gluten test a weighed amount of flour is made into a dough with water and the starch washed away with running water. What remains is for the most part water, gliadin and glutenin, together with a small amount of fat and mineral matter. That is wet gluten. It is weighed in a wet condition to obtain the percentage of wet gluten. After drying in the oven to constant weight the amount of dry gluten is obtained.

The ACTING CHAIRMAN: You spoke of the possibility of it being necessary to rewrite the grades in case this new method was adopted. Is it possible that wheat that now grades No. 4 or less might have a greater milling value along with some of the wheats that now are in the higher grades?

Dr. BIRCHARD: By wheat that grades No. 4 you refer to frosted wheat?

The ACTING CHAIRMAN: Not necessarily frozen wheat.

Mr. ROSS: Rusted wheat.

Dr. BIRCHARD: Rusted wheat?

The ACTING CHAIRMAN: Put frozen wheat out of the consideration for the time being. Take wheat that is not frozen as grading No. 4; is it possible that any of that wheat that grades No. 4 might have a higher milling value. They are sixty pounds often—some of that wheat.

Dr. BIRCHARD: The wheat certainly would have different characteristics and would be used for different purposes. Some wheat that appears in No. 3 Northern is known as Yellow Berry and is very low in protein. It has only eight per cent perhaps, or possibly a little more, eight and a half or nine. That wheat grades No. 3 Northern. It has entirely different characteristics from

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the average No. 3 Northern, or from the "Three Northerns" that we ordinarily meet. When you ask about No. 4 it must be a damaged wheat to which you refer.

The ACTING CHAIRMAN: No, I am thinking of wheat that is imperfectly matured.

Dr. BIRCHARD: It would be thin and it would have a lower yield of flour, and the character of that flour would be quite different from that produced from the Yellow Berry wheat. In the latter case we would have more flour but with less gluten and in the former a lower yield of flour and probably a higher percentage of gluten. Rusted wheat as a rule is put in a separate grade Special No. 4, Special No. 5 or Special No. 6, according to the weight per bushel. Now ordinarily we have found rusted wheat to have a high protein content of very good quality. It makes an excellent loaf of good volume. On the other hand the flour is somewhat yellow in colour and for that reason it is not so desirable.

Mr. DONNELLY: Now, Dr. Birchard, you said the soil conditions influenced the amount of protein in wheat. Now would the land that is cropped year after year of wheat, and that has been cropped for forty or fifty years be lower in protein content?

Dr. BIRCHARD: Yes, I think so. There is no question that the amount of available nitrogen in the soil has a direct influence upon the protein content of the wheat.

Mr. DONNELLY: The newer the land the higher the protein?

Dr. BIRCHARD: Not always.

Mr. DONNELLY: The same land?

Dr. BIRCHARD: Yes, the same land. I have a map here which you may find of interest. I will pass it around. It shows the different districts in the three Western provinces which produce high, medium, average, low and very low protein wheat.

Mr. DONNELLY: Would you go into the soil conditions?

Dr. BIRCHARD: I am sorry. I have no means of knowing anything about that.

Mr. COOTE: It would be interesting to tell the committee approximately the number of tests you have made. Maybe it is not necessary. Give us the result of your tests to show the variation in protein content in western Canadian wheat?

Dr. BIRCHARD: The variations?

Mr. COOTE: Yes.

Dr. BIRCHARD: Well, the variations by grade?

Mr. COOTE: Yes, by grade or otherwise.

Dr. BIRCHARD: Well, the protein varies greatly from year to year. This year we have nothing but low protein wheat. All the grades are low.

Mr. COOTE: What would the average be this year for say, what you would call good wheat?

Dr. BIRCHARD: The average? Well No. 1 Northern averages this year around twelve per cent, but there is very little of it.

Mr. McMILLAN: What does No. 1 usually grade?

Dr. BIRCHARD: About 13.5 or 14 per cent. No. 2 Northern this year averages about 11.6 per cent. No. 3 Northern around 11 or 11.2 per cent. Now you could add on about 2 per cent to all of these for an ordinary year. Sometimes No. 1 might average 13 per cent or possibly 13.5 or 14 per cent.

[Dr. F. J. Birchard.]

The ACTING CHAIRMAN: Is that proportion maintained year after year—the proportion that you have indicated as being between 12 and 13?

Dr. BIRCHARD: I don't know that I could say off-hand. I could obtain that data for you covering a period of six or seven years.

Mr. ROSS: Doctor, as a matter of fact, you said a while ago that there have been years when 90 per cent of the crop went into One, Two and Three Northern?

Dr. BIRCHARD: Yes, sir.

Mr. ROSS: And during a year such as that in all probability the protein is very similar in all the grades?

Dr. BIRCHARD: Not a great deal of difference.

Mr. ROSS: Not a great deal of difference?

Dr. BIRCHARD: I think not.

Mr. ROSS: In other words, we have years in Western Canada when we have 90 per cent of the crop One, Two and Three Northern. If that had been all mixed together as is done with it after it is bought by the elevator man, it would go out as One Northern?

Dr. BIRCHARD: I would not like to say that because there are other grading factors. What about the weight per bushel?

Mr. ROSS: You average it all together. The One Northern—a great deal of it—has a lot higher weight than 60 pounds?

Dr. BIRCHARD: Oh, yes.

Mr. ROSS: A lot of the Two Northern is up to 60 pounds, and the Three Northern may come up to 58 pounds; and if you mix the whole business together in all probability you will get One Northern for the whole business?

Dr. BIRCHARD: According to our present system? I don't know. For instance, No. Three Northern carries a certain amount of bran frost. If you put frosted wheat in with Three Northern it all becomes Three Northern. No. One Northern is not supposed to carry any frost.

Mr. ROSS: It is only a bran frost.

Dr. BIRCHARD: Even so: that is the understanding with the Inspection Department as regards frosted grain.

Mr. ROSS: I realize that. Had you the system for determining the actual value of that Three Northern that has bran frost, you would probably find that the bran frosted wheat was not damaged in the protein?

Dr. BIRCHARD: No, I do not think that bran frosted wheat is damaged.

Mr. DONNELLY: How high would it go in protein quantity?

Dr. BIRCHARD: Our experiments indicate that bran frosted wheat does not materially differ from sound wheat as regards protein content.

Mr. MILLAR: Did you notice the figures recently published of tests made of Reward?

Dr. BIRCHARD: Yes, sir, but I have never had the opportunity of testing any Reward wheat.

Mr. McMILLAN: Have you tested any of the wheat that has taken the highest prize?

Dr. BIRCHARD: No, sir. I haven't had an opportunity of seeing any of that wheat.

Mr. DONNELLY: This map might be altogether different in other years?

Dr. BIRCHARD: Yes, it might be different in other years, but certain sections would be the same. For instance, district right north of Edmonton, all the way to Collington,—I do not remember the names of all the points on the line—

[Dr. F. J. Birchard.]

that section is always low in protein. My recollection is that for thirty years it has always been low—about 8 per cent or a little better.

Mr. DONNELLY: Don't you find it better on the open bald prairie?

Dr. BIRCHARD: Yes, the drier the climate the higher the protein, generally speaking. And the more rain you have, the lower it is.

Mr. DONNELLY: Generally speaking, it is higher in the south than in the north?

Dr. BIRCHARD: There are one or two points in the Peace river quite as high and higher than anything we get in Manitoba. I do not know that you can make an absolute, general rule.

The ACTING CHAIRMAN: It seems to me we found that scrub land is lower than the bald prairie?

Dr. BIRCHARD: That is a question of moisture.

The ACTING CHAIRMAN: I farmed scrub land, and in the early days we got Pibald wheat.

Dr. BIRCHARD: Yes, that is the same as Yellow Berry.

Mr. MILLAR: I think I have on my file a statement of a test that was made in Reno county, Kansas, of a case where they had been growing wheat on land for a great many years, and along-side of it was wheat grown on land that had been in alfalfa for some years, and the difference in protein was nearly 3 per cent.

Dr. BIRCHARD: I have never had any experience along that line.

The ACTING CHAIRMAN: I think perhaps we are getting away from the point as to the practicability of this test.

Dr. BIRCHARD: To continue again as to what it would mean if we were to introduce the protein test as a grading factor. We would have to establish laboratories at Montreal, Fort William, Winnipeg, Saskatoon, Moose Jaw, perhaps Medicine Hat, Calgary, Edmonton, Vancouver and Prince Rupert. Not only that, but we probably would have to have laboratories at the elevators at Edmonton, Calgary, Saskatoon and Moose Jaw, because we must make tests there as well. The grain is graded in and it must be graded out. We have to have the means of making the tests at these Elevators. Also I think all the cargoes would have to be tested. It would involve, I think, selling wheat on a guaranteed protein content. If I am correct in this every cargo would have to be tested.

Mr. COOTE: It might mean doing away with the private terminals. That would simplify it a lot?

Dr. BIRCHARD: I am not sure. I think perhaps it might accentuate the mixing. Because if you knew exactly the protein content necessary for a particular grade, and that is fixed at say, 14 per cent for No. One Northern, and 13 per cent for No. Two Northern, and 12 per cent for No. Three Northern, then what is going to happen to wheat that carries 13.9 per cent. It cannot be No. One Northern.

Mr. COOTE: The same as obtains now—it is in between.

Dr. BIRCHARD: Exactly, only now we have defined the grade so precisely, so hard and fast, that all it is now necessary to transform our No. Two into a One Northern is to add a very little extra high protein wheat and we at once meet the 14 per cent requirement.

Mr. DONNELLY: If you had a protein content it would be impossible to do anything in the way of buying wheat on the street in the country.

Dr. BIRCHARD: That is another thing I was coming to. I do not know how that would be overcome.

Mr. DONNELLY: You could not overcome that at all.

Mr. MILLAR: I would like to make a statement regarding what the Doctor said regarding mixing. Would not that cut both ways, Doctor? At the present time, say, for instance, they are grading out of a private or public elevator—perhaps the private elevators—is it not a disadvantage for the man who is having a cargo dragged out? He can say: There is nothing definite in the Act; it says so and so; but if there is a numerical definition such as there is for weighted wheat, it is definite. The Act does not say this has to be very heavy wheat; it says 60 pounds to the bushel, and the inspector can say, if it is not 60 pounds to the bushel, that it does not pass. Is not there an advantage to a definition that can be expressed numerically?

Dr. BIRCHARD: There decidedly is. But what would you say to the question which I propounded? Here is a wheat which we will say carries 15 per cent protein. Well, it is One Northern if 14 per cent is the limit. Here is another wheat which carries 13.9 per cent protein. It must be Two Northern. The Elevator mixes the 15 per cent wheat with the 13.9 per cent wheat and he certainly now has two One Northern samples where he only had one before.

Mr. DONNELLY: Don't you think there would be a premium paid to the man who had the 15 per cent?

Dr. BIRCHARD: Yes, I think there would be.

Mr. DONNELLY: And he would get a just return?

Dr. BIRCHARD: Yes, the man with the 15 per cent protein wheat should obtain a larger premium than the man with the 14 per cent if both are One Northern. For instance, wheat may be either straight or tough. Now a man may have only ten per cent moisture in his wheat, but he does not get a cent more for it than if he had wheat with 14.4 per cent moisture. And yet there is a difference of 4.4 per cent. He gets no premium, so far as I know. There might also be the difference between 14.5 and 17 per cent—that is the difference between the moisture limits for tough wheat.

Mr. COOTE: Is it not the same with regard to where it is decided by the weight per bushel? He may lack an ounce, but have you got the grade?

Dr. BIRCHARD: I doubt whether it would make as much difference as in the cases I have mentioned.

The ACTING CHAIRMAN: You take a miller, I think he would buy that 15 per cent wheat for his own use. He could afford to pay and would probably pay for that extra one per cent.

Dr. BIRCHARD: I do not know that he would. Our mills have their own elevators, and they can pick out the wheat they want for themselves.

The ACTING CHAIRMAN: They do that in Minneapolis.

Dr. BIRCHARD: They do that in this country. It is different in Minneapolis; they have a sample market. If we had a sample market in Winnipeg it would be altogether a different question.

Mr. MILLAR: Wouldn't it be more difficult for the farmer to get it? Would not the field from which they could pick narrow down?

Dr. BIRCHARD: Which would get the pick?

Mr. MILLAR: The Canadian mills.

Dr. BIRCHARD: They have their own elevators, have they not? And the wheat comes in and they can take it or not as they like.

Mr. MILLAR: But if a man had thousands, say five thousand bushels to sell and he finds that his wheat is very high in protein, he is not going to take it to the Ogilvie mill unless he is going to get a premium.

[Dr. F. J. Birchard.]

Dr. BIRCHARD: I am not speaking in this matter as an expert at all but that is the way it appears to me. It seems to me there would be a great danger of playing directly into the hands of the mixing houses.

Mr. COOTE: Unless we prohibit mixing by law.

Dr. BIRCHARD: Can you prohibit a man mixing his own grain?

Mr. COOTE: No, but you can refuse to give him a government certificate for wheat that is mixed. We do not allow mixing of butter.

Mr. ROSS: Yes, we do.

Mr. COOTE: I think the most practical question, perhaps, has not been discussed very much yet, to my mind, Mr. Chairman; that is whether the quantity of protein in wheat is the proper thing on which to grade wheat; that is unless we have also a test on the quality of the protein; and I think Dr. Birchard should give us an opinion.

Dr. BIRCHARD: I would answer that in this way. I think the amount of protein in wheat is perhaps the most important single factor that we have, certainly the most important factor we can measure. The quality also is very important but I am now speaking of sound wheat. I am not speaking of damaged wheat at all and I am not speaking of Durum wheat. I am referring to our ordinary standard varieties, similar and equal to Marquis that are ordinarily found in our Grades Nos. One, Two and Three Northern.

Mr. COOTE: Then, if you were going to make the protein content the determining factor in the grading of wheat, just how do you suggest it might possibly be done. I am not saying you would recommend it; but would you have a certain percentage fixed—a certain percentage of protein fixed that Number One wheat must have?

Dr. BIRCHARD: That is something I have considered, but I am not quite sure if it would be best to adopt a fixed percentage for each grade which would remain the same every year or whether the percentages should vary from year to year according to conditions. If the percentage for each grade remained unaltered, we will assume, 14 per cent for No. One Northern, 13 per cent for No. Two and 12 per cent for No. 3 Northern, then in a year like this we would have no No. One Northern at all. Very little No. Two, and nearly all No. Three Northern and lower. Then the question immediately arises—

Mr. MILLAR: Before you go any further than that let me point out that that change would not be brought about by the change in the grading system; it is so now.

Dr. BIRCHARD: Yes, that is true. However, the question arises: what are you going to do with wheat in a year like this testing under 12 per cent protein?

Mr. COOTE: That would otherwise be One?

Dr. BIRCHARD: This year, certainly it would be No. One and it has all the characteristics of No. One Northern. It has the required percentage of hard red vitreous kernels; it has not the Yellow Berry which carries with it certain undesirable qualities. These hard red vitreous kernels look exactly the same as if they carried 15 or 16 per cent protein. What is to be done with that wheat? Surely you cannot put it in with low grade damaged wheat? You would have to have a number of special grades to take care of this sound low protein wheat. You would have to have extra grades for wheat with 11 per cent and 10 per cent protein—grades which would not be necessary in those years when you had abundance of high protein wheat.

Mr. COOTE: Then it would appear from your statement that it would not be advisable to fix a certain percentage of protein content as a basis for our standard grades?

[Dr. F. J. Birchard.]

Dr. BIRCHARD: I do not know. I think there are objections to both plans and I cannot say which would be the better way. I think a fixed invariable percentage would lead to a good deal of confusion perhaps.

Mr. COOTE: I am anxious to find out all the difficulties before we take any steps in regard to this matter.

Mr. McMILLAN: I think we have information from the doctor to show us that at the present time it would not be advisable to make that the standard of selling.

Mr. COOTE: Would it, in your opinion, be possible to establish sub grades for No. 1. That is a graded barley on the present basis of the grades you find in the Act. Introduce sub grades there according to the protein content in each one of these.

Dr. BIRCHARD: There are a great number of valid objections to increasing the number of grades. If you introduce sub grades you multiply them by three again. You have No. 1 A, tough No. 1 A, damp No. 1 A, smutty No. 1 A, tough smutty No. 1 A, and so ad infinitum almost. Let me make a suggestion of my own which I think perhaps might be the best. That would be to allow any one who wanted it, to have a protein test made and have the result written on his certificate. If he thinks he has a high protein wheat, or a wheat which is above the average, he should have a chance to get the benefit. Let him demand an official protein test with the result stamped on the certificate along with the moisture content.

There is another point which should be considered. I had intended to speak of it before. It is this: to make a proper protein test involves also a moisture test. That is quite obvious, since if we have a sample of wheat containing 15 per cent moisture it will test lower in protein than if it contained only 10 per cent. Each per cent of moisture makes approximately a difference one-tenth of a per cent in the result. If wheat containing ten per cent moisture is tested, and the same wheat with fifteen per cent moisture, there would be a difference of about one-half per cent due to the difference in moisture content. This might be sufficient to swing the sample from one grade to the other.

Mr. COOTE: While you are on that point. Is there much of our wheat that tests as low as 10 per cent moisture?

Dr. BIRCHARD: No, not as we receive it, but it does dry out. Wheat stored in the Laboratory at this time of the year sometimes dry down to 8 per cent. We have wheat coming in at twelve per cent and, of course, also at 17 per cent.

Mr. COOTE: Would you say the bulk of the wheat coming in is around 12 per cent?

Dr. BIRCHARD: No, perhaps not; possibly 13 per cent or 13½ per cent. It depends greatly on the year of course.

Mr. ROSS: That wheat comes from the elevators coming to Winnipeg?

Dr. BIRCHARD: Yes, sir.

Mr. ROSS: And the general practice in the country elevator is that if there have been rains and the house is fairly full of dry wheat—the practice is to throw the damper wheat in with the dry wheat, and that goes into the car, and when the test is made at the inspection point the percentage is below 14.4; but a great deal of that wheat when it entered that elevator was much lower than it is when it comes down for testing. That is the general practice in the country amongst elevator men. Everybody knows that.

Dr. BIRCHARD: Yes, I think that is right.

[Dr. F. J. Birchard.]

Mr. MILLAR: I would like to ask a question regarding an objection you raised a short time ago. It was brought out particularly by Mr. McMillan's remark. If I heard it aright, he took the attitude that sufficient evidence had been taken now to convince us of the impracticability of it. Some years ago, there was considerable discussion in Western Canada as to whether we should have a wheat pool or not, and there were quite a number who took the attitude that it was impracticable, and they threw up their hands. There were others who thought it was a good thing. They said: this is a good thing if we can do it, and we believe it is practicable and we are going to have it, and now we have it. I think if we take the attitude toward this matter that it is impracticable and look for difficulties only, that is where we will lead up to; if we take an equally good look to see how it can be done as well as how it cannot be done, I think something will come out of it.

Now, you raised an objection—there have been other objections raised this morning—but this one that Dr. Birchard raised this morning is one that I didn't think of. That is, what are you going to do with wheat which, under the present system, will go into One, Two, and Three Northern, but which lacks protein; what are you going to do with it under this proposed system? It lacks protein to get into anything, and yet it is sound wheat, and it does not do to put it in with badly frosted wheat. Now, there is a real difficulty. I think it is best to look at it to see if there is not some solution. There is an objection to multiplying the grades; but isn't it worth while if it might make one more grade. Now, wouldn't it solve the difficulty if you took that Number One—I do not think there would be much Number One—if there is considerable wheat that is lower than 12 per cent protein, coming down to 9, 10, and 11 which is going now into Number One. That is a condemnation of our present system. But it will be Two and Three wheat now that will be under 12 per cent protein. What are you going to do? It is a practical question. Could not a new grade be created?

Dr. BIRCHARD: It will be absolutely necessary, I think, to create another grade to take care of that wheat.

Mr. MILLAR: I would like to press one point. Is it not a fact at present that wheat that is going into Number Three at one time in its existence, before it was subjected to rain, would have graded a One, and under a test it has been proved that it has not been damaged? Therefore, it has been dropped two grades without anything to warrant it whatever. That means a loss in that particular car of say, 1,600 bushels or \$400. Now, that is taking place right now. Is that not true?

Dr. BIRCHARD: Yes, I think so. I think that is true. On the other hand, I would point out that it is not necessary to make a protein test to get around that difficulty. These are hard vitreous kernels still, although the bran coating has been discoloured. All that is necessary is to cut them across and you will notice the difference between them and starchy kernels or piebald wheat.

Mr. MILLAR: Under the present Act would the Inspection department be permitted to grade it up to a one or two, because they feel that it is worth that? There is the wording of the Act. Are they not compelled to put it into two. Of course, I feel it is not fair to question you on that. It takes you out of your own field.

Dr. BIRCHARD: I am not sure for the moment what the Act says about colour. You can change the Act much easier than you can change the whole system of Grading. I am not saying you should change it: I am simply pointing out a fact.

Mr. COOTE: Have you any idea for what percentage of our wheat would really be graded down? Taking one year with another?

Dr. BIRCHARD: I do not think I could answer that question.

[Dr. F. J. Birchard.]

Mr. COOTE: What proportion of our wheat grades relatively good as far as protein is concerned?

Dr. BIRCHARD: Three or four years ago 90 per cent of our wheat graded No. 1, 2 and three Northern. Most of that wheat graded One Northern. Now this year we have practically no One Northern.

Mr. COOTE: What percentage of that one, two and three in that year would you call a good protein content wheat?

Dr. BIRCHARD: Most of that wheat was high protein.

Mr. COOTE: There would be a small percentage that would be discriminated against—

Dr. BIRCHARD: Discriminated against if it were put into a three.

Mr. COOTE: That would not measure up to a pretty good protein content?

Dr. BIRCHARD: I think I can say that nearly all of that wheat was of fair protein content.

Mr. COOTE: I suppose the certificate does not show whether it is from north of Edmonton?

Dr. BIRCHARD: No, sir.

Mr. COOTE: The wheat coming from that district would be low protein content?

Dr. BIRCHARD: Yes, I think so—nearly always.

Mr. COOTE: If there was a definite protein content stated in our standard grades that wheat probably could not enter?

Dr. BIRCHARD: Under our present system all that wheat grades No. 3 Northern. It grades No. 3 not because of its protein content, but because it is sound wheat of the required weight per bushel. For certain purposes this wheat is valuable. It is not good for bread making, but is good for biscuits, for instance.

Mr. COOTE: If we had a protein content stated in the Act, probably it could not even be a three?

Dr. BIRCHARD: No, it would have to be put in a Special No. 4, for sound grain of low protein.

Mr. ROSS: It is not three, is it?

Dr. BIRCHARD: It is sound wheat. There is nothing between a Three and a Four, and a Four means damaged wheat. That is the reason for No. Four. But you cannot put sound wheat with No. Four.

Mr. COOTE: I desire to get from you if I can an idea of what percentage of the total wheat crop of the prairie provinces would fall into that class?

Dr. BIRCHARD: Into One and Two?

Mr. COOTE: And Three—that would have to be given a different grade if you set a protein content in the definitions of the grades?

Dr. BIRCHARD: I do not think I can answer that just now. That would depend upon the protein content which is set for each grade, and I do not know what is proposed. I do not know what we would do. I do not know what system it is thought would work out best; whether to change the protein content from year to year on account of climatic conditions, or to set a definite fixed protein amount unvaried from year to year. The answer, I think, would depend upon the decision which was made.

The ACTING CHAIRMAN: Would it be practicable to have a double standard; maintain the grades and in addition to indicate the protein content? Would that be an unnecessary complication?

[Dr. F. J. Birchard.]

Dr. BIRCHARD: My suggestion is this: Inasmuch as the protein content is certainly a valuable factor, and inasmuch as premiums are now being paid, and have been paid for a number of years, for high protein wheat—there are men whose business it is to divert this wheat to particular elevators where it is specially binned, or sent to the mills—it would appear only just that the producer of this high grade wheat should obtain a premium for it. In the past he has obtained but little advantage.

Mr. MILLAR: Would you just follow that up? What would be the reflex action on wheat breeding, and the number of varieties of wheat that are being grown in the country that are of poor milling value? Would not that be checked, possibly, to some extent?

Dr. BIRCHARD: I do not know that I could answer that question. If you would leave that for the Experimental Farm experts I think it would be better. It seems to me that something could be done to reflect back to the producer some of this extra value paid for high protein wheat. And if we had the system which now prevails, and in addition an exact statement of the protein content of that particular car of wheat, then I think the commission merchant to whom that car is consigned should be able to obtain for the producer some premium in accordance with the amount of protein in the wheat.

The ACTING CHAIRMAN: We will grant he can do that if he is dealing with a mill that is using that. The difficulty is whether that system can be applied to the great bulk of our wheat trade. It is an export trade.

Dr. BIRCHARD: Yes, that is the great difficulty. I think I am right, however, in saying that at the present time a certain amount of high protein wheat is being binned. Now would it not be possible for the Wheat Pools to make an experiment. Let them buy a cargo of high protein wheat and find out if, as a matter of fact, there is a market in England or elsewhere for this high protein wheat, and if the extra premium paid would be commensurate with the extra cost of selecting, specially binning, and the other expense involved in keeping the wheat intact.

Mr. DONNELLY: It is quite hard if they have to retain the identity of their wheat.

Dr. BIRCHARD: I understand a certain amount is done at the present time. Now that the facilities at Buffalo are available there is no inherent reason why it could not be done.

Mr. FANSHER: It could be handled through Quebec and St. John.

Dr. BIRCHARD: It could be handled through Quebec and St. John. To what extent the English buyer would be willing to pay the extra premium I am not sure. In conversation with them some years ago I didn't find much inclination to pay very much more. They didn't seem to take very kindly to the idea at all. They seemed to think they would be paying something for nothing. I think it should be tried out first and then if it were found that there was a market, and a growing demand for specially selected high protein wheat, we might go further and make the protein content a definite factor in the grade, if it were found feasible to do so.

Mr. FANSHER: You said a moment ago that there were certain men in Winnipeg who picked up cars and diverted them. Are they doing that by testing or do they know from the district from which it comes?

Dr. BIRCHARD: A combination of ways, I believe. A man becomes expert after a time so that in a great many cases he can form a very good judgment as to whether any particular sample is high in protein or not. And if he knows the district it comes from, that is an additional help, and then he confirms his judgment from time to time by an actual test.

Mr. MILLAR: You said a moment ago, Doctor, that you did not find any strong inclination in Great Britain for buying wheat on its protein quality?

Dr. BIRCHARD: Yes, on its protein content. That was in 1920. Our wheat at that time was considerably higher in protein I think, than it has been lately. There may have been a decided change in their viewpoint since that time.

Mr. MILLAR: Dean Rutherford was over there some time ago. But I would like to stress this point. Too much stress has been laid in the past on the fact that the British buyer is satisfied with our system of grading wheat. I know that is true, but too much stress is laid on that fact. The question is, should the seller be satisfied? From the buyers' standpoint he is certainly satisfied. He is getting uniform quality of wheat. That is important to him.

Hon. Mr. MALCOLM: Are you sure of your statement that he is; that your British buyer is satisfied? He has been in the past.

Mr. MILLAR: A few years ago he was entirely satisfied. I will not say he is entirely so now, but a few years ago he was satisfied. The point I want to make is this. I want to stress this. As long as the buyer gets what he wants at the price he wants, he is satisfied. If I buy a horse, a good horse, and I get it for one hundred dollars, I would be naturally satisfied if the horse were worth one hundred and fifty dollars. The question is: Are the sellers all satisfied?

Mr. ROSS: The British importer of wheat is paying what the wheat is worth. He is buying; but that does not say that that man who originally grew that wheat is getting the price. He is not selling the same wheat that the British buyer is buying. There is a difference between the wheat bought by the British importer and the wheat sold to the country elevator in Western Canada. That is the place where we want to get some system of grading whereby the man who has sold a better grade of grain than the British importer is buying gets the premium for it.

Dr. BIRCHARD: Would not my suggestion meet that objection?

Mr. ROSS: I think it would go a long way. Under our present system a man goes into a country elevator with high protein wheat, low moisture wheat, wheat of sixty-five pounds to the bushel. The British miller never gets that; he never gets the wheat in that shape. He gets wheat sixty pounds to the bushel, perhaps, somewhat lower in protein content, because it has been mixed with other wheats of a lower content and a higher moisture content, because it has been brought up to 14.4, and that is the basis on which that Canadian wheat is bought—on sixty pounds to the bushel, 14.4 per cent moisture, and no real protein content set. That comes back to this country. One Northern is bid for on the Liverpool market on that basis. But I go into a country elevator and sell wheat that is much more valuable to the British miller than that. He never sees that. The important stress is on the price he pays for sixty pounds to the bushel, 14.4, and lower protein wheat. Our endeavour is to try to get back to the man who grows that superior wheat the value for it.

The ACTING CHAIRMAN: The Minister of Trade and Commerce is here and the Committee would like to hear a few remarks from him on the subject.

Hon. Mr. MALCOLM: Mr. Chairman, I am sorry I was not here when Dr. Birchard was giving his evidence at first. I wanted to hear Dr. Birchard because there are some angles to this question which affect us all. The Department of Trade and Commerce, and we as Members of Parliament, are first interested in getting the greatest total value for the crop. It has been represented to us by those in favour of mixing, and I think probably by pool representatives, that the sum total received for the Canadian crop, was greater by

[Dr. F. J. Birchard.]

virtue of mixing than by selling on straight grades. I have never been associated with the grain business, but I know in a general way the problems that confront the committee. As I see the problem of mixing, it is comparable to a man who is selling commodities at certain fixed convenient prices, say 50 cents, 75 cents and \$1. The article may be worth 62½ cents and if, because it was not worth 75 cents he had to take 50 cents, he would be the loser. The article might be worth between 75 cents and \$1 and if he had to take 75 cents, he would also be a loser. Perhaps the trouble with grades is that you cannot have enough to cover the whole price range. The men in favour of mixing, state that putting a lower grade with a higher grade, makes the average required by the price. I think this is generally true. Therefore, they argue that by mixing, the sum total to the Dominion of Canada is greater.

Now, we are also facing the other trouble which Mr. Ross has pointed out, that although some farmer in Saskatchewan might grow high protein content wheat, he would not receive his full value because his wheat was used to step up some lower grade wheat. In other words, even though the sum total received for the crop is greater by mixing, there is not a proper distribution among the growers, of the money so received.

The Committee is trying to deal with the allocation of the returns from the crop and the question of protein content is before the Committee as one of the factors in deciding this point. I would like to ask Dr. Birchard if he has reviewed the article by Miss Cora Hinds, the correspondent for the Winnipeg Free Press. She has written on the dissatisfaction existing among the buyers on the Liverpool market, with our present grading system. I think the Committee would be well advised to have the chief Grain Inspector as a witness. The dissatisfaction is probably founded on the fact that we are getting more for our wheat and it may be that there is not so much spread on which the British importer can trade and make a profit. The dissatisfaction which exists in Britain may be evidence that at the present time they are paying full price for the grades received. I do not know whether it is true or not, but the statement is made in Liverpool that the protein content of our wheat has been steadily declining, due to the exhaustion of the soil.

Dr. BIRCHARD: That is partly true.

Hon. Mr. MALCOLM: The Liverpool trader says that Canadian wheat to-day is not as valuable to him as it was. When he says "valuable" I think he means "profitable." When he says that Canadian wheat is not valuable and means profitable, it may be that it is more profitable to us.

The ACTING CHAIRMAN: It might mean that the broker is operating on a smaller margin.

Hon. Mr. MALCOLM: The Liverpool broker has said some rather sharp things during the past few months. We sent the Chief Inspector to Liverpool this year and I rather think he would confirm the general impression which Miss Hind has advanced, that the British broker is not quite so satisfied as he used to be. The Liverpool market has a sample room with various parcels of wheat sampled on the table, and the miller selects a parcel for his particular use and pays full value for it. I believe under this system, the Liverpool merchant takes full advantage and gets a good price for the high protein content wheat and that on certain parcels he makes considerable money. I think at the present time, the broker is finding a good deal of difficulty in getting the old spread—therefore the dissatisfaction.

Whether the method of mixing wheat is good or bad, I do not know, but it seems to me that even admitting the problem of distributing the returns, the sum total is greater than it would be under a grading system. I admit that it may not be fair to the individual grower of premium grade wheat. I will make this statement, based on my experience in the Department for fifteen months.

[Dr. F. J. Birchard.]

that by prohibiting mixing, we may be stopping profitable means of getting the greatest sum total for our crop. If we allow mixing, then we have the other problem of how to better distribute the money to the grower. There would have to be a different basis than the present grading system provides. I think the Committee should first decide on whether mixing is to be permitted and then devote itself to considering a new system of reimbursing the man with the premium wheat.

The Department of Trade and Commerce is interested in the total volume of our exports. What I would like to get from Dr. Birchard is his opinion on whether we are going to gain by introducing the protein factor in the grading of our wheat, assuming that the Liverpool statement is correct, that with the exhaustion of the soil the protein content is declining rather than increasing. The problems that seem to affect us at the present time, are the multiplicity of grades and the new varieties of wheat, the exhaustion of the soil bringing about a slowly lowering protein content.

Mr. MILLAR: Is it not just possible that the blame for the deterioration of our wheat that should really be placed on the mixing elevators, is being placed on the farmers?

Hon. Mr. MALCOLM: That is quite possible, but I am speaking of the criticisms that seem to be made against our wheat on the Liverpool market. Too many kinds of wheat and the gradual lowering of protein content. I think first, we have to assume that there is some foundation for the statements and ask ourselves, is there a lowering of protein content? Is it possible to check it? Is it possible, through fertilization of the soil or by some other method, to step up the protein content? Can it be done by educating the grower? We know we have a higher protein content in Saskatchewan than in Manitoba.

Dr. BIRCHARD: That is correct.

Hon. Mr. MALCOLM: If the soil in Saskatchewan is being gradually exhausted and will in ten years be comparable with the soil in Manitoba, are we wise in grading protein? I think we, as Members of Parliament have to consider the total value of the crop and not introduce a factor that might be detrimental. I would like to have Dr. Birchard's views on whether there is a danger in using the protein content in grading.

Dr. BIRCHARD: As I understand it, the situation is this: Grading according to the protein content is a more exact way of doing what we are trying to do at the present time. We say, for instance, that No. One Northern must contain sixty per cent of hard red vitreous kernels. That is one way of saying it must have a high percentage of protein. That is the rough way we have at present of expressing it. We have no other means at present. When we had Red Fife almost exclusively we didn't have the same variations in protein value that we have now. There is a need for defining the grade more exactly—What it is now proposed to do is to do what we have been endeavouring to do in the past, but to do it more accurately.

Mr. DONNELLY: Dr. Birchard, would you say that different varieties of wheat have different amounts of protein content? For example, it was said that Reward wheat had been known to have 22 per cent.

Dr. BIRCHARD: I have seen that reported.

Mr. DONNELLY: If you put a premium on high protein content our farmers will grow the valuable wheat such as Reward which is high in protein content, and it will have the tendency to cause farmers to grow that wheat.

Dr. BIRCHARD: As I see it, the object is to extend the area by introducing early maturing varieties, and varieties less susceptible to rust. That has been the endeavour in the past, and it is a great problem.

[Dr. F. J. Birchard.]

Mr. FANSHER: There is another point, that the farmers will receive remuneration. It is possible to restore nutrition to the soil, but it makes the cost of the production of wheat considerably greater until the soil is restored. If this grading system could be worked out, I am sure it would bring back a large percentage of the ground that we have lost in that particular regard. I have been at it for years, and I know it will do this; but it costs slightly more.

Mr. McMILLAN: It must be followed if we are going to keep up the fertility of the soil. It is not only the experimental stations that are proceeding in such a way. That is following the system of rotation. It would be very interesting to get their samples from year to year and compare them with samples where they are growing wheat year in and year out. Take the Rothamsted farm in England. Their soil gives as good a quality and a higher yield than forty years ago, simply by following a proper system of rotation.

Hon. Mr. MALCOLM: There are two points to consider. As I see them, one is the question of policy, and the other is the question of the return to the individual grower. Now, if the policy which Mr. Millar suggests and which Dr. Donnelly refers to of making protein the important factor will induce the farmer to grow wheat of a higher protein factor—if that policy will result in a greater total return for the yield, I do not believe the distribution of the money received will be a difficult problem to work out. But, so many men in discussing this big problem are starting at the back end of the vehicle and trying to get for the individual grower a more fair return without considering the total return that is going to be gained for the crop. The individual return will be higher if the total return is considered first. I would like the committee to make its mind up on the point of by what method can we get the greatest return for our crop on the British market. I do not think there is a shadow of a doubt, gentlemen, that the spread which has existed between what the Dominion of Canada gets for its crop and what the buyer pays on the British market is very much narrower than ten years ago, and I think that as the result of that narrower spread the British merchants are kicking because they are not making as much money.

The ACTING CHAIRMAN: Is the miller who actually uses that wheat dissatisfied?

Hon. Mr. MALCOLM: No.

The ACTING CHAIRMAN: We can understand the dealer because he is operating on a narrower spread.

Hon. Mr. MALCOLM: The miller is saying this, Mr. Brown; that the protein content of the Canadian wheat is slightly deteriorated. He is not so discontented with the Canadian wheat he is getting. It is the trade in Liverpool that is doing the kicking at the present time.

Mr. DONNELLY: We had Dr. Birchard here chiefly to tell us about the testing of wheat for protein content and how it could be best done, but the marketing end, and how it was to be handled, was to be taken up at our next meeting, next week.

Hon. Mr. MALCOLM: I introduced this subject for a specific reason. The Doctor knows very well from all his experiments what we have to do with regard to finding the protein content in wheat; but what I am anxious to have the Doctor clear up in my mind is this: Even though we find out all the ways possible of arriving at the protein content, that is all waste effort providing the protein value is going to be gradually lowered. What I am wondering about is the statement on the Liverpool market, that the protein content is going down. We do not want to make as a basis for a larger return for our wheat, something which is going to disappear.

Mr. Ross: There is another point. It might be possible for us to have our laboratory in Winnipeg make tests for anybody that wanted them made on the

protein content; but that does not go far enough. There is another question which comes up, and it is this: under the present system of handling grain, the grain cannot be followed through by the man who is buying the grain. For instance, the wheat pool will buy wheat and only have control of that wheat until it passes Fort William. Suppose that the pool or some grain company wanted to pay a premium for that high protein wheat, they cannot do it under our present system because when their wheat has gone forward to Fort William or Buffalo that actual wheat is not turned back to them in a great many cases, but wheat of that grade is turned back. That is one point this committee has to settle before it is finished with its business on grading. If it is bought on the percentage of protein in Winnipeg and if you put the protein content of the certificate to-day, and if the man cannot follow it outside of Fort William, the only man who gets the benefit is the miller.

Mr. DONNELLY: We know that the wheat pool has been trying to keep the identity of its wheat going to the old country, but they have had difficulty.

The ACTING CHAIRMAN: The difficulty in my mind has been whether this system, perfectly applicable in Minneapolis where they deal direct with the miller, can be applied to the export trade.

Mr. Ross: Absolutely, it can. The trouble is this: The grain selling system in Canada has been built up primarily by the men who are selling grain. They are the people most interested. They are the people who don't care whether we get more money back through our high protein or not. All they are interested in—

Hon. Mr. MALCOLM: When you say "we," I think you are wrong. When you say "we," as the Dominion of Canada, you are wrong.

Mr. Ross: I do not mean as the Dominion of Canada; I mean the producer.

Hon. Mr. MALCOLM: The trade do, undoubtedly, retain the identity of high grade parcels and get the benefit on the Liverpool market.

Mr. Ross: The Trade does that and the Trade gets back to Canada the larger percentage of the money for the crop. I will admit that comes back to Canada; but it does not come back to the producer.

Hon. Mr. MALCOLM: There are the two angles.

The ACTING CHAIRMAN: If you look at that map (the map shown by Dr. Birchard) you will see that "we" includes the man with the yellow stuff; it means the man with the high and the man with the low protein; the man with the high grade wheat as well as the man with the low grade.

Mr. Ross: I have yet to have it proved to me, Mr. Chairman, that the man with the low protein wheat is ever paid too much money under this present system. When you prove that to me I will say there is some merit to the present system.

Hon. Mr. MALCOLM: Of course, under the pool he must receive some benefit. I do not see, Mr. Ross, how you can contend that for the simple reason that sixty per cent of Canada's crop which is marketed is the pool product.

Mr. DONNELLY: It does not all go through the pool elevators.

Hon. Mr. MALCOLM: The sum total must be greater. If the sum total is greater, and the man with the high content gets less than the man with the lower content must get more.

Mr. Ross: Yes, Mr. Minister, but the pool to-day, under the present system, cannot turn out any better grade of wheat at Fort William than the line elevators turn out. It must be the same. Supposing they wanted to put a better grade on the Liverpool market, they cannot do it, because the moment it goes out to Montreal some man in the organized grain trade will get that grain and the other man will get the lower one.

[Dr. F. J. Birchard.]

HOUSE OF COMMONS,

THURSDAY, March 22, 1928.

The Select Standing Committee on Agriculture and Colonization met at 11 o'clock, and proceeded with the consideration of grain grading.

Dr. F. J. Birchard, Chief Chemist, Board of Grain Commissioners for Canada, and Mr. J. D. Fraser, Chief Grain Inspector, Board of Grain Commissioners for Canada, both of Winnipeg, were present, and were questioned by the members of the Committee.

Mr. Fred. Kay, Chairman of the Committee, presided.

Mr. MILLAR: Mr. Chairman, before we call witnesses, I may say that while I was unavoidably absent at the last meeting, I believe something was done with respect to Tuesday and Friday; that Friday should be taken for Immigration. Well, we have here the Chief Inspector and some members of the Board of Grain Commissioners, and Dr. Birchard, who has been here for some time, and I was very anxious to see us get along with my resolution so that we could let some of these gentlemen get back. I have spoken to quite a number of those interested in Immigration, and nobody seems to have raised any particular objection, and Mr. Guthrie suggested that I see Mr. Cahan. I phoned Mr. Cahan at the Chateau but was not able to get him. I would like to ask that since we are holding these men here, and we might possibly get through with these men entirely, as far as evidence taking was concerned, we might get through to-morrow. Any way I think we could get through with Dr. Birchard. We have had him on the stand. I would ask the Committee to consider that and let us have Friday for the grain trade. We could go on, I think, sitting on Monday, and possibly get through with this work entirely, and then Immigration could go on.

Mr. TOTZKE: There are witnesses called for to-morrow for Immigration.

The CHAIRMAN: The witnesses could be advised that they are not required, if the Committee so desire. They are only from Montreal, and we can let them know to-day.

Hon. Mr. MOTHERWELL: I think Mr. Millar's suggestion is a sensible one. These witnesses are here from their business. We might as well finish up. I think it can be done in two days; and I think it would be agreeable to those interested in Immigration, as well.

Mr. MCGIBBON: I think Mr. Millar's request is a very reasonable one, and I think it should be granted.

Carried.

Mr. MILLAR: The members of the Committee have been very fair. Now, I am going to make another suggestion. We have been discussing the resolution that has been referred to this Committee, and there is the danger, when we have the witnesses on the stand, that we will drift off to other subjects. In fact, the suggestion has been made that Dr. Birchard, while he is giving his evidence, in an entirely unbiased state of mind, it might be better in connection with the protein matter to go on with that instead of on the grading system that leads us off the matter. I have given considerable thought to this matter, and I am quite convinced, after considering it before the Committee,

if we find that the difficulties are great, we may find that the chances of benefit are perhaps just as great too. Now, the point I want to get at is this, that it leads us away from the definite subject matter under discussion, and in a little while we would be in a maze, and we would not be even able to make a suggestion whether this is practicable or not. I would like to ask that the inquiry be confined to this matter alone until we get through; after that, I believe that the members of the Committee are anxious to take up the whole grading system. But I believe we will make greater headway, and we will be more likely to make a definite pronouncement and a definite investigation if we confine ourselves entirely to this matter.

Hon. Mr. MOTHERWELL: You want to start with Dr. Birchard first?

Mr. MILLAR: I wish to clear up one question before calling the chief inspector.

Mr. CAMPBELL: Mr. Chairman, it seems to me that the essential part is to discuss the advisability of making the protein quantity a basis for grading, and I would rather agree with the member for Qu'Appelle that this is something that should be kept in mind; because that is the exact reference before the Committee.

Mr. COOTE: Well, Mr. Chairman, Mr. Millar simply made a suggestion, and possibly the members of the Committee will have that under consideration when they are putting their questions to the witnesses; but I do not think the members of the Committee can be limited in any way in putting their questions, except by the order of reference.

Mr. MILLAR: It is only so that we will not get entirely drawn away from the matter.

The CHAIRMAN: I would suggest that Mr. Millar is reasonable, and that the members should bear in mind the reference that we are working under.

Mr. COOTE: I would like to say that in so far as I am concerned, I want to see the whole question of grading and inspection of wheat discussed as thoroughly as this particular point.

Mr. MILLAR: So do I.

The CHAIRMAN: Of course, when the members are addressing questions to the witnesses it is well to bear in mind the office or profession of the witnesses we may be examining. Sometimes we are liable to ask a question of one witness that should be asked of someone else. We have with us this morning, Mr. Fraser, the Chief Grain Inspector of the Board of Grain Commissioners; but just before we call Mr. Fraser, I think we should decide when we will go on with the matter of immigration. Will it be next Tuesday?

Mr. BROWN: If we meet here to-morrow, would it not be time enough to make that decision to-morrow?

Mr. MILLAR: We could tell better at the end of this meeting.

Hon. Mr. MOTHERWELL: We could complete the agricultural end of this matter.

Mr. BROWN: It seems to me to be a foolish method of procedure to be turning from one to the other.

The CHAIRMAN: That arises from the fact that we have a dual reference. We are supposed to be carrying on two independent inquiries, and neither of the groups interested in the different subjects seem to wish to give way altogether. We have been trying to carry on both together. We can leave the question until to-morrow.

Mr. MILLAR: Before we call Mr. Fraser, could I have Dr. Birchard answer one question?

Dr. F. J. BIRCHARD, Chief Chemist, Board of Grain Commissioners, takes the stand.

Mr. COOTE: We take it for granted that the doctor will be here for another meeting, and if there are any questions we want to ask him we will have an opportunity?

Mr. MILLAR: Doctor, in your evidence of a previous day the question was asked by Mr. Donnelly: "How many do you think it would take?" That is, how many of a staff would be required to make those protein tests at Winnipeg? The doctor's answer is: "How many men? I think we would have to have two supervising chemists, probably, with perhaps six assistants, then a dozen other men or more who would be somewhat above the class of a labourer, and then perhaps thirty men or even more perhaps of the class of a labourer. Now, we would also want a large number of stenographers and clerks to make the records and to make the reports out in time. It could be done very much cheaper if it were not for the fact that the work has to be done so quickly." That is the answer I take exception to. Now, in the doctor's own evidence before the Royal Grain Inquiry Commission, and, also, through an authority in the United States, this is given: "In the laboratory. . . ." I do not know whether I should use the name. Some of these men have requested that what was said was not for publication; but it is a chemist in the Kansas City laboratory.

Mr. YOUNG (Saskatoon): I do not know whether Mr. Millar intends to give rebuttal evidence or not; or if Dr. Birchard intends to give evidence; but he has given what he wants to give, and I think the committee should hear it. If Mr. Millar wants to give evidence, we should hear him, and if Dr. Birchard wishes to revise his own evidence I think that it is quite in order; but I doubt very much if it is in order to bring in rebuttal evidence in this particular way. I do not think it would advance the committee's work very much. I think if Dr. Birchard gives what evidence he wants we should hear it, and if Mr. Millar wants to give rebuttal evidence in a little while, later on we could hear that.

Mr. MILLAR: That is, I would be shut off from asking a question?

The CHAIRMAN: Dr. Birchard found that his evidence was printed without his revising the manuscript, and there were several errors in it. He has revised the manuscript, and yesterday we decided to have the address reprinted, so that it would be possibly just as well, Mr. Millar, to keep your question until the reprint has been published. This, I understand, was a mistake—this particular answer?

Mr. MILLAR: No, I think not. This could not possibly be all a mistake, and I was going to ask the doctor, after thinking the matter over, what would be his answer to this question that was given? I think it is quite proper I should have it straightened out as soon as possible. The number given here is two chemists, two helpers, one clerk; making a staff of six, and they can make four hundred tests in ten hours.

Dr. BIRCHARD: I am sorry; will you repeat the question?

Mr. MILLAR: How do you square your answer given the other day with your own former statements given before the Royal Grain Inquiry Commission, and the statement I have just read—the information just read given by a chemist in the Kansas City laboratory where they are doing this work? There is a great discrepancy; how do you explain that discrepancy?

[Dr. F. J. Birchard.]

Dr. BIRCHARD: I think the situation at Kansas and at Winnipeg can hardly be compared. The great difficulty as I see it in this case is the extreme rapidity with which the tests have to be carried out. If we were suddenly called upon to make twenty-five hundred tests in twenty-four hours, I do not think we could make those tests in time to meet Mr. Fraser's requirements with a less staff than I have indicated. Now, it is possible that I may have over-estimated; but at the same time I would not like to take the responsibility of giving these tests out between the hours of nine o'clock in the morning and five o'clock in the afternoon with a staff very much smaller than what I have mentioned. I may say that I have here a more detailed statement that I made for the Board of Grain Commissioners. I estimated, at that time, on the basis of fifteen hundred tests in the day time and one thousand tests at night. I would require sixteen wheat grinders, ten during the day and six during the night; sixteen weighmen, ten during the day and six at night; thirty titrating technicians, eighteen during the day and twelve at night; two supervising chemists; five assistant chemists; three boys during the day and two at night; six cleaners and five helpers. I also have an additional statement of what permanent staff I consider necessary: two chemists at perhaps \$3,000 per annum, five chemists at \$2,000 per annum, two cleaners, two clerks and two typists. That staff I do not think could be dispensed with. The remainder would be more of the type of labourers that could be obtained whenever necessary and laid off whenever unnecessary.

Mr. COOTE: Dr. Birchard stated that he had made a report on this to the Board of Grain Commissioners, and I was going to ask whether that might not be incorporated in our minutes for our benefit. We could peruse it then without taking the time of the members.

The CHAIRMAN: Have you that?

Dr. BIRCHARD: Yes, I could give that.

The CHAIRMAN: I will inquire of the Board, and, if they have no objection, have it incorporated. Thank you, doctor. (*See production at page 176 post.*)

Mr. J. D. FRASER, Chief Grain Inspector of the Board of Grain Commissioners, called:—

The CHAIRMAN: I do not think Mr. Fraser needs any introduction to the committee. He is well known to the members of the committee present. He is the Chief Inspector of the Board of Grain Commissioners. Are you going to make an address to us, Mr. Fraser?

Mr. FRASER: Well, I received a wire asking me to report to this committee in connection with protein. Now, as far as my knowledge goes, I know very little about protein, but I would be very glad to answer any questions, if I am able to do so, that any of the members wish to ask. I have never made any protein tests myself, and any information I have gained is by reading articles on it; and that is very limited. I understand protein is a very important factor in wheat.

Mr. COOTE: Mr. Chairman, I thought possibly you were waiting for some question. I think it would be very beneficial to members of the committee if Mr. Fraser, in a very few minutes, could give us the basis on which they grade wheat at the present time. I think that would then very well lead to the question of whether we could include the use of protein content as a basic factor in the grading?

Mr. FRASER: Well, wheat, at the present time, of course, is graded according to variety, in the first place; that is the main factor. The variety has to be considered first, and then the class in which that variety may be placed. A

[Dr. F. J. Birchard.]

sample of wheat is judged by the deputy inspector or inspectors on its soundness, after the variety, and on its colour and weight per bushel. If a sample is sound, red and weighs sufficient for One Northern wheat, it may be graded One Northern.

Mr. YOUNG (Weyburn): What do you mean by "sound"?

Mr. FRASER: I mean well matured wheat, not damaged by frost or hail or saw-fly, rust or things of that kind.

Mr. YOUNG (Weyburn): You say "damaged by hail". Wheat has been struck by hail and a little dent is made in it; is that damaged?

Mr. FRASER: It depends on the size of the dent. If it is very small and is hard to detect, I would not call it damaged. If it is dented so that the kernel is half the size it should be, it is certainly damaged.

Mr. YOUNG (Weyburn): It is a little out of shape?

Mr. FRASER: Yes, it is a little out of shape, and the amount of flour is no doubt affected by it.

Mr. MILLAR: Is Yellow Berry damaged?

Mr. FRASER: That is what we call starchy wheat. No, I would say no. That is mature wheat, although it may be starchy.

Mr. COOTE: Next will you tell us how you decide between One, and Two and Two and Three?

Mr. FRASER: Two Northern? Of course, variety has to be considered first. It has to be wheat of a variety to be placed in Two Northern. I mean it should be Marquis or wheat of equal quality. You could not put Durum wheat with it.

Mr. DONNELLY: What percentage have you to have in it in grading hard, red, spring wheat?

Mr. FRASER: Two Northern requires to be wheat of the hard, red, spring varieties.

Mr. DONNELLY: What percentage?

Mr. FRASER: The definition does not really cover that. It says 45 per cent of hard, red, vitreous kernels; the balance might be of red varieties, and might be soft and starchy.

Mr. COOTE: It is left to the judgment of the inspector what percentage of each variety might be required?

Mr. FRASER: We would not put Durum wheats in to that or we would not put Kota wheat with One or Two Northern wheat.

Mr. COOTE: Would you put Preston, Stanley or Huron?

Mr. FRASER: Yes, Preston, Stanley or Huron would go in as Two Northern.

Hon. Mr. MOTHERWELL: Into Two or One?

Mr. FRASER: Into Two Northern; not into One.

Mr. COOTE: Would you go on and give us a little idea as to how Two is distinguished from Three?

Mr. MILLAR: Before you leave that point. In the case of dried wheat. You are the man; and it is according to your discretion as to whether it goes into a straight grade or not?

Mr. FRASER: Yes.

Mr. MILLER: On what basis do you decide the value of that dried wheat?

Mr. FRASER: Well, the general appearance of the dried sample determines whether it is placed, for instance, in One Northern or Two Northern, or as dried to the grade.

[Mr. J. D. Fraser.]

Mr. MILLAR: How would you describe the general appearance of the grain that you would consider really damaged?

Mr. FRASER: That is in connection with "dried"?

Mr. MILLAR: Yes, dried wheat?

Mr. FRASER: First, One Northern containing, say, fifteen per cent of moisture can be dried where the colour is not very badly affected—if it is not badly affected; that is, only slightly bleached in the drying. There is no reason why it might not be placed in the straight One Northern; but if it is dried so that the colour disappeared and if it is heavily bleached, then I would consider that that is damaged wheat and could not be graded as straight One Northern.

Mr. MILLAR: Is that arrived at and decided in a general way, or can you by the appearance actually tell whether damage has been done or not, without a milling and baking test?

Mr. FRASER: Why no; you cannot actually tell.

Mr. MILLAR: Is it the wetting or drying that deteriorates?

Mr. FRASER: It is the drying that removes the colour.

Mr. VALLANCE: Then, is the colour a factor really in the milling of wheat?

Mr. FRASER: The danger point is this, that the wheat has been affected in the drying, either in the field or in the artificial drier. Wheat that has had extensive rains on it and contains a high percentage of moisture is dried in the field and has, maybe, started to germinate.

Mr. VALLANCE: It would be degraded because of germination?

Mr. FRASER: Yes. It might not show germination so that you could notice it from the outside, but it would have an effect on the kernel just the same and would show if artificially dried. For instance, wheat comes into Winnipeg. It is put into the drier showing three per cent of sprouts; it comes out showing seven per cent. That means that the sprouts were not showing prior to the drying, but when we put the wheat into the heat the kernel swells up. It breaks the skin; that exposes the sprouts, so that the drying actually exposes four per cent more sprouts than were apparent in the first place.

Mr. CAMPBELL: Does not that depend more on the degree of heat?

Mr. FRASER: I think that would show under any heat because those sprouts are there in the wheat.

Mr. MILLAR: Would you say, Mr. Fraser, that the cargoes that went off-grade—I think Number Three in 1926—that were dried and went over and would not make good bread when they arrive there—would you say that the defect could not be detected by the inspector, and that it was weakness rather in the system of grading than in the work of the inspectors?

Mr. FRASER: You could not detect that by appearance only. The baking, really, is the only test.

Mr. BROWN (Lisgar): The test would be just as far as wheat off colour is concerned; the fact of its being damaged in colour might indicate that germination had begun?

Mr. FRASER: That is the idea. There is another factor. I have placed samples before English millers—quite frequently English millers pay us visits when they are in this country—I have placed before them a sample that has good colour, and sound, and a sample that is bleached, that is, fairly heavily bleached—the only difference between the samples is the bleaching—and they would pick the good coloured sample. They know that the good coloured sample is O.K., they do not know whether the other is or not.

[Mr. J. D. Fraser.]

Mr. CAMPBELL: The point is, it is not necessarily damaged by the off colour of the wheat; it is not necessarily damaged by the bleaching? It may be damaged; but not necessarily so?

Mr. FRASER: That is so; and, especially, light bleaching.

Mr. VALLANCE: That is a point that wants clearing up for those of us who grow wheat and many times it is degraded because of bleaching. The farmers believe that it is the bleaching that is being degraded; that it is not, as Mr. Fraser says, that it would indicate that it was germinating or had germinated—the possibility. The farmer believes to-day that his grain is degraded because it is bleached, and, apparently, from Mr. Fraser's statement it is not because of that at all, but because it would indicate that germination had set in.

Mr. FRASER: Wheat is degraded on account of its being badly bleached?

Mr. VALLANCE: Because farmers believe to-day that grain is being graded, to use a slang expression, "just by a guess and a bygone."

Mr. MILLAR: Because of the limitations of the eye test, is it not a fact that sometimes wheat is degraded and put down to a lower grade because of bleaching, and yet a baking test would show that it has not been damaged.

Mr. FRASER: Yes, I believe that is possible, although we allow slightly bleached wheat into One Northern, and a little heavier bleached wheat into Two. Bleached wheat is not kept out of these higher grades entirely.

Hon. Mr. MOTHERWELL: It is the relative damage?

Mr. FRASER: Yes.

Mr. YOUNG (Weyburn): Didn't you say that Number 2 required 45 per cent of hard, red, kernels under the Act; there is still 55 per cent.

Mr. FRASER: No, it says hard, red, vitreous kernels. A kernel might be slightly bleached and still be hard and vitreous.

Mr. COOTE: It would not be red?

Mr. FRASER: It might not be as red as in the first place. It may have lost a little of the bloom.

Mr. COOTE: Mr. Chairman; Mr. Millar made a suggestion before the committee started to work that we confine ourselves more to the question of the protein content. My questions to Mr. Fraser were directed to him with the idea of getting at the present method that is in use. Then I think we should follow that up, if we see any defect in it, with questions to Mr. Fraser as to whether the present method could not be improved by including the use of the protein content as a factor in grading. Now, we have been led off because Mr. Millar insisted on asking a question on dried grain. I would like to ask that he allow Mr. Fraser to answer the question as to how they differentiate between Number Two and Number Three Northern and then, possibly, we could question him as to the use protein might be in helping him to grade wheat on a more scientific basis.

Mr. CAMPBELL: Do I understand that no variety of wheat is allowed into One Northern unless it has first proved its milling worth? Are there any other varieties of wheat debarred from Number Two for the same reason?

Mr. FRASER: Well, when we take the red, spring wheat varieties, there is nothing barred from Number Three.

Mr. CAMPBELL: Number Two?

Mr. FRASER: Nothing barred there.

Mr. CAMPBELL: What about Stanley and Garnet?

Mr. FRASER: No, that is all graded Number Two when sound enough.

Mr. CAMPBELL: Is not there another one?

[Mr. J. D. Fraser.]

Mr. FRASER: There is Vermillion. That is one of the new kinds.

Mr. CAMPBELL: Any of those debarred from Number Two?

Mr. FRASER: They have not been, but they should be in my opinion.

All these red, spring, varieties are being graded as Two when sound enough.

Mr. CAMPBELL: Why was a definite grade given to Kota?

Mr. FRASER: Kota is of a different texture and nature of wheat. I am not up in the construction of wheat well enough to define that, but it is more of the nature of a Durum.

Mr. DONNELLY: Is it easy to tell?

Mr. FRASER: Yes, unless it is bleached and considerably damaged in the field, when it gets fairly badly bleached, it is difficult sometimes to distinguish it from other varieties of wheat grown in the west.

Mr. BROWN: It would not be hard to distinguish it from Marquis?

Mr. FRASER: No; but some of the other varieties. We have some soft varieties there, and if they get weathered badly it is hard to make a distinction.

Hon. Mr. MOTHERWELL: Is there authority in the Grain Act for establishing a grade for any particular variety?

Mr. FRASER: Yes, our present grades for instance; One Northern requires to be equal with Marquis; that establishes a grade for variety equal to Marquis.

Hon. Mr. MOTHERWELL: I mean Kota. If you have authority for establishing a grade for Kota you might have authority for establishing a grade for anything.

Mr. FRASER: I think so. That could be done.

Hon. Mr. MOTHERWELL: That would be rather inadvisable?

Mr. FRASER: Yes, that would be rather inadvisable.

Mr. COOTE: With regard to the establishment of a grade for Kota; that was done by legislation in Parliament?

Mr. FRASER: Yes.

Mr. DONNELLY: Do I understand you to say that neither One, Two or Three Northern is allowed to contain any Kota or Durum wheat at all?—

Mr. FRASER: One and Two should be free of Kota or Durum. Three Northern may contain a small percentage.

Mr. DONNELLY: What percentage?

Mr. FRASER: Probably two or three per cent, I would say.

Mr. YOUNG (Saskatoon): Mr. Fraser, would you suggest that when this wheat is bleached to a certain point that takes it from Number One to Number Two?

Mr. FRASER: Yes.

Mr. YOUNG (Saskatoon): I would like to ask this question: In your judgment is the milling value of that wheat deteriorated?

Mr. FRASER: Well, of course, that depends I think on whether the wheat has actually been damaged or not in the bleaching. Any heavily bleached wheat in the field may be damaged although that damage may not be apparent to the eye.

Mr. CAMPBELL: Would not that indicate that your system of examining is wrong?

Mr. FRASER: Well, of course, we go according to the Grain Act, or, as nearly as possible.

Mr. YOUNG (Saskatoon): To me this is the real issue in the grading system. If that is just enough to bring it from Number One to Number Two, has that at the same time brought the real value of that wheat from One to Two in your

[Mr. J. D. Fraser.]

judgment for milling purposes? I think the suggestion has been made to me many times that the fact that there is some discolouration in the wheat does not take the real value of the wheat away, and consequently the farmer suffers under the present system of grading?

Mr. FRASER: I do not think there is any question but that there may be cars that are bleached sufficiently to lower it from One to Two that the present grading may be a little stiff on.

Mr. MILLAR: That is putting it rather mildly. I would press it a little further?

Mr. FRASER: I do not know. I haven't made any experiments.

Mr. MILLAR: Sometimes rain affects a field when it is being threshed and the rain bleached it, and it goes into Three. It goes not from One to Two but from One to Three. Now, would not, in your opinion, a baking and milling test show that some of that wheat had not been damaged?

Mr. FRASER: I would imagine, Mr. Millar, that if that wheat was bleached sufficiently to lower it from One to Three that some damage had taken place. There is no doubt if you could cut the kernels of Marquis wheat, before being bleached the kernels would be amber and hard; but cut it after it is badly bleached and the berry is like slack lime. It has more the appearance of starchy, yellow kernels.

Mr. MILLAR: Do you base your answer on actual milling tests?

Mr. FRASER: No, I cannot do that. I do not make any milling tests. I have seen the results of milling tests, of course; but cannot say whether those results were always right, I could not pass my opinion on actual milling tests. I based my opinion on the cutting of these kernels. Cut the kernel of the wheat that was threshed before the rain and cut the kernel of the same wheat after it has been rained on and bleached badly, and there is a difference in the inside of these kernels.

Hon. Mr. MOTHERWELL: One is flinty and the other is partly slack?

Mr. FRASER: One is flinty and the other is partly slack. Some chemical change has taken place. Whether it is sufficient to knock it down from One to Three I am not prepared to say.

Mr. COOTE: Have you made use of the laboratory to determine just how much difference is shown between these grades?

Mr. FRASER: We have had a great many samples tested at the laboratory.

Mr. COOTE: Have you had enough made to determine or enable you to decide how much bleaching should cause a wheat to be thrown from number One to number Two grade?

Mr. FRASER: If it is heavily bleached—one sample may be heavily bleached and not damaged, and the other may be heavily bleached and damaged. I cannot see the difference unless germination is evident.

Mr. COOTE: You grade the wheat largely at the present time on its appearance?

Mr. FRASER: Yes.

Mr. COOTE: First on variety?

Mr. FRASER: Yes.

Mr. COOTE: Then on soundness?

Mr. FRASER: Yes.

Mr. COOTE: Then on the weight per bushel?

Mr. FRASER: Yes.

Mr. COOTE: Then on appearance or colour?

Mr. FRASER: Yes.

Mr. DONNELLY: In reply to a question asked by Mr. Young he said Two Northern must be 45 per cent of hard, red, vitreous kernels. Now, take the other 55 per cent and suppose it is bleached, what then? Does that take it into Two Northern?

Mr. FRASER: Yes, that would take it into Two Northern.

Mr. COOTE: And if the other 55 per cent was yellow berry?

Mr. FRASER: It would still be Two Northern.

Mr. COOTE: Now, if the Committee will allow you, will you tell us how you distinguish between number Two and number Three?

Mr. FRASER: Number Two Northern is wheat equal in variety to Marquis, or may be softer varieties of wheat with a heavier weight and a higher percentage of hard, red, kernels in it. Two Northern may carry some frosted, a small percentage or light frost. It may carry some shrunken, thin and immature kernels. The difference between number Two and number Three would be that the Three Northern will carry a higher percentage of frosted, green, immature and shrunken kernels, and a higher percentage, of course, of starchy, or soft wheat. There is no limit on the amount of hard vitreous kernels that Three requires. We have Three carrying 90 per cent or 95 per cent of starchy wheat. The difference between the Two and Three is the amount of damage that the samples contain.

Mr. YOUNG (Weyburn): Now, when you have a sample of wheat with a few damaged kernels, I understand you refuse to separate it; if there were shrunken, damaged kernels in the sample, rather than take these kernels out as dockage you degrade the whole sample?

Mr. FRASER: It would be impossible to make a separation all the way through.

Mr. YOUNG (Weyburn): You do in the case of noxious weeds?

Mr. FRASER: Weeds are different. You get a kernel absolutely red and sound and a kernel frozen and green, equally as heavy and equally as large, how could you separate them—only by hand.

Mr. YOUNG (Weyburn): I know that in handling the wheat in the country, if there is green, shrunken, damaged kernels, that would come out much easier than wild oats, for instance.

Mr. FRASER: Of course, if you have it shrunken so badly that when you remove the shrunken wheat and weigh it it probably weighs 35 pounds to the bushel, that stuff could be removed by suction or wind; but if you get the kernels plump and damaged by frost or green you cannot make a separation.

Mr. COOTE: Mr. Fraser, does not the Act require that everything that will go through a certain size of screen is dockage?

Mr. FRASER: It requires that we shall use a certain size of screen, but it does not say that anything and everything that goes through that shall be treated as dockage.

Mr. COOTE: Don't you follow the rule?

Mr. FRASER: No, I could not possibly do that on some of this rusted wheat. We clean 25 per cent out of some samples. You cannot treat that as dockage. It is wheat, although it is shrunken.

Mr. COOTE: In wheat of ordinary size that will weigh 60 pounds to the bushel, anything that would go through the screen would be dockage?

Mr. FRASER: Yes, I believe if the wheat weighs 60 pounds to the bushel, any small or broken kernels would be considered dockage.

[Mr. J. D. Fraser.]

Mr. MILLAR: Would it be an advantage to have the protein factor in your grading system to substitute, to take the place to a large extent of the appearance test when it is unreliable in colour? If you could apply the protein test there, would it be an advantage assuming that could be worked out?

Mr. FRASER: I mentioned before that I did not know a great deal about protein, but the little I do know leads me to believe that protein is a factor in the determining of the milling value of wheat, but protein alone does not determine the real milling value of wheat that has any damaged kernels, either shrunken, frozen or immatured kernels.

Mr. MILLAR: In the three higher grades?

Mr. FRASER: Three Northern at times carries fifty to sixty per cent of damaged kernels. Wheat graded Three Northern carrying fifty per cent of slightly frosted kernels—there might be fifty per cent.

Mr. COOTE: Where do you have them?

Mr. FRASER: At all places—Calgary, Winnipeg—

Mr. MILLAR: Slightly frosted?

Mr. FRASER: It has got to be very slight—bran frost.

Mr. COOTE: Visible to the naked eye?

Mr. FRASER: Yes.

Mr. BROWN: Sometimes you get frosted kernels, good and plump that are discoloured?

Mr. FRASER: That is the kind I mean; wheat that has been practically ripe and has had a frost before it has been cut. I have had such cars, of course. I am going the limit on that. I do not say that many cars are graded like that.

Mr. COOTE: A moment ago in stating how Number Two was distinguished from Number Three, you said it was largely determined by the percentage of damaged kernels. I wondered if you could make any statement as to the percentage of damaged kernels that are allowed in either a Two or a Three. That is a question that is most often asked, I think, by the producer?

Mr. FRASER: There is a sack in this room now with standard samples that I sent down here, if a separation was made of that sample you will find that Two Northern has seven or eight per cent of damaged wheat—more or less damaged.

Mr. COOTE: I suppose it depends on the nature of the damage?

Mr. FRASER: Quite a lot.

Mr. COOTE: And the extent?

Mr. FRASER: Yes.

Mr. COOTE: If wheat were determined good, what percentage of green kernels would be left for Number Two?

Mr. FRASER: That is a pretty hard thing to answer. It is pretty hard to put a percentage on it. Two Northern has got to be reasonably sound. Now, what would the term reasonably sound mean? The Act says it must be reasonably sound, I would define reasonably sound something in this manner: A small percentage of lightly frosted, a small percentage of immature and shrunken wheat a total amount that would be not too apparent to the naked eye. It is indicated that it is there; but it is not so apparent that it is obvious.

Mr. COOTE: At a casual glance?

Mr. FRASER: Yes.

Mr. COOTE: Then, Number Three; could you tell us something along the same line as regards Number Three?

[Mr. J. D. Fraser.]

Mr. FRASER: Number Three is an open grade. I have mentioned that Three might in some cases carry as high as fifty per cent of frost. Three often carries twenty, twenty-five and thirty per cent of frozen.

Mr. GARLAND (Bow River): What other damage besides frost?

Mr. FRASER: There is hail damage, hailed wheat, and wheat affected by rust, thin wheat, green rusted wheat down to 57 pounds. Three Northern would run all the way from 57 pounds up to 65 pounds to the bushel. This variation in weight occurs nearly every year.

Mr. COOTE: Now, with regard to the green kernels in Number Three; wheat that is bright and of good colour. I am sure you have seen this type of wheat—nearly all good wheat except a certain percentage of green kernels in it. What percentage would be allowed to get it into Number Three?

Mr. FRASER: You mean the maximum amount that might be allowed into Number Three?

Mr. COOTE: Yes.

Hon. Mr. MOTHERWELL: Does not the Act say that if it is not good enough to go into Two it drops into Three?

Mr. FRASER: Yes, the Act states that. Of course, that would cover the top qualities of Three Northern. The maximum that might go into the Three Northern, would be determined by a comparison with the standard sample of Three Northern.

Mr. MILLAR: You spoke of frosted wheat. Can the protein of frosted wheat be used for mixing purposes?

Mr. FRASER: I could not answer that, I have had no experience along that line.

Mr. MILLAR: That is a matter of chemistry?

Mr. FRASER: That is a matter of chemistry.

Mr. DONNELLY: In standard samples; have you anything to do with setting the standard samples in Winnipeg and Fort William?

Mr. FRASER: Yes. One, Two and Three Northern.

Mr. DONNELLY: One, Two and Three Northern, yes; is there any difference between the standard samples at Winnipeg and Fort William?

Mr. FRASER: Is there any difference between the standard samples at Winnipeg and Fort William?

Mr. DONNELLY: Yes.

Mr. FRASER: A portion of the standards made at Winnipeg is sent to Fort William and to all other inspection points—the same standards.

Mr. COOTE: Does that apply to Calgary and Edmonton?

Mr. FRASER: Yes, the same standards are sent there.

Mr. COOTE: Don't you also send other standards?

Mr. FRASER: Not for One, Two and Three.

Mr. COOTE: What have you to do with the standard samples?

Mr. FRASER: I said I made up One, Two and Three.

Mr. GARLAND (Bow River): Who else is on the Board?

Mr. FRASER: In making up One, Two and Three?

Mr. GARLAND (Bow River): Yes.

Mr. FRASER: My assistant chief, and the other inspectors.

Mr. GARLAND (Bow River): You are, of course, responsible for them?

Mr. FRASER: Yes, I make them up.

Mr. COOTE: They are made up by you?

Mr. FRASER: Yes, they are made up by me.

[Mr. J. D. Fraser.]

Mr. COOTE: Do you think it is necessary when grades are defined by Statute, to make samples every year?

Mr. FRASER: We are required to send samples to Great Britain and foreign markets representing the wheat for each year. That is what those standards are used for.

Mr. COOTE: Would not the fact that you make up standards for each year lead to a good deal of dissatisfaction and misunderstanding in the country when wheat that graded One one year graded Two the next year?

Mr. FRASER: The fact of the standard being made up would not actually cause that. We would grade wheat every year as One Northern if it weighs sixty pounds to the bushel and is sound and otherwise good enough. Our standard never weighs sixty pounds to the bushel; it is always better than that; but it is not necessary to live up to the weight of the standard in order to grade a sample One Northern.

Mr. COOTE: The fact that you make up standards every year indicates, surely, that there is a difference from one year to another?

Mr. FRASER: Yes; there is some difference from year to year, we could not make them exactly alike.

Mr. COOTE: Would not it account for the fact that what grades a One this year might grade a Two next year?

Mr. FRASER: I would not say it does, Mr. Coote.

Mr. DONNELLY: Your inspection at Winnipeg is often checked up at Winnipeg?

Mr. FRASER: Yes.

Mr. DONNELLY: Now, when you ship out of Fort William, is there any checking up on the grading that is done at Fort William, or at any other port?

Mr. FRASER: Those shipments have all been sampled and a portion of that sample is sent to Winnipeg, and those samples are checked over upon their arrival there.

Mr. YOUNG (Weyburn): How do they compare with the others?

Mr. FRASER: We find them to be O.K.

Mr. BROWN: There is a very general impression that the samples that come up from Fort William are lower than what are passed in the inspection at Winnipeg. It is realized, of course, that there is a spread between the maximum and the minimum of a grade. Now, is there anything in the general impression that the wheat that goes out from Fort William is just the minimum of the grade?

Mr. FRASER: There is no question; it is not the minimum. There is not a shipment that goes out of Fort William that is down to the minimum. I have been in the Inspection department since 1899, and there has not been a shipment of One Northern made since that time that has been down to the minimum required by the Grain Act. There has not been a year but what our wheat was one, two or three pounds higher than was required.

Mr. DONNELLY: Would you say the same thing of Two and Three?

Mr. FRASER: Yes.

Mr. DONNELLY: Have you any samples sent back from England?

Mr. FRASER: I understand the Pool have been getting the samples for their shipments to Great Britain, and these samples have been checked by experts in Winnipeg and they have not made a single complaint to me.

Mr. DONNELLY: That is not what they told us.

Mr. FRASER: They have not made any complaint to me.

Mr. DONNELLY: In fact, they told me they had forty-one samples sent from Philadelphia, Baltimore, New York and Montreal, and there were only some eighteen of them that stood up to the standard when they were sent back to Winnipeg and inspected.

Mr. FRASER: I have had no complaint direct about any of these samples.

Mr. MILLAR: Have you seen the statement in the papers recently that some cargoes arrived in Great Britain only sixteen per cent of Marquis wheat?

Mr. FRASER: No, I did not see that.

Mr. MILLAR: I am not sure whether it was Major Strange in the Mail and Empire or Miss Cora Hind.

Mr. FRASER: That is Marquis wheat? I could understand that. We are trying to produce forty or more varieties of wheat in the west. It is difficult to get a cargo that is true to any one variety. You might easily get shipments from sixteen to fifty per cent of Marquis, and the balance might be other varieties of Red Spring wheat.

Mr. MILLAR: I do not know whether this had reference to One, Two or Three; but it could hardly occur in connection with One.

Mr. FRASER: No, it would not occur in connection with One. It might be Three Northern or Two—more likely Three Northern.

Mr. DONNELLY: When you are inspecting a cargo at Fort William will the man who owns the wheat not often appear before the inspectors and protest against the grade he is given?

Mr. FRASER: They do occasionally.

Mr. DONNELLY: And argue with him if he is not given a high enough grade?

Mr. FRASER: You mean with the deputy placed at elevator?

Mr. DONNELLY: With the man inspecting the wheat?

Mr. FRASER: I do not think there is very much argument. If our inspectors in the elevators that are inspecting these samples are not satisfied with them they sent them into our head office at Fort William. If there is anything that our deputy at the elevator questions the matter is settled at the head office at Fort William.

Mr. BROWN: Are these samples of the cargoes that you say are sent to you at Winnipeg, held?

Mr. FRASER: Yes.

Mr. BROWN: They would be available for inspection by farmers.

Mr. FRASER: Yes, we hold them there at least nine months.

Mr. BROWN: It would be very satisfactory if those could be inspected by farmers and decide for themselves.

Mr. MILLAR: After the grain leaves Fort William what check is there to show that it has not been tampered with or changed or mixed on transfer to the seaboard?

Mr. FRASER: At Montreal we have sampled shipments of the One, Two and Three Northern leaving there for the last two or three seasons.

Mr. MILLAR: Who samples these?

Mr. FRASER: The inspector at Montreal and his staff.

Mr. MILLAR: Are those samples sent back to your office?

Mr. FRASER: No. They are kept in the Montreal office. They are checked there by the inspector and his deputies and filed away in case a claim is made on that shipment.

[Mr. J. D. Fraser.]

Mr. MILLAR: Now, I am going to ask you a rather delicate question. Statements have been made frequently, and they are very persistent lately, that cargoes arriving in the old country are not in the same condition; that some of them are considerably dumped. Now, this statement has been made. I am not insinuating that any inspector at Montreal or any other point has been tampered with or bribed; but does your check go any further than the statement of one man who is placed at Montreal or Port Colborne? Is there inspection at Port Colborne?

Mr. FRASER: No.

Mr. MILLAR: At these places where you have inspection, does the inspection go any further than the statement of one man; is there anything done to check up and find out if these samples kept are fair samples?

Mr. FRASER: Well, of course the samples are taken while the grain is loaded on to the boat. Then the sample is delivered into the main office in Montreal, is there checked over by the deputy and by the inspector in charge, and then filed.

Mr. MILLAR: Suppose a man says: Here is a cargo I am shipping and it should go into a Three. I would like to get it into Two. If he could get it into Two he would make \$25,000; and here is the inspector who gets \$200 a month or whatever it is. You can see the temptation. I have no knowledge that anything of that sort has been done. Have you any way of checking that up to prevent it happening?

Mr. FRASER: They could not very well do that. Our Western grades are not inspected in Montreal at all. The certificates issued in Fort William go through. No certificate is issued on Western grades in Montreal at all.

Mr. MILLAR: No, but the sample kept. Suppose there has been a change in Montreal. Suppose—I am making another statement—I believe that in the Grain Inquiry Commission that investigated this—I was told this, and I expected to see it in the report—I was told that the Grain Commission arrived at Montreal and they accidentally arrived at a time when a boat was putting a Number Two in a Number Three hold. If such a thing should happen, the cargo being en route, I want to know if we have any more check than the word of one inspector

Mr. FRASER: I have no more check than the sample taken by the sampler and the deputy inspector at Montreal.

Mr. DONNELLY: What about our wheat going over to the old country this year. Have you any complaints?

Mr. FRASER: You mean our shipments? There have been a few.

Mr. DONNELLY: Any last year?

Mr. FRASER: In some cases they consider the wheat too poor for the grade given. In one complaint there was a case of some mixtures that had taken place.

Mr. DONNELLY: Where do you think this mixture had taken place?

Mr. FRASER: I think in the United States, the mixtures might have taken place in some of the transfer houses—the Bay ports, Port McNicholl, Buffalo, or Montreal, or in the States at some of the Atlantic ports down there.

Mr. DONNELLY: You can say there is no mixing done at Fort William?

Mr. FRASER: No mixing is done at Fort William?

Mr. DONNELLY: Yes.

Mr. FRASER: Certainly, but it is mixed before it goes on to the boats.

Mr. COOTE: Have you any inspectors at the elevators at Port McNicholl, Port Colborne or Goderich?

Mr. FRASER: No.

Mr. COOTE: Don't you think you should have some check?

Mr. FRASER: It might be well to have it. Probably the trouble in the past has been that we have been trying to keep down the cost of it as much as possible, and to put men at all these points is going to cost considerable money, running into thousands of dollars every year. As it is, we are running close to the line. The dollar fee per car allowed for inspection is not covering the present cost.

Mr. YOUNG (Weyburn): When you inspect grain is the owner of that grain allowed to be there?

Mr. FRASER: The owner? Oh, no.

Mr. YOUNG (Weyburn): Or his representative?

Mr. FRASER: Well, of course, the elevator man is around there. You cannot keep him away as the inspection is done at the elevator.

Mr. YOUNG (Weyburn): The point I want to know is, when a farmer ships a carload of wheat a sample is taken at Winnipeg by the inspector. The inspector does not know whose grain he is inspecting and nobody interested in the grain is allowed to be there; but when you are inspecting grain out of a terminal elevator the company's representative can be there to argue the point with the inspector. If the inspector says that the grain is a Two, then the owner can say that the grain is a One. He can say: there is the law, and I am complying with the law; and I defy you to put it down to Two.

Mr. FRASER: They do not do that. A few of them have tried it, but it does not pay them they have found.

Mr. MILLAR: When you say that, do you mean they are not there?

Mr. FRASER: They may be around, but they do not take the stand this gentleman has represented. In the first place, they give an order showing the cargo that is to be loaded. Now, if that goes out and the inspector finds it equal to that grade there is nothing said. If he finds it is not equal to that he informs the elevator company that he is running too low. It is up to the elevator company to improve it or take the lower grade. The deputy inspectors at the elevators down there are not so easily worked as some people imagine.

Mr. YOUNG (Weyburn): They have a chance to argue with the inspector?

Mr. FRASER: Yes, there is no doubt that will take place at times.

Mr. YOUNG (Weyburn): Which is a chance the farmer does not have?

HOUSE OF COMMONS,

FRIDAY, March 23, 1928.

The Select Standing Committee on Agriculture and Colonization met at 11 o'clock, a.m., the Chairman, Mr. W. F. Kay, presiding.

JAMES D. FRASER recalled:

The CHAIRMAN: We are taking up again this morning the grading of wheat and its protein content.

By Mr. Brown:

Q. There was one point I wanted to get a little more clear in my own mind from Mr. Fraser. It may have been answered yesterday. I am not sure. It is in relation to the outward inspection of wheat, and the question as to whether that which the British miller receives is equal to our inward inspection. I understand that when the cargoes are stopped at Fort William samples are sent back to Winnipeg to compare?—A. Yes, samples of all cargoes shipped from Fort William, Port Arthur, Vancouver and Prince Rupert are sent to Winnipeg.

Q. What about Montreal?—A. The Montreal samples of the western grain are taken from these cargoes as they are loaded at Montreal for checking purposes only but they are kept at Montreal. Of all of the samples taken at Montreal, there has been no complaint with the exception of one.

Q. In practice you never have to review the samples of the cargoes that go from Montreal?—A. No, as western grain is finally inspected at Fort William. As a matter of fact when I visit Montreal I go over these samples and examine them. The last time I was in Montreal I went over 125 samples taken from shipments of western grain out of Montreal, and I found them all O.K.

Q. In actual practice have you ever had samples returned to you on complaint, which you thought did not measure up to the standard required?—A. We get samples sent over from the trade in the Old Country occasionally, which do not compare with our samples.

Q. You have no way of telling whether they are genuine samples or not?—A. No.

Q. You have no reason to believe they are not?—A. No, I have no reason to believe they were not regularly taken.

Mr. MILLAR: I would like to ask Mr. Fraser a few questions in regard to bleached wheat. We touched upon that yesterday, and I think he was rather reluctant to admit that wheat which was bleached but not damaged would be reduced by the amount of two grades.

The WITNESS: No, I would not make a statement like that. It is possible that wheat badly bleached might not be damaged materially for making flour, there might be an odd car where a grade or two grades might be lost on account of very bad bleaching.

By Mr. Millar:

Q. Following that right up, are you willing to admit that in cases where wheat has not been damaged—the milling or baking test showing it had not been damaged—the wheat, according to our Inspection Act now, might be dropped two grades?—A. In some few cases, yes, but it would have to be badly bleached

wheat. I will tell you that it is questionable whether badly bleached wheat is not damaged. I claim it is, because a change has taken place in its kernels which has turned them, when cut open, to look like starchy wheat inside.

By Mr. Totzke:

Q. Would any degree of bleaching lower one grade?—A. We allow slightly bleached wheat into No. 1 Northern; that is, where the bleaching is sufficient to take the bloom off of it, but not to alter the general appearance of hardness.

By Mr. Millar:

Q. When wheat is bleached, what are the signs of damage which guide you?—A. Colour is the main thing.

Q. You can tell by an appearance test when damage starts?—A. No, I would not say that you can tell exactly where damage starts. I mentioned yesterday about a car of tough wheat that showed 4 per cent of sprouted kernels. After it was dried it showed 7 per cent. There were 3 per cent of sprouted kernels there which were not apparent. That wheat was damaged to a greater extent than was apparent.

Q. You always consider sprouting as damage?—A. Yes, there is no doubt about it. A heavily bleached wheat we consider as damaged.

Q. Upon what are you basing your decision?—A. It has always been treated that way for the last 25 or 30 years.

Q. That is exactly the point I want to get at. I know it has always been treated that way, and the impression is that as soon as wheat is bleached it is damaged and it is graded down. Have not many milling tests shown that wheat which is considered bleached has not been damaged?—A. Yes. Not damaged to any great extent; at the same time there have been tests made showing that wheat has been damaged. The great difficulty in making a test of that nature is to get the same wheat before it is bleached and then after it is heavily bleached.

Q. I remember in two or three authorities that I have been studying the consensus of their opinion is in the samples they have tested they have not found any case in which bleaching indicated damage. Would that be too strong a statement, in your opinion?—A. I would not like to make that statement myself.

Q. Now, in the case of frosting, does frost always indicate damage?—A. Yes, frost always indicates damage.

Q. A slight frost in the bran, frozen after the grain has ripened, you say will indicate damage?—A. That will indicate damage, although of course to a lesser extent than when frozen before cutting.

Q. All I have to say to that—and if I am permitted I will put some authorities on record later on—is that it does not—that is in the slightly frosted bran, frosted kernel.—A. You can have it frosted so slightly that it is almost impossible to tell whether it is frosted or wrinkled by heat. In a case like that I would not say it was damaged, but if it is frosted heavily enough, where there is no difficulty in telling that it is frosted, in my judgment it is damaged.

Q. Heavily frosted, of course, is damaged.—A. No question about that.

Q. But in the case of slightly frosted you would not say that there is always damage?—A. I would say that any frosted wheat is damaged wheat.

Q. While you say that you do not know very much about protein, you know that the colour specification in the grading of wheat is an attempt to get at something of value, strength, protein, or whatever you want to call it?—A. Yes.

Q. In your judgment is it possible for, say, a No. 4, wheat which is not heavy, but is sound wheat, well matured, no damage whatever, in the quality

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and the quantity of protein or strength or whatever you want to call it, really makes it of more value than a No. 1? Would you consider that possible?—
A. That would be a thin, light No. 4?

Q. Yes, of no damage, and the protein of high quality and high quantity?
—A. That would depend, of course, upon whether the miller wishes wheat with strength in preference to wheat with quantity of flour.

Q. Yes, we will have to take into consideration the purpose for which he wants the wheat, but I am speaking of the value on the general market.—
A. When you get down to No. 4 wheat, as a general thing, if it is a thin wheat caused by rust, it is strong—when you get down into the lower grades of 4, 5 and 6, it is the quantity of flour that counts the most with many millers.

Q. The example was given at the Wheat Pool Conference in Minneapolis a year ago last March, where a man in the States gave a sample of wheat which weighed 48 pounds to the bushel—which would not come under our No. 4—and which was sold at a premium of 5 cents over 62 pound wheat?—A. Yes.

Q. We have to take into consideration the difference in the demand as against Canada, but there is a thing there which strikes me, and that is that because of its lack of weight per bushel it cannot get into a higher grade than a 4. Might that be, because of the quality or quantity or strength of protein, better wheat for milling purposes, and the British millers, if they had it separated, would be willing to pay more for it than for some of the other grades?—
A. Under some conditions, probably, the Old Country miller might prefer it. My impression of the Old Country miller is that he would prefer heavy wheat of No. 4, 5 or 6, rather than the thin.

Q. Provided it has all the other qualities? I am bringing this out because a part of the research work in connection with these results is to show that our present system is not satisfactory. If it were, there would be no object in proposing a new one.

By Mr. Bancroft:

Q. This system of grading wheat, where we had simply all No. 1, under the old grading system, it would be No. 1 wheat, but it was low in protein content. Might not the reverse be the case. This might grade No. 4, under the newer system, just as well as grade No. 4 under the older system, because of this high quantity of protein. It might work both ways?

Mr. MILLAR: That is a matter I intended to take up later, when we were discussing it among ourselves.

By Mr. Donnelly:

Q. You said that the grades at Winnipeg and Fort William were exactly the same?—A. I said yesterday that a portion of the samples made at Winnipeg were distributed to Fort William, and other inspection points, as well as sent overseas.

Q. That is sent as a standard sample?—A. Yes.

Q. How do you make that agree with the report which I have here from the Committee appointed by the President and Board of Directors of the Saskatchewan Cooperative Wheat Producers Limited?—A. They say:

“From Winnipeg, we went to the head of the Lakes, and while there formed an opinion, which we still hold, that there is a difference between the standard grade at Winnipeg and at the Lake Head. There has been some fairly severe criticism with regard to this opinion being expressed by members of the Board, but, notwithstanding anything that has been said, we are still of this opinion, and would recommend that the resolution which was unanimously agreed upon by the Interprovincial meeting held

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in Calgary, in March last, be again taken up with the Dominion Government, at the next session of Parliament, the resolution being as follows:

'That steps be taken to provide, that in accordance with the Canada Grain Act, terminal elevators, both public and private, shall be compelled to maintain outturn grades of the same standard as that in use at primary inspection points;

And further, that if the Canada Grain Act, at present constituted, does not provide for this, steps be taken to obtain an amendment thereto to bring it into effect.'

Well, of course, you cannot do that. The Grain Act provides that grain out of private elevators shall be graded equal to the average being shipped out of public terminals. The Inspection Department cannot refuse to take out of a public terminal, as No. 1 Northern wheat, wheat that weighs 60 pounds to the bushel—it might be the very minimum—we cannot refuse to take it out of the public terminal if it went in as No. 1 Northern.

Q. You still maintain that the grades that go out are just as good as the lowest that passes Winnipeg?—A. Yes, I consider shipments from Fort William, either from private or public elevators, better than the minimum quality of grain allowed in grades at Winnipeg.

Q. That go through Winnipeg?—A. Better than the lowest put into those grades at Winnipeg.

Q. Of course, there are some mistakes made, and some pretty low grades sometimes go into Fort William?—A. I am not taking into account any mistakes that might be made. Shipments out of Fort William and Port Arthur, either from public or private elevators, are always better than the minimum that might be put into that grade.

Q. Who grades the cargo, first of all, at Fort William?—A. The inspector at the elevator from where it is being shipped.

Q. Supposing there is a dispute over it, where is that taken up?—A. That goes into the Fort William office, and it is placed before the inspector in charge, and his chief deputy.

Q. And the Board of Appeal sits on it?—A. No, that goes into the Fort William office, and is checked over. If they find that the inspector at the elevator was correct in his judgment, they confirm his inspection.

Q. Is the owner of the elevator there to uphold his side of the case?—A. In the Fort William office?

Q. Yes.—A. The main office?

Q. Yes. Is he likely to be there?—A. No, he is not likely to be there.

Q. He never comes in?—A. I would not say that he never comes; some of them may be there occasionally.

Q. He may have an agent there representing his side of the case?—A. At Fort William, it is the superintendents of the elevators that look after that business.

Q. Supposing he is not satisfied with that, where does it go?—A. He can ask for an appeal. For instance, if he is shipping a cargo as No. 2 Northern, and we say it is only No. 3, and that is confirmed by our main office in Fort William, then he can ask for an appeal. A sample will be sent to Winnipeg and placed before the Appeal Board.

Q. And who is the Appeal Board?—A. There is a permanent Chairman—at the present time, Mr. George Serls—and there are eight other members. When an appeal is called, a selection of two is made from the eight.

Q. Have you many of those appeals?—A. There are not a great many.

Q. Can you tell us anything about the result of those appeals?—A. The result, usually, is to confirm the inspectors' grades. There are not very many changes, but there are some.

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Q. You say that you think the grades going out of Fort William are better than the minimum of the grades going through Winnipeg?—A. Better than the minimum cars that may be inspected at Winnipeg.

Q. What is the reason, then, for our wheat in the Old Country deteriorating in standard? This Committee reports as follows:

“In connection with this work, we had found out from our General Sales Manager, Dr. D. L. Smith, and from the perusal of correspondence and cables received from the United Kingdom and Continental Europe, that there was some dissatisfaction in connection with the standard of Canadian Grain which was reaching those countries, a complaint being particularly strong in connection with our No. 3 Northern wheat. We also found a fairly general opinion expressed by terminal operators of long standing, and by grain men generally, that our grain standards were being gradually reduced.”

Then in the House the other day, the Minister of Trade and Commerce made a reply, as follows:—

“In reply to my hon. friend, I may say that a letter was received from the Liverpool Grain Exchange, pointing out that during the last two years there appears to be a decided lowering of the grades of Canadian grain. Whether this was due to bad seasons, or the lowering of inspection, we do not know, but they express the opinion that if the grades were not obtained, serious injury might be done to Canada's reputation as a wheat producing country.”

Apparently our grain standards are being reduced. How do you account for this?—A. That statement is quite true. We are not producing in Western Canada to-day the quality of wheat we did fifteen or twenty years ago.

Q. I am a wheat grower myself, and I think I am raising better wheat to-day than I did ten years ago.—A. There are individual cars, yes, but taking it as a whole it would not apply. Twenty years ago our main crop was Red Fyfe, or Marquis; this made up eighty per cent or better.

Q. Do you not think that it is a serious thing that with our chief agricultural product, our wheat, the standards are being reduced or lowered on the world's markets? Is it not a serious thing for the wheat producers?—A. Yes, it is, but it is impossible to keep them up to the standards we had fifteen or twenty years ago.

Q. We are interested in some means by which to raise these standards, or keep them up. Can you suggest anything to us?—A. I believe the source of the trouble that has occurred starts right from our seed that is placed in the ground in Western Canada.

Mr. TOTZKE: Following along Dr. Donnelly's line of argument, I would like to give a quotation from this Hind report. This quotation has nothing to do with the quality of the seed, but refers to the inspection:

“That increased mixing means and has meant increased deterioration, there is no manner of doubt. The best indication of this is the growing complaints from buyers that not only has Canada lowered her grades from previous years, but that, as the season advances in many cases shipments arriving are inferior to even those lowered grades.”

By Mr. Totzke:

Q. The quotation is, “In many cases, the shipments arriving are inferior to even those lower grades”?—A. Last year we had a peculiar condition, in that about eighty per cent of our wheat was tough or damp. A large portion of that

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was dried. It is with regard to wet wheat that I think that statement is made. After that wheat was dried, it was a question whether we should grade that in to straight No. 3 Northern, or Dried No. 3 Northern. With the large quantity that was being dried, it was a serious problem. We gave that considerable thought, and we decided that we would grade that out as Straight No. 3 Northern. We probably were wrong in doing that, we should have graded it out as Dried No. 3 Northern, and ignored the consequences to the farmers in Western Canada. If we had done that, there is no question in my mind that every bushel of tough wheat that was bought, after that decision had been made, would have been bought at from 3, 4, or 5 cents a bushel less than was paid for it. Just as soon as you put the word "dried" on a certificate, you will cut the price three, four or five cents a bushel. As a matter of fact, a year ago last spring, shipments of Dried No. 2 Northern, remained in the East all summer, and was offered at No. 3 Northern price, and nobody would buy it. The same thing would apply to our No. 3 Northern, if we had made it Dried No. 3 Northern. We took a chance that this Dried 3 Northern would arrive in the Old Country, and that it would yield and turn out to be satisfactory. Unfortunately, in the drying of a lot of that wheat, it was apparently overheated a little, which affected the strength, and that is the reason for the complaint coming in. Some of the cargoes that arrived there were probably lower in strength than the standard sample that had been made up to cover that grade.

By Mr. Millar:

Q. Was not a greater profit made by the elevators that were sending this dried wheat out, rather than the farmers?—A. Well, they profited if they had an actual profit in the drying of that grain. They probably made money, because they dried a lot of it.

Q. In the raising of the grade from damp or tough wheat to straight grades, would not the profits be greater? In other words, the dried wheat went into the straight grade?—A. Yes. At the same time shipments of tough No. 3 Northern, that were sent over to the Old Country, were acceptable and satisfactory. The wheat that was dried was exactly the same kind of wheat, only in the drying it was overheated, and that is what affected it.

By Mr. Vallance:

Q. What was the difference in the Old Country between the damp or tough wheat that was shipped as tough, and the tough wheat that was dried and shipped, what was the difference in price?—A. I do not know, as I am not in touch with the prices, but there would be about as much spread, I would say, as between tough and straight wheat here.

Q. Just as Mr. Millar pointed out, anything that was made in the drying process would be made by the shipper, and not the grower?—A. If we had called that wheat all Dried No. 3 Northern, the price received would be reflected back into the country on all tough and damp wheat.

Q. We were getting eight and nine cents less for tough wheat than we were getting for straight grades.—A. That is quite possible. Of course, I have nothing to do with the prices.

Q. The trouble was that your grade Northern wheat, was dried, and sold as Straight. The grower is going to be at a disadvantage if that practice is allowed.—A. Well, as I told you, there is a question that the Inspection Department probably made a mistake in grading that Dried No. 3 Northern, as a straight grade.

Mr. BROWN: That is what we want to fix our minds on just now, that the Inspection Department did make a mistake. The British miller considers that not only the sample quality of our wheat, as a whole, has been reduced,

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but that our standards have not been lived up to. The admission that they made a mistake is a recognition, on the part of the Inspection Department, that the British miller has a ground for complaint.

The WITNESS: There is another point, in connection with that, that I would just like to mention. I think it has been proven that wheat can be dried and not injured, and, in some cases, it is improved. How was the Inspection Department to know last spring whether that wheat might not be improved?

By Hon. Mr. Motherwell:

Q. You were just trying it out this year?—A. That is it.

By Mr. Coote:

Q. Did the Inspection Department take some of this dried wheat from each elevator and have the laboratory test it to see whether it had been injured or not?—A. There were, of course, some tests made.

Q. Do you not think that it might be detected what elevators were drying it in an improper manner?—A. I do not think so.

Q. And you could refuse to grade that out as straight wheat after that?

By Mr. Donnelly:

Q. Suppose they had two cars, of a thousand bushels each, of seventeen per cent moisture. They reduced one car to eleven per cent moisture, and then, by mixing the two together, it would all be fourteen per cent moisture?—A. That is an operation that would take place in the elevators and the Inspection Department would not know what they were doing.

By Mr. Young (Weyburn):

Q. Two years ago you allowed wheat containing 14.4 per cent of moisture to go through as straight grades?—A. Yes.

Q. In doing that, did you not lower the standard?—A. Yes, to a certain extent.

Q. And the miller has a ground for grievance there?—A. Yes, but that was done at the suggestion of, and for the benefit of the producer.

Mr. BROWN: The question of benefit might be a doubtful one.

By Mr. Totzke:

Q. I would gather, from this report, that the deterioration in standard, of our grades of wheat going out, is the result of mixing. What would you say in regard to that?—A. In my opinion, you cannot mix a lower quality wheat with a higher, and keep it as high as the higher one.

By Mr. Donnelly:

Q. If the diverting of wheat was stopped, it would have a tendency to raise our standard?—A. It appears to me that that is a question that enters into this protein question. To have a protein test made on cars of grain passing Winnipeg, would permit a selection to be made of these strong cars.

Q. If these strong cars were not taken out of our grain, do you not think that it would have a tendency to keep our standards higher?—A. There is no doubt that a lot of shipments out would be somewhat better than they are.

By Mr. Totzke:

Q. If the mixing at Fort William were stopped, do you not think it would have a tendency to keep our standards higher?—A. If there was absolutely no mixing, or no selection of the higher quality wheat, undoubtedly our shipments would be better.

By Mr. Miller:

Q. You mentioned making protein tests in order to give a better chance for selection?—A. Yes.

Q. At the present time, I think it is a well known fact that the chance to select is confined, almost entirely, to Canadians and Canadian millers. The British firms cannot send their experts out here to gather samples all over the country; they have not the elevators; they simply cannot do it. If protein were made a factor in the grading of wheat, so that it were known that all wheat that went into No. 1 had a certain percentage of protein, the British and Continental miller would know just what it was. If he wanted a high protein wheat, he could get it, and he would be placed on a more equal basis with the Canadian miller?—A. Yes, but he would still have to have somebody there to select those cars before they were binned, or unloaded at Fort William.

Q. You are talking of another proposition entirely. The proposition in the resolution was this, that colour would play no part in grading. Instead of colour, you would simply make a protein test, and that would be a part of the grading system. There would be no extra certificate, no protein stamp on the certificate, nothing of that sort at all. It would mean that colour would not cut as big a figure. Instead of saying, "look at the appearance, I think that is damaged; it is frosted a little, but I do not know whether it has been damaged or not, but it is discoloured," you would make the protein test, and that would decide the grade. It would mean that any wheat that got into Grade 1, would have a certain percentage of protein—it has been suggested that it should be fourteen per cent. The British miller, and other buyers, would know where to get straight protein wheat?—A. Is it the intention, Mr. Millar, to set a percentage of protein for No. 1 Northern, and a percentage for No. 2, and No. 3?

Q. For Nos. 1, 2 and 3.—A. And any car that tested up to that percentage could be placed in No. 1 Northern?

Q. With all the other specifications, weight per bushel, and others.

By Hon. Mr. Motherwell:

Q. That would only give you the quantity of protein; you could not get the quality?—A. That would give you the quantity.

By Mr. Millar:

Q. If this were done, would it not give the buyer in the Old Country a better chance to get the strong wheat that he wants?—A. Well, if he were buying wheat for the percentage of protein only, I would say yes.

Q. Why do you say, "only"? If it is a big factor, would it not naturally follow?—A. It is a big factor, but it does not, in my opinion, determine the exact milling value of the wheat. What I mean by that is this: you can take two cars, both testing fourteen per cent protein; one is sixty pounds to the bushel, the other is sixty-five pounds to the bushel; there is no question in the mind of the miller that the sixty-five pound wheat is worth more than the sixty pound. They might be both absolutely sound and well matured.

Q. That is the same anomaly that exists now; it is not proposed to remedy that at all?—A. If the test is made, it would indicate, to some extent, the value, in matured, strong wheat.

By Mr. Donnelly:

Q. I understood you to say that the diverting of wheat at Winnipeg, and the mixing at Fort William, was partly responsible for the lowering of our standards?—A. What we understand by standards.

Q. Our grades of wheat, in the Old Country. If that is stopped, our grades of wheat in the Old Country would be better; I understood you to say that?—A. Of course, there is no question in my mind but that they would be somewhat better.

[Mr. J. D. Fraser.]

Q. You agree then, with what Miss Hind says in her article, that the mixing of wheat is partly responsible?—A. I would say, partly responsible.

By Mr. Garland (Bow River):

Q. There are just two things that trouble me. A moment ago you said that the increase in the moisture content to 14.4 per cent lowered the standard of overseas shipment. Have you ever had a serious complaint from the importers on the other side, on the basis of the lowered standard because of the moisture content?—A. No, I do not know that I have.

Q. Before you answer that. Is it not true that there has been some approval expressed of the quality of the grain, containing moisture, that has gone from this side? Perhaps that is too technical. There has been, then, no lowering of the standard of overseas shipments on the basis of the raising of the moisture content of 14.4?—A. Of course, you cannot add water to wheat and extract flour from it.

Q. I am speaking of the standard of the shipments. No complaints have come to you because of the raising of the standard to 14.4, from overseas importers?—A. No, I have had no complaints from overseas.

By Hon. Mr. Motherwell:

Q. The yield of flour from 60 pound wheat would be less?—A. A little less.

By Mr. Garland (Bow River):

Q. If you are going to allow, as Mr. Miller suggests, the importers of our wheat on the other side to skim off the cream of the straight wheat, what are you going to do with the tremendous bulk of wheat that is going to be left?—A. Just the same as they do on the other side of the line, sell it at a lower price.

Q. It will be depreciated in price?—A. Yes.

Q. Do you think that would be of any benefit to the wheat producers in Western Canada?—A. Candidly, I do not.

By Mr. Donnelly:

Q. Do you not think that it is a good thing that the man raising good wheat should get a better price?—A. In my opinion, that is the way our grading system is built. You have got to average these things.

By Mr. Vallance:

Q. The large bulk of the wheat strong in protein content is that portion that does not get the precipitation that the other portions get, so that you are penalizing the man.

By Mr. Garland (Bow River):

Q. Can you say definitely that any one district in Western Canada will continue to produce high protein wheat?—A. No, and I do not think anybody could say that.

Q. In other words, one district might produce high protein content wheat this year, and next year it would be impossible?—A. Yes.

By Mr. Donnelly:

Q. It is almost an incentive for the man who raises good wheat, unless you give him a better price?—A. I do not think that they can help raising high protein, or low protein wheat, as a general rule but good varieties should be sown.

By Mr. Vallance:

Q. Why not grow Vermilion, for instance?—A. Unfortunately, too many of them are growing it to-day.

By Mr. Donnelly:

Q. We may as well grow Vermilion, instead of growing Marquis?—A. That is one of the reasons why our shipments to the Old Country are lower to-day than they were fifteen or twenty years ago, just because this mixture and poor varieties of wheat are produced.

By Mr. Vallance:

Q. We might produce a system of grading that would eliminate that.—A. Well, you have poor varieties of wheat. Take your Kota. It will test as high in protein as the Marquis. Will you put that into one grade? It is a grade by itself, but it is Spring wheat, and there are some of the other softer variety which could not grade No. 1 Northern, which will test high protein.

By Mr. Millar:

Q. Mr. Fraser, you have replied to Mr. Garland that you cannot guarantee that any district would grow a high protein wheat this year and not do it next year. That is true. But, as a general rule, are there not districts which usually grow high protein and other districts which usually grow low protein wheat?—A. Yes, that is so.

Q. Would there not be an advantage to the producer then to institute such a system as this: we have found in the grading of potatoes or eggs or cheese that it was good policy to pick out the best, and classify them together—those which were of the most value, but that is not satisfactory to the man who is growing a few potatoes, getting a few eggs, or making a few cheeses, to pick out the best, but the man who wants to export to the United States, to the people who want a high protein wheat, it is picked and picked and picked and mixed until we are selling now on the basis of the lowest and the poorest.

Hon. Mr. MOTHERWELL: There is no doubt about that.

The WITNESS: I would say so.

By Mr. Millar:

Q. I want something more specific than that. What is your reason for saying that a thing which is true in connection with all other commodities is not true in connection with wheat, or would not be of benefit in picking out what is of the greatest value, so the buyer will know what he is getting?—A. My reason for that is that if you skim off 20 per cent or 25 per cent of the protein wheat and leave the rest, it will go into the public elevators. The private elevators do not want those low grades, nor do the millers want them.

Q. I do not quite see where you get the idea of "skimming."—A. If you extract all the high grade protein cars passing through Winnipeg, what you have left will be low. If you make your test and make it possible for a man to go in and say, "That is 14 per cent, that is what I want," it is all picked out—

Q. I do not think you get the idea at all.—A. It leaves it open so that it can be done.

Q. No. 1 will have 14 per cent protein, but graded by other specifications as it is now, outside of colouring, it gives everybody who is buying our wheat a chance to buy 14 per cent, if he wants to.—A. Do I understand that nothing less than 14 per cent would be allowed into a No. 1 Northern?

Q. Yes. It is a fixed amount, and 14 per cent has been suggested.—A. If you are going to fix the grade by protein itself, that is a different matter.

Q. Your remarks referred to something that has not been proposed, and I think Mr. Vallance's questions are perfectly sound.

By Mr. Coote:

Q. I would like to ask you a question in regard to a statement made a little while ago that if certain things were done, we would be like the United States.

[Mr. J. D. Fraser.]

You said that their No. 1 Dark Northern would be the same as our No. 3. Is it not a fact that our No. 3 when sent to the United States will grade No. 1?—A. I have heard the statement made that it would.

Q. So you would expect them to be the same price?—A. No, I would not. If the wheat in the United States is graded according to the definition for No. 1 Dark Northern, as included in the handbook of the Agricultural Department at Washington, it should be much better than our No. 3 Northern wheat.

Q. A few years ago I secured from Mr. Serles, who was then Chief Inspector, a sample of No. 3 Northern at Winnipeg and took it myself to Chicago and had it graded by Mr. Phillips, the head of the Appeal Board, and an assistant, and he graded it No. 1 Northern Spring.—A. That is not No. 1 Dark Northern.

Q. It is very close to it.—A. It is a lower grade.

By Mr. Campbell:

Q. In regard to this question: You spoke of what would happen if the higher protein content wheat were skimmed off at Winnipeg and the balance went into public elevators. Is that not precisely what occurs, that the millers go on the Grain Exchange and examine the samples and pick off the protein?—A. Yes, they pick off the higher protein cars that will suit their purpose for mixing or milling.

Q. Any change in the system would mean perhaps that the farmer gets the premium?—A. A changed system would mean that the protein test would have to be made before the cars could be graded at all.

By Mr. Millar:

Q. It is part of the grading?—A. It is the grade.

By Mr. Campbell:

Q. To-day the farmer does not know, but the miller does.—A. How much wheat have we tested 14 per cent this year?

By Mr. Millar:

Q. How much have you had that goes into No. 1?—A. Not very much, of course.

By Mr. Coote:

Q. There is one other question which should be asked here in regard to the question which is raised by Mr. Fraser's statement in regard to Kota wheat, that is, a high protein wheat. Is it not possible we can develop wheat, which is a poor baker, such as Kota wheat, and still be a hard Spring wheat with a high protein content, but very poor baking quality?—A. I cannot very well answer that because I do not know what might be done by crossing, but believe it possible.

By Mr. Donnelly:

Q. Is there much Kota wheat going through Winnipeg?—A. Not now.

Q. Where does it come from?—A. Scattered over Manitoba and Saskatchewan, but there is really only the odd car coming forward now. It is pretty nearly a thing of the past.

Q. What about the Durum?—A. That is increasing.

Q. Have you any means of showing how much Durum and how much Kota is put into the terminals, and how much is shipped out?—A. No, we have no record.

[Mr. J. D. Fraser.]

Q. Is it possible to get those records?—A. You might get that from the Board of Grain Commissioners at Fort William. I do not know whether they have records of that kind or not. I do not keep anything like that, and I cannot give you those figures.

By Mr. Millar:

Q. You spoke I thought rather disparagingly of the American system. I have in my hand the statement of the standard prices quoted on the Minneapolis market on one ordinary day, and the spread between No. 1 and No. 3 was less than four cents?—A. Yes.

Q. While the spread in one grade when the protein was high was over 20 cents. Does that not indicate that protein is something of value down there, and when we consider that the British miller is anxious to have it, it must be valuable to him? Another matter I want to bring out is in regard to picking out the protein. Let me point this out to the Committee. In this case it would stop the picking, no test would be made of 4, 5 or 6. They would be exactly as they are now, no change whatever, but in the 1, 2 and 3 tests would be there specified as part of the inspection system and everybody in the world who buys our wheat would know when he got No. 1, he was getting 14 per cent, if we fixed that as the amount.

HON. MR. MOTHERWELL: You think the quantity would be a sufficient guide without knowing something of the quality of the protein?

MR. MILLAR: A student at Stamford University said that, taking everything into consideration in the higher grades, the quantity of protein reaches the nearest to the ideal, although not everything we would like, in evaluating wheat that is known to-day.

HON. MR. MOTHERWELL: Taking a risk on the quality?

MR. MILLAR: Yes, but there is not much risk. There is an English authority who states that knowing the origin of the wheat, seeing the wheat and knowing its nature, that is about all he needs, if he has the quantity. It comes the nearest to the ideal and proper evaluation of the wheat.

By Mr. Young (Weyburn):

Q. I understood you to say yesterday that our One Northern wheat might contain 100 per cent of hard, bright, red kernels, or might only contain 60 per cent, that it might contain 14.4 per cent moisture, or down as low as 9 per cent. There is a wide variation there. Is that not responsible for a large part of the dissatisfaction on the part of the Old Country miller, that he might, in getting a cargo of our No. 1 Northern, get 90 per cent of hard, bright, red kernels, with, say, 10 per cent moisture, and next year he will buy another cargo expecting to get the same thing, but perhaps will get only 60 per cent hard, bright, red kernels, with 14 per cent moisture. Is that not responsible for a great deal of the dissatisfaction over there?—A. There is no doubt that cargoes will vary, but not to the same extent that you have pointed out. In my 29 years in the Inspection Department I have never seen a cargo of No. 1 Northern go out that contained less than 85 or 90 per cent of hard, vitreous kernels. It is possible to go as high as you state, of course, or down to 60 per cent.

By Mr. Vallance:

Q. But very little would ever reach the Old Country, because of the fact that 60 per cent is the lowest, and it would go as near to the minimum as possible?—A. No, our shipments do not show that.

[Mr. J. D. Fraser.]

By Mr. Donnelly:

Q. Have you any samples of your standard grades here?—A. Yes.

Q. Have you any samples of grain returned from the Old Country?—A. No, I have none with me.

The ACTING CHAIRMAN: There was one correction I should think we should make in the record, which I think was overlooked by both Doctor Donnelly and Mr. Fraser. Doctor Donnelly asked a question in regard to grain going out of the terminal, and Mr. Fraser said that the average going out of the terminals was better than the minimum going into the grade.

The WITNESS: Yes.

The ACTING CHAIRMAN: I think the reporter has taken it down, and there seems to be a misunderstanding there. In one case Doctor Donnelly referred to the minimum going out of the grade being better than the minimum going in. I think it should be the average. I do not think, Doctor Donnelly, that you intended to use the term at the time, and I think Mr. Fraser also misunderstood your question.

Mr. DONNELLY: I was referring to the fact that we may get the minimum; a lower grade No. 1 than was graded at the lowest grade going out of Fort William.

The ACTING CHAIRMAN: I think the statement Mr. Fraser intended to make was that the average going out of the terminal was better than the minimum going through Winnipeg.

The WITNESS: No, I think I remember that now. What I meant was this, that the lowest quality shipment that goes out of Fort William, for instance, No. 2 Northern, is better than the minimum car graded as No. 2 Northern at Winnipeg.

Mr. CAMPBELL: That largely confirms our suspicions that the outgoing grade is based largely on the minimum, rather than the maximum or medium.

By Mr. Donnelly:

Q. In other words, the standard set for the lowest standard at Fort William is better than the lowest standard of any grade going into Winnipeg?—A. Yes. For instance, we grade a car No. 2 Northern, and we shove it into No. 2 Northern. You would not get a shipment out of Fort William as low as that. It will always be higher than that.

By Mr. Bancroft:

Q. I was wondering if there was any mixing done in the Old Country after the grain reached there, and if a sample sent back from the Old Country is a sample of our grain as it is received, or is it mixed over there?—A. There should be no mixture in the Old Country, if the sample is taken from the hold of the boat while it is being unloaded. Of course, a man might get a sample out of one hold, when it was intended to be taken out of another.

The ACTING CHAIRMAN: There is the chance that the Old Country dealer might do some mixing before sending it to the miller. We would have to be sure that these samples were taken from the boats and not from the dealers.

Mr. BANCROFT: That is what I had in mind. When the Grain Act was revised in 1923, we had it in evidence that the firms in the Old Country bought Canadian wheat and Australian wheat and Indian wheat and made a blend for the millers..

Mr. MILLAR: Perhaps I could ask Mr. Fraser a few questions with regard to possible difficulties.

[Mr. J. D. Fraser.]

By Mr. Millar:

Q. Could you mention any difficulty you can see in the way of carrying out the proposal of having a test made of the wheat in each car before it was graded, and that becoming a part of the inspection? Would you mention any difficulties which you see?—A. I believe that can be done if equipment and men are supplied for that purpose.

Q. It is a matter of expense?—A. It is a matter of expense and equipment. There are cases where probably cars might be held. For instance, we inspect cars at Winnipeg going into the mills or private elevators there, and in some cases unloaded there before they are inspected. If they are too full to sample in the yards they are taken into the elevator, sampled at unloading, and that sample is inspected after the car is unloaded.

By the Acting Chairman:

Q. Would it increase the number of grades if the protein content was made a factor in determining the grade?—A. Well, if the percentage of protein is added to the present definition, I do not see that it would increase the grades.

By Mr. Millar:

Q. There is a question here which you raised yourself. In order to work this out I have thought out the details as carefully as I can, and there is one difficulty which has arisen which seems to make it necessary that the sample must be taken, even from cars which are loaded very full. At Winnipeg, for grain going East to Fort William, in the higher grades, it is not very often that a car would be filled so full that it would be difficult to take a sample?—A. Wheat running about 25 to 35 per cent of the cars are loaded too full to properly sample this is proportioned from No. 1 Northern right down.

Q. 25 to 35 per cent?—A. 25 to 35 per cent of the cars passing Winnipeg are found to be loaded too full to properly sample.

Q. What percentage of this would be 1, 2 and 3?—A. Well, in a year like this when we have rusted wheat, the greater proportion would be the lower grades of wheat, but years where we have 4, 5 and 6, on account of frosted grain that is as heavy as 1, 2 and 3 Northern, I think it would be equally divided.

Q. I have been pretty well convinced that samples must be taken at Winnipeg. Is it not possible to invent some device to take a fair sample of a car, even though it is pretty well loaded?—A. We have been looking for such an instrument for years, and it is open to the world to manufacture one, if it is possible to do it. We have been trying all kinds of equipment.

Q. You would not say that it was impossible to get a fair sample for testing purposes?—A. We always get samples of every car, even if we can only get it from the doorway.

Q. And recheck it at Fort William afterwards?—A. It must be re-sampled and rechecked at Fort William, the Winnipeg sample may be right or it may not, it might affect the protein test the same as it would affect the grading at the present time.

Mr. COOTE: I would like to ask two or three questions to clear up some matters which were mentioned before.

By Mr. Coote:

Q. Some samples are sent back to you from the Old Country, where the buyers complain that they are not up to standard?—A. We get a few complaints in a year. I do not know that I have had more than one complaint this year.

Q. Are there cases where the samples are sent back?—A. Occasionally, yes.

[Mr. J. D. Fraser.]

Q. What do you do with these samples to determine whether there is ground for the complaint from the Old Country?—A. These samples are examined in the same manner as we examine any sample placed before us and are compared with the standard samples.

Q. Do you not think it should be sent to the laboratory for baking to find out if there is anything wrong, and if so, what it is?—A. The baking test requires a considerable sample. Sometimes these samples would not be large enough for a baking test. At other times, of course, they would be.

Q. Would it not be well to make it known to the trade there that if they have any complaint to make, you would like to receive a certain sized sample, and when it is received have it sent to the laboratory to find out what is wrong?—A. The last complaint I had from the Old Country was on a shipment made from Vancouver. The boat had six holds in it, which were loaded with practically the same wheat. In No. 4 hold, next to the boiler room, the wheat was found to be slightly heated. Now, a baking test would not determine that. The wheat was tested for moisture at Vancouver when it was put into the hold, the same as the balance of shipment. The wheat went in there dry. Whether there was any leakage from rain during loading time, I do not know, probably the extra heat from the boiler room caused sweating and heating, we do not know that. In a case like that you could not determine anything by baking.

Q. Would it not be a good idea to make it known to the trade that if they have a complaint the inspection department would like to receive a certain sized sample of wheat, so you could tell whether there were any grounds for the complaint and if so, what the trouble was?—A. I would like in a case like that to have our own representative in the Old Country see how this cargo arrived, because the old Country men, just like ourselves, are human and reasonable when shown.

By Hon. Mr. Motherwell:

Q. They are not naturally looking for grounds for complaint?—A. No.

By Mr. Coote:

Q. You said that there was ground for some of the complaints this year, in regard to the dried wheat put into straight grades?—A. Yes.

Q. Do you keep any check on the driers at Fort William? Have you sent one of your men there to watch them?—A. No, I have not.

Q. I think you said that grain might be spoiled by being dried at a certain degree of temperature?—A. From experiments made by the Research Council during the past year, that is believed to be so.

Q. You know to what temperature grain may be safely heated when it is being dried?—A. It has been determined by the Research Council to a very close figure.

Q. Has there been any regulation passed to make the terminals doing the drying live up to that and not use any greater heat?—A. I find the men in charge of the terminals and driers are very willing to do it in a proper manner.

Q. They have been ruining some.—A. It was through ignorance rather than intent.

By Mr. Garland (Bow River):

Q. Was it not due to their anxiety to rush through a quantity of grain?—A. A year ago we had a large quantity that was damp, so it had to be rushed through.

By Mr. Coote:

Q. But does that not tend to spoil the wheat?—A. It was a question of whether it was better to rush the drying, or run the risk of it spoiling altogether by heating. It could all go into bread, but its strength would probably be reduced.

Q. Do you have any limit?—A. Some of the Old Country millers had no complaint to make about it. Others did.

Q. Have you any point of moisture to which damp grain might be dried?—A. The inspection department has nothing whatever to do with the drying. We do the grading before and after, but we do not control the driers.

By Mr. Millar:

Q. In the Inspection Act we find this statement, "Equal to Marquis". In regard to any particular variety which comes forward, how do you arrive at a decision as to whether or not it is "Equal to Marquis"? Is it by milling or baking?—A. Milling or baking. Any new variety that comes out, as soon as we can get a sample we ask Dr. Birchard to make a milling and baking test. That is the test we make on any wheat.

By Mr. Coote:

Q. Just one question in regard to the varieties of wheat raised in western Canada. It is often said that we are raising too many and spoiling the standard. Would it not be better for a man in a district where it seems impossible in ordinary years to raise Marquis properly, to raise Garnet wheat and get a No. 2, rather than to attempt to raise Marquis wheat that would not grade better than No. 5?—A. I would say to raise the Garnet.

By the Acting Chairman:

Q. There is no confusion between the Durum wheat and the others?—A. No; they are an entirely different kind of wheat.

By Mr. Garland (Bow River):

Q. Do you dry any tough grain during the moving season?—A. The inspection department does not dry any tough grain. Tough grain during the Fall and Winter seasons is stored as tough grain in the elevators, and a lot of it is shipped out, even to the Old Country in its tough state. When it comes to the months of May or June, if there is any tough grain in the elevators, they usually dry it.

Q. You have nothing to do with it?—A. No, we have nothing to do with it. It is a matter for the owner.

Hon. Mr. MOTHERWELL: Any samples shown by yourself or anybody else would require to be certified samples, certified by some person as being what it represents?

The WITNESS: Oh yes, we would expect them to be certified in some way.

Hon. Mr. MOTHERWELL: I was wondering if these samples which Mr. Fansher has have been certified by anybody.

Mr. FANSHER (Last Mountain): I will just read the letter. It is from the Regina Office of the Saskatchewan Co-operative Wheat Producers Limited, and is dated March 19, 1928, addressed to myself.

"In answer to your request, by telegram, for overseas samples of wheat, we are sending you to-night, under separate cover, samples of [Dr. F. J. Birchard.]

No. 2, No. 3 and No. 4, and of No. 2, Tough, No. 3, Tough, and No. 4, Tough. On each sample you will find a slip giving the full details of the cargo, the name of the boat, from what port shipped, and at what port received, and date of sailing. Trusting that this is what you require, we are,

Very truly yours,

(Sgd.) A. J. BURES,

Publicity Department."

These samples were collected by representatives of the Pool, and they were taken as the cargoes were being taken out of the holds of the ships. No doubt, these samples are as authentic as it is possible for any one to get.

Witness retired.

Dr. F. J. BIRCHARD, recalled.

The WITNESS: On looking over the unrevised evidence, I found, in answer to a question of Dr. Donnelly's, that I had not quite grasped the question, and made a misstatement of fact. With the permission of the Committee, I would like to change that. Dr. Donnelly asked me a question—I have spoken to him about it, already—referring to the amount of protein in bran frosted wheat, and I answered that question wrongly. I should have stated that bran frosted wheat does not show any appreciable difference to that of normal sound wheat.

Mr. COOTE: I would suggest that the Doctor certainly be given the privilege of correcting that answer.

The VICE-CHAIRMAN: He is entitled to the privilege of making any corrections that he wishes.

By Mr. Millar:

Q. I have been dealing with frosted and bleached wheat. I would like to ask you if the research work you have done, in regard to frosted and bleached wheat, would enable you to tell, by the appearance only, when the damage starts in bleached wheat?—A. Yes, to a very large extent.

Q. What are the indications?—A. When the wheat is very slightly blistered, particularly on the back, and when it does not extend around to the crease.

Q. I was speaking of bleached wheat.—A. If the wheat shows no signs of germination, or is not swollen at the end, or if a condition known as "Sprung" has not developed, and if, when cut across, it still has a hard, vitreous appearance, I find no deterioration.

Q. That is, you think you can tell?—A. In the milling or baking value.

Q. You think you can tell, fairly well, by appearance, when the damage starts?—A. I think so; I think our tests would show that.

By Mr. Garland (Bow River):

Q. You mean that an expert could tell, but the ordinary inspector could not?—A. I would not like to say that the ordinary inspector is not an expert; I would not like to make that insinuation.

Q. Let me put it this way, Doctor. You are an expert in this thing, and have trained your eyes so accurately, by the tests, that you are able to tell about when the damage starts?—A. I would rather put it this way: we have been able to co-relate, to a certain extent, the damage in bleached wheat, with milling and baking value.

By Mr. Miller:

Q. Have you found cases in which bleached wheat has been improved?—A. Yes. It makes a bigger loaf, makes a loaf with a larger volume.

Q. For certain purposes, is sprouted wheat not sometimes improved?—A. Yes. The addition of a certain percentage of sprouted wheat certainly improves the baking value.

Q. Can you tell when the damage starts, by appearance, in frosted wheat?—A. Yes, in the same way, as I stated before. When the blistering from the frost is confined to the back of the kernel, then the experiments show that there is no decrease in strength, as indicated by loaf value, and there is no decrease in the milling yield of flour.

Q. Does it make any difference at which stage the frost takes place?—A. Oh, yes. If the frost has occurred during the dough stage, when the kernel is still green and soft, so that the kernel has taken on the characteristic shape of badly frosted wheat, then the damage is severe and is very characteristic.

Q. But there is a frost, up to a certain stage, that does not damage it for milling purposes?—A. Yes, I would say that, if it is a very light bran frost, and, if the blistering is confined to the back of the kernel.

Q. Do you believe that wheat that is now, according to our present grading system and practice, being graded down because of frost, and still not damaged?—A. I think, in certain instances, that would be true.

By Mr. Campbell:

Q. Do you think that it is possible to dry grain without impairing the quality of it in any way?—A. Yes, sir, I do.

Q. What process would you suggest?—A. Our tests indicate that if too high temperatures are avoided, and if the grain is not dried too rapidly, and if too much moisture is not removed, there is no deterioration, or, at least, very little.

By Mr. Donnelly:

Q. Wheat that dries in the stook in the field would not be damaged, when it has not been wet too long?—A. No, I do not think it is damaged in that case.

Q. Bleaching would not hurt it?—A. In that case, I do not think the bleaching would have any detrimental effect.

By Mr. Campbell:

Q. I suppose you have read Cora Hind's article?—A. Yes.

Q. You notice that she makes reference there to grain as apparently being damaged in drying. It is your opinion that this drying was either at too high a temperature, or that it is dried too much, or both, probably?—A. Yes, I would assume so.

By Mr. Millar:

Q. An English authority I was reading puts it this way: "Say what you think of this, that moisture is held in the wheat in two forms. One form, you can understand it as clinging particles; the other form is as a moisture of constitution." This expert says that this latter moisture cannot be driven off, without doing damage. What do you think of that statement?—A. Well, no doubt, that is true. That moisture of constitution however would never be driven off in any ordinary commercial process, because, I think, he only refers, in that case, to the last one, or possibly only the last one-half per cent. I think it is the consensus of opinion, of all the investigators I know of, that one of the great dangers is removing the moisture too quickly. Some change takes place in the physical condition of the gluten, if the moisture is too rapidly removed. That holds true, I might say, even when the grain is dried before it is thrashed.

[Dr. F. J. Birchard.]

If the grain is exposed to very hot winds for several days, a very similar change takes place, as in the too rapid drying in the dryer. A physical change takes place in the gluten, and that change is detrimental to the baking quality.

By Mr. Coote:

Q. That would not be as serious as in the case of the dryers?—A. No, it is not, but it is of a similar nature.

By Mr. Garland (Bow River):

Q. You have read Mr. Millar's resolution?—A. Yes, sir.

Q. Do you think that the growers of wheat would be benefited by the application of his resolution to the grading system?—A. I think that certain growers would undoubtedly be benefited; it would be to their advantage. Whether it would be to their advantage, on the whole, I do not think that I am in position to say.

Q. There is a doubt in your mind?—A. Well, the implications are very great. As I stated in my evidence before, it means a revolution in our grading system. What all those implications might amount to, and just where it would lead, is a matter that would have to be very closely considered. I can see certain advantages, and I can also see a good many objections.

Q. I think it would be of interest to the Committee, if you would let us know those implications?—A. First, I would say that the value of any particular sample of wheat depends as much upon the quality as upon the quantity of protein present. As yet, we have no adequate means of measuring the protein quality. The only way we could at present safeguard the quality, would be to confine the test to the varieties which are known to produce the best quality. However, that would not be invariably satisfactory. The next point I have is the impossibility of making tests at country elevators. That seems to be a very serious objection, and I know of no way to meet it.

The next is the disposal of wheat that is sound in every respect, of high weight per bushel, but is yet low in protein. Presumably, an additional grade would have to be created to take care of wheat of that character. It would be impossible to put wheat of that kind, in No. 4, or No. 5.

By Mr. Donnelly:

Q. Like Vermilion wheat?—A. No, that would be excluded on account of variety.

By Mr. Garland (Bow River):

Q. It has a similar appearance to that low in protein content?—A. Yes, and very often it would be mixed with high protein wheat.

By Hon. Mr. Motherwell:

Q. You would not necessarily have to make a new grade for that, just put it down in to No. 3.—A. It is understood that No. 3, is to have a definite percentage, as well as No. 1. No. 1 might have 14 per cent; No. 2, 13 per cent; and No. 3, 12 per cent protein. What are you going to do with wheat of 11.9 per cent, that might still run 63 pounds to the bushel? You cannot put that wheat with damaged wheat.

By Mr. Millar:

Q. Would there be a large percentage of that?—A. In some years there might be a large percentage, yes. This year there will be a large percentage. It is important, because the point is how to dispose of sound wheat, of high wheat

[Dr. F. J. Birchard.]

per bushel, say 65 pounds to the bushel, but with one-tenth per cent difference in protein below the standard requirement. Sixty pounds to the bushel wheat, but with a higher protein percentage than the requirement for the grade, might be less valuable, all things being considered. I think that point should be carefully considered.

Another implication is that if a definite protein content were guaranteed for each grade, it would probably involve seaboard inspection also. A moisture test would have to be made on every sample, as, otherwise, the test would not be comparable. Tests would have to be made on all cars and cargoes out of the elevators. This would mean a large number of laboratories at Fort William and Port Arthur. In some cases, tests could not be made at all. For example, at the Canadian Government elevator at Saskatoon, no running water is available, and this is absolutely necessary for making the test.

Q. How far is the place of inspection of the grain at Winnipeg, from the place where they take the samples from the cars?—A. I understand that the elevators at Fort William and Port Arthur are spread over a distance of something like sixteen miles.

Q. That is not the point. How far must the samples be taken, at Winnipeg, to the place where they are graded?—A. I think perhaps you had better ask Mr. Fraser that question.

Q. Just finish those points, and we will discuss that later.—A. If a definite protein content is set for each grade, it appears to me that this would, in many cases, lead to some confusion, and might lead to mixing on a very much larger scale than is at present possible. For example, if No. 1 Northern is fixed at 14 per cent, as the maximum; No. 2, at 13 per cent; No. 3, at 12 per cent; and presumably a special grade, which we will call No. 4 Special, at 11.9 per cent, and if the weight per bushel was sufficient, mixing on a large scale would occur. Mixing a car of No. 1, at 14.2 per cent protein, and a car of No. 2, at 13.8, would make two cars of No. 1. Is that desirable?

Mr. COOTE: We will have to discuss that under the question of Mixing.

The WITNESS: I cannot help but think that it makes it much easier.

Hon. Mr. MOTHERWELL: What is the use of grading at all, if they are going to mix it up afterwards?

Mr. DONNELLY: The difference is that the mixing might be scientific mixing.

The WITNESS: If the protein content was definitely fixed each year, then, in a year like the present one, we would have no No. 1 Northern, 14 per cent. We would have very little of No. 2 Northern, 13.9 to 13 per cent. No. 3 Northern 12.9 per cent to 12 per cent, would be our present No. 1 Northern. No. 4, 11.9 per cent, would be our present No. 2 and No. 3 Northern. If our present No. 1 Northern were graded No. 3 Northern, and all our No. 2, and most of our No. 3, as No. 4, would that not lead to considerable confusion and dissatisfaction among the producers from year to year? If the protein content were variable from year to year, then, say, No. 1 Northern, fourteen per cent one year, would be twelve per cent another year. No. 2 Northern with 13.9 per cent to 13 per cent, in a low protein year would be 11.9 per cent to 11 per cent. No. 3 Northern, 12.9 per cent to 12 per cent, or a low protein year, would be 9.9 per cent to 9 per cent. No. 4 Special, 11.9 per cent and under, would be 9 per cent and under this year. One year a sample would grade No. 3 Northern, and in another year it would be No. 1 Northern. Another sample would grade No. 4, and in another year would be No. 2 Northern. You must either do one thing or the other, and yet neither method would be satisfactory.

There is another thing I would like to call your attention to. What would be done with the dried wheat? In the case of dried wheat, the protein quantity would not be changed, but it might, as has been admitted, be very seriously altered. In that case, the protein test would not be of any value at all; it would be very misleading.

[Dr. F. J. Birchard.]

By Mr. Garland (Bow River):

Q. If all these difficulties were overcome, and this proposed change in the grading system established, do you consider that it would be advisable to confine it to the first three grades? Why should it not go through all of them?—A. I do not think we could apply it to our grades Nos. 4, 5 and 6, because of the great difference in the quality of the protein, and the fact that our lower grades would often show a higher percentage of protein than the contract grades.

By Mr. Millar:

Q. It might be possible with No. 4?—A. Well, it might be arguable whether it could be applied to No. 4 or not.

By Mr. Coote:

Q. You have made some experiments in connection with the drying of grain?—A. Yes, sir.

Q. Have you decided how much heat may safely be used in drying grain? Is that a known factor?—A. Yes, within limits. It has been found that the temperature to which grain can be subjected depends, to some extent, upon the amount of moisture in the grain. Damp grain cannot be heated to as high a temperature as tough grain. We have found that tough grain can be heated to about 175 to 180 degrees—I am speaking of the temperature of the air—without injury.

Q. How long would it take to dry out the grain, using the proper temperatures so as not to injure it?—A. That depends a good deal on the type of dryer. I think about an hour, or an hour and a quarter.

By Mr. Donnelly:

Q. What form of commercial dryer did you find to be the best?—A. I have not conducted enough tests to answer that question.

By Mr. Coote:

Q. If you know the moisture content of the grain going into the dryer, and the temperature to which it is subjected in the dryer, could you tell very closely what length of time it would need to be in the dryer to bring it down to a given moisture content?—A. I have no doubt that that could be determined with a little experience.

Q. How close are they able to do it to-day, in a commercial way?—A. I know that on the other side they do it very closely, within two-tenths of one per cent. In talking to the managers of some elevators in Minneapolis, I was informed that if any operator failed to reduce the moisture to within .2, or at the most, .3 per cent, he would be fired.

Q. If an experienced man were operating the dryer, he should be able to dry all this grain without injuring it?—A. I think so.

Q. So far as the drying is concerned?—A. I think so.

Q. In view of that answer, if someone from the Inspection Department were stationed at each one of these dryers, would it be possible to have this grain dried without injuring the quality of the wheat?—A. I think so with proper supervision. I do not know just what the nature of that supervision should be, but, with proper supervision, I think the damage would be practically eliminated.

Witness retired.

Mr. MILLAR: It may be unusual, but I would like to move a vote of thanks to Mr. Fraser and Dr. Birchard for the courteous and satisfactory manner in which they have given evidence before this Committee.

The Committee adjourned until Monday, March 26th, at 11 o'clock.

HOUSE OF COMMONS,

MONDAY, March 26, 1928.

The Select Standing Committee on Agriculture and Colonization met at 11 o'clock, a.m., the Chairman, Mr. W. F. Kay, presiding.

The Committee proceeded to the further consideration of the question of grain grading.

Mr. M. SNOW, Board of Grain Commissioner, called.

By Mr. Millar:

Q. I find that some of the members of the Committee do not exactly understand what this proposition is. We have four specifications in grading, and the proposition is to take out one of them and put another one in its place. I would ask you if you understand what the proposition is?—A. My idea of the proposition is that you are still going to have the inspector grade the three higher grades, in accordance with the regulations that are in force at the present time, but supplementing that with the fact that he will not issue a certificate until the protein content is determined. In other words, he would not put a final grade on that until he got information on the protein content, whatever that might be.

By Hon. Mr. Motherwell:

Q. That is as to quantity; the other, namely, quality is not determinable except after a prolonged process?—A. The grain is laid before the Inspector, and he says, "this is No. 1 Northern Wheat, under our present regulations." But you want to go further than that, as I understand it, and you say that it must contain a certain protein content before he can say that is No. 1. Northern wheat.

By Mr. Millar:

Q. That is it, exactly, except just this: you say that he would grade it according to our present standard?—A. Yes.

Q. Leave out the colour, and you have it, and replace that with the protein test; that is all there is to it.

HON. MR. MOTHERWELL: Disregard the colour.

MR. MILLAR: And substitute an actual chemical test.

HON. MR. MOTHERWELL: The only difficulty would be whether this high quantity of protein is usually accompanied by high quality.

MR. MILLAR: No, it is not, but that is not a question that would come within the scope of the Board's work?

THE WITNESS: No. Unless you wish to go further than making a protein test, you would have to assume that any number 1, 2 or 3 protein content was good protein; you would have to assume that, or you will have to go further than merely testing it to determine the content.

MR. FANSHER (Last Mountain): There would be no grading of Nos. 1, 2 or 3 until the protein content was determined.

MR. MILLAR: That is it, exactly.

[Mr. M. Snow.]

By Mr. Fansher (Last Mountain):

Q. It would be held in reserve until the protein content was determined, and then the placing of the wheat would be determined by that?—A. That is as I understand it. I would like to point out to this Committee that if you are determined to put that into effect, outside of the question of the buyer in the country elevator, you must also remember that we have a great many inspection points in the West. I do not know whether it is this Committee's idea to confine this to the Winnipeg inspection, or whether this would be put in force at all of our inspection points. If it was put in force at all of our inspection points, I fail to see where we could avoid having the necessary machinery at all these different points to make this test.

By Mr. Millar:

Q. It might hasten matters if I were to say right here that the proposition is to have laboratories at Winnipeg, Fort William, Vancouver, Calgary, Edmonton, and probably Moose Jaw and Saskatoon; that is, if those places are made inspection points?—A. Yes. I would imagine that you would have to establish some machinery at the different inspection points.

By Mr. Fansher (Last Mountain):

Q. Would it not simplify matters to have inspection points at these different places, but have the laboratory test made either at Winnipeg or Fort William, for the grain going east, and at Vancouver, for the grain going west? Samples of the grain could be forwarded by express, or by mail, and would be there, and the protein content would be ascertained, before the wheat arrived? In multiplying the stations where the laboratory tests would be made, I think we would be multiplying our difficulties. These tests would have to be supervised by special men, and they are hard to obtain, and the results, probably, would not be as satisfactory as with a smaller number. These men could then unify their efforts a great deal better, than they otherwise could?—A. Supposing a farmer's car went through Calgary, billed to Vancouver. This farmer is anxious to sell his car, and, at the same time, he has to wait until the car is really spotted at Vancouver before he is in position to determine the actual grade of that car. It might, in many cases, cause him a loss of time. He would not be in position to sell that car, immediately that inspector had decided what grade it was, but would have to wait until the test was made. In that case, he would have to sell it like we do a car on the track, on the basis of the grade.

By Mr. Brown:

Q. If the tests were not completed at, say, Saskatoon, it would simply reduce Saskatoon to a sampling station.

HON. MR. MOTHERWELL: It would be putting all cars in the same position as the overloaded cars. Unless you had it definitely settled at the place, where the other factors of the grading were determined, it would have to be done all at the one place.

By Mr. Millar:

Q. With cars going westward, I have been under the impression that it could be done, like this: cars graded at Calgary would be inspected there, the laboratory would be there, and the sample would be drawn. Before that car reached Vancouver the test would be made and an inspection certificate made out, and the result either wired or 'phoned on from, say, Winnipeg to Fort William. They would be sent on in the same way for Edmonton, or any other point?—A. Suppose that car was inspected at Moose Jaw, and you had no means of determining the content at Moose Jaw?

(Mr. M. Snow.)

Q. My proposal is that you will have means there.—A. There was a suggestion made that you would confine to certain of the larger inspection points.

Q. I would not suggest that. There has got to be a laboratory there to make the test; if you are going to have an inspection point, you have to have a laboratory.

By Mr. Lucas:

Q. Could you tell us what percentage of the cars going through Winnipeg are too full to grade there?—A. I believe that Mr. Fraser made the statement that it was around thirty per cent.

Discussion followed.

By Mr. Garland (Bow River):

Q. Do you think that it would improve the condition of the farmers to have the protein factor in the grading of wheat?

The CHAIRMAN: Have you finished the question of overloaded cars?

Discussion followed.

The WITNESS: I might say, from our own knowledge, in a year where we have a large crop, the railway companies are very insistent that the cars be loaded right to the very fullest capacity.

By Mr. Millar:

Q. If an 8 foot 6 inch car is loaded to its fullest capacity, how much space would that leave?—A. If it is a good sound car, they will get it a little above the wheat line.

Q. What is the space between the wheat line and the top of the car?—A. There might be from 12 to 18 inches.

Q. Only 12 to 18 inches?—A. Not any more.

By Mr. Coote:

Q. Is it not a fact that practically all cars, containing two thousand bushels, are marked, "too full for final inspection"?—A. A great many of them are, but I could not say they all are.

By Mr. Millar:

Q. In the case of a car of damp flax passing Winnipeg, can they stick damp flax with the present stickers?—A. It is very difficult.

Q. But they do grade them?—A. No inspector will put a final grade on any grain unless he is satisfied that he has a proper sample; that is one thing that they will not do.

Q. With damp flax, it is practically impossible to stick it?—A. Yes. This other question is something that would be very difficult for anyone to answer. I can only give you my own opinion on the thing, which might not agree with other opinions. Anything that can be done that will improve the present system of determining the value of a man's car of grain, would certainly be an improvement, there is no question about that. If we can devise something that will give better satisfaction to the producer of the grain, I think we are doing him a great service. Nevertheless, a farmer, at the present time, loads a car of grain. It has all the characteristics of a high grade, and he expects to get that grade. According to his knowledge of grain, and the system under which his car is graded, he is right in expecting to get that grade. The car comes along, and owing to a change in our system, he finds that his car goes down one or

[Mr. M. Snow.]

two grades, and he is a very dissatisfied farmer. I have no doubt but that that would happen very often in the handling of our crop. I have been told by our chemists that we have many cars of high-grade grain that are not very high in protein.

By Mr. Garland (Bow River):

Q. Do you think it would be wise, at the outset of such a revolution in our grading system, to establish laboratories at every inspection point, or do you think it should be confined to two main points, for the start?—A. Well, personally, I cannot say. If you are going to put this into force, and make it effective, I do not see that you can do anything else but have the machinery at the different points where inspectors are taking samples. You have got to give them the same machinery that they would have at any other point.

By Mr. Millar:

Q. What would you think of this statement, Mr. Snow? This is from the Food Research Institute, Stanford University, California:

Nevertheless, all things considered, the amount of gluten, that is, of protein, seems, in the light of the present day knowledge, to be the nearest approach to an ideal index of baking strength available. The baker who depends upon it alone will now and then be deceived. If, however, he knows the variety and place of origin of the wheat from which the flour is milled, he will less often be misled.

Is that a better test than the present one; is it a more accurate test?—A. Well, Mr. Miller, that is really a question that could be better answered by a chemist. I would say that with a sample of wheat we have to take the judgment of a man who simply looks at it to determine that it contains certain qualities that would entitle him to put it in a certain grade. If that can be supplemented by a scientific test, that would also determine that that was a high-grade wheat for milling purposes, I think, in that case, that we are getting down to what the grain actually is. At the present time, under our system, it is quite possible that many farmers might be disappointed.

Discussion followed.

By Mr. Garland (Bow River):

Q. Mr. Snow, under the plan, as you outlined it yourself at the start, would you mind telling me what would happen to wheat which was graded by an inspector subject to protein content, being returned to him as No. 3? He gets back a protein content even if it only contains 9.9 per cent. What would he do with that?—A. As I understand it, he would not get a 3 for it.

By Hon. Mr. Motherwell:

Q. It would drop into 4?—A. Yes.

By Mr. Coote:

Q. Was it your idea, Mr. Snow, that all wheat which would not meet the requirements of the protein content required for a No. 3 would automatically go into a No. 4?—A. I do not see what else could happen to it.

Q. Would it be better to establish a separate grade for that wheat which was better than was required for a No. 4 but did not measure up to the protein content required for No. 3?—A. Well, of course if you wish to supplement this legislation with additional grades, owing to the fact that certain wheat does not come up to the requirements of the protein content, but is otherwise still a 3

[Mr. M. Snow.]

Northern, that is another question. I might point out to the Committee that at the present time, according to the information I have, we have a multiplicity of grades to-day, and I do not think we should increase those unless it is absolutely necessary to do so.

Q. Is it true, Mr. Snow, that there are a lot of those grades of which there will be but very few cars each season?—A. Yes, no doubt about that. But we have a great many grades at the present time and I think we should hesitate to increase them unless it is necessary.

Q. I think this is a very important point. If we are going to establish the protein content as a basic factor in grading, we should determine and have information on the point as to what is to be done with wheat that would be No. 1 except for the protein content requirement. What is to be done with that wheat? Is it automatically to go into No. 4, or would it be preferable to establish a grade for wheat which is now No. 1, 2 or 3, but because of the lack of the required protein content, would not be graded 1, 2 or 3? Is it better to establish a grade into which those three classes of wheat might go?—A. Mr. Coote, this would mean that in your terminal storage houses you would have two different grades of the same grade.

Q. No.—A. Why not? You cannot put that grade of yours into 1 Northern on account of lack of protein content, and yet you might have 1 Northern which passed the protein content.

Q. I think you are misunderstanding my question. Presume that we put all these into one grade, 1, 2, and 3, which do not meet the protein requirements, and give that a separate classification—some other grade number. Would that be preferable to putting it all in as No. 4?—A. You mean that I have a car which otherwise will grade 1 Northern, but owing to the fact that it does not come up to the protein content, it cannot go into No. 1 Northern?

By Mr. Millar:

Q. Cannot go into No. 1, cannot go into No. 2, and cannot go into No. 3.—A. Instead of putting it into—

By Mr. Coote:

Q. No, it cannot go into No. 1, 2, or 3 because it does not have the protein requirement.—A. It might have the protein content that would put in into No. 2.

Q. Then it would go into No. 2. You will have cars in No. 1, 2, and 3 which under the present standard will not meet the protein content required for even a No. 3?—A. Yes.

Q. Is it wise to adopt this system that this No. 1, No. 2, and No. 3, as it would be under the present system, should go into No. 4, or would it be better to establish a separate grade into which all No. 1, No. 2, and No. 3, which cannot meet the protein requirements, might go?—A. In other words, you would adopt three different grades?

Q. No; one more grade.—A. Would you intend to put a car which otherwise would grade No. 1 Northern, but owing to the fact that it lacks the protein content, and another car in as No. 3 Northern, but owing to the fact that it lacks the protein content—would you want to put these all into one grade?

Q. I am not saying what I want to do. I will put my question in another way in an endeavour to get an answer from you. If 10 per cent protein were required for wheat to get into No. 3, and you had wheat which meets all the other requirements—it might be a No. 1, No. 2 or No. 3—but only had a 9.9 per cent protein content, would you say that it would be better to put that wheat into No. 4 or establish a separate grade for it?

[Mr. M. Snow.]

By Mr. Bancroft:

Q. Would the price not be a determining factor?—A. I want to try to understand what Mr. Coote is getting at. I may not comprehend him properly. I cannot see that you could confine yourself to No. 3. You will have a protein content for No. 1 which will be different from No. 2 and different from No. 3. You will not have the same protein content for those three grades, as I understand it, but you will have a higher protein content for the higher grades. Supposing you have a car come along that might be 1, 2 or 3, but it does not come up to the protein content? You want to know what you will do with that car instead of putting it down in No. 4? If it were a No. 3 you would have to establish a grade which would take care of that particular car which otherwise is a No. 3. You get another car which otherwise is a No. 2 but cannot go into No. 2 on account of the lack of protein content. It looks to me as if you will have to establish another grade to carry on. The same with No. 2 and the same with No. 1. Surely you would not want to make a grade that you could dump all the higher grain into, in the higher grades?

By Mr. Coote:

Q. Then your opinion is that we would need three more grades?—A. It looks like it.

Q. There seems to be an opinion prevalent that all wheat which would not get into 1, 2 or 3 on account of the protein content should be put into No. 4. My question was asked with a view to getting your opinion as to whether that should be done, or whether we should establish another grade?—A. Mr. Coote, I cannot agree that a car which has all the characteristics necessary to grade 1 Northern except its lack of protein content would necessarily have to go into No. 4. I would imagine that that car probably just escaped going into 1, but would have high contents enough to go into No. 2.

Q. Yes, but take a car that is otherwise No. 1, but has a protein content one-tenth of one per cent too small to get into No. 3. What would you suggest should be done? Into what grade should that car be put?—A. I would like to have some way of taking care of it rather than putting it into No. 4. There is no question about that.

Q. Is it your opinion that it would be proper to have three new grades established to take care of these three different cases?—A. I think it would be preferable to do that rather than put it into the No. 4 grade.

Mr. VALLANCE: I would like to reverse that question. Mr. Snow, do you think it is preferable to create three new grades to give the farmer who is growing the wheat the price for what he is growing? Mr. Coote is supporting the man who is not growing the wheat with high protein content, and I put the question to you the other way. Is it not right that the farmer who grows the high protein wheat of 1, 2 or 3, should be paid for it?

Mr. COOTE: On a question of privilege I want to say that I am not supporting anybody. I am putting questions to Mr. Snow in an endeavour to get from him what should be done if we change this system.

The WITNESS: I will try to answer both of you. I agree with the statement that if there is any way of devising a scheme which will give a man the value of his car, I think we should try to do it. If we have a high protein car, and it is worth more money than a car which has not the high protein content, I think if there is any possibility of getting an advanced price on the car with high protein content, we should try to make that available.

Now, in reply to Mr. Coote's question. Mr. Coote, you were trying to get from me an idea as to whether in case of a high grade car, which could not get into the higher grades on account of the lack of protein content, would it not be

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better to establish a grade to take care of these cars rather than to automatically put them into a lower grade, say a No. 4? I say that rather than have a farmer's car which failed to get into a high grade owing to the lack of protein content, I would rather, if it is possible to do so, have some system so that the farmer would not be compelled to take a No. 4 grade.

By Mr. Brown:

Q. Mr. Snow, it seems to me that there is a point being overlooked. In actual practice, would it very often happen that a car which would otherwise grade No. 1—grade No. 1 apart from the protein content—would drop below a No. 3, and if that is true, why the necessity, in a great majority of cases, for a new grade?—A. Mr. Brown, Mr. Coote put up the proposition, as I understand it, that it might happen that a car would come along which otherwise would go into a high grade but owing to lack of protein content might not even get into No. 3, and he asked what we should do to take care of these kind of cars. While I can only give you this second-hand, I believe from statements made by our chemists that we do have a good many cars of the high grade which, owing to lack of protein content, necessarily would go into the lower grades, if you set the protein content fairly high, say at 14 per cent.

By Mr. Millar:

Q. Would that condemn our present system, Mr. Snow, considering that the protein content of the kernel, according to chemists, is the most valuable part of the kernel? There are quite a number of cars going into our highest grades which are away down in protein content, our most valuable element.—A. I would say rather "a certain number."

Q. You seem to think that it would be a distinct disadvantage, in fact almost unthinkable that a car of wheat graded down to, say, 4 or down to 3 because it was low in protein content would in every other respect be a No. 1? You speak of that as being almost unthinkable. Is that not our present system? Have we not got such cars which are graded down to 3 and 4 because they lack the weight per bushel; have not lots of cars which have the weight per bushel but lack the proper colouring, and have we not cars which have perhaps the weight per bushel and the colour, but lack the proper percentage of the hard, red, vitreous kernel?—A. Of course, Mr. Millar, any car of grain that has the weight and is not damaged by frost will very seldom go down into a very low grade. In this country we have damage by frost, and we still have weight, therefore, I would not put it into a lower grade.

Q. But for one lack or the other, it is put down, while it is up in all the other characteristics?—A. I think if a car comes along, in actual practice, and has the weight, unless it is damaged by frost, as a rule it will not go down into the lower grade—not as a general thing. I might say this, in regard to this particular question. At the present time we have, in a normal year, the great bulk of our higher grade cars with good protein content. But in a year such as this and perhaps the year before, we find that owing to climatic conditions we do not have these high protein cars. The question in my mind is if this is correct, under this system, you hope to devise something which will give the farmer the price he is entitled to. You will find perhaps as his crop comes along that the great bulk of it is high in protein, as high as you would fix it. I doubt very much, however, if anyone would be willing to pay very much of a premium owing to the fact that some inspector or some chemist tells him that this car is very high in protein. That is only my opinion, however. On the other hand, Mr. Millar, if you ever had a condition, which will show our crop low in protein and with a scarcity of high protein cars, you would realize that there would be a big competition for them because we have to have this kind of grain for the flour which the people want to eat. We have that condition in other markets,

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where the high protein car commands a tremendous premium over the same grade with low protein content, and in very many cases the premium will be just as much as the duty is on our wheat going into the United States. Therefore, you have to take into consideration that you are going to introduce a system which will, in a sense, cause a certain amount of delay in the handling of the crop, and will cost a great deal of money to put it into operation, and the question is whether the farmer is going to get any recompense that would adequately compensate him for the cost entailed in carrying this into effect. I am just as strong as this Committee in favour of anything that will give the producer the full value of his cars of wheat. I do not want to say that in the aggregate they all get a good price, but I want to see the farmer get the value of his wheat, but at the same time we have to consider certain difficulties that will confront us when putting in a system of this kind.

By Mr. Fansher (Last Mountain):

Q. Listening to your argument, it seems to me that if we are going to introduce this protein content test into grading, it would be possible to create what we might call a protein content and leave the old grades just as they are, the 1's, 2's, 3's which measure up to the standard of protein content. That wheat could be so graded and stamped with the protein content and could be handled in separate bins according to its grade, and not interfere with the present grades at all, but increase our grades, as it would, by a system that could be devised later, if we are going to adopt this method for the 1, 2 or 3, with certain protein content, leaving the old grades just as they are. Then the European buyer would be on the same level as the millers. I suppose it will hit the millers pretty hard in western Canada. Nevertheless, we are developing in western Canada a very, very much wider area than we ever did before, and in certain parts of western Canada, where the protein content is a factor, it is making the wheat very valuable in certain districts. But those districts do not get the yield, and they must of necessity get a price for the quality of their product to make up for the lack in quantity, and I think the sooner that some scheme of this nature is devised and we seriously sit down and think it out, the better it will be for all the districts in western Canada. In the northern part of my province, 200 miles north of where I live, they get three times the yield I get, and I happen to live in a district where there is a high protein content.

The WITNESS: I do not know whether this Committee would be willing to consider this proposition—

By Mr. Millar:

Q. Is it a new proposition?—A. No, just the same proposition. I wonder if the Committee would consider, before we start establishing all this machinery, connected with changing our system to this extent, whether it would be satisfactory for one year to have a trial of this by having any one who wished the protein content determined on his car of grain being enabled to have it done, so that any farmer shipping a car of grain could say, "I want the protein content of this determined". I realize that the difficulty in doing that would be that we might not have establishments enough at all our different points to be able to do this completely, and we might for one year confine ourselves to our Atlantic and Pacific ports, that is, our shipping points, Calgary and Edmonton for the west, and Winnipeg for the east. By doing that, we could make arrangements to give this a fair trial, put in the necessary machinery, and a year from now we might be able to come to you and say that we have had requests for so many thousand cars, we have made the tests, and we could give you the results of them, and we could ascertain from that whether it has been of material benefit

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to the producer, and find out whether it has caused or is likely to cause any great delay in the handling of our crop. We will also be in a much better position to determine how far we would have to go, if we go on and put this into effect for another season, and we would ascertain the machinery that we would have to establish and at what different points we would require to put this thing into force.

Q. Would that not lead to enormous confusion in connection with storage?
—A. No, I do not think it would, as long as we do not make that part of your inspection for this year. Supposing I have a car and I secure a determination of the protein content and am then able to make a sale, possibly to some miller, where I would get a premium for that particular car. I am getting the benefit of it and we are not interfering in any way with our present system of storing grain in our terminal elevators. It would only be upon request, and upon request we would give this information. Then the owner of the grain if he could make a better sale and find a better market, would benefit to that extent, but if not, it would go the same as if it were never tested.

Mr. MILLAR: I think the weak spot in that is this: nobody will pay a premium for a car like that when he can get it for nothing. The millers would have their lines of elevators throughout the country and would be drawing their strong grain free, and would not pay any premium.

The WITNESS: If that argument of yours is sound, then let us look ahead to see where the farmer will get his premium under your system.

Mr. MILLAR: I do not know whether "premium" is the proper term.

The WITNESS: Get a better price, we will say. The car goes into storage as protein content along with other characteristics. That necessitates putting it into that grade, and that grain then will be sold for export, and under this system you hope and believe that that wheat will get a better price than is obtained under the system of our grading. That is where you expect to get a better value—

Mr. MILLAR: In part.

The WITNESS: Then this wheat when sold for export you hope will bring a better price for the farmer, but the purchaser will have to be guaranteed on this particular grain that it has, and will have, and must have a certain protein content. When he receives it, if it does not come up to the protein content requirement upon further test, it seems to me he would have a claim for damages against the shipper.

Mr. MILLAR: Let me answer that right here. At the present time the British buyer has no claim for damages.

The WITNESS: Not at the present time.

By Mr. Millar:

Q: But there is a standard there, and the grain is expected to be up to that standard?—A. Yes.

Q. You will have a complaint, and probably you and the inspector will be kept pretty busy saying why it was not 14 per cent protein, if we fix 14 per cent for No. 1.—A. Under our present system there may be complaints, but at the present time on a complaint it is a matter of judgment. The inspector says, "That is No. 1 Northern," and the purchaser says, "I don't think it is". Well, it is a matter of dispute as to their judgment, but the protein content is a matter of test. I do not think our test shows this when we put it into store.

Q. It will make you a little more trouble, because the inspector can say, "That is a matter of judgment; I think it is No. 1", while the British buyer

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could say, "It is not up to 14 per cent protein content". It may make a little more trouble for the inspector and the Grain Commission, but I do not think there is any reason to assume that it would be necessary to give these damages or provide any means by which he could collect damages.

By Mr. Coote:

Q. Are not some of the complaints from the Old Country this year to the effect that our wheat has a low protein content?—A. Well, of course, we do know that this year, especially in certain grades, there has been dissatisfaction. I think it was mainly caused through climatic conditions, over which we had very little control. It was owing to the fact that we allowed a good deal of dried wheat to go forward on straight grades, and apparently some of that wheat was damaged in the handling of it.

Q. Would it not be desirable to get a system which would permit as little dispute as possible? It seems to largely resolve itself down to a matter of personal opinion.—A. Not being a chemist, I cannot say very much. At the present time our inspection certificate is final. It is a matter of judgment, and a matter of simply being up to a certain grade, and containing certain characteristics. On the other hand, I go to work and I sell a cargo of wheat to an importer. We have informed him that that particular grade must contain a certain protein content. He says, "all right, under that condition I am willing to pay a certain price for it, as long as you guarantee it has that protein content." In that way, we hope to get a better price for the producer. That cargo comes along, and the importer says, "I took this cargo into my mill to test" and, according to his test, and according to his information to us, he says, "that wheat that you shipped me ought to contain twelve, thirteen or fourteen per cent protein, and it does not contain anything of the kind. I refuse to pay for it unless a certain discount is given." Not being a chemist, I cannot say whether that is probably going to happen, but I think it is quite possible.

By Mr. Millar:

Q. Why do you say he would refuse to pay for it when he knows that he has been buying for many years on a final certificate?—A. Because there is no guarantee, except that he is furnished samples of our grades, and we try to give him what will correspond to those grades, as far as the inspectors will allow them to do so. I might sell a man, and I can tell him, "that grain has been tested for moisture, and the moisture content is so much." That is a mechanical piece of work, and he is quite right in thinking that that mechanical piece of work is correct. But he might have a very different opinion of my judgment in determining that that is No. 3 Northern. That is a matter of judgment, but when I go to work and guarantee the content to him, that is a matter of determination.

Q. You have just mentioned moisture. That is expressed numerically, is it not? Is that not the very thing to which you are objecting with reference to protein?—A. I am not objecting. I say that the moisture content is something that is determined by test, and not by judgment. The protein content is not determined by judgment, it is determined by test. At present, the grade is determined by judgment.

By Mr. Brown:

Q. This new proposition is made with the view of getting more for the farmer for his good wheat. When this test is made, there will be certain standards set for Nos. 1, 2 and 3 grades. When it is tested for protein content, and is found lacking, though it possesses all the qualifications for No. 1, it

will not be able to get into No. 1, but might go down into No. 2, or No. 3. The only effect would be to prevent some farmer, who might otherwise get No. 1, from getting that. I think it has already been said that if a car of wheat grades No. 2, and even if it is high in protein content, it cannot get into No. 1, because it is lacking in other qualities. Would not the thing work out that there would be no possibility of a man getting any better grade than he is getting now, while there is a possibility of his getting a lower grade. As I see it, it may keep the high quality up, but there is no possibility of a man getting anything better than the present grade, while there is a possibility of his getting less?—A. A farmer with a car of grain, as you say, that has all the characteristics of grade No. 1 Northern, but lacking protein content, could not get into that grade. At the same time, the idea behind this legislation is that we would raise the qualities of our particular grades higher than they are to-day, and that, in the aggregate, the farmer would get more money for the high-grade car. A farmer comes along and he has got No. 1 Northern, but it lacks in protein content. There is no getting away from it, that farmer will suffer, but, at the same time, we have got to remember that possibly that farmer, according to the standards that we go on, was entitled to No. 1 Northern, but he is not entitled to No. 1 Northern because it lacks in a very important element that which the buyers of that high-grade wheat expect to have. As long as we can guarantee that they are going to get it, they will probably pay us more money for these particular grades than they are paying at the present time.

Mr. MILLAR: During many fall seasons, a large percentage of our cars are shipped out after a rain. The wheat has been in the stook, and the rain falls on it, and it is discoloured. A great many chemists have shown that in many cases that wheat is not damaged. It is wheat that is graded No. 1 before the rain, and any part that was left after the rain may be graded as low as No. 3, and in some cases a little might go to No. 4. This wheat is graded down because it has been discoloured; it has been bleached. That is the wheat that I want to see go up. Some wheat will go up, and some will go down, but it will give to each man more nearly what he is entitled to, and it will give to the buyer a better knowledge of the thing he is buying.

Mr. BROWN: I think we should discuss this matter from the standpoint of straight grain.

The WITNESS: I think what Mr. Millar says is true, to this extent: you may have a crop of wheat, and where you have had a heavy rain on it it might damage the looks of it, but when it is tested it might be entitled to go in a higher grade than it would, based on appearance alone. On appearance alone, it might only get No. 3, but, by a test of the protein content, it might get No. 2, or No. 1. I believe that is your argument?

Mr. MILLAR: That is it, exactly.

By Mr. Donnelly:

Q. Do you not think that that wheat might be very damp, and, on being dried improperly, the protein has been spoiled by over-drying? When it gets to the Old Country, you have to convince the English miller that the wheat has not been damaged in that way.

Mr. MILLAR: Would that ever occur in field dried wheat?

Mr. DONNELLY: Not so much where it is field dried.

By Mr. Fansher (Last Mountain):

Q. You mentioned this year, as being a bad year, and said complaints had been received regarding overseas cargoes, where there was such a small percentage of high protein wheat. Is it not a fact, that our grading system permits the millers to skim off the cars with the high protein content, here in

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Canada, and, consequently, lower the whole average price for the Canadian crop? They took practically all the high protein content wheat from Western Canada this year, and none of it reached the Old Country at all. A system of this kind, in a year like this, would prevent the re-appearance of that. It is quite possible for the millers here to take all our wheat of high protein content, and allow none of it to get to the Old Country at all. Where we have sixty per cent of the wheat high in protein content, they could not handle it, and a great deal of it would get over to the Old Country, and establish a price for the high-grade wheat. But this year, there was none left, and years like this will, no doubt, recur more frequently than they have in the past. It seems to me that we should study this very closely. I would like to ask your opinion regarding the effect of the skimming off of the high protein content wheat. Has that not had more to do with the lowering of our standard in the price of wheat this year, than any other cause?—A. It is pretty hard for me to answer that question, but I have not any doubt that there is a certain element of fact in what you say. To further correct your question, I believe that if we had this system in force this year, I doubt if we would have had any numbers 1, or 2 Northern at all. I think our crop would have been No. 3, downward.

By Mr. Millar:

Q. I was in Winnipeg, and there was some fourteen per cent.—A. A very small quantity.

Q. There was a sprinkling of fourteen per cent.—A. I think our crop this year, under this system, would have been a No. 3 Northern crop, and downward. I believe we would have had practically no Nos. 1 and 2 Northern wheat.

Q. There was quite a lot above thirteen per cent?—A. We had only a very small percentage of No. 1 Northern, as it is.

By Mr. Coote:

Q. We have been talking about the final certificate that the Board of Grain Commissioners put on our wheat. We have been discussing this question from the viewpoint of the Old Country buyers. I would like to ask you how the Grain Commission provides that the wheat the Old Country miller buys, under our certificate, is the same wheat that they put the certificate on when it left Fort William? We understand that you have inspectors that inspect all wheat out of Fort William, and you state that the Old Country buyer buys that wheat on that certificate. That wheat has to travel long distances, it has to go through transfer houses, and different boats before it gets there. How do you ensure that the Old Country miller gets the same wheat on which you put the certificate at Fort William?—A. In connection with that question, I asked one of our inspectors to give me some information along that line. I asked him if he thought it would be wise for the Commission to appoint samplers at our different transfer points, so we could determine that there had been no lowering of the grade. He told me that they found the cargoes, coming along through the transfer points, very, very satisfactory, and practically no complaints at all. He thought it would be a mistake, and one of the reasons why he took that attitude was the practice of sampling the cargo in loading the boat at the head of the Lakes. He contended that by placing men at these transfer points, to resample the cargoes again, you might find that the samples would not actually agree, and then the question would be as to which sample you are going to go on. Would you take the Fort William sample, or would you take the sample of some man you may have hired, over whom nobody has any control or supervision? In my opinion, we find that our cargoes, leaving the head of the Lakes and going through our transfer houses, arrive in Montreal without any mixing, and so far have been very satisfactory. We sample all those cargoes, and have them on file in our office in Montreal. I have gone over them carefully and could find no reason for

a ground of complaint. You cannot expect to handle hundreds of millions of bushels of grain without somebody making a complaint. Our inspector at Montreal has gone over those samples carefully and so far has found no grounds for complaint. Those samples are also gone over by our chief inspector when he visits Montreal. Our inspector told me he did not think it would be a wise thing to instal samplers at our transfer points. This is the question Mr. Coote brought up.

Q. As one of the Board of Grain Commissioners you are responsible for the administration of the Act, and should feel some responsibility for our wheat getting to the Old Country in just as good condition, or with the grades just as good as the standard when they left Fort William. Do you feel that grain that is going through a transfer elevator at Port Colborne, and a transfer elevator at Montreal, or going through an elevator at Buffalo and into cars from Buffalo to New York, and through an elevator at New York; do you feel that you are giving adequate protection, when you allow it to go through all those hands without any supervision?—A. I can only repeat the information I got. I think it is a very important question, I asked this Inspector at Montreal about it, and I can only tell you what he told me. At the same time, if we ever felt that there was the slightest slackness in following our grain, from the time it was loaded until it finally gets on an ocean boat, then we would take up that slackness. I do not want to do anything, unless it is necessary. I do not want to do anything that might cause harm instead of good, and I had to trust the inspector, when he told me that our cargoes came through these transfer houses in absolutely satisfactory conditions. I think, myself, that this Commission will possibly follow this matter up farther, and try to determine whether we should take any further precautions than we are taking at the present time. There is no doubt that we should see that there is no danger of any deterioration from the time the boat is loaded at Port Arthur, until the grain is put in the ocean vessel. I do not want to say that we will do that, without further consideration.

By Hon. Mr. Motherwell:

Q. If we can trust the Port Colborne elevators, and all the other transfer elevators, to do the right thing, why can we not trust the Fort William and Port Arthur terminals to do the right thing, without any supervision?—A. Well, it is not so much supervision, Mr. Motherwell, it is the fact that the boat comes to the head of the lakes to load a certain cargo of wheat, and the inspector is supposed to grade that out. He is supposed to take samples to show that he did grade this out. Not only that, his judgment is not final; that sample is sent up to the inspection office, and gone over by other inspectors—it may be the Chief Inspector, or the Chief Deputy—and they put an o.k. on it, or turn it down. They take all precaution to see that, so far as Fort William is concerned, the cargoes leaving that port are up to what they should be. The question Mr. Coote has in mind is whether, by the time it arrives on an ocean vessel, anything had happened that might have caused deterioration.

By Mr. Coote:

Q. What is the difference between a public terminal elevator at Fort William, and what we call a transfer elevator at Port Colborne; it is wheat coming in one end and going out the other?—A. There is no difference, as far as the actual handling is concerned. The one is merely a transfer house, and the other is a house where the grain is brought in and graded.

Q. In one case it is graded in and graded out, in the other case it comes in and goes out without grading?—A. A transfer house is just a means of putting a cargo from one boat into another, or into cars.

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By Mr. Totzke:

Q. The transfer house has no interest in mixing the grain?—A. I cannot see where they could have.

By Mr. Garland (Bow River):

Q. We have been dealing with a proposed plan for the application of Mr. Millar's proposition for a period of one year. Do you not think, if that plan were put into effect, that there would be an inclination on the part of those farmers who know they reside in high protein areas, to submit the bulk of the wheat to you for protein grading, and you would not get a proper proportion of wheat from the lower protein areas?—A. That might be.

Q. And the result of your test would be rather encouraging to Mr. Millar's proposal?—A. If we found that that condition was existing to a large extent, we might possibly go a little farther to try to determine this matter. We might make some tests from different districts, to determine whether we had a good proportion. If we found that condition existing, we could always put that into force ourselves. We would be bound to try to get to the bottom of the thing.

By Mr. Coote:

Q. With regard to drying grain in terminal elevators, and then grading that grain as straight. Do you think that is a proper procedure, after the experience you have had in the last few years?—A. I have been told, Mr. Coote, that under the system of drying that we have now, and the supervision and experiments we have been making, that we can dry grain without injuring it.

Q. Have you contemplated the installation of supervision in private terminals, so that you would know the grain was dried in a manner that would not injure it?—A. I do not think I could answer that question off-hand.

Q. Do you think that some supervision could be exercised, so that the Old Country buyer will not have the complaint that he has bought wheat that has been spoiled for baking purposes because it has been dried too quickly?—A. Yes.

Q. At the present time, you do not have any limit in the moisture content to which damp or tough wheat can be dried?—A. Oh, yes, we have.

Q. But you do not prevent the terminals from drying below that?—A. No.

Q. Is it not a fact that some of this damp and tough grain has been dried down to a very low moisture content, and then a good deal of tough grain mixed in, and the resulting mixture shipped out as straight grain?—A. I do not think so.

Q. Have you any positive information which would enable you to deny it?—A. No, I would not say that I have positive information, but I doubt very much if that is the fact. I would like to answer that question in another way. Through our own researches, and through the Research Council, we are conducting a great many experiments along the line of the proper method of drying grain. We hope, from our joint exertion, to get a system whereby grain can be properly dried, the proper amount of moisture taken out of it, and dried in such a way that it will do no injury. I think Dr. Birchard made the statement that in some cases it improved it. I do not know that I have ever investigated the matter, as to whether any houses or terminals dried grain down excessively, for the purpose of mixing it with some other tough or damp grain. I doubt that very much.

Q. But that is just the opinion you have?—A. Well, it is only an opinion.

Q. Dr. Birchard had a map prepared this year, showing the results of his investigations with regard to the protein content of wheat. If we are to make any change in our present system, it must be with the approval of the farmers in general. I would like to ask you if the Board of Grain Commissioners

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would not have that map published, and made available to the farmers at as low a cost as possible, and that it be continued each year? In that way the farmers would be familiar with the possible results of the change, and it would probably encourage the farmers to investigate this thing on their own, and submit their own wheat for protein content tests?—A. That map of Dr. Birchard's has been before the Board, and I believe that we intend to take some steps, whereby that information will be disseminated throughout the country. I would not like to state positively that that will be the map; it may be revised, but it will be along that line. We will try to get that out and get it into the hands of the producers.

Witness retired.

The Committee adjourned.

HOUSE OF COMMONS,

MONDAY, April 23rd, 1928.

The Select Standing Committee on Agriculture and Colonization met at 11 o'clock a.m., the Chairman, Mr. W. F. Kay, presiding.

The Committee again took under consideration the subject of wheat grading.

L. H. NEWMAN, Dominion Cerealists, called.

The WITNESS: Mr. Chairman and gentlemen: about a year and a half ago most of you will remember the discussion which took place, particularly in the western papers, regarding the extent to which our varieties of wheat were becoming mixed. It was assumed that we were getting too many varieties in western Canada, and that, as a result of this increase in number, our wheat was becoming lowered in quality in the Old Country markets. The department considered it advisable to obtain some definite information as to what extent our varieties were mixed, and to what extent, if any, these mixtures had a detrimental effect on the quality of our commercial grain. Fortunately, it is possible to determine the varieties by making a growing test. That is, the varieties may be grown, allowed to come to maturity and disclose their identity, the same as we identify the different species of plants. Following these discussions in the West we had a number of samples collected through the Canadian Trade Commissioner's office in the Old Country. These samples were large enough to permit our conducting milling and baking tests, as well as growing tests. What I have to show you this morning is chiefly the results of those investigations, which, to me, are rather significant, and reveal a rather interesting situation. Without going too much into detail as to how this was done, I will first take Lot No. 1, which was shipped via the port of New York, and graded and sold as No. 1 in Liverpool. A sample was collected from this shipment and was sent back and grown, and we have here the different varieties that we found in that particular lot, as well as the percentages of each. We found that Marquis occupied 63.46 per cent.

By Mr. Millar:

Q. This was grade No. 1?—A. This is grade No. 1. Early Red Fife, 5.98 per cent; Common Red Fife .33; Ruby, 1.00 per cent; Kitchener, 5.31 per cent; Huron, 3.00 per cent; Preston, 1.00 per cent; Club, .33 per cent. There were a number of the bearded types, which presumably arose as a result of natural crossing between such varieties as Preston, Huron or some other type, and they occupied 4.37 per cent. There were also some miscellaneous beardless, arising presumably as a result of natural crossing, and occupying 15.28 per cent. In this particular lot, all of these wheats could be considered good milling wheats, except possibly the Huron, Preston and Club, and probably these miscellaneous bearded types. On the whole, this lot consisted of very good milling and baking wheat. You will notice that the Marquis predominated. Here we have the loaf made from that shipment (Produces loaf).

By Mr. Totzke:

Q. What year was that?—A. That was the crop of 1926.

[Mr. L. H. Newman.]

By Mr. Millar:

Q. How many different varieties have you there?—A. We have nine different varieties, and two representative of segregates; two different groups of segregates. Here we have the loaf made from this shipment, and the loaf from a standard sample of No. 1 grade. (Produces loaves.) You will see that they compare very well in volume, texture, and in all points that are considered when it comes to the value of the wheat.

Q. One of those loaves shows a little more volume than the other?—A. This loaf is a little higher. The proteins are being determined, and we had hoped to have them here. Unfortunately, they were not completed, so we are not able to give them to you to-day. Here is the sample of No. 1 grade, and a sample of the actual shipment. (Produces samples.) You will find that the grading of this particular sample No. 287 was at least as good as the official grade, and possibly a little better.

Here we have No. 288, from a shipment grading No. 2 Northern. We found the following varieties in this sample. Marquis, 58.5 per cent; Early Red Fife, 11.8 per cent; Kitchener, 16.7 per cent; Common Red Fife, 1.9 per cent; Renfrew, 1.9 per cent; Ruby, 2.9 per cent; Kota, 3.9 per cent; Preston, 1.5 per cent; and Durum, .9 per cent. In this particular lot I have brought along the little boxes which might possibly give you a better idea of the relative proportions. You will see that Marquis occupies considerably over half of the total, and then comes Kitchener, Early Red Fife, Renfrew, Red Fife, Durum and so on. The other varieties only occupied a relatively small place. Marquis, Early Red Fife and Kitchener are all good milling wheats, and they occupy, by far, the larger proportion of the lot.

Here we have the official sample of No. 2, and the sample actually shipped (Produces). The sample shipped was clearly superior to the official grade. Here we have the loaves from that particular lot. (Produces loaves.) This is the loaf of the official grade No. 2, and here is the loaf of the shipment grading No. 2.

By Hon. Mr. Motherwell:

Q. They are nearer uniform than the first?—A. Very similar.

Now, we come to No. 3 shipment—No. 289—shipped via the port of New York to Liverpool, February, 1927. In this lot Marquis occupied practically 26 per cent; another type, which is apparently a natural cross between Marquis and some other very good wheat, 25 or 26 per cent; another type, which is commonly found in Old Red Fife, and which has been looming up very prominently during the last two or three years, and which we call Type No. 1; here is one we call Type No. 5. Both of these were old types found in Red Fife, before Marquis was introduced at all, and they are both reasonably good milling wheats. Here we have Early Red Fife, Huron, and then another mixture of what we call "miscellaneous," coming presumably from natural crossing. It is considered to be pretty fair quality.

Q. As the grades descend the quantity of Marquis in it also reduces?—A. A little.

Q. Is that 26 per cent?—A. The straight typical Marquis is 26 per cent. There is another one—a natural cross between Marquis and something else—but resembling Marquis rather closely. In No. 2 there was 58 per cent Marquis.

Q. What was No. 3?—A. No. 3 was 26 per cent straight Marquis.

Q. That is not half as much as in No. 2 or No. 1?—A. Twenty-six per cent is classed as Marquis and another 26 per cent resembling Marquis in many respects.

By Mr. Millar:

Q. Do you say all these varieties are good milling varieties?—A. Not all of them. I would not consider Huron a good milling variety. There is 5.88 per

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cent Huron. Early Red Fyfe is only fair, but would be classed among the good quality wheats.

By Mr. Ross (Moose Jaw):

Q. There is some Huron there?—A. There is some in this No. 2 sample—0.9 per cent.

By the Acting Chairman:

Q. Do I understand you to say that Early Red Fyfe is not the old Red Fyfe?—A. No, it is a selection from old Red Fyfe and quite different. Here (indicating) we have the samples of the grain. This one (indicating) represents the shipment, and this one (indicating) represents the commercial grade. It is worth while looking at those two. You will see the shipment there again is of better quality than the official standard grade.

By Mr. Garland (Bow River):

Q. You say the shipment is better?—A. Yes. If you examine the lot you will see that the wheat shipped was well above the sample of the grade.

By Mr. Totzke:

Q. Was this all shipped through New York?—A. Yes. We took them through New York with another idea in view. It has been thought by some that our varieties may become mixed in the handling through American ports.

By Mr. Coote:

Q. With the United States wheat?—A. Yes. We can get at that very nicely there through a test of this sort, in that we can determine the American varieties.

By Mr. Totzke:

Q. You said one of these had Kota in it? Which one was that?—A. No. 2 had 3.9 per cent of Kota.

By Mr. Bancroft:

Q. Did you say these were taken at Liverpool?—A. Yes, by Mr. W. A. Wilson of the Trade Commissioner's office, at our request.

Here is the official grade (indicating). Here (indicating) is the loaf made from the official sample No. 3 Northern, and here (indicating) is the loaf made from the actual shipment.

By Mr. McKenzie:

Q. About what percentage of wheat in No. 3 is considered of a good milling quality?—A. About 75 or 80 per cent.

Q. What about the No. 1?—A. Essentially the same as No. 1.

By Mr. Coote:

Q. How does the loaf from the shipment of No. 3 compare with the shipment from No. 1?—A. Here (indicating) is the shipment of No. 1.

Mr. Garland (Bow River):

Q. Will the standard be better?—A. There (indicating) is the loaf from the standard sample in each case.

Q. Would you mind telling the Committee whether in your opinion there is any material difference in the quality of bread baked, from No. 1 and No. 3?—A. In this case I would say there is no essential difference.

Q. Is there not a very great variance between the No. 1 shipment baking and the No. 3 shipment baking?—A. As to the quality of the grain?

[Mr. L. H. Newman.]

Q. No, the quality of the bread.—A. No, not very much. It is a little finer in texture in No. 1.

Q. Just a third question to finish this out. In your opinion, is the variation of price to the producer reflected in the quality of the bread?—A. In this case, I would say no.

By Mr. Bancroft:

Q. Does it take in more wheat?—A. The same amount of flour is used in each of these loaves.

By Hon. Mr. Motherwell:

Q. Did they all yield alike?—A. There was no significant difference between No. 1 and No. 3.

Q. No. 1 yields a little less in this case.

By Mr. Donnelly:

Q. Where were these tests made?—A. Here in Ottawa in the Cereal Department of the Experimental Farm.

Q. Under the same condition?—A. Absolutely, and by the same man—by Mr. Whiteside, who is here.

By Mr. Ross (Moose Jaw):

Q. That standard is the minimum of the grade?—A. Yes, the minimum of of the grade.

By Mr. Lucas:

Q. Have you many tests along this line?—A. Yes, a good many.

Q. Do they all bear out what you say this morning?—A. Pretty generally, yes. Unfortunately I am not able to give you the protein percentages but in the case of this particular lot of No. 3 it is fair to assume there were little more sprouted kernels. Where sprouted kernels are absent in our wheat we are liable to find a lower diastatic action. Generally speaking our present varieties of wheat are inclined to be a little low in diastase where the season is favourable. This (indicating) is the sample which is slightly sprouted. It has been a common custom to mix a little sprouted wheat with flour made from wheat of the higher grades, but this is not so necessary since the use of malt extracts came into vogue.

By Mr. Garland (Bow River):

Q. Could you give us two other facts: first, what is the exact weight per bushel of each of the wheats you are speaking of, the Nos. 1, 2 and 3 Standards—if you have it.—A. I regret I have not that information with me.

By Mr. Garland (Bow River):

Q. Well, it is not very essential. Have you been able to make a larger volume of bread, (from grade No. 1) and if so, how much?—A. It has a little higher flour extraction.

Q. Enough to reflect in the price?—A. Not always.

By Mr. Côté:

Q. In the cases you have tested have you found any American wheat mixed in?—A. No, I think not.

By Mr. Garland (Bow River):

Q. Your very first statement causes me to ask a question. I think it was to the effect that there was a complaint from overseas based on the mixing of varieties.—A. The complaints were on this side of the water.

[Mr. L. H. Newman.]

Q. In your opinion is it really a deterioration in the quality as a result of mixing the varieties or a deterioration in quality as the result of mixing the grade?—A. We have, in our division, been unable to find any evidence that the mixture of varieties up to the present at any rate has actually degraded our wheat. I was in the old country just a year ago now and took advantage of the opportunity to get in touch with the people at the Corn Exchange in Liverpool and also in London and in discussing various matters concerning Canadian wheat I asked if they had any evidence to give me as to whether or not there was being included a percentage of inferior varieties that had any tendency to reduce the quality of our wheat. I explained, as a justification for asking that question, that we in this country, both in the Federal and provincial departments, were vitally concerned in maintaining the quality of our Canadian wheat, and if there were any complaints from the standpoint or variety, I would appreciate knowing them. As a matter of fact, I was surprised to find no one, without exception, who made any complaint on the question of varieties. They did say that there might be reason, now that Durums were getting in, to watch for mixtures of varieties but up to the present the men I interviewed had no complaint. I did not confine my interview to the committee, but I went to the men who were actually examining the samples coming from the boats. I was not quite satisfied that these other fellows knew whether there were any mixtures affecting our varieties of wheat, but I could obtain no information that our wheat was being mixed, or was, up to the present time, being degraded. I know that statement does not correspond with others which have been made, but I am giving you exactly what they told me. I am giving the information as we actually got it.

By Mr. Coote:

Q. When were you over?—A. A year ago. It was the crop of 1926. The only complaint they had, and it was a real complaint, was regarding the grading, about which you have heard a great deal.

By Mr. Garland (Bow River):

Q. In your opinion have you any evidence that material degrading did take place? I am speaking about the imported Canadian wheat. Did you find any evidence that any of it had been degraded?—A. No.

By Mr. Ross (Moose Jaw):

Q. Have you not the proof of it right in front of you in those samples? You have a grade which is shipped, which is practically identical with the minimum of the grade?—A. A little higher than the minimum.

Q. It would not be up to the average?—A. It would be up to the average, I would think.

Q. You think it is up to the average?—A. Yes. It is a pretty good sample.

Q. The average of grade No. 2 as it came to the elevators?—A. Yes; it is a pretty nice sample.

By Mr. Millar:

Q. Would you go so far as to say you found no sufficient grounds for the complaint that the importers have made as to mixtures of varieties?—A. Not in so far as variety was concerned. That was the thing which concerned our division. It was a question whether or not mixtures of varieties will result in the lowering of the quality of our wheat.

Q. Do you think the British buyer, if he gets what he wants at a price he wants, is satisfied?—A. Yes.

Q. Is the information you have given us here in regard to these loaves—would you say that is the last word in evaluating wheat, even though the No. 1 does not make any better loaf, does not make any bigger loaf, does not make

[Mr. L. H. Newman.]

any more—is that the last word in evaluation of that wheat? Might not one be worth more for mixing purposes even though it would not make any more or better bread when baked by itself?—A. Yes, that is true. Possibly No. 1 is an illustration. It might, under certain circumstances, be better than No. 3.

By Mr. Ross (Moose Jaw):

Q. You state that in your opinion there has been no degrading of the grades on account of the variety. If there has been any degrading it might have been on account of the mixing of the grades, and not the mixing of the varieties.—A. It looks that way. The data we have so far does not indicate that the trouble is due to the mixing of the varieties themselves.

By Mr. Coote:

Q. There cannot be any better way of determining whether these varieties—at least whether American wheat is being mixed in that way—than this method which you have used?—A. I do not think so. That was one thing we were particularly interested in.

By Mr. Vallance:

Q. If that is true you would naturally conclude there were some things which are unknown to some of us, because of the fact that we are growing wheat over a larger area than in days gone past and that the wheat grown there is of a certain variety, different from that grown in other places, and this would tend to lower the value of the wheat.—A. That opens up a very big question.

Q. If you are convinced in your mind that it is not the mixing of the varieties, it must be the varieties grown under these conditions which would probably deteriorate.—A. Yes. For instance, this year the wheat in Alberta is grading very low. In many districts it is grading 5 and 6. We have other varieties better adapted to Alberta conditions which are grading No. 2 and 3. We find that all the way through. We find other districts where Marquis is grading down to 5 and 6—4 and 5 on the average—as in Northern Manitoba where you often get the starchy kernels. You find there other varieties. Some of our later introductions grade higher, 1 and 2. That brings up the question, if it is opportune to mention it at this time, that this idea of having one standard variety for a big country like Canada is all wrong. We have a great variety of conditions here and one of our big problems in the judgment of our department is to find out the districts or zones within which certain varieties are best grown, and we have been working for four years on what we call a cereal map, having in that undertaking about two hundred co-operators testing varieties on their own farms, with the best we can give them from our branch farms and we hope within the next year to have a map out, marking off the zones. We know fairly well what districts will grow higher grades than Marquis on the average. After all, even the millers who criticize some of the wheats which have been introduced, such as Garnet, on account of the colour of the flour, admit that a wheat like Garnet or any other good strong wheat which will give a good high commercial grade is more profitable for the miller, as well as for the producer, than a wheat which gives a lower grade. Here (indicating) is a loaf of Garnet and of Marquis made from wheat sent to Liverpool and baked by three large commercial bakeries. Both of these wheats were grown at Scott Experimental Farm; both graded No. 2 Northern. That was the only point last year where we could get Marquis and Garnet grading about the same. While we had an enormous amount of data on this wheat we thought we would like to get a little more, so we sent 600 pounds of flour, Garnet and Marquis, to Liverpool and had it baked by three Liverpool bakers. Here (indicating) are the loaves baked from those two flours. There is no significant difference

[Mr. L. H. Newman.]

in the volume of the loaf, only about 25 cubic centimetres. In connection with the point you (Mr. Vallance) brought up, that in a series of years wheat, such as Marquis, had certain characteristics which seemed to make it unable to produce hard kernels in some districts, Garnet may give a higher value per acre even from the millers' standpoint.

By Mr. Garland (Bow River):

Q. Is that an actual sample?—A. This (indicating) is the loaf of Garnet and this (indicating) is the loaf of Marquis.

Q. I cannot see any difference from here either in the texture or in the colour.—A. These are from unbleached flours. You will remember that nearly everybody in this country and certainly all of the old country people employ maturing processes which whiten the flour. They practice the maturing processes on account of the great water absorption—greater life, as they call it—given to the flour so treated.

By Hon. Mr. Motherwell:

Q. The bleaching would scarcely take away the creaminess from the Garnet?—A. Yes, proper bleaching would remove a great deal of this. In this connection it is rather interesting to note that the three bakers of Liverpool stated that these two flours have the strength and stability for which Canadian wheats are noted. Only one concern made any comment on colour. This concern stated that for their purpose Garnet was worth about a shilling per 280 pounds more than Marquis because of its more creamy colour of flour, and for that reason he was particularly partial to the wheats of Kansas which consist chiefly of Turkey Red or Kanred. I do not know whether that report is altogether reliable. I would simply say that in so far as the old country trade is concerned where our wheats are always blended with other wheats there seems to be no complaint whatever on account of the colour.

By Mr. Glen:

Q. What is the difference in the price between No. 1 and No. 3?—A. I cannot say offhand. It would be a matter of looking up the records at that time. These were collected in February, 1927.

Q. Do you think the difference in price would be reflected in the value of the product?—A. Unless that price were fairly small I would say not.

Q. The one who sells the No. 3 wheat—his loaf would be almost as good as the one who sells the No. 1?—A. In this particular case it looks that way; there is not a very great difference in this particular case.

Q. When it comes to the value of the flour there is not much difference?—A. There is a little difference in the flour extraction.

Q. And is that difference sufficient to account for the difference in price?—A. We have to do some pretty close figuring there. We only had these baked yesterday, and have not had time to do much figuring.

By Mr. Millar:

Q. Is there not a danger in the multiplicity of varieties, and if so, where does this danger point start?—A. Yes, I think there is danger in a multiplicity of varieties, but so long as all concerned are careful not to allow varieties low in quality to become included and get a foothold, I think the danger is not as great as many people seem to think. If, however, certain varieties which I might mention were spread widely they would have a decided influence in time.

Q. What known varieties have merit sufficient to warrant their being grown now? Would you name the varieties which have sufficient merit so that you would recommend their use?—A. Naturally I would start out with Marquis, and

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grow Marquis in the places adapted for its growth. That would be demonstrated by the grades you would get. A Marquis capable of giving a good yield and grading 1 or 2—certainly not lower than 3—in an ordinary year would be considered probably as the standard.

In another district requiring for any reason an earlier maturing wheat I would consider a wheat like Garnet. There are districts where Garnet will give a grade higher than Marquis.

There will be other districts to which the Early Red Fife will be particularly suitable, while in the rust areas of Manitoba—well, we are just groping our way there now. Up to the present one of the promising common varieties from the rust standpoint is a new one we are putting out which is called "Reward". Here (indicating) is a sample at its best, and here is another grown at Morden under very severe rust conditions. Even there the Reward weighed over the standard weight per bushel. It is entirely too soon to say that Reward will solve the rust situation. I do not think it will, but it is probably the safest of the common wheats so far.

By Mr. Garland (Bow River):

Q. You stated that these two loaves in which we can see no appreciable difference—if any, the colour seeming to be on the side of the Garnet as compared with the Marquis in the loaf—were prepared from unbleached flour. Now, in your opinion, will the Garnet under a bleaching process show a little more yellow colour than the Marquis under the bleaching process?—A. Yes, a little more, but a little bleaching is all that is necessary to make the Garnet apparently acceptable from a colour standpoint even to our Canadian millers.

Q. In your opinion there is no difference in bleaching out the Garnet and a thoroughly standard flour?—A. It does not look like a serious matter at all.

By Mr. Coote:

Q. There would always be plenty of Marquis grown in this country to satisfy the demands of our own millers so that if Garnet graded No. 1, it would not necessarily be injured—they could pick out the Marquis wheat?—A. Yes, just as they do now.

By Mr. Millar:

Q. Will you finish your list?—A. I started with Marquis and Garnet and Reward the latter as possibly a very valuable wheat in Manitoba. Ceres is a rather promising looking wheat in Manitoba. It is giving good results from a quality standpoint and has considerable rust resistance, but is a little weak in the straw. A good many in Manitoba are considering Ceres as a stubble wheat and Reward as a summer-fallow variety, because Reward has a very strong straw.

By Mr. Coote:

Q. What about Red Bobs?—A. It is a very good wheat and a wheat that is particularly good where the conditions are right, but it is not so widely adapted as Marquis, and while some may find in certain districts that they get excellent results from Red Bobs, others a short distance away may have almost a ruinous result from the same variety. That applies also to Kitchener and to the Early Red Fife.

By the Acting Chairman:

Q. What about Ruby?—A. That is about one of the best we have. But it does not yield enough to attract the average farmer. It shatters quite easily. If we had a Ruby which would yield as well as Garnet I would say there would be no particular place for Garnet.

[Mr. L. H. Newman.]

By Mr. Coote:

Q. From your experience, would you say that it is possible to stick to one variety of wheat for Western Canada?—A. I do not think it is practical at all. We have reports from about 1,100 farmers this year, who have grown Garnet for two years, and these reports indicate that in many cases this variety came in the nick of time. They advised that they would have had to move out if they had not had a good yielding early wheat made available to them. To continue to tell these people to grow Marquis is absolutely foolish.

By Mr. Millar:

Q. You have named about half a dozen varieties; how many other varieties are in fairly common use, and which are, in merit, below those? About how many varieties are there being grown at the present time?—A. What I have named are the varieties that are grown to any extent. Marquis, Garnet, Red Bobs, Early Triumph, Supreme and Kitchener. Then there is Early Red Fife, a selection out of the Old Red Fife. Then there is Renfrew, which is a very good wheat where the season is early enough, but it is not suited for districts where the season is likely to be late.

Q. I asked for the varieties that are sufficiently high in merit to be worthy of growing; do you include those in that class?—A. I could perhaps answer it better in this way, by naming the good varieties. They are Marquis, Early Red Fife, Red Bobs 222, Early Triumph, Supreme, Kitchener, Old Red Fife, Renfrew, Ruby, Garnet, Ceres and Reward. Reward is being introduced this year.

By the Vice-Chairman:

Q. Is Ceres being grown outside of your experimental farms?—A. It is being grown by a number of farmers, but under the control of the Farms.

By Mr. Lucas:

Q. Is it not a fact that they have discriminated against Garnet in not grading it high enough?—A. Yes. According to the present regulations, Garnet cannot receive a higher grade than No. 2.

Q. Is that justified, in your opinion?—A. Our results so far would appear not to support that discrimination. Probably the Inspection Division is quite right however, in wanting to go a little slowly at first.

By Mr. Coote:

Q. They always want to go slowly?—A. The only trouble is that we are a little afraid they may over do it. I have been in consultation with Mr. Fraser a good deal, regarding these overseas tests. Last year we had a large shipment of Marquis and Garnet tested by Dr. Humphries of England. Dr. Humphries has had many years close association with the Home Grown Wheat Committee and with the milling industry generally and is a very reliable man. I have just issued a statement on this very question to the press, and it includes Dr. Humphries' report. In spite of the excellent report that Dr. Humphries sent us, we thought we had better consult further with the Inspection Division. We thought that if we got a favourable report from Old Country bakers, in view of the fact that such a large proportion of our wheat is exported, it would help settle the question. We have that report now, and the next move is up to the Inspection Division.

By Mr. Millar:

Q. Everything that you have shown us there would seem to indicate that a lot of other varieties have gone in there, varieties that have not specifications equal to Marquis, and no harm has been done.

[Mr. L. H. Newman.]

By Mr. Donnelly:

Q. Do you think this multiplicity of varieties is not hurting us?—A. If this does not get too far, and if the Seed Commissioner and his staff continue their aggressive campaign, and get us better seed throughout the country of the approved varieties—

Q. Do you think it is fair to mark one variety better than another?—A. To base No. 1 on Marquis alone would be absurd nowadays in my judgment. You must consider varieties grown in certain areas, where you hardly ever find Marquis, entitled to grade No. 1.

Q. You do not think that this complaint that we have in England concerning our wheat is based on the varieties at all?—A. I cannot find any evidence to that effect.

Q. Where do you find the cause for complaint?—A. The only complaints that they made to me over there were on the question of grading.

By Mr. Millar:

Q. Just what was their complaint?—A. Their chief complaint was in the grading of this treated No. 3.

Q. Dried?—A. Dried.

By Mr. Donnelly:

Q. We were told that our grading was just as good as it ever was, and that it is our varieties that are causing the trouble; you say the opposite?—A. The Department thought it advisable to get some definite information on that question.

The VICE-CHAIRMAN: I think you will remember that Inspector Fraser admitted that they had made a mistake in grading dried wheat.

By Mr. Millar:

Q. An authority in Stamford University in the States gave as a reason for the demand among American millers for Canadian wheat that we had not as many varieties as were grown in the States?—A. That is quite true.

Q. What do you mean by "quite true"?—A. It is quite true that we have not as many varieties here. Our dominating varieties are high quality wheats, like Marquis. They have many others in the States.

Q. He gave that as a reason for the demand in the States, that they considered it of higher value. Have they any reason for that?—A. I think that would have to be interpreted a little differently.

By Mr. Donnelly:

Q. Have you seen the letters that were sent to Hon. Mr. Malcolm, complaining of our grading this year?—A. I sat in the Committee and listened.

Q. You have not seen the letters?—A. Not the actual letters, but I think I know pretty well what the trouble is. That was very much impressed on me, and I was asked to bring the matter to the attention of the Trade and Commerce Department when I came back, which I did.

By Mr. Coote:

Q. That is the including of dried wheat?—A. Yes.

By Mr. Vallance:

Q. Do you find that Reward comes up to Marquis?—A. In yield?

Q. Have the results been as good with Reward as they have been with Marquis?—A. From a quality standpoint, yes. We consider Reward one of our best quality wheats.

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By Mr. Donnelly:

Q. You have not a sample of the bread from it?—A. No.

Q. How does it stand up on baking tests?—A. Very well. We have no wheat which seems to vary as little as Reward, and for that reason we are using Reward, more than any other, in our breeding work, where we want to combine high quality with such things as rust resistance.

Q. It gives a white bread?—A. A very fine white colour.

By Mr. Totzke:

Q. How is the yield, as compared with Marquis?—A. The yield, as a rule, is not as good as Marquis. In districts like Brandon, however, Reward averages higher than Marquis on account of its greater resistance to rust.

By Mr. Vallance:

Q. How about Scott?—A. At Scott it has not yielded up as well.

By Mr. Donnelly:

Q. Does it take in as much moisture in making your bread?—A. Absorption?

Q. Yes.—A. Yes, it ranks along with Marquis. Reward was our heaviest wheat per measured bushel, at practically every single station in the west in 1927. It weighed more per bushel than any other wheat, which is a very important point from the millers' standpoint. Even in the rust years, Reward was well above the standard weight of sixty pounds.

By Mr. Millar:

Q. Are all of these wheats that you have been speaking of this morning red wheats?—A. Red wheats.

Q. What about white wheat; is that equal in value to Marquis?—A. No, not in Canada.

By Mr. Coote:

Q. Quality has been giving very good results?—A. From a quality standpoint we do not find that it has any advantage over Marquis.

Q. Is it good enough to be called a good quality wheat?—A. It would be a good milling wheat, on the basis of our tests.

By Mr. Lucas:

Q. Is Reward earlier or later?—A. It is about a week earlier than Marquis although in the north it and Garnet would mature about the same time.

By Mr. Millar:

Q. Do you think it would be wise to grade Quality with the red wheats?—A. No.

By Mr. Donnelly:

Q. Is there much white wheat grown in the West?—A. Not a great deal.

By the Vice-Chairman:

Q. What about Axminster; it has been grown quite extensively—A. It produces a very yellow flour.

By Mr. Donnelly:

Q. Is it rust resistant—A. It is a little more rust resistant than Marquis, but not nearly enough.

Q. Is the straw tough?—A. It stands up fairly well. It also makes a fairly nice loaf, apart from this very yellow colour.

By Mr. Coote:

Q. The two outstanding reasons why we cannot stick to one variety are on account of frost and rust?—A. Yes. In certain parts of Manitoba, where there is what we call "scrub" land, we find that Marquis does not give a very good grade as a rule. Up in Northern Manitoba, in Mr. Bancroft's district—as he very well knows—we very seldom get a very good quality of Marquis. We used to get a much better quality of Red Fyfe, when it got by the frost. There are some wheats, like Stanley, Percy and Preston, which were introduced a few years ago, and we find that they still persist, because Stanley gives a little harder kernel than Marquis, under these conditions, yet it is not as good a quality of wheat.

Q. They are being displaced by Garnet and Reward?—A. It is fairly safe, I think, to assume that Garnet or Reward or both may come to take the place of these other varieties in these particular districts. The introduction of wheat like Garnet, which is an outstanding wheat as a yielder, and as an early maturing wheat, will do a great deal to purge large areas of our wheat-growing land from a lot of mediocre and poor stuff, resulting from a mixture of wheats such as Club, Stanley, Preston, and so on, which varieties still persist because they give a very good colour. I have made this statement in a recent press article entitled "Garnet Wheat to Date."

Mr. DONNELLY: I think we should have that report incorporated in the proceedings of this Committee, and I would make a motion to that effect.

This was seconded by Mr. Garland (Bow River). (*See Report at p. 183 post.*)

The WITNESS: I would like to read this quotation from Dr. Humphries' report, which I think sums the whole thing up, and corresponds very closely with the conclusions made by Mr. Whiteside and myself in our bulletin entitled "Garnet Wheat" published a year ago. He says:—

Apart from the point of colour of flour and bread, the differences I have found are small, sometimes in favour of one variety, sometimes in favour of the other, and, seeing that the bleaching of flour is so generally practised in all important countries where the two varieties are likely to be used, I am of the opinion that Garnet, inasmuch as it seems to favour the interests of the producer, can be recommended, at any rate in those parts of the Dominion where its virtues will be appreciated by the producers.

By Mr. Coote:

Q. If we grew in each district the wheats suited to that particular area, could we not largely get away from having to market low grade wheats?—A. I think so.

Q. That would certainly be very desirable?—A. I think so. If we had had Garnet wheat in Alberta this year, in some of the areas where Marquis suffered, it would have made us millions of dollars. Mr. J. D. McGregor, a large grower near Cluney, Alta., had 190 acres of Garnet, which he claimed gave him 52 bushels to the acre of No. 2 grade. He said that if he had had all Garnet instead of Marquis, it would have been worth at least \$10,000 more to him this year.

By Mr. Donnelly:

Q. Are you marking out those areas?—A. Yes. Within the next year or so we hope to have enough information to enable us to prepare a cereal map, covering the three western provinces. This map will be divided into districts, the boundaries of which will naturally be more or less irregular, and within each of these districts we will inscribe the name or names of the varieties which can be grown with the greatest assurance of giving a wheat of a good grade, good milling quality and good yield.

[Mr. L. H. Newman.]

By Mr. Coote:

Q. This need not in any way degrade the milling quality of our wheat, nor the value on the world market?—A. No, I think it would have a very advantageous effect.

By Mr. Donnelly:

Q. A beneficial effect?—A. A very beneficial effect.

By Mr. Lucas:

Q. Did you name Renfrew in that list?—A. Yes.

Q. Has that been satisfactory?—A. Where the season is early enough, it is a very good wheat, but it is a little later than Marquis. The people at Edmonton who developed it, do not recommend it for places where you need an early wheat.

By Mr. Coote:

Q. What are the results of your experiments with the fall wheat, Kharkov? A. Kharkov is one of the most promising varieties we have tested. It is one of the hardiest varieties, and is probably the best suited variety for Alberta. In our tests, made by Mr. Whiteside, it has proven to be a very good quality wheat. In this connection, I might say that Mr. Noble of Nobleford, whom many of you know, grew a large area of that variety last year. He also had a field of Kharkov which was badly damaged by soil drifting, and he went on last spring and disced in Garnet on top of this Kharkov, hoping to get a stand which would check weed growth. The result was that he got a very heavy yield, and a sample, which we milled and baked, gave a very fine loaf, with a fine colour, fine volume, and texture.

Q. That would be a mixture?—A. It would have to grade Mixed Spring and Winter.

Q. That brings up the question of the ability of inspectors to determine the variety of wheat. Do you think that our inspectors are always able to determine the variety of wheat?—A. No, I do not think so, and I do not think anyone else can, on the basis of the grain itself. We would not want to stake our reputation on telling one variety from another when threshed.

By Hon. Mr. Motherwell:

Q. That is the reason you have growing tests?—A. Yes.

By Mr. Coote:

Q. Do you think that a man that has had some experience with testing and raising different varieties, would be better able to tell the different varieties?—A. Undoubtedly a man that is working with different varieties all the time becomes more familiar with them.

By Mr. Donnelly:

Q. Is it easy to pick out Kota wheat from the other varieties?—A. In the growing crop?

Q. In the threshed grain?—A. No, I would not say that it is a very easy thing.

By Mr. Coote:

Q. I have heard the suggestion made that if our inspectors were required to have an agricultural college course, to start with, they would be better qualified to grade wheat.—A. I think it is a natural conclusion that they would be, especially if the variety question is to be considered at all.

Q. Well, it is being considered, if we can believe the inspectors. Would it be advisable, in your opinion, to have a man in the Inspection Department, say,

at the main points of Calgary, Edmonton, Winnipeg and Fort William, who had a good deal of experience in plant breeding, and who would be best able to judge the variety of wheat?—A. That might very well be considered.

By Mr. Vallance:

Q. The variety cannot be determined, with any degree of accuracy, except by growing?—A. No.

By Mr. Millar:

Q. If the inspector cannot determine the variety he cannot determine the value?—A. No.

By Mr. Coote:

Q. Do you think it is always possible for the inspectors to detect this Kharkov from the common spring wheats?—A. I do not think so.

Q. I know of one case where a man shipped a car of Kharkov and it was graded No. 3 Northern. Is it possible that an inspector might grade it No. 3 Northern by mistake?—A. Yes, I think he might. I might say that we have brought along a number of bottles of different varieties of wheat, which are just numbered, and if anyone would like to try their hand at identifying the varieties, we would be very glad to have them do so.

By Mr. Garland (Bow River):

Q. It has been stated by some people that Kharkov was allied to Durum, and that they are not good quality wheats?—A. There is no connection. Kharkov is a fall wheat, to begin with, and Durum is a spring wheat.

By Mr. Coote:

Q. Before a grain inspector gets his certificate, or before he is allowed to act as an inspector, he must pass an examination. Would it not be a good idea to test him out, just as you are suggesting now, that we should try to pick out the different varieties?—A. It would be a pretty hard test.

By Mr. Totzke:

Q. You would not undertake to do that yourself?—A. No, I certainly would not.

Q. You are engaged in plant breeding all the time, and you would not expect an ordinary inspector to do it?—A. No. We have one very fine sample here, and probably all of you would say that it was entitled to grade No. 1. It is a very beautiful sample, but it is very poor in milling and baking. It is a variety that has not been put out, but is one that might get out.

By Mr. Coote:

Q. I have been told that there are men who have tried the examination that did not seem to have even a common school education. Do you think that a man should have at least a common school education before he should be allowed to act as an inspector?—A. I do not know what the requirements are of the Civil Service Commission.

By Mr. Vallance:

Q. Is it easier to determine fall wheat, while in the seed, than spring wheat?—A. Some varieties, yes, others not.

Q. When fall wheat is shipped, is it shipped as fall wheat, or is it just shipped as wheat, and left to the inspector to determine whether it is winter wheat or spring wheat?—A. It is up to the inspector. The grower would not ship it as fall wheat, if it were a first class sample, but simply as wheat, and he would hope that it would get at least No. 3 Northern.

By Mr. Coote:

Q. There are grades provided for winter wheat?—A. Yes.

Q. What about Turkey Red wheat?—A. That is a very good wheat. That was the first wheat that was grown in Alberta, twenty years ago. (That is a Kansas wheat; Kanred belongs to the Turkey Red group.

Q. We usually get from eight to ten cents a bushel less for that than for Northern wheat. From your experience in milling and baking tests, is there that much difference?—A. We have not done much work with Turkey Red, because it is not grown here any more. Kharkov has taken the place of Turkey Red.

Q. There is still some grown?—A. Yes. I would think, from the work we have done, that it is not a wheat that should be discriminated against from the standpoint of quality.

By Mr. Millar:

Q. Would you say that the varieties of wheat which you have been showing us, many of which may require more moisture for milling purposes; would you say that a carload of that, even though it might make as good grain, is worth as much money to those who are fixing the price, as a carload of pure Marquis wheat? I am pointing out that the different wheats sometimes require different temperings, and do not mill well together. Is a carload of that worth as much money as a carload of pure Marquis wheat—A. A carload that will absorb appreciably higher moisture, a higher per cent of water than the other wheat, would naturally, other things being equal, be considered of greater value. In water absorption, we do not find a very great deal of difference between any of these varieties, excepting Kota and Ceres. Ceres is a cross between Kota and Marquis. Those two varieties are very high in water absorption, yet, from other standpoints, Kota is not considered by some, as good a wheat as some of the varieties that really absorb less water.

Q. When you speak of absorption you are referring to the baking?—A. The amount of water the flour will take up.

Q. I was referring to the amount of moisture required in tempering the grain for milling. I understand there are varieties that require much, while others require very little, and the two will not mill together?—A. I think what you mean, Mr. Millar, is what we know as absorption.

The VICE-CHAIRMAN: The statement has been made that the amount of moisture required to temper Kota, for instance, would make a paste out of Marquis; I have heard it stated that way.

Mr. MILLAR: The amount of water it would absorb.

The WITNESS: Yes, that is quite right.

Hon. Mr. MOTHERWELL: I think the term used is "conditioning".

By Hon. Mr. Motherwell:

Q. Do the varieties vary much in that respect?—A. Kota is an outstanding variety in that respect.

By Mr. Donnelly:

Q. You mean in the milling part, not the baking part?—A. Yes. In the conditioning for milling.

By Mr. Coote:

Q. That will be considered when you recommend the varieties which should be grown?—A. Yes. We have crosses coming on now, for instance, between certain varieties and Ceres, trying to incorporate this high absorption quality of Ceres.

[Mr. L. H. Newman.]

By Mr. Millar:

Q. Is a carload of a mixture like that equal in value to a carload of pure Marquis wheat?—A. It may be, or may not. It would depend a good deal on the season. In some seasons, if you happen to get a mixture of that kind, it might be worth more; in other seasons it might be worth less. Let me illustrate that. In a particularly fine year in Alberta there may be very little sprouted wheat. Wheat shipped from Alberta is sometimes criticized in the old country because of being too high in protein—it was “protein bound.” If it had had a little of a lower grade it would have given better results.

Q. I do not think you quite get all the implications in that question. A high price is often paid for wheat because it is gluten bound—has gluten to spare. Is a carload of a mixture worth as much as a carload of pure Marquis?—A. In the average season?

Q. No, I would not include the average season. I fancy it is possible to answer that question with a yes or no.—A. If I have to say yes or no, I would say no.

By Mr. Donnelly:

Q. Are we troubled as much with gluten bound wheat now with the prevalent use of malt extract?—A. No.

By Mr. Coote:

Q. I want to ask a question which seemed to be in Mr. Millar's mind. Is it probable that a car of straight Marquis or any other wheat would be worth more than a car containing a mixture of varieties; that is, one variety might be advantageously treated in a certain way and another variety would not respond 100 per cent to the same treatment. Would a car composed of just one variety be worth more than a car of good varieties, but mixed?—A. Assuming that the cars would grade the same?

Q. Yes?—A. That might easily happen.

Q. It would not necessarily follow that the value would be interfered with and the grain be worth more?—A. No. The Old Country millers mix as many wheats as they can together, particularly in France.—They never bake Canadian wheat by itself.

By Mr. Donnelly:

Q. May not that No. 1 Northern which you have there be mixed with a cheaper wheat, and still give as good a loaf and give as good value?—A. Exactly; that is what is being done.

Q. Does not that No. 3, where we have some Durham and some Kota, stand as much mixing with the lower varieties of wheat as the ones you have here?—A. It might not.

Q. You have no bread baked from the different mixtures?—A. Yes, we have baked different mixtures.

Q. But you have not put in Durham and Kota with it?—A. No.

By Mr. Millar:

Q. You could have several varieties mixed together and have a protein content of, say, 12 per cent—that would be about the right amount for a good loaf?—A. Yes, that is a fair average.

Q. Would you say a carload which would go 15 per cent of protein is not worth more money than a car averaging twelve?—A. It probably is, yes. There again it would depend on the season. If it were a year like 1927 it would be worth considerably more.

[Mr. L. H. Newman.]

Q. Would it always be worth more?—A. Not necessarily.

Q. In the old country markets?—A. Not necessarily.

Q. Have you known of a year which was not a year for high protein?—
A. Yes.

Q. When?—A. I cannot say offhand. If there were any disposition to favour high protein it would be of advantage, and I think in very many cases it is. We find a very interesting situation right across the line in Montana which produces a high grade wheat. In some cases the premium on account of the protein has gone up to 60 cents a bushel. The average premium runs about 16 per cent this year, I understand. In some seasons where the protein is higher the premium is very small, and sometimes there is practically no premium at all, but in a year like this there is a very decided premium because the average of the wheat is low in protein in the United States.

Q. Could you give a year in which there was no premium paid in the United States for protein?—A. The protein basis has only been carried on for the past five years, so it does not give a very big range, but only on Saturday I had a long talk with a gentleman from Montana; we were discussing this thing for several hours, and he mentioned one year in the last five when there was a very small premium paid for protein.

By Mr. Donnelly:

Q. When our wheat is high in protein content the protein becomes a sort of a drug on the market and there is very little premium paid for it?—A. It is a question of supply and demand.

By Mr. Vallance:

Q. Naturally more of it is needed south of the line than north of it.—A. This gentleman made the statement that if the duty were taken off Canadian wheat the premium would disappear; that there would be so much good Canadian wheat available that people to whom they now sell would buy the Canadian wheat.

By Mr. Totzke:

Q. Would you say that the protein content would not have much effect on the price paid? Would we get more for our average good wheat if the protein content were made part of the grading?—A. I would not care to say.

Q. Even if we had so much high protein wheat.—A. Some years it might.

By Mr. Garland (Bow River):

Q. Let us put it another way. If the protein content were taken as a factor in the grading of wheat, do you think it would benefit the majority of the wheat growers in Western Canada?—A. I do not think it would. There might be some cases in some districts where it would, but one thing it might help to bring about would be the growing of varieties high in protein.

By Hon. Mr. Motherwell:

Q. How will you discourage the growing of low protein? We have a lot of low quality stuff now. How will you discourage the further growing of that?

By Mr. Vallance:

Q. The fellow who grows a small quantity, maybe 10 or 15 bushels could not grow anything but high protein, and he would not get anything for it. Yet he would raise the value to the others by his growing it, and the growers to the north of him would reap all the benefit.—A. That is very true. That is one of the difficult things to get around.

[Mr. L. H. Newman.]

By Mr. Millar:

Q. Mr. Newman, is not the grading of wheat with protein as a factor a more accurate system of grading than we have at the present time?—A. I think probably it would be, because there is no doubt about it but what protein is the best single index.

Q. It probably would be.—A. It probably would be.

Q. You have admitted a whole lot. Probably you will admit that even yourself, an expert, cannot tell all the varieties, and yet when I ask you if a test by protein would not be a more accurate evaluation of wheat, you say "It probably would be". Are you not sure?—A. No, I am not sure it would be. I can give you one or two illustrations of that. Let us take Vermilion wheat. It was stated here in evidence by one of the gentlemen testifying that in the test made Vermilion was a little lower than Marquis. That is not absolutely the case. I was talking with the witness afterwards, and I think that was a little slip. We have found Vermilion to be essentially as high as Marquis in protein, but it is of a different quality entirely.

By Mr. Totzke:

Q. In that case your protein test is no good?—A. In that case the Vermilion might be a little higher than some varieties, but the other varieties would be very much superior in the quality of protein.

By Mr. Millar:

Q. What percentage of Vermilion is grown now?—A. The point is this: if that applies in the case of Vermilion, might it not apply in other wheats?

Q. It applies also to Durum, but to what percentage of the wheat we are growing now does that apply?—A. Vermilion is the outstanding.

By Mr. Totzke:

Q. It would induce the grower to grow more Vermilion if he could get more for it?—A. I was informed that there would be about 15,000 acres of Vermilion grown in Alberta this year, and I know that is worrying the inspection department at Winnipeg.

Q. You say, in the opinion of this man from Montana, if the tariff wall were removed the premium would entirely disappear?—A. That is what he stated.

Q. What would be the average of the protein in wheat we are growing at the present time?—A. In 1927, or over a period of years?

Q. Take a period of, say, five years.—A. It would run between 13 and 14.

Q. And what is the amount required to make a good loaf?—A. You should have around 12, at any rate. A Dr. Bailey at Minneapolis said to me, "You people do not need to worry as much as we do, because our average of protein in the United States is so much lower, that we find the giving of a premium very much worth while."

Q. You require 12 per cent to make a good loaf, and our average is about 12 per cent. There is a great deal below 12 per cent, both in Canada and the United States?—A. Yes.

Q. Then why, when there is such a large quantity below 12 per cent, and the average is only 12, should there not be a premium?—A. I said, between 12 and 14 per cent. There would be large areas up around 14 and 15 and 16 per cent. I would say 12 per cent would be a very low average—probably the minimum.

Q. Could you give me a year when the average ran up to 16 per cent?—A. In 1924—the crop of 1924. We have a large number of determinations here

[Mr. L. H. Newman.]

made from different varieties by the chemical department. Some of these run up to over 20 per cent. Reward, in the Fort Vermilion district, ran up to 20 per cent. 1924 was a very high average, very seldom going below 14 or 15 or 16 per cent.

Q. Once in the history of Canada in one spot with one variety it went to 20 per cent?—A. Yes.

By Mr. Donnelly:

Q. Read us the result of some of your stations.—*A. I will take two or three at Rosthern, omitting fractions. Garnet 16.43, Reward 18, Marquis 17, Early Red Fife 17, Red Bobs 16.3. Then at Brandon, Garnet 14, Reward 18, Marquis 14, Early Triumph 16. At Scott, Reward 18.5, Garnet 16.7, Marquis 17, Kota 17, Red Bobs 16. At Morden, Garnet 14.36, Reward 17.38, Marquis 14.6. At Indian Head, Reward 17.35, Marquis 15.7. At Lethbridge there are different conditions prevailing there.

Q. Have you any below 12 per cent?—A. I think I noticed one here. The Red Stone variety—which is almost entirely unknown—10.67. That was the only one down to 10. I do not see any others here. Kitchener, at Fort Vermilion, ran 11.1. All the rest ran from 12 to 20. At Beaver Lodge, Reward that year went to 20.25. That was rather an outstanding year. It was a dry year.

By Mr. Millar:

Q. Of the actual wheat we are growing I doubt if you can find in the last 10 or 20 years that it has averaged 16 per cent.—A. No, possibly not.

Q. I would not be afraid to risk a new hat that you cannot find any one year where it averaged 14 per cent.

By Mr. Donnelly:

Q. These samples are grown on your experimental farms?—A. Yes.

Q. Grown on land that has been cultivated for a long time?—A. Scott, of course, not so long.

Q. But the other places?—A. Yes.

Q. So the report that our land is depreciating in quality which would give protein to wheat does not seem to hold good on your experimental farms? They are as high in protein as they ever were?—A. Yes. Even this year, which is a low protein year, we have a pretty good test.

Q. It does not seem to bear out what they told us, that our land is being used up? It is still in the land and you are able to get it; all you need is the right variety of wheat?—A. Yes.

By Mr. Totzke:

Q. You stated that Vermilion wheat had a very high protein content?—A. Not particularly high, but about the same as Marquis.

Q. But of a very poor quality?—A. Yes.

Q. Would you say that the protein content itself would not be sufficient without the varieties?—A. No, not in a case like that. That is one case where it falls down.

By Mr. Donnelly:

Q. You would have to have the varieties?—A. Yes.

By Mr. Totzke:

Q. You say it is almost impossible for an Inspector to determine the varieties?—A. Yes, but I think if we make headway with this zoning business, and can keep our varieties down to the point where we can get good milling qualities.

* Protein per cent on dry matter basis.

those qualities and those varieties will predominate in any shipments we make. Then, of course the argument in favour of the Vermilion will have no particular point. I think that is one reason why this variety question is so very important. It should be easy then to get the rank and file of growers to grow varieties which they know to be good.

By Mr. Donnelly:

Q. Have you many samples brought from England?—A. All we succeeded in getting over last year was twelve samples in time to plant last spring.

Q. You did not get any in time to mill or bake them?—A. Yes, these loaves (indicating) all came from wheat brought over last year. We are holding many more for baking, but we are not baking any until we can grow them for varietal analysis and can link the two of them up together. Perhaps a year from now, if you are interested, we can give you our results of those tests.

By Mr. Millar:

Q. You think it would be better to continue to grade on the appearance than on the chemical tests, as suggested by this resolution?—A. I am inclined to think that for the present—and this is my own private opinion; I am not really in a position to speak on this particular matter—my own feeling is, looking at all the evidence available, it would be the safer plan to proceed as we are doing for the present time until we get the variety question settled a little more, because there are all kinds of complications that you will open up when you introduce the other. For instance, there are now districts growing wheat which is not high in protein but which will improve in a year or so perhaps.

Q. Will not this system of grading encourage them to do that?—A. Yes; for instance, we got wheat going up to 16 or 17 per cent in the case of Reward in 1927, as compared with 12 or 13 on Marquis up around Gilbert Plains, which very seldom produces high quality wheat. I think the difference in protein content between some of the districts which now give very high protein content as compared with other districts will be reduced.

Q. You are in favour of grading eggs and cheese and butter fat?—A. Yes.

Q. And there are some, I suppose, who produced the best, who at first were dissatisfied, but that was really not an argument against the system?—A. No, I do not think so.

Q. This amounts to the same thing?—A. Yes.

Q. It is a more accurate determination of the value of the wheat? It is hard for me to understand how you can still continue advocating a system which you have admitted is very far from accurate rather than take a step farther and arrive more nearly at the real value of the grain.—A. We did not go very much into the complications you will run into.

Q. What difficulties do you see? Mention the worst one you can think of.—A. One of the big difficulties is in getting representative samples.

Q. In a specification in our Inspection Act Vermilion is kept out. No. 1 must be "Marquis or equal to Marquis."—A. One shipment came to the inspection office this year that was believed to be Vermilion. The case was referred to us. It was not Vermilion. I do not know how the case was disposed of.

Q. What percentage of wheat grown this year will be Vermilion?—A. Very small.

By Mr. Totzke:

Q. Can the inspector tell it is Vermilion?—A. No, I do not think so.

By Mr. Millar:

Q. Suppose it is 1 per cent, and that gets into the wrong place, it would not be such an awful thing.

[Mr. L. H. Newman.]

By Mr. Totzke:

Q. Can the inspector determine whether it is Vermilion wheat or not?

By Mr. Vallance:

Q. Then you believe by the zoning system you can tell the growers what they can grow to the best advantage, for instance, high protein wheat of a specific kind, and you think that will overcome the tendency prevalent to-day in certain parts of the country to attempt to grow the wrong kind of wheat, and will tend to create a higher average of production?—A. We hope to reach that happy state soon.

By Mr. Millar:

Q. Just why would a man grow it when he is not getting any more for it, and the man who has the low protein wheat gets the same price?—A. He would grow it probably for other reasons.

Q. What are the other reasons?—A. Take the case of Reward grown in districts which now give a rather starchy wheat, a wheat which very seldom gets above 3 or 4. The difference in the grade he is going to get in the wheat will induce him to grow wheat like Reward. A greater value also may accrue by reason of Reward being at least a week earlier. He would be induced by the earliness, and perhaps also by the degree of rust resistance.

Q. Does it follow that the strong wheat is the earliest? Would that induce him to grow the strong wheat?—A. Early wheat is likely to be a better quality of wheat, because it ripens more quickly. Anything that ripens late is likely to increase the amount of starch in relation to the protein.

Q. And the same cause will reduce the yield?—A. No, not necessarily. We have several varieties of wheat which are earlier than Red Fife yet are more productive.

Q. Does it not follow that the strong wheats are grown on the arid soils?—A. To a certain extent, but in the case of some varieties this is not so noticeable.

By Mr. Donnelly:

Q. What is the cause of the English millers complaining of our wheat this year? Is it below the grade?—A. As they told me, they do not like to buy wheat, graded, say, No. 2, which originally was a No. 3 but dried and brought up to a No. 2, without their being told, or having something on the documents to indicate that the wheat was dried.

Q. You say the cause of it is that our inspectors are not severe enough in grading the wheat?—A. I think a great deal of the trouble last year arose at the mills in the drying processes.

The ACTING CHAIRMAN: The inspector admitted that.

By Mr. Ross (Moose Jaw):

Q. Did they not dry it down too far?—A. That was said to be the case.

By Mr. Coote:

Q. Dried at too high a temperature in the driers?—A. Yes.

By Mr. Donnelly:

Q. Does the same thing apply this year?—A. I do not know.

Discussion followed.

The Committee adjourned until Tuesday, April 24, 1928, at 11 o'clock a.m.

House of Commons, Tuesday, April 24, 1928.

The Select Standing Committee on Agriculture and Colonization met at 11 o'clock a.m., the Vice-Chairman, Mr. J. L. Brown, presiding.

The Committee again took under consideration the subject of wheat grading.

L. H. NEWMAN recalled.

By the Vice-Chairman:

Q. Have you any further statement to make, Mr. Newman?—A. Mr. Chairman and gentlemen: a request was made yesterday that we secure the protein tests on the three shipments of wheat made to the Old Country last year, of which we showed loaves of bread, as well as the protein content of the official samples of Nos. 1, 2 and 3 grades. Dr. Shutt, the Dominion Chemist, has made these tests and has succeeded in getting them through for this meeting. The official grade No. 1 Northern tested 14.1 per cent protein. The shipment grading No. 1, tested 13.9 per cent protein. The official sample grading No. 2 tested 14 per cent protein. The sample taken from the shipment grading No. 2 Northern tested 13.2 per cent. The official sample grading No. 3 Northern tested 13.5 per cent. The shipment grading No. 3 Northern tested 13 per cent. You will see that the tests were relatively close all the way through, not a very marked difference in the protein between No. 1 grade and No. 3, either in the official samples or in the samples taken from the three shipments. (See table of tests at p. 186 post.)

By Mr. Totzke:

Q. Is that the usual difference in the protein content between No. 1 and No. 3; would you say that that was the ordinary difference?—A. Our work has not really required us to make many tests of this sort of material, but, from the reports we have received and the tests that have been made by the Chemistry Division, I would say that they are not very widely different.

By Mr. Coote:

Q. Have you a laboratory in your own Department?—A. We do all the work, Mr. Coote, in our Department, except to make determinations for protein. Up to the present time, that has been made in the Chemistry Division.

Q. You have no facilities for making protein tests?—A. We have no facilities for making protein tests. In connection with our work, we feel that a great deal more work should be done in making protein determinations, as protein, undoubtedly, is a very important factor. So far, the Chemistry Division have been doing what has been done.

By Mr. Donnelly:

Q. Would you say, as the protein content is practically the same in Nos. 1, 2 and 3, and the bread is practically the same, that the only reason that they should be graded Nos. 1, 2 and 3 is the amount of flour received from the wheat?—A. I have the flour extractions here, also.

Mr. COOTE: I would like to move that that complete table be printed in our report.

Mr. DONNELLY: I will second that.

Motion agreed to. (See table of tests at p. 186 post.)

[Mr. L. H. Newman.]

The WITNESS: The flour extractions were determined by our experimental mill. You will understand that these are not absolutely reliable, but they are very suggestive, and the differences that would be obtained in a commercial mill in a large way would not be so very widely different. There is not a very significant difference in the flour extracted from the different grades. From the first shipment, grading No. 1 Northern, we got 72.1 per cent; from the shipment grading No. 2, we got 71.5 per cent; and from the shipment grading No. 3, we got 72.4 per cent. While, as I say, these figures may not be absolutely reliable, we do not find any great difference in the amount of flour extracted, as far as these particular lots are concerned.

By Mr. Donnelly:

Q. What was the amount of flour from the official grades?—A. In the official sample grading No. 1, the extraction was 71.3 per cent; which was a little lower than the amount extracted from the sample shipped. This holds true for the three lots. The sample grading No. 2 Northern yielded 70.7 per cent, and the sample grading No. 3 yielded 70.5 per cent.

By Hon. Mr. Motherwell:

Q. Have you the protein content?—A. I just gave those, Mr. Motherwell.

By Mr. Totzke:

Q. Would there be any difference in the quality of the flour from No. 1 and No. 3?—A. You have the loaves here to pass your judgment upon in that respect. We do not recognize any very distinct difference in the quality.

By Mr. Donnelly:

Q. Can you give any reason why they should be paying one price for one grade of wheat, and another price for another grade?—A. On the basis of this particular test, it is a little difficult to answer that question.

By Hon. Mr. Motherwell:

Q. Did you analyze the quality of the respective proteins?—A. Our only expression of quality is in the loaves. That is the only accurate way we have, as yet, to determine the quality of protein.

Q. They are very uniform?—A. Very good.

By Mr. Carmichael:

Q. There is more bleaching done to flour in grade 3 than to that in grade 1?—A. These were not bleached at all.

Q. None of the flours?—A. No, they are all milled through the same mill at the experimental farm, and are not bleached, in either case.

By Mr. Coote:

Q. Insofar as your own baking and chemical tests go, there is no appreciable difference between the bread manufactured from No. 1, and that manufactured from No. 3?—A. No appreciable difference in this particular instance. You will understand, of course, that it would be necessary to make a great many more tests, and have a great many more figures, before we could submit anything that would be absolutely reliable, and anything that could be acted upon. All we can say from these tests is that the results are suggestive, and are rather significant.

By the Vice-Chairman:

Q. Would not No. 3 contain a proportion of frozen grain?—A. We have the sample there, Mr. Brown. I do not think there was any great amount of frozen grain present.

[Mr. L. H. Newman.]

By Mr. Totzke:

Q. Do you think that a commercial mill would show different results?—A. A commercial mill would show a little different result, possibly, in the flour extracted.

By Mr. Donnelly:

Q. They would all show a little more?—A. Yes, there probably would be a little more.

Q. But the proportion between the different samples would be about the same?—A. It might be, or it might not. We have not been able to check that up very well, on account of the lack of an experimental mill capable of handling wheat in carload lots, such as they have at Minneapolis. When Garnet wheat first came out we sent 100 bushels of Garnet, and 100 bushels of Marquis to the State Testing Mill at Minneapolis. They were able to make an extraction comparable with that made in a large commercial mill. In that case, the relative differences between the two wheats as regards flour extraction were not very different from those we obtained at our own laboratory, as you will notice by our bulletin entitled, "Garnet Wheat."

By Mr. Coote:

Q. Could you give the Committee a little more information about that mill?—A. The first report on the work of this State Testing Mill at Minneapolis was issued in 1921. I have the first report, showing a picture of the mill. It is 60 feet long, 30 feet wide, and is a five story building, capable of storing two and a half cars at a time. They are capable of getting quite accurate data as to the percentages of the different separations. A mill of this type is able to give a little more reliable results, than our own small testing mill. There has always been the feeling that the small mill was not as reliable as it should be. In the United States, many people were anxious to have larger lots tested in a commercial way, in order to get more definite and reliable information, and this mill was eventually built. It is operated in co-operation with the University of Minnesota. Dr. Sherwood, the Director of it, is also connected with the University. The mill cost about \$100,000 to construct. I do not know exactly what the equipment cost. The net cost of running the mill amounts to about \$10,000 per year. The total cost is reduced to that amount by reason of an arrangement entered into between the University and certain State institutions, by which the flour made from these experimental tests is sold to the State institutions. In that way, the net cost is brought down to about that amount.

By Mr. Young (Saskatoon):

Q. Are you suggesting that we should have one in Canada?—A. It seems to me that a country growing the amount of wheat that we grow, and with the number of problems that we have, should have a mill capable of doing work comparable with this mill.

By Mr. Donnelly:

Q. Where would you suggest that it should be situated?—A. I think Winnipeg would be the logical place for a mill of that sort. I received a letter this morning from a member of the Committee of the Pool, and I thought that I might read it. This is a letter from Mr. Tinline, of our experimental farm at Brandon. It reads as follows:

A director of the Wheat Pool was in the office yesterday discussing the matter of a research laboratory for the Pool. This man is a member of the committee working on this problem and his visit here was to learn as much as he could of the way this problem might be attacked. He
[Mr. L. H. Newman.]

stated that some of the members of the committee expected to meet you in Winnipeg, but as he left early he did not know whether a conference had taken place or not, but expressed one thought that I will pass on to you. He suggested that if you were putting in a Departmental mill it would be better to have it linked up with the Pool elevator in St. Boniface rather than with any of the private milling companies. He asked if we could grow some samples of the grain exported to determine the amount of mixing and as this is a matter of policy I am writing the Director. A copy of the letter going to the Director is enclosed.

Yours very truly,

M. J. TINLINE,

Superintendent.

The Department has been quite interested in this problem and I know that Mr. Motherwell has been giving it his consideration, realizing that it is a matter of importance. We have been trying to get some data as to the cost, and also some ideas as to arrangement. However, nothing definite has been done, so far as I am aware, but, speaking generally, it would appear that a mill of this sort would be very much worth while.

By Mr. Coote:

Q. You consider the work that has been done by the experimental mill in Minneapolis to be of considerable value?—A. I would think so, judging from their reports, and from discussions with the men. I think it has created a little more confidence on the part of the growers; they feel that the results are a little more accurate, than those from a small mill. This is a very important factor.

Q. In regard to making protein tests, would it cost very much to give you the necessary equipment?—A. About \$1,000 would put in very good equipment, and one extra assistant would enable us to carry on and make practically all the protein tests that we consider necessary in connection with our departmental work, unless something else were put on in addition.

Q. As protein is such an important constituent, it would seem to be a rather necessary thing for your Department?—A. Yes. The making of protein determinations is largely a routine matter, and is one which could be handled, or a good deal of the work could be done by men who are not trained chemists. That is, we would not require to add more than one trained man in order to carry on.

By Mr. Donnelly:

Q. You were over in the Old Country investigating complaints received concerning our wheat?—A. I was not there for the purpose of investigating complaints, but only seeking information.

Q. Whom did you find the complaints were coming from?—A. From members of the Grain Exchange at London and Liverpool.

Q. Were the millers complaining as well, or just the dealers?—A. The dealers, chiefly.

Q. We are told that the dealers complained because we were doing the mixing here, instead of the dealers in the Old Country, and that we were making the money here instead of those in the Old Country?—A. I heard something to that effect, also.

Q. Do you believe that is true?—A. I would not like to say. That is rather a difficult question for one in my position to answer.

[Mr. L. H. Newman.]

Q. Were the dealers doing much mixing?—A. The dealers themselves?

Q. In the past years, have the dealers themselves been doing much mixing?—A. I have no information on that point.

Q. I am led to believe that in the past the millers have been doing the mixing?—A. That is my impression from what I could gather there, but I have no definite information on the matter. The millers certainly do a great deal of mixing.

Q. And they take the protein content?—A. A number of them stated to me that they prefer to do the mixing themselves. I gathered from that that there had been mixing done by someone.

Q. How do you account for the fact that the dealers are complaining of our wheat, and not the millers?—A. The chief complaint from the dealers was on the basis of grading the dried wheat.

Q. Did you go to see any of the millers at all?—A. Yes.

Q. And you had no complaint from them?—A. No, I did not have any particular complaints from the millers.

Q. Did you see any bakers at all?—A. No, I did not see the bakers.

Q. We can understand that the miller might be able to get just as much flour from the wheat as before, but the baker may not find it just as good, or something of that kind?—A. I have no information that the bakers themselves were complaining. I rather hesitate to think that they are complaining.

By Mr. Garland (Bow River):

Q. You have not had a single complaint from the bakers or millers?—A. No. The lots that were sent to the three large Liverpool bakers, to which I referred yesterday, were very well received. In their comments, they stated that these two wheats were very satisfactory from the point of strength and stability of gluten, the points which characterize the "Manitobas" as they call our wheat.

By Mr. Donnelly:

Q. Did you go to the Continent at all?—A. Yes.

Q. What did you find on the Continent?—A. In France, particularly, I discussed this matter privately with a number of the large importers of wheat, and with some dealers. I found that they were practically all buying No. 3 Tough from Canada, and finding it surprisingly satisfactory. They told me that they were a little afraid of this wheat at first, but they had found it to give such surprisingly good results that they were now buying it exclusively, on account of the difference in price and the results they were getting.

By Hon. Mr. Motherwell:

Q. Would they buy it before it was dried?—A. I suppose it would be after it was dried.

Q. Some was sent over before it was dried.—A. Yes. They were a little afraid of it at first, whether they would be able to continue to buy tough wheat, on account of the moisture.

By Mr. Garland (Bow River):

Q. If the moisture was still there, surely the grain had not been dried?—A. They were afraid, in some cases, that this so-called tough wheat might contain a little more moisture than would be safe. They were not altogether clear on this drying question, as a matter of fact.

By Hon. Mr. Motherwell:

Q. That would be the cheapest wheat they could buy?—A. Yes, and the best buy, from their standpoint.

[Mr. L. H. Newman.]

By Mr. Donnelly:

Q. Did you see the millers in France, as well?—A. I only saw two or three.

Q. And they did not complain, either?—A. No complaints.

By Mr. Garland (Bow River):

Q. Why would they call this tough wheat if it had been dried?—A. That was the grade under which they knew it.

By Mr. Coote:

Q. It would be shipped without drying, would it not? A great deal of our wheat was exported as Tough?—A. They spoke to me of No. 3 Canadian Tough, and they may have been referring to the undried wheat.

By Mr. Garland (Bow River):

Q. I think you will find that they were buying direct from the Pool, who shipped large quantities?—A. I think that you are probably right, because, now you speak of it, we did have a discussion on the Pool. I was quite interested to know how largely they were buying through the Pool in France.

Q. And the tough wheat has been found to be quite satisfactory?—A. So far as these people were concerned, yes. I spoke to quite a number on that point, and I was rather interested to find that it was giving them such good results, although, at first, they were rather sceptical of the appearance.

By Hon. Mr. Motherwell:

Q. Why do they object to dried wheat being put in the straight grades; because it does not condition uniformly?—A. Apparently.

By Mr. Coote:

Q. Were there not complaints that the wheat had been spoiled in the drying by being dried at too high a temperature?—A. I did not hear that in France. Apparently, as Mr. Garland said, they were buying undried wheat. In England we heard lots of complaints, that they could not depend on the performance of this dried wheat this particular season.

Q. I was referring to the complaints you had received about the dried wheat, that possibly they were from the fact that it had been dried at too high a temperature; would you think that was possible?—A. I think that that is the basis of a lot of the trouble that has taken place.

By Hon. Mr. Motherwell:

Q. That it was dried at too high a temperature?—A. Dried at too high a temperature.

By Mr. Coote:

Q. Would you care to express an opinion that if the wheat were dried in the proper manner, and then shipped out to the Old Country, that it should not be damaged for milling purposes?—A. As a rule, it should not. The trouble is that a lot of the gluten was really killed. When you get it heated up to a high temperature, a temperature that will destroy germination, it will certainly affect the gluten.

By Mr. Donnelly:

Q. It was either dried too much, or dried too rapidly?—A. Yes, probably both.

[Mr. L. H. Newman.]

By Mr. Coote:

Q. If we are going to continue to allow wheat that has been through a dryer to be graded into a straight grade of wheat, we certainly ought to exercise some supervision over the dryer?—A. I would think that that was fundamentally important.

By Mr. Spencer:

Q. Is there any supervision now being given by Government officials to the drying of wheat?—A. I expect so. That is under the Department of Trade and Commerce, so we are not so familiar with what is actually done.

By Mr. Donnelly:

Q. What method of drying do you advise?—A. I am not able to advise on that point; I have not had experience in the different methods.

Q. What other countries did you visit, besides France?—A. Italy.

Q. Any complaints there?—A. No, nothing special.

By Mr. Fansher (Last Mountain):

Q. Have you any data as to the amount of moisture in the wheat that was shipped over to the Old Country, and which received such favourable consideration; have you any data as to the amount of moisture that was in that wheat? Do you know the safe amount that it can contain to be shipped in the winter?—A. No.

Q. I think that is a very important point, from the producers' viewpoint?—A. Yes.

Q. If we are held down to 14.2 and 14.4, and this wheat has gone over with 15.7, and has crossed the Atlantic perfectly safe, and was received so very favourably by the milers, it is a point for us to consider very seriously.

By Mr. Donnelly:

Q. How much moisture are we allowed to have?—A. About 14 per cent.

Q. They must dry wheat with 15 per cent?—A. Yes, that is considered to be pretty safe, around 14 per cent.

By Mr. Coote:

Q. How many samples have you tested that have been sent back from the Old Country?—A. I think we have actually milled six and have tested twelve for varietal composition, and we have quite a large number that will be sown this spring for further work.

Q. Do you think that it would be wise for us to make it known in the Old Country that those who have complaints to make should send samples?—A. I think it would be very highly desirable. As a matter of fact, when I was there I asked the Canadian Trade Commissioner, as well as some of the leading men of the Corn Exchange, to send us samples, in case there was any doubt at all as to the varietal composition, which was the thing that I was primarily interested in. We are very much interested in maintaining the quality of our wheat, and if there is anything wrong we want to get it as quickly as possible.

Q. Your branch would be quite willing to analyze these wheats, or test them for varieties by growing, and so on?—A. Yes, and we are doing that more and more.

Q. Had they any complaint to make on account of our wheat being damaged by rust?—A. No, I heard no complaint on the ground of rust.

Mr. Garland (Bow River):

Q. Do you not think that it would be of considerable advantage if we kept a continual check and tests on the wheat imported to England from Canada?—A. I think it would be very desirable.

[Mr. L. H. Newman.]

Q. Have you made any arrangement to do that?—A. No more than we arranged through the Canadian Trade Commissioner's office to keep in touch with these people.

Q. And with the complaints?—A. The complaints also.

Q. But outside of the complaints, would it not be a good thing if we had some continuing samples?—A. We have requested the Canadian Trade Commissioner's office, chiefly Mr. Wilson, to periodically collect samples from shipments, and send them in.

Q. Has any attempt been made, officially, to counteract the incorrect propaganda in England on the grading of our wheat?—A. Not that I know of.

Q. Do you not think it advisable that that should be done officially, after the tests?—A. I should think so. A few years ago Australia had a man resident in England, who did a great deal for Australian wheat.

Q. Do you not think that it would be a good idea for the Department of Trade and Commerce, in addition to its general advertising activities, to undertake to advertise the quality and protein content of our wheats, in order to counteract this adverse propaganda?—A. It would appear to be a matter worth looking into.

By Mr. Ross (Moose Jaw):

Q. Did you find that the mills in the Old Country had laboratories—A. Yes, quite generally.

By Mr. Donnelly:

Q. Did you visit other ports besides Liverpool?—A. I visited the Grain Exchange at London and at Liverpool. We met by arrangement, made through the Canadian Trade Commissioner's office. I had appointments with the members at both places, and we had quite a large attendance. I spent about an hour and a half at each of the two places, discussing these things.

Q. And you found the same complaint at both places?—A. Exactly the same.

Q. Chiefly with regard to our dried wheat?—A. That was the one thing that they wanted me to bring back to this country.

Q. Was there any other complaint of any kind?—A. No, that was the one complaint that was quite outstanding.

By Mr. Coote:

Q. I wonder if you would be good enough to tell us a little about the work of your Department, in connection with the research with regard to rust? I consider this is one of the greatest problems facing the wheat producers to-day.—A. The Cereal Division of the Farms has been carrying on work for a number of years, with the view, among other things, of producing a wheat capable of resisting rust. The first crosses made by my predecessor, Dr. Saunders, with this particular object of producing a rust resistant wheat, were made quite a few years ago. In the spring of 1924, we started quite an extensive program of crossing, here at Ottawa. We used such wheats as Reward, which was recognized even then to be a wheat of particularly high quality, as one of the parents, and certain highly rust resistant, but relatively poor quality forms, such as Marquillo, as the other parent. That program has been continued, and has been extended. We were well under way at the time it was decided to speed up this work by establishing a rust research laboratory at Winnipeg, which, as you know, was established through the Department and the Research Council working in co-operation. We have two main divisions at the rust research laboratory, one division having to do with straight pathological studies, and the other with genetics and breeding. The work of plant breeding, and the studies in genetics, as related to that work, is under the Cereal Division. The work in pathology is

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under the division of Botany. The work is progressing quite satisfactorily, and while we now have wheats which are showing a great deal of rust resistance, it will require some time before we can prove the degree to which we have combined rust resistance with quality, in trying to produce a variety which may be considered entirely satisfactory. That, roughly and very briefly, is the work being done by the Department, in connection with rust.

By Mr. Donnelly:

Q. Have you made any advances in a pathological way?—A. Yes. In the Pathological Division some rather outstanding work has been accomplished and crystallized during the past year. One of the men, a Mr. Craigie, has recently submitted a paper which almost marks a new epoch in the study of rust, indicating that the different forms of rust, of which we have quite a number, are capable of hybridizing one with the other, just as some of our wheat varieties may cross naturally. The question is whether we are going to reach an end, if these forms are going to become multiplied by the crossing of one particular form with another. Where is the end going to come, or will it come, or what does it signify? That paper is considered by the scientists of the world as a very remarkable contribution to our knowledge, and it will be quite a help to us in our breeding work.

By Mr. Coote:

Q. I have just received from the Council of Agriculture a resolution dealing with rust research work, and I will just read the first paragraph in it.

Whereas grain rust is costing the country millions of dollars annually, such loss can only be prevented through the agency of scientific research, which demand the services of the most highly trained experts.

And whereas, Canada is losing many agricultural scientists to other countries, where the scale of remuneration is considerably higher than that paid here,.....

I will not read the rest of the resolution, but I would like to ask you whether, in your opinion, we are losing some good agricultural scientists because we are not paying enough?

The VICE-CHAIRMAN: This reference to the rust question is a little apart from the order of reference, and there is a possibility of our wandering far afield.

Mr. COOTE: Could we have the permission of the Committee to have Mr. Newman answer that question?

The WITNESS: Yes, that is, unfortunately, very true. During the past five years, we have lost from the Department of Agriculture, through resignations, seventy-five technical and semi-technical men, who have left to accept other positions. There has been a total of eighty-one who have left, three due to death, three having left by request, and seventy-five having left to obtain more remunerative positions.

By Mr. Garland (Bow River):

Q. Have you found any trace of rust in Alberta?—A. Yes, we found a little in Alberta. This year the pathologists found a species of rust called Glume Rust, which is quite common in England, and also in Sweden. That particular species was found in Alberta this year.

By Mr. Lucas:

Q. Have you found any black rust?—A. Yes, a little was found but we have not found any place where it has become serious.

[Mr. L. H. Newman.]

By Mr. Garland (Bow River):

Q. It is likely to become serious, if it is not checked?—A. It might; we may get something that will live, even in Alberta.

The VICE-CHAIRMAN: I think we will have to bring the Committee back to the subject that is properly before us, the question of the grading of wheat.

By Mr. Spencer:

Q. What type of rust was it that caused the loss last year?—A. There was a good deal of leaf rust in Alberta. Until recently this was not thought to do a great deal of damage, but now it is found to do some damage.

By Mr. Ross (Moose Jaw):

Q. You mentioned that practically every mill that you visited in Europe had a laboratory, and chemical men employed there. In your opinion, were these men employed for the purpose of determining the milling and baking value of the wheat that the mill would be using?—A. Yes.

Q. There are also chemical laboratories in every mill in Canada. Now, if these people can determine the milling and baking value of wheat by chemical and mechanical means, do you not think that, with a little further research work, we should be able to determine a system of chemical and mechanical analyses, whereby we could grade our wheat on an absolute milling and baking value?—A. That situation, Mr. Ross, has often made me ask the same question. I am not in position to answer it, but it seems reasonable to think that if the milling and baking tests made by the millers play such an important part in determining their purchases, that it should be possible to work out some arrangement whereby similar tests should play an important part in the commercial handling of our grain. As to how that could be done, is an involved question, obviously, but it seems reasonable to think that something might be done.

By Mr. Coote:

Q. Would it be reasonable to say that we should take full advantage of the work of our chemists and scientists, especially in connection with our own laboratories, in the grading of wheat?—A. I did not get your question.

Q. Would it seem reasonable to believe that we should make the very fullest use possible of our laboratories, and our Dominion Government chemists, in connection with the grading of our wheat?—A. Oh, yes, I should think so.

By Mr. Millar:

Q. I would like to have a little more information about these loaves. One of each pair is baked from the standard Winnipeg sample, is it not?—A. Yes.

Q. Have you made tests to find out how many varieties were contained in those standard samples?—A. No.

Q. You have a chart here showing the number of varieties in the samples taken from the shipments?—A. Yes.

Q. One is baked from a mixture, but you do not know the number of varieties in the mixture of the other? You do not know that it is a mixture, but it goes without saying that it is?—A. Yes.

Q. The official samples probably contain just as many varieties as the other?—A. I should think so.

Q. You are making a comparison between wheat composed of a mixture, and another wheat composed of a mixture; between two mixtures?—A. Yes.

Q. I was going to ask you another question with regard to whether that was a reliable test, but I think you have already answered it by saying that a number of tests are necessary before you can come to a conclusion. Not

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only that, but I believe that even among the expert millers, such as they have in England, there is a difference in the results which they get from the same cargo?—A. Yes.

Q. Would you say that the results from the samples that arrived in the Old Country, such as you have there, are a guide to the value?—A. I should think it should be.

Q. If you had a mixture where you have seven or eight varieties, such as you have there—and you are almost sure to have the varieties with good milling qualities, and which would make good bread—would it be worth suggesting to those who are buying our grain, that a certain cargo would test, say, fifteen per cent protein?—A. Not likely, because, in the majority of cases, a car of that sort would be used in jacking up other lots that would not be so high in protein content.

Q. That is the point that I want to make; they are buying our wheat because of its strength?—A. Yes.

Q. I have a lot of literature in connection with that, but I do not want to read it, unless it is questioned. They are buying our wheat because of its strength?—A. Yes.

Q. And if they can get wheat containing 15 per cent protein, it is worth far more to them than a cargo of wheat containing 12 per cent, but which might make just as good bread by itself?—A. Yes.

Q. Therefore, that does not necessarily indicate the value of the wheat as it arrives in the Old Country; the fact that it would make a good loaf of bread does not indicate its value on the Old Country market?—A. Well, in that sense, of course, the relative value is perhaps not indicated.

Q. We were discussing yesterday the average protein that one would find in grain grown in Western Canada. We were dealing with the point of whether there would be a premium—perhaps it is not proper to use the word “premium”—on account of a higher protein content? Under this new proposal, they would simply buy No. 1, knowing the percentage of protein content. I have a list here of a number of tests made by two laboratories in Winnipeg, about two years ago. This was taken from a larger list. I have not the exact date, or the names of the laboratories that made them. Instead of using the large lists, containing some three or four hundred tests, I took those under the letter “C,” so that there could not be any charge of picking out certain ones to serve a certain purpose. The percentages were as follows: 13.4, 13.7, 13.8, 12.2, 12.2, 14.3, 12.3, 13.2, 13.4, 13.3, 12.1, 12.8, 13.6, 13.9, 14.3, 13.8, or an average of 13.8 for probably twenty-five samples. Those are all No. 1.

Mr. GARLAND (Bow River): What do you mean by Class “C”?

Mr. MILLAR: In the large list they were grouped alphabetically, according to the place they came from. For instance, Indian Head would be under “I.”

Mr. GARLAND (Bow River): Where do the “C’s” come from?

Mr. MILLAR: All the shipping points that start with “C,” such as Calgary, and so forth. That really signifies nothing, as they were scattered all over the three prairie provinces. No. 2 averages a little less, 13.6, and there were fewer tests. There were only six tests in No. 3, with an average of 12.55. I believe you made the statement yesterday that some man from Montana said that that premium on protein would disappear. The charge has frequently been made that if we graded wheat on a protein content we would not be able to get any higher price, for the reason that there is so much high-protein wheat in Canada. I will read a portion of this statement: “Wheat that produces the best grade of flour must contain from 12 to 12.5 per cent of protein. When we stop to consider that the bulk of our wheat contains less than 12 per cent, we can readily understand why high-protein wheat must sell at a premium.” The Old Country people are buying our wheat and mixing it with their own wheat, with Austral-

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ian, Argentine, Indian and other wheats, and even Americans are buying it over the tariff wall—and for export they do not have to pay any duty—to mix it. Milling concerns at and near Buffalo can catch our grain in transit, and it does not cost them any more for transportation. They mix quantities of that with their soft wheat for export. The Canadian mills in the east mix it with the soft wheat of Ontario. From one year to the other, the average of our wheat is no more than 13 per cent, and it requires from 12 to 12.5 per cent to make a good loaf. Does it not look reasonable that we would have a splendid market for our high-protein wheat? It is going down lower and lower in the States, and the demand is getting greater, and the same is true in Canada. I cannot really understand how anyone can come to any other conclusion than that there is a sufficient demand to warrant the segregating of the strong wheat, so that they know where they can get strong wheat.

Mr. GARLAND (Bow River): I have no objection to hearing Mr. Millar's argument at all, and I hope we will hear it at some length in the House, but we have Mr. Clark and Mr. Newman to finish with, and if Mr. Millar has any questions to ask I would suggest that he put them briefly so that the Committee can get on.

The VICE-CHAIRMAN: I think the point is well taken myself.

Mr. MILLAR: I allowed Mr. Garland and others to ask questions, and I think I am entitled to ask some myself.

Mr. GARLAND (Bow River): Not to argue, surely?

Mr. MILLAR: I want to go on the record with Mr. Newman.

By Mr. Millar:

Q. I want to ask him now if he agrees with this information, and if he is still of the opinion that there is not a sufficient demand to warrant the segregating of high-protein wheat?—A. I would like to be able to answer that question, Mr. Millar, but it is rather too much. I can only express an opinion based on what I have heard from others who have looked into the matter more fully. They say that it is all a question of supply and demand, when it comes to protein. That is the opinion I have had crystallized for me. If people in any part of the world, in the United States or in Europe, want protein badly enough to pay a premium for it, they will pay it. In some years they will pay more than in others. In some years what they would pay would be very small. In the United States they say that during some years the premium paid on protein is not worth bothering with, while in other years it is very much worth while. I cannot add very much to what I said yesterday.

By Hon Mr. Motherwell:

Q. It is not likely to be declared if it is too much?—A. I would not think so, because that can very easily be corrected.

Q. By mixing with the low?—A. Yes.

By Mr. Millar:

Q. I asked yesterday if this protein test, with the other qualifications in the grain, would not be a more accurate test than at present, and you said that it might be. The fact is that practically all the hard wheat in the United States is being sold on that basis now where they have similar wheat to our own. On both sides of the line it would be identical, but as between the north and the south it would vary. They probably would have the same varieties as we have, and they have gone as far as we have in the grading system, outside of the protein question. After they have gone as far as they can in that, when they obtain further information, it makes a variation, in some cases, of 30, 40 and 50 cents a bushel. If they find the quantity test sufficient to guide them in paying such premiums as that, why should that not be a sufficiently accurate test here?

[Mr. L. H. Newman.]

—A. In the United States they have not made any reference, in the wording of their grades, to protein. As I understand it, you have in mind the including of the protein content as a part of the grade.

Q. Yes. There is a difference?—A. There is a difference there. If, with their grading system in the United States, they are decided not to include protein as part of the grade, but to handle protein outside on a sample market, it seems to me that their experience, which is much more extensive than ours, should be somewhat of a guide, or it should be looked into. They have protein testing stations scattered through the different States. A farmer can send in his sample and have it tested for protein. If he finds that it runs high he can immediately get in touch with the markets that are prepared to pay him a premium for the high-protein.

Q. You have not got my point. Their protein tests, added to the other information, is sufficient to cause them to accept it as a method of valuing the wheat, to such an extent that there is the variation I spoke of. Can you point out any difficulty in the way of Canadians that does not exist there; are there more varieties, or are there more difficulties?—A. I do not see why the same plan that they follow could not be followed here.

Q. That of determining the protein content?—A. Determining the protein content, yes. I do not see why the actual determinations could not be worked out.

Q. Would it be as safe a guide here, to determine the value, as it is there?—A. I think so.

Q. You mentioned the difficulties that you saw in adopting this scheme, and you mentioned some varieties of wheat that could not be properly tested, which is admitted. Would you mention any other difficulties that you see in the way?—A. I do not think I can add to the list of difficulties enumerated by the previous witnesses, in connection with the present investigation. I think Dr. Birchard and Mr. Fraser, and these other gentlemen, have summed the situation up fairly well. I do not think I can add anything to what they have already given you.

By Mr. Garland (Bow River):

Q. Mr. Millar referred to the United States testing laboratories stationed all over the country. Has there been any complaints as to the lack of uniformity in those tests?—A. According to my information, occasionally there have been complaints, as there are bound to be, but nothing very serious.

Mr. MILLAR: I happen to have something that answers that question. There is a bill before Congress right now asking the Government to go further. The complaint is that the tests from these commercial laboratories are not always reliable, and, for that reason, they ask the Government to undertake this work. I will not read all the article, but it shows that they are not always satisfactory. They are asking, I believe, that a laboratory be established to make the original tests, other laboratories be established to make the appeal tests.

By Mr. Ross (Moose Jaw):

Q. When before the Committee yesterday you mentioned certain wheats obtained from Kansas. When you were in England, and on the Continent, did you find that the millers were paying premiums for certain wheat from Kansas, having the characteristics of Garnet wheat?—A. I had no intimation that any particular premiums were being paid for wheat of that nature. The first instance that really came to my notice was in connection with the report from these bakers of Liverpool, who tested the two shipments, one of Garnet and one of Marquis. One baker stated that in his opinion the one flour was worth a little more than the other, on account of the particular colour of bloom, or crust.

[Mr. L. H. Newman.]

By Mr. Donnelly:

Q. Did they have any complaint with regard to the wheat they received from any particular port in Canada? Did they compare Vancouver with the Atlantic seaboard, or say that one was better than the other?—A. I have no recollection of their making any particular discrimination.

Q. One port was as good as the other?—A. Yes.

By Mr. Coote:

Q. In your answer to Mr. Ross you said that one baker said one flour was worth a little more than the other; you did not state which was which?—A. It was Garnet.

Q. Garnet was the better of the two?—A. Yes.

By Mr. Millar:

Q. When you were overseas, did you get any information like this. Dean Rutherford asked the question "I asked him if it would be an advantage in selling Canadian wheat, if they could guarantee the millers a grade with, say, 14 per cent protein. It would, he said, be an advantage to the miller to have such information, and more if possible."

By Hon. Mr. Motherwell:

Q. Supposing that the percentage of protein was obtained, and it was assured in the three higher grades; what would be the major difficulty in applying that as a basis, in actual practice, in our grain trade to-day? Would it be in keeping it intact during transportation?—A. Probably the biggest difficulty, as indicated by Dr. Birchard and Mr. Fraser, would be that of making the test sufficiently quick in order to make it practicable. The one big difficulty, apparently, was that of establishing machinery to look after the making of the tests.

By Mr. Millar:

Q. Is that the only excuse they give?—A. That was not the only one, but I think it was the principal one.

By Mr. Coote:

Q. Was not the matter of grading straight wheat a major difficulty?—A. Yes.

By Hon. Mr. Motherwell:

Q. The millers get over that difficulty?—A. Yes.

By Mr. Donnelly:

Q. Of course, the farmer would not get the benefit.

By Mr. Millar:

Q. Under the plan proposed there would be no difficulty, such as has been mentioned. No. 1 would be just No. 1, as now, only arrived at on a different basis?—A. Yes.

Q. I do not know whether your research work will enable you to give an expert answer on this. The Chairman of a Board of Revenue in the States—I do not want to give his name because I do not think he spoke for publication—said that if Canada should establish protein as a grading factor, the United States would be forced to do the same. If they adopted this policy of grading, they would have such an advantage over the other countries that the other countries would be forced to fall into line. That is not contained in his words, but I am taking that interpretation of it, and I think that is what he meant.—A. That is quite possible.

[Mr. L. H. Newman.]

Q. Do you know whether the cargoes, from which these samples were taken, went through the mixing elevators, or through the public elevators?—
A. No, I have not that information.

Q. You do not know whether they went through the the mixing elevators or not?—A. No. We know they went through the port of New York, and we know the name of the vessels.

Q. In what percentage of cases would the quantity of protein indicate good quality; would it be eighty or eighty-five per cent?—A. I could not say, Mr. Millar, as it would be only guessing.

By Hon. Mr. Motherwell:

Q. High quality usually goes with high quantity?—A. It seems to be associated, as a rule.

By Mr. Millar:

Q. I think you had better correct that. I do not think that that had better go in the record, as I do not think the Minister means exactly what he said. He asked if high quality protein went with high quantity. You would not say, "yes" to that?

Hon. Mr. MOTHERWELL: I was referring to the three top grades. Does quality of protein go with quantity in the three top grades?—A. Generally speaking, I think we may usually say that in wheats of the three top grades, if the quantity of protein be high, that it is likely to be of a better general quality in the case of the varieties we have in general now.

Witness retired.

GEORGE H. CLARK, called.

The WITNESS: Mr. Chairman, may I offer a few words of explanation? The matter under consideration is one that pertains particularly to the work of the Board of Grain Commissioners of the Department of Trade and Commerce, and to the Cereal Division of the Department of Agriculture. In my position, as Commissioner of the Seed Branch, it is necessary that I follow very closely what is being done by the Grain Inspectors, and the Cereal Division, in order that we may be in a better position to plan our work, to lead up to the production of the kinds and qualities of wheat that are most in demand. The subject matter under discussion is largely outside my field of work.

Having made that explanation, I would like to say just a few words regarding what has been the general policy of the Seed Branch looking to the improvement of our wheat crop in the prairie provinces. Every year, in the months of October, November and December, we make a survey to gather information as to the condition of the crops, in respect of the seed supply. Every year we want to know, before the end of December, whether, because of frost, rust or hail, there are any considerable areas in Western Canada that may be without satisfactory seed supply of any particular kind. Fortunately, we have not had what we might call a real disaster to our wheat crop since the year 1916.

My first survey of the wheat crop of the prairie provinces was made in the years 1904 and 1905. Practically all of the wheat crop at that time was composed of the old Red Fife variety. I found that there was no large source of supply of pure seed of Red Fife wheat and, in consequence, the Red Fife wheat crop at that time was composed, largely of Red Fife, of course, but also a very considerable percentage of other varieties, most of which could not be determined. The immigrants coming in to the country were bringing varieties from the home land. Later information has shown us that natural crossing produced a good deal of mixing in our Red Fife wheat at that time.

[Mr. G. H. Clark.]

Another serious defect that I found in the Red Fife wheat crop of 1904 and 1905, was the marked prevalence of smut. The records of grain inspection for the grain crop of 1905, will show that about six per cent of the total output of wheat for that year was rejected because of smut. We had good reason to believe—I say we, because I discussed the question with many people who understood the technique of the subject—that the Red Fife wheat we were growing was, in a large part, run out. A large proportion of the plant population in the crop of Red Fife wheat was weak and susceptible to disease. While the treatment of wheat with bluestone, which was common at that time, was a help, what was really needed was to produce fresh supplies of seed that was vigorous.

At that time there were experimental farms only at Brandon and Indian Head, for the prairie provinces, and the quantity of elite stock seed they were able to produce was not large. In the early spring of 1906, following that investigation we organized with the co-operation of the C.P.R. and C.N.R. a special educational train, which some of you may remember. It was called the Seed Selection Special. I started on that train on the 6th of January from Brandon, and I finished by running the train into a ditch away up in Northern Manitoba about the second week in March. That train had good educational value, in bringing to the attention of the people the effect of using frozen wheat, and wheat that was run out for seed purposes.

In 1907, with the co-operation of Hon. Mr. Motherwell, who was then Minister of Agriculture for Saskatchewan, we organized field crop competition, in the three prairie provinces, offering prizes up to \$75 for the best quality of seed crop, judged in the field, from the standpoint of utility for seed purposes. As had been estimated in a year or two the competitors endeavoured to procure pure variety seed grain, and within a comparatively few years most of the Red Fife wheat of Western Canada traced back to the fields of grain that had won prizes in a field crop competition.

At that time there was very little registered seed available. The development of registered seed has given to Western Canada a wheat crop of several varieties, but a wheat crop which, on the whole, is purer as to variety than the Red Fife wheat crop of 1904 and 1905. We now have a purer strain and a better quality of Marquis than the Red Fife wheat was in 1904 and 1905. We have now reached a point in the Prairie Provinces where the quantity of registered seed wheat produced is about as large as is sufficient to meet the requirements amounting to perhaps nearly one per cent of the seed which enters into commerce. The whole of the Marquis wheat crop of the Prairie Provinces may be traced back within a very few years to the registered seed. What is of great importance is that as a result we have a grain crop that is able, because of its vigour, fairly well to resist most of the diseases.

Mr. MILLAR: Just a moment. Do I understand your statement to be that you could by education change the nature of all the grain grown there now into any particular variety in four years' time?

Mr. CLARK: No, I did not make that statement as to variety; I did make the statement as to the quality within any variety. I believe, if you were to go over the Prairie Provinces now and trace back almost any field of wheat—Marquis or any of the other varieties which are eligible for registration—you would find within a very few years that it traces back to wheat that was registered. That is an important factor in the improvement of crops in the Prairie Provinces. There are some varieties which people persist in growing that are undesirable. Under the amendment which you have made to the Seeds Act, those varieties, I believe, can be gradually eliminated. From the discussion throughout I regard it as desirable that only the varieties that are of good milling quality should be made eligible for registration, and some of

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these objectionable varieties may have to be checked out by the use of that new section of the Seeds Act.

I want to mention one other condition that exists. When we have large areas of crops that are destroyed by rust, hail or frost, the new supply of wheat that is brought in to that area the next year comes largely out of grain elevators. Such seed is not of pure variety. The quality is not good. While our Seed Purchasing Commission was operating we were able to go to areas where there were large acreages of relatively pure Marquis wheat and secure 1,500,000 or 2,000,000 bushels from that area to be shipped into the interior terminal elevators to clean, grade and distribute in the area where the wheat crop had been destroyed. That protected the grain crop as a whole to a very marked degree. For the present and because with most others I agree that merchandising is not a proper function for a government, except under extraordinary conditions such as we had during the war, I believe it is advisable to encourage the development in several locations in the Prairie Provinces of seed cleaning plants where good quality seed wheat of the approved varieties may be assembled in the fall of the year or during the early winter and from them be made available to those areas where the wheat crop has been destroyed by frost or rust or hail.

Mr. MILLAR: As a function of government?

Mr. CLARK: Not necessarily a function of government. I believe it would be helpful if those cleaning plants were constructed and equipped by the government and the overhead cost on account of the capital invested were not charged against the seed wheat so that the seed would go forward to the seed trade and to the ultimate consumer at the lowest possible cost.

Mr. FANSHER (Last Mountain): Just on that point, Mr. Clark: granting that that was done, would you consider it necessary to take similar action to that taken by the live stock industry, where they have pure bred sire areas, and create an area of what might be called "a pure seed area"?

Mr. CLARK: We now have something comparable to those pure sire areas in that both the federal and provincial plant breeders are producing quite a substantial quantity of elite stock seed of the best varieties, and that elite stock seed is put out to the registered seed growers for the purpose of multiplication. The price which is obtained for that elite stock seed is not at all comparable with its cost of production, but that is done with government assistance, both Federal and provincial.

Hon. Mr. MOTHERWELL: Is there any demand for all the elite stock seed which is grown?

Mr. CLARK: They are not producing as much elite stock seed, I believe, as could be used to good advantage by the growers of registered seed, that is, men who have clean farms and who devote special attention to the production of seed.

Hon. Mr. MOTHERWELL: What is the usual price this year per bushel? Does it depend on the variety?

Mr. CLARK: The elite stock seed is commonly sold at, perhaps, 50 cents higher than registered seed; at a price sufficiently high to make sure there is no danger of its being used for milling purposes or of being wasted.

Hon. Mr. MOTHERWELL: Is it cheaper than that sold by the seed merchants?

Mr. CLARK: The seed merchants do not handle the elite stock seed; they handle registered seed.

Mr. FANSHER (Last Mountain): The elite stock seed goes only to the registered seed growers?

Mr. CLARK: Yes. I think I have said enough to indicate that so far as this subject matter is concerned, I have only a very general knowledge of it. It

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is necessary, as I said before, for me to understand the problem in order that our work may fit into the problem. It is not desirable that in our work we overlap the work of Mr. Newman or the work of the Board of Grain Commissioners.

Mr. GARLAND (Bow River): You are taking the proper steps now to check out the undesirable varieties in western Canada?

Mr. CLARK: I think so.

Mr. GARLAND (Bow River): And up to this date that problem only becomes a serious or dangerous one in so far as the quality of our export grain is concerned? That you are checking all the time?

Mr. CLARK: We are watching it all the time well in advance, and while you cannot take the farmers by the scruff of the neck and say "You must not grow this variety" or "You must grow that variety", yet in a mild way we are doing all that reasonably can be done to discourage them from growing the varieties that are undesirable.

Mr. GARLAND (Bow River): And you are doing that before the problem has really become a serious one, so far as our export grain is concerned?

Mr. CLARK: So far as possible.

Mr. MILLAR: In the light of the statements made by Miss Cora Hinds and Major Strange that we were in danger of losing our reputation unless something were done and done quickly, would you say that we have kept up to the job? Would you not say there is a real danger now? I think Mr. Fraser said there was a lot of trouble, and it was also mentioned by Miss Cora Hinds—or something to that effect.

Mr. CLARK: My understanding of the viewpoint expressed in the *Winnipeg Free Press*—Miss Cora Hinds—resulted from the unfortunate climatic conditions that existed a year ago, which yielded us so very much tough wheat that was dried too rapidly, perhaps by men who did not understand the deleterious effect that too rapid drying had on the milling qualities of that wheat. This wheat was mixed with other wheats and graded No. 3. Upon that I have no comment to make. I heard one of the members of the Board of Grain Commissioners here state that they could see now they had made a mistake in doing that.

Mr. MILLAR: So far so good, but I think she mentioned two other factors, mixing in the elevators and a multiplicity of varieties.

Mr. CLARK: There has been in the West of Canada Press a good deal of comment about Vermilion wheat and I think that is what Major Strange had in mind when he was expressing himself so very strongly. Vermilion wheat has got too far, yet it has not got very far.

Mr. MILLAR: How much of that is grown?

Mr. CLARK: Well, the application for the licencing of the variety name came to us only two years ago.

Mr. DONNELLY: Would you say that the complaint with regard to our wheat is not on account of the mixing of the varieties but on account of the mixing of the qualities?

Mr. CLARK: As to the mixing of the qualities I can only speak from my understanding of the discussion which took place here. The complaints grew out of that one particular condition of the mixing with wheat which had been too rapidly dried.

Mr. DONNELLY: Would you say that what Major Strange says, and what Mr. Fraser and Miss Cora Hinds said, that the mixing of varieties was one of the causes—would you say there was nothing to it?

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Mr. CLARK: No. I would say there is a great deal to it, but not as much as the statements would indicate.

Mr. DONNELLY: The chief complaint is from the mixing of the qualities.

Mr. CLARK: That has been largely the outcrop of complaints which have come from the old country.

Mr. COOTE: If we were compelled to stick to one variety, say, Marquis wheat, in western Canada could you give us an idea of what percentage of our crop would be considered good milling wheat?

Mr. CLARK: The Marquis wheat is one of the best milling wheats produced in the world, but if we were restricted to Marquis wheat probably a great deal of the wheat coming forward from Northern Alberta and from parts of Northern Saskatchewan in two years out of five at least would be pretty low grade, because of climate conditions.

Mr. COOTE: And would be no good for milling.

Mr. CLARK: And would be no good for milling. In my judgment Mr. Newman is working on the proper policy in endeavouring to produce for northern Alberta, northern Saskatchewan and northern Manitoba varieties of wheat that in point of milling quality are comparable to Marquis but are earlier and more suitable to the soil conditions. Mr. Newman showed us that if you grew Marquis wheat on scrub land you would have a starchy kernel.

Mr. COOTE: Is it not possible that some of these people who have been complaining of two many varieties of wheat thought these starchy kernels were a new variety.

Mr. CLARK: There is no question about that.

Mr. COOTE: I feel very strongly about that, because as a farmer I somewhat resented the advice handed out by the farm experts to stick to Marquis, and that is why I want to get an opinion from you as to what would be the result in western Canada if we were to stick to one variety of wheat.

Mr. CLARK: I do not think it is practicable nor desirable. I think it is desirable to adhere to varieties which are of good quality and high protein.

Mr. COOTE: And which should grade No. 3.

Mr. CLARK: Oh yes, I think so.

Mr. COOTE: In other words, is it better to raise some other varieties of wheat that will grade 1 or 2 or possibly 3, or stick to Marquis wheat which ordinarily grades, in that district, 4, 5 or 6.

Mr. CLARK: It is better to take a variety which will grade probably 1 or 2.

Mr. MILLAR: I do not think there may be as much difference in the opinion of the Committee as regards that as one might think. When it comes to using white wheat after all the good varieties of red wheat are exhausted—pick out the areas where they are suitable, and exhaust all the strong varieties—does that necessarily mean they should go into white wheat?

Mr. DONNELLY: Do you know of any white wheat?

Mr. CLARK: Yes, the White Fife. That is somewhat out of my field, and I do not know whether there are any places in the west of Canada that would be more suitable to the white variety.

Hon. Mr. MOTHERWELL: Do you consider White Fife really as a white wheat?

Mr. CLARK: It is classed as white wheat.

Hon. Mr. MOTHERWELL: It is a light colour?

Mr. CLARK: Yes.

Hon. Mr. MOTHERWELL: But has quite an amber appearance.

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Mr. CLARK: Yes.

Mr. DONNELLY: Is it strong in straw?

Mr. CLARK: My recollection of the White Fife is that it is grown to a considerable extent in Ontario, in Renfrew county. It is of good strength of straw, produces a good quality of grain for milling, but not as good as Marquis. It has a place in eastern Ontario.

Mr. DONNELLY: What about the yield?

Mr. CLARK: It would be comparable. Both Marquis and White Fife are grown in eastern Ontario; some farmers prefer the White Fife; others prefer the Marquis.

Mr. MILLAR: The question arose as to whether it would not be advisable that the grain inspectors be—to put it briefly—trained chemists as well: what is your opinion with regard to that?

Mr. CLARK: Well, I have always felt that the first and most important qualification for a grain inspector was that he should be of unquestioned integrity and possessed of good common sense; next, that he should have a good education, including a technical education, in the particular work he was doing. In the west of Canada you have good schools of agriculture at Winnipeg, Saskatoon and Edmonton—to use a common phrase, “the woods are full” of young men who are graduates of these agricultural colleges—young men who have a sympathetic understanding of the problems of the men on the land. I do not believe you would have to pay any more salary to get those young men of fine sterling worth, of good character, and with superior ability because of their technical training. I believe it would be advisable, looking to the future, for you to support the Board of Grain Commissioners and the Chief Inspector of Grain by providing that in future the men who come into the grain inspection work should in addition to having the other important qualifications, have a technical knowledge of the work they are to do. After they have had five or six years' experience I believe they would be better men than they would otherwise be without having that technical training.

Mr. GARLAND (Bow River): You mean being a graduate of an agricultural college or some provincial university?

Mr. CLARK: Yes. But if provision were made that grain inspectors must have special training of a certain kind, the agricultural colleges would provide that training.

Mr. COOTE: Would it be possible to have a course of instruction for these grain inspectors during the slack season when they have not so much to do?

Mr. CLARK: I think that would be very helpful, for those men who are there.

The VICE-CHAIRMAN: Up to the present are the agricultural schools giving any attention to that?

Mr. CLARK: Yes.

Hon. Mr. MOTHERWELL: Have you noticed whether Garnet wheat turns piebald or starchy when grown on scrub land?

Mr. CLARK: Mr. Newman has submitted evidence that it will not, to the same extent.

Hon. Mr. MOTHERWELL: Will it do it to some extent?

Mr. CLARK: I have not given the matter careful study.

Mr. DONNELLY: Would you say the standard at Winnipeg is as high now as it was some years ago for the different grades?

Mr. CLARK: I hardly expect it is. You have to remember that twenty years ago it was practically all of one variety, that of Red Fife, and the Red

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Fife when produced at its best was probably unexcelled as a milling wheat. Then again, twenty years ago, the land was newer, and that has an effect on the quality of the wheat, and what is more important the land twenty years ago was relatively clean. Weeds were not as widely distributed as they are to-day. I believe that the wheat coming before the grain inspectors carries with it a larger percentage of dockage than did the wheat twenty years ago.

Mr. DONNELLY: Is the grading as strict and severe as it was twenty years ago in Winnipeg?

Mr. CLARK: I would not like to say that it is not. It is perhaps, from the viewpoint of the miller not as strict as it was twenty years ago or fifteen years ago, but from the viewpoint of the farmer perhaps it is equally if not more strict.

Mr. DONNELLY: There is a feeling that the inspection and grading at Fort William is not as hard as it is at Winnipeg.

Mr. CLARK: I could offer no opinion on that.

Mr. COOTE: Just one question with regard to the higher standard of our wheat twenty years ago. Is it not a fact that a great deal of our wheat was then put in the stack and threshed out of the stack, which improved the appearance?

Mr. CLARK: Yes.

Mr. GARLAND (Bow River): Does your branch still continue to produce and distribute sample varieties of seed?

Mr. CLARK: That is done by the experimental farm branch, which is separate from mine, but I understand they have discontinued that practice.

Mr. FANSHER (Last Mountain): Speaking of the soil being newer twenty years ago, by any system of farming can that soil be restored so that the wheat will have the strength that it had then, such as the alfalfa in southern Alberta which proved to be the strength in the soil which advanced the strength of the straw?

Mr. CLARK: I believe the time is coming, and not many years hence, when farmers in the prairie provinces will have to apply phosphate to the soil; secondly, you will have to find some way to put more nitrogen into your soil, and by far the best way to do that is by growing legumes. I heard you say, Mr. Fansher, that the production of sweet clover to plow down or for pasture or for hay will put more fibre into your soil. That will also put more nitrogen into your soil.

Mr. DONNELLY: How does the experimental farm keep up its land?

Mr. CLARK: They have a good deal of manure to put on the land, and they also follow the rotation of crops.

Witness retired.

Discussion followed.

The Committee adjourned until Wednesday, April 25th, at 11 a.m.

HOUSE OF COMMONS,

MONDAY, May 7th, 1928.

The Select Standing Committee on Agriculture and Colonization met at 11 o'clock a.m., Mr. Brown, presiding.

The Committee proceeded with the consideration of the grading of grain.

THE ACTING CHAIRMAN: Gentlemen, please come to order. Mr. Kay, the Chairman, is not here this morning, but he requested me to take his place. The subject before us this morning is the question of wheat grading. We have Mr. Ramsay, of the Selling Agency of the Wheat Pool, who will give evidence this morning.

E. B. RAMSAY, called.

WITNESS: Mr. Chairman and gentlemen of the Committee, I can outline for you, perhaps, the Pool's attitude towards this question. This grading question is one which has been very troublesome, as long as I can remember, in the West, or probably ever since wheat was grown. There have been several changes within the last few years in connection with grading. I think perhaps it is well to bring the question out in cold facts, looking at it from the producer's standpoint. Before the pools, the farmer looked to the Fort William market as his ultimate market for wheat, and although Fort William prices were on the basis of world prices, the farmer individually was not interested in the grading of wheat after it left Fort William. He took an interest, of course, in such questions as mixing and the shipment out of the terminals, overages, and that sort of thing, but as far as the European buyer was concerned, the farmer was not in direct contact with him. The situation at present is that the farmer is in direct contact with the European importer in selling his product, and he has now a personal interest in the grading of wheat, not only at the primary points, but also in the quality of the shipments that are offered of his wheat to Europe.

I notice a good deal of information in the public press these last few months on this question, and, people coming from England express a good deal of dissatisfaction on the part of the European importers with the quality of Canadian shipments. If the quality of the shipments is down, it is largely something over which nobody has any control; that is to say, crops vary from year to year with the kind of season we have. The European buyer discounts in his purchase any poor quality there might be in any particular grade of wheat. For that reason we have a condition which is rather worrying the Pools just now, and that is, the condition of No. 3 Northern. I think I am quite safe in saying that the country generally acquiesces in the present grading system. There is a certain amount of question as to whether it can be bettered, or whether something better can be substituted. We have never yet seen anything practical offered which would replace the present grading system. Questions of administration, inspection and operation of the system are questions which do not enter into the problem of grading the wheat; that is more or less a mechanical feature of it.

From a merchandising standpoint, grades should bear a relationship to each other which will permit of the marketing of that wheat without too heavy a discount between each grade. If you look at the present Durum grades, you

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will see that almost uniformly the discount, grade, by grade, is 6 cents. That would seem to point to the grades being set to take care of the wheat in its proper relationship to the higher grade.

When we come to the hard, red, spring grades, that is, Nos. 1, 2, and 3 Northern, we find 1 and 2 in a fairly reasonable relationship, or a discount of about 3 cents, but when we get down to No. 3 Northern we find a drop of 15 cents. That is the condition which is causing us a good deal of anxiety. Probably 1, 2, and 3 will take most years from 65 to 80 per cent of the total crop. Due to the changing conditions in the West, the fact that wheat is no longer grown along a narrow belt in the same type of soil and with the same climate, the belt has widened northerly. You find a good many changes taking place in the character of the wheat coming forward. You also find a great deal of effort being made to raise a rust-resistant wheat. A good many of those efforts should not have been allowed to the farmer, because of the quality of the wheat, which, while it may resist rust in some degree, is of an inferior milling quality. Some of these poor wheats cannot be kept out of No. 3 Northern, in the present state of the Act; the Inspection Department has no option but to grade it No. 3 Northern, because it conforms to the definition of No. 3 Northern in the Act. The Pools have recognized that condition and have taken the stand that it is not a pool question, that the non-pool farmer as well as the pool farmer is vitally interested in this, and we had a committee working to see what remedy we could propose for it, and we propose to have it debated during this summer in the country.

The matter was submitted to the Provincial Boards. It was accepted by the Saskatchewan Board, it was accepted by the Manitoba Board, but it has not yet been accepted by the Alberta Board. In seeking for a solution of it the Committee consulted Mr. Serles and Mr. Fraser, of the Inspection Department, and they have drawn up a definition of No. 3 Northern which should bring No. 3 Northern into line with No. 1 and No. 2 Northern, and which would make it a major grade. I think the deterioration of wheats, some through the depletion of the soil, some through the extending of the wheat belt into northern areas which do not grow the same quality of wheat as the southern areas, the change in the character of the wheat, makes it necessary to have another major grade other than 1 and 2 Northern. We have here a sample, which is an average sample of all export shipments during last year. We analyzed it with a view to finding out why there was such a heavy discount on No. 3 Northern. I think the analysis shows very clearly why that discount is there. Millers on the other side are very much in the same relation, I think, as the farmer in the country; they kick on the grade because they cannot lose anything by it, and they may gain something by it. Their dissatisfaction with any particular grade of wheat is reflected in the price they will pay for the wheat; in other words, it is a question of value.

There is no doubt that No. 3 Northern has suffered through the introduction of dried wheat in it last year which was improperly dried. There is also the possibility of mixing into No. 3 Northern on a scale which is not possible with 1 and 2 Northern. What we had anticipated was a definition of No. 3 Northern in the Canada Grain Act which would preclude the mixing-in of inferior varieties of wheat, and we are quite anxious to get grades that will segregate these inferior varieties of wheat and allow them to be sold on their own merits for whatever they are worth; that is to say, as long as you allow the farmer to grow, or as long as the farmer will grow a wheat which is only worth No. 5 grade for milling purposes, as long as you allow him to get a No. 3 price for that wheat, he is going to grow it. The only way to prevent it is, to make it unprofitable, that is, you do not want to enable him to ride on the back of the fellow with the good wheat. It is a simple change, simply

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the introduction into the Act of the words, "Equal in value to Marquis Wheat." The Pool would be quite anxious to get the fellow in the country No. 3 Northern for it. It is hard enough to satisfy the farmer now that you are doing him justice.

I would just like to say, Mr. Chairman, that as far as we have had experience with the Inspection Department, we have had very happy relations with them, and we find they work with us in the best possible spirit. They are very anxious to find the best possible solution for it, just as well as we are, and I think everybody in the country is. The definition of No. 3 will mean a limitation of the possibilities of mixing. We are inclined to think that it is a definite raising of the standard of No. 3 Northern, and if those are precluded, No. 3 will sift down into the proper grades, and that will tend to raise the standard of those lower grades.

In regard to the Inspection Department, I would like to mention to you what we are proposing to do. We propose to take samples from all unloaded cars at our terminals, in order to build up a case and prove whether the sampling as at present carried on is satisfactory or not. It is very unsatisfactory to deal with hearsay evidence, and until we have some definite evidence as to wrongful methods, we do not want to introduce the stuff to the public. This year we will take samples off our belts at the terminals, of all cars unloaded, and they will be compared with the inspection samples taken at Winnipeg through the stabbing method. We are doing that in order to find out if there is a percentage of error, and if so what the percentage of error is. I think probably by doing so we can prove that present methods are proper or that they are improper. It is quite important if they are proper that those people who are interested should be able to get out and tell the farmers that the business is carried on properly, with a view to satisfying their minds that their interests are being taken care of. Probably, Mr. Chairman, that is as far as the Committee have gone in working out this problem. We are in favour of the segregation, as far as possible, of all varieties of wheat, in their proper grades, from a milling standpoint. There are varieties which are worthless for milling, but which to-day the Inspection Department might have to grade No. 3 Northern because the appearance of the wheat conforms with the definition of that particular grade in the Canada Grain Act.

I think that is all I have to say.

By Mr. Donnelly:

Q. You said there were several complaints from England or that you had correspondence with regard to certain complaints; have you any of that correspondence here with you?—A. I have an article here in a journal called Milling. Most of these articles come from people like Miss Hind, also Mr. Rank, of England, who has been working on this. They are public complaints, not specific complaints of any shipments, just general complaints.

Q. You say there is a difference between No. 3 and No. 2 of 15 cents this year. Before the season opens and the standards are set, or as soon as the season opens and the standards are set, do the grain men get together and decide upon what the difference in value in the different grades is, or what the difference will be?—A. Not 1, 2 and 3; they are statutory grades.

Q. But the difference between 3 or 8 cents, the spread, would that be in the milling interests?—A. No, the spread widens out largely by the experience of the importers on the quality of this year's shipments; in other words, they base their ultimate spreads on the values they have received as an average over the season.

Q. Are the standards set from year to year, or are they the same each year?—A. 1, 2 and 3 are set always; there is no change in those standards. 4, 5, and 6 are set by the Grain Standard Board on the average run of the crop.

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Q. So the standards are set from one year to another?—A. They are for 1, 2 and 3.

Q. So that if our grades are the same as the standard grade, there should be no complaint, and our wheat should come up to those standards?—A. The definition of the Standard of No 3 Northern is very loose.

Q. Will you read the definition for us, if you have it there?—A. I do not know that I have it.

By Mr. Campbell:

Q. Do you think the grades of wheat going out of the terminal are equal to the grades coming in?—A. I would say the standard is the same; but the average going in is higher than the average going out. I do not think there is any doubt about that.

By Mr. Donnelly:

Q. The standard report at Fort William is not arranged in the same way as at Winnipeg; we know that, from the investigation that took place here in 1923 before the Committee. We were told that the standards were not the same at Fort William, and yet Mr. Fraser tells us that they are the same. What have you to say to that?—A. As I understand it, the standard at Fort William is a shade higher than the standard at the primary inspection point. It takes one part in four is it, Mr. Steele, of the average of the public elevator?

Mr. STEELE: * Of the average of the public elevator, going out of the elevator.

WITNESS: That is added to the standard at Winnipeg. Now, the presumption is that the average of the public elevator will be above the standard because it will have the high, the middle and the low grain in it.

By Mr. Donnelly:

Q. Is the wheat of the different grades coming out of the public elevator higher in standard than the average grain coming out of the private elevator?—A. Out of the public?

Q. Yes. Is it higher than that coming out of the private terminal elevators?—A. Would you think so, Mr. Steele?

Mr. STEELE: I do not think there is much difference.

WITNESS: I don't think so. It is just infinitesimal.

By Mr. Donnelly:

Q. Who is responsible for the condition of the grain?—A. I am of the opinion that the standard is always shipped out, but the average of the grade is not shipped out, therefore the mixing debases the average down to the standard.

Q. If that be so, then your impression can hardly be correct, or your answer can hardly be correct because in the public terminals mixing is not permitted, so that the average must be a little higher?—A. No, you must remember that the wheat, before it goes into the public—there are so few publics now—that the wheat is selected, and it is really the minimum of the grade that goes into the public now.

Q. According to that, there is nothing in this resolution that was passed in the interprovincial meeting held in Calgary where they say: "that steps be taken to provide that in accordance with the Canada Grain Act terminal elevators, both public and private shall be compelled to maintain out-turn grain of the same standard as that produced at the primary inspection point." This is a resolution passed by your Provincial pool in Calgary?—A. Yes.

Q. And further that if the Canada Grain Act does not provide for this, there should be amendments made thereto to bring it into effect to compel grain of the same standard as that used in the primary inspection.—A. I think it is generally conceded now that the same standard is used.

*Mr. Steele was associated with Mr. Ramsay but was not called as a witness.

[Mr. E. B. Ramsay]

Q. Then there is nothing to this resolution?—A. No.

Q. Now you say you are acquainted with what took place with regard to this deputation that was met by the Committee last year. Did you not take samples down to Buffalo?—A. Yes.

Q. And shipped them back?—A. Yes.

Q. And what did you find then?—A. We did not consider that those samples were a fair test. Some of those samples were bad, but they were taken at the wrong time of the year, and they were not actually taken out of wheat being shipped. They were taken out of the bottom of bins. We did not consider that that was a fair test.

Q. What do you mean, by the "wrong time of the year;" why should that affect it?—A. There is no wheat passing through Buffalo at that time of the year, going out by Montreal; and the fag end of the crop is nothing upon which to base a judgment of the whole crop.

Q. They also took samples at the seaboard, Baltimore, Philadelphia, and New York?—A. Yes, the same would hold. There was some rather peculiar mixtures in them. The same thing holds good with those samples. They were taken at the fag end of the crop. They were not taken from a representative shipment.

By Mr. Vallance:

Q. Mr. Ramsay, how do they look upon the bringing about of the change in the grading system, whereby the protein content would be a factor in the grading of wheat? Has the Pool expressed itself on bringing that in under a revision of the grading system?—A. No, I do not think so.

Q. What is your belief?—A. They rather feel that the injection of protein into the question would just raise another uncertainty. We have some samples here of wheat with a high protein content, which is absolutely useless for milling.

By Mr. Donnelly:

Q. How do you find your samples coming back from England? Are they as good as the samples here or not?—A. Yes, they are approximately quite in order.

Q. And you think that the reason for the spread is because of the laxity of the wording in what the standard has been and what it should be?—A. Yes, the definition is so wide that it has been possible to reduce the general quality of the grade.

Q. Now, these standards of these samples that are shipped out of Fort William or go across the continent—suppose a farmer would send a car of that same variety to Fort William, what is your opinion of what he would get?—A. I could not say that. Mr. Steele is our inspector in the Pool, perhaps he could answer.

Mr. STEELE: I have seen a great many of them, but there are some of them so scientifically mixed that he would not make it. I am quite sure of that as to some of them, and yet in actual value for milling, they are up to the standard.

By Mr. Vallance:

Q. Then, are we to assume that the only kick is of Number 3 Northern? A. Yes, Three Northern is the major grade this year. We have exported no One Northern and but very little Two.

Q. Do you think that because of that fact that the grade volume is Three Northern, and because of the laxity in the definition of Three that constitutes the difficulty on the other side?—A. Yes, I think so.

[Mr. E. B. Ramsay]

By Mr. Millar:

Q. The statement has been made that not only have the standards been lowered of late years, but that shipments have come forward which are still lower than the standard. Have you seen anything to that effect?—A. Yes, Dr. Donnelly read it to me this morning. That is the first time I had seen it. I do not agree with it. I do not think there has been any change in the standard. I think that the wheat is going out on standard. I think they are probably disappointed in the protein content this year.

By Mr. Fansher:

Q. That is due to weather conditions?—A. Yes, partly so.

By Mr. Millar:

Q. We have had correspondence which would seem to indicate that there is general dissatisfaction, particularly with No. 3 Northern; but the dissatisfaction is quite definite, and certainly voiced in strong language. You think there is not a good reason for that.

By Mr. Donnelly:

Q. Let me say this: It is quite apparent that the samples of No. 3 Northern in Manitoba in 1927 are inferior to the standard in 1925. They must have had both standards before them to make a statement of that kind. They say the standard in 1927 is inferior to that of 1925. Not the wheat, but the standard?—A. That would mean that the wheat in the standard was inferior quality. And it would be too. There is no comparison between the 1925 crop and the 1927 crop.

Mr. MILLAR: The standard is not the same.

By Mr. Donnelly:

Q. Do they make another standard every year?—A. They have to provide samples according to the standard. They would take them from the current wheat.

By Mr. Millar:

Q. Why should not the No. 1 of 1927, be the same as of 1926 or 1925?—A. Well, the climate comes into the question.

By Mr. Donnelly:

Q. Then they must send new standards every year?—A. Yes, but the standard is defined in the Canada Grain Act. The sample they send must conform to the standard in the Canada Grain Act. Now, it may conform to that standard, but the quality of the wheat in that standard that goes to him—that standard may be reduced according to the climatic conditions that may be here.

Q. That was my request in the first place. They send samples of the same standard every year, or of No. 1 Northern. For No. 1 Northern they would send samples of that grain each year, and this new sample is taken and not the old one, so they are setting new standards every year?—A. No, I would not put it that way.

Q. If there is anything in standards, that is so?

By Mr. Vallance:

Q. Does not that indicate that the grading system is wrong, because you cannot set a standard which will say the wheat contains so much of this and so much of that because of the fact that we are grading wheat by sight. We entirely grade our wheat to-day by the eye. That wheat may look all right,

and yet not be all right, so our grading system must be wrong, when wheat, which looks all right, may be wrong from a milling standpoint?—A. Yes.

Q. Then the grading system is wrong?—A. Does not the appearance give you an indication of the value of that wheat?

Q. But the fact is that you admit that the standard has changed because the quality grading upon sight is wrong; then the whole system of grading is wrong, and there should be some other factor in it to say what the grade should be. Some wheat looks just as good as that of other years, and yet it is not of the same milling value?—A. If you have to consider grading by protein or quality, how are you going to handle the wheat?

Q. The same as you handle it now?—A. No, you could not. That is a simple proposition, protein. Also it does not take into consideration how you are to grade the street grain which comprises 50 per cent of the crop.

By Mr. Millar:

Q. Let us take those things up one at a time. You speak of the handling. Why could it not be handled—leaving the street out—why would it not be handled just as it is now; the same grade exactly, simply arriving at the grade in a different manner, on a different basis.

MR. VALLANCE: What if you said No. 1 Northern must have 14 per cent protein or better? All 13 or better would go into No. 2 Northern; 12 or better into No. 3 Northern.

WITNESS: Would you give me that sample of feed wheat that you had Mr. Steele.

MR. VALLANCE: It must have the appearance of No. 3 Northern and might not have the protein?

WITNESS: Yes.

MR. MILLAR: The standards might be just the same excepting in the matter of protein content.

MR. FANSHER: According to the Grain Act, the standards are just the same, but each year, the Board selects new samples, or samples of each year's crop, according to the standards set, and the samples are not all the same, although the standards set by the Grain Act are the same.

MR. MILLAR: Let us reason this out.

THE CHAIRMAN: You had already asked Mr. Ramsay a question which he was going to answer.

WITNESS: The protein has so many inconsistencies. Here is a wheat weighing 61 lbs. to the bushel with 12.56 protein in it. It is graded feed. It is absolutely worthless for milling purposes, yet it has the protein content.

MR. MILLAR: Right there I would like to ask this: That is excluded by another Section in the Grain Act. No. One must be equal to Marquis. Two must have a percentage equal to Marquis?

WITNESS: They are all Marquis wheat.

By Mr. Millar:

Q. And this is a Marquis wheat?—A. Yes.

By Mr. Donnelly:

Q. What is wrong with it?—A. That (indicating) is frosted. This (indicating) is blighted in some way; it has 12.67. This wheat (indicating) is not frosted, it is shrivelled.

[Mr. E. B. Ramsay]

By Mr. Millar:

Q. Then, would it not be in the lower grade because of the lack of weight per bushel? What is the weight per bushel?—A. 61 lbs, for this, and 55 for this. (Indicating).

Q. What is No. 3 in weight per bushel?—A. 57-56.

Q. That would go below Three, so that this proposal only applies to No. 1, 2 and 3?—A. One, Two and Three.

By Mr. Donnelly:

Q. What protein content is that?—A. 12.67.

By Mr. Lucas:

Q. Why do you say that that is useless for milling purposes?—A. No miller would try to mill feed. It has no volume, do you see. It just has protein, and that is all it has.

By Mr. Millar:

Q. Just there, have you a knowledge of this; that either this year or last year the Americans bought a large quantity of Five and Six from Manitoba at what was considered a very high price. Have you a knowledge of that?—A. No, I have not. There was a very small export of wheat to the United States last year.

By Mr. Donnelly:

Q. Is it the fact that grain grown under dry conditions will be high in protein?—A. Yes, the protein content is in relation to the moisture content of the wheat to some extent.

By Mr. Millar:

Q. But do not the Americans sometimes, when they find they have not a sufficient protein to keep up to their flour content—do they not buy the low-grade Canadian wheat in order to build up, jack up their flour to the contract?—A. I do not think so. They usually take No. 3 Northern, and they select it as it comes in, so they get a good grade of No. 3 Northern.

Q. I have not any proof, but I understand they purchased No. 5 and 6 last year for that purpose?—A. Probably No. 5 and 6 have the qualities they wanted, so that is the grade they would buy.

Q. Apparently it had sufficient protein to enable them to fill their contract. However, I have no evidence of that. Now, let us go to another objection?—A. I have no objections, myself, Mr. Millar.

Q. Is there any difficulty then, in the way of working out this scheme?—A. To make it effectual, it would require a sample market, I think.

Q. Why so?—A. Until you could accumulate the necessary shipments.

Q. That does not apply to a proposition that has sometimes been made, that in addition to our present grading system, a protein test be added, and a special certificate accompany the other certificates. Would not that apply? That would require a sample market, but this is not a proposal like that, at all?—A. Do you think that it would get more money for the farmer to do that?

Q. Oh, I certainly think it would, yes.

By Mr. Vallance:

Q. What would it be in the final analysis?—A. That is all we are interested in.

Q. It would need a grading system that would give to the purchaser the greatest possible return?—A. Yes.

[Mr. E. B. Ramsay]

Q. And your organization believes that under the present system as you see it, it is better than the suggestion of the Committee's that protein be a factor in wheat?—A. We have not any evidence to show that it would mean a larger return to the farmer, and it would complicate the situation. That is our view, substantially.

By Mr. Millar:

Q. I would like to follow this up a little farther. You have stated that you do not think it is any better system than the one we have got?—A. No, I said we have not any evidence to show us that it would be.

Q. A bald statement like that is hardly sufficient to satisfy me that the system or the proposal is weak. I would like from you the reason why. Where are the difficulties, or wherein is the present system superior to the one proposed? Let us have something to show that it is a considered opinion?—A. My own view of the situation is that there is too much protein wheat in Canada to make it worth the trouble.

Q. What would be the average?—A. The average this year is somewhere down in the neighbourhood of 12 per cent, is it not, Mr. Steele?

Mr. STEELE: For standard one. The average one, 12.45.

Mr. MILLAR: I did not quite catch that? Will you state it again?

Mr. STEELE: The standard of one, 12.25. The average 12.45. And the average cargo, 12.17. That is approximately.

By Mr. Millar:

Q. Take the normal year, and what would it run?

Mr. STEELE: Well, the year 1926, the average cargo was approximately 13.56. That is No. 1 Northern. The 1926 crop.

Mr. MILLAR: What is the 1925 crop?

Mr. STEELE: In 1925, No. 2 Northern 13.44. That was the high protein crop.

Mr. FANSHER: One of the reasons was the difference in the quality from '25 to '27 that Mr. Donnelly mentioned a few minutes ago.

Mr. STEELE: It would unquestionably make some difference.

Mr. MILLAR: I want to develop that point. The protein in our wheat as the years go on is gradually getting less, is it not?

WITNESS: Are you peering into the future, Mr. Millar?

By Mr. Millar:

Q. Is it a fact that as the years go on in Western Canada the average of the protein is getting less?—A. I would not be prepared to admit that.

Q. You will not admit that the average of the protein in Western Canada is steadily growing less?—A. No.

Q. You have referred to the expansion of the wheat belt northward and many new varieties of poor milling value being brought in. I think some other authorities have pointed out that gradually for these reasons the protein in our wheat is becoming less. Anyway, if you have no proof of that, let that pass. Is not the demand for high protein wheat in the States becoming greater?—A. It depends on conditions from year to year with their own crop.

Q. But in a general way, is not the demand increasing?—A. Not on us. We have no evidence of it.

Q. Would not the premiums they are paying in late years seem to indicate that it is?—A. I am not very familiar with the actual premiums. There are high premiums paid every year for that class of wheat, at certain periods of the year. It depends very much on the supply of that particular quality of wheat.

[Mr. E. B. Ramsay]

Q. And what is the major factor for which the British buy our wheat?—A. I assume they wish our wheat for its value in strength.

Q. Have you any knowledge of the amount of protein required in wheat to make bread of itself?—A. No, I have no knowledge.

Q. You have knowledge that our Canadian millers keep experts at Winnipeg for the purpose of picking out the strong wheat?—A. Yes.

Q. And making maps of wheat all over western Canada to find out where the strong wheat is grown?—A. Yes.

Q. Would you say in the face of that that if there is so much protein wheat in Canada it would not be of benefit to have it graded that way?—A. The question in my mind is whether in the final analysis you obtain more money for the whole crop under the present system or whether by selecting a high quality out of the whole crop you would receive enough premium to offset the discount on the balance of the crop.

Q. I want to establish that there is a big demand for strong wheat and our wheat one year after another is so little above the amount required to produce a good loaf. I doubt if in any one year in the last fifteen or twenty it would average fourteen. It might, but that would be the very top, and there is a great deal of it that goes less than 12.

By Mr. Donnelly:

Q. Mr. Ramsay, do you not think, as Mr. Millar pointed out, that on account of our millers taking the wheat and shipping certain cars and having it tested in chemical laboratories, retaining what they want, or, in other words, skimming the top from our wheat by taking the high protein content, they are lowering the standard in the Old Country this year?—A. That would have a bearing on it, but the extent of their selection would hardly be noticed in the general average—a few million bushels a year.

Q. If the dumping of wheat at Fort William were stopped, and the mixing at private elevators were stopped, would not the standard of wheat going out be higher than it is at the present time?—A. Undoubtedly.

Q. And one of the causes for lowering the value of our wheat in England or the continent is on account of the mixing and the dumping of wheat?—A. I should say entirely, having due regard to the climatic conditions that produce the wheat.

By Mr. Campbell:

Q. Did you not say that the Board passed some resolution to stop that?—A. No. The attitude of the Central Board to this question was that they had not sufficient information or evidence upon which to base an opinion as to the value of mixing from the sales point of view. The thing in export grain is to have uniformity of shipment. You cannot do that in the general run of wheat; you will send one man more than he should get, and that is as painful as sending him too little. The great thing is to have uniformity, therefore, you must have a standard to go by in your shipments. You should have a proper standard to give a grade that will permit of the marketing of the crop; you must remember this wheat must be marketed and must go into seven grades, and you should not have too wide a discrepancy between each grade. The wheat should be allotted to its proper discount.

Q. I do not quite agree with you that the wheat should be marketed. I think it would be better if it were not marketed, if we are using the better markets to get rid of something that is not saleable.

By Mr. Donnelly:

Q. Did you not have a conference with some of the other members of the pool, and decide to add the words "Of equal milling qualities" or "Equal to

[Mr. E. B. Ramsay]

Marquis wheat"? I understood you also had a conference with the other pools.
—A. Yes.

Q. They are unanimous in this demand?—A. With the exception of the Alberta Board, which has not accepted it as yet.

Q. And do you think by inserting it it would do away with the spread of fifteen cents between No. 2 and No. 3?—A. That was our solution of the difficulty—more or less in the nature of a compromise between the arbitrary cutting off of mixing and the present condition where mixing is unbridled.

Q. It would cut the spread down to 5 or 6?—A. No. 3 Northern should market about 8 cents under No. 1 Northern.

By Mr. Millar:

Q. Is that big spread due to the fact that the wheat was dry and spoiled?

—A. Why should spoiled wheat go into any grade?

Q. But is that the reason?—A. That is part of it.

By Mr. Donnelly:

Q. Have you that portion of the Grain Act referring to No. 3 at the present time?—A. Yes.

Q. Would you mind reading it, and how it would read with the amendment?

—A. The present Act reads:

"No. 3 Manitoba Northern wheat shall consist of Red Spring wheat of the varieties which are excluded by the preceding grades on account of damage; shall be reasonably sound and reasonably clean; of fair milling quality; weighing not less than 57 pounds to the bushel and may contain Amber or Red Durum, singly or in combination, up to 3 per cent."

By Mr. Vallance:

Q. What do you suggest?—A. "No. 3 Manitoba Northern Wheat shall consist of Red Spring wheat, equal to Marquis; shall be reasonably sound and reasonably clean, weighing not less than 57 pounds to the bushel, and shall contain 25 per cent of Hard Red Vitrous kernels". That is carrying out the principle of 1 and 2 Northern, "No 1 Northern shall contain 75 per cent of hard red vitrous kernels", "No 2 Northern shall contain 45 per cent of hard red vitrous kernels". This would put 25 per cent in No. 3 Northern. "—or may be composed of soft varieties of Red Spring wheat of fair milling quality; shall be reasonably sound and reasonably clean, weighing not less than 58 pounds to the bushel, and containing not less than 35 per cent of red kernels, and may contain amber or red Durum singly or in combination up to 2 per cent".

Q. You said "soft spring wheat". How much of that is allowed?—A. "It may be composed of soft varieties of Red Spring wheat of fair milling quality; shall be reasonably sound and reasonably clean, weighing not less than 58 pounds to the bushel, and containing not less than 35 per cent of red kernels".

By the Acting Chairman:

Q. Do you make a definition that would allow the mixture of your wheat equal to Marquis with the softer varieties?—A. Any variety that is as good as Marquis for milling would go into this wheat.

Q. You have a second alternative definition which makes provision for softer varieties weighing a pound more. There might be a mixture of these two?
—A. Yes.

By Mr. Donnelly:

Q. What soft spring wheats have you in mind?—A. There are a number of them.

By Mr. Coote:

Q. If we were to adopt that, do you think the inspectors at Winnipeg could tell the Marquis wheat from the other variety?—A. They say so.

Q. Do you think they can?

The WITNESS: Is that a fair question, Mr. Chairman?

Mr. COOTE: I will withdraw that question.

By Mr. Donnelly:

Q. We have evidence that they cannot. Mr. Newman said that he sent a number of samples up there, and asked them what they were, and they sent them back and said that they could not tell.—A. I think in a general way they can, Mr. Coote.

By Mr. Coote:

Q. May I ask if, in your opinion, it would not be better to accept Mr. Millar's suggestion of the protein test of this wheat, that protein shall be of a certain percentage, otherwise it would automatically go into No. 3 wheat, and do you think that the chemists would be able to determine the value of the wheat from that standpoint better than the inspectors can now determine it from the variety standpoint?—A. The chief difficulty I see with that is getting a representative sample to test.

Q. Would it be more difficult than getting a representative sample to grade under the present system?—A. I think they use the moisture test which shows a tremendous variation for moisture alone. That has great bearing on the protein test. When there is high moisture there is low protein, but when you dry the wheat down to 8 per cent the protein rises accordingly.

Q. Has your Pool expressed any opinion as to whether the dried wheat should go into the straight grade?—A. Wheat can be dried without spoiling it for baking purposes.

Q. But has not a lot of it been spoiled for baking purposes, and is that not the objection of the Old Country millers?—A. Yes. We were waiting to see what regulations the Board of Grain Commissioners brought in in connection with drying before we formed any opinion.

Q. Have you any method to suggest for correcting that difficulty?—A. The National Research Council is working on that problem, and they have not given their final report as yet, although they have had some of the drying machines adjusted. There is no complaint this year of drying, so far, but we are of the opinion it should be regulated.

Q. Are you of opinion that the Board of Grain Commissioners should have inspectors overseeing the work that has been done by these drying machines to see that the temperature, for instance, is not kept too high while the wheat is being dried?—A. I understand they have installed recording thermometers to see that the temperature never rises above a certain figure.

Q. But unless somebody is there to take the readings of these thermometers all the time I do not see any need of installing the thermometers.—A. If the wheat were improperly dried and the sample did not test properly you would have an action for damages against the elevator company. Then it is a case of who will watch the inspectors. There is so much supervision. The business should be carried on without supervision and when anybody does a misdeed he should be dealt with and penalized accordingly. If necessary, put him out of business; if he is responsible.

By Mr. Millar:

Q. You spoke of the great difficulty in getting samples for making tests under the proposal that is made, and said it would require a test for moisture?

[Mr. E. B. Ramsay]

Would that be necessary in anything except tough or damp wheat?—A. I think so.

Q. That is taking the straight grades, you think it would still be necessary to make a moisture test?—A. I would say so. I do not think the question of its being more or less tough would come to it. It is a question of what would come into that particular wheat, whether it is 8 per cent or 12 per cent.

Q. You do not think the difficulties are insurmountable?—A. I do not think anything is impossible.

Q. I mean within reason. It boils down to the question of whether it would warrant the expense?—A. Exactly. It is a matter of importance to the people whether you are going to make money for the farmers or not.

By the Acting Chairman:

Q. You expressed the opinion that you do not think the aggregate price would be raised?—A. I think that would be a question in my mind—whether you would gain more than you lose.

Q. Even if the aggregate price were not raised, do you think it would raise to the degree equitable to the entire crop?—A. My point is that the farmer is satisfied with the present grading system. All he is disturbed about is the obtaining of a proper grade under the present conditions. Generally speaking, the protein test does not make much appeal to the farmer, probably because he has not sufficient information on it.

By Mr. Coote:

Q. Why do you object to Huron, Stanley and Preston wheat?—A. Because they would not sell for as much as Marquis.

Q. Why?—A. They do not have the quality of flour, or the volume of protein.

Q. Is it because they are lacking in protein?—A. Not necessarily. It may be the quality of the flour they produce.

By Mr. Donnelly:

Q. They cannot tell what that is until they bake it?—A. No.

Q. According to Mr. Newman it is impossible for these inspectors to tell the varieties. Mr. Newman says in answer to the following questions:—

Is it easy to pick out Kota wheat from the other varieties?—

A. No, I would not say it is a very easy thing.

Q. The variety cannot be determined with any degree of accuracy except by growing?—A. No.

Q. If the inspector cannot determine the variety he cannot determine the value?—A. No.

Q. Do you think it is always possible for the inspectors to detect this Kharkov from the common spring wheats?—A. I do not think so.

So his opinion is that the inspectors cannot tell the different varieties of wheat?—A. Mr. Steele is an inspector and can probably give you more first-hand information.

Mr. STEELE: He covers too much territory. It is not always possible, perhaps, but is always feasible, but to take one kernel out of a thousand and say what variety it is is practically impossible. You can, in practically every case, pick out the softer varieties; it does not matter what the variety is, but you can determine if it is one of the varieties.

Mr. DONNELLY: I am very sure there was a great number of them marked in that way.

By Mr. Millar:

Q. Mr. Ramsay, just what did you refer to; I did not catch your answer to the last question asked you. You said that the reason why Preston, Stanley and some other varieties would not pay the same price was not necessarily on account of the protein; what is it on account of?—A. Flour volume.

Q. Is that not the same thing?—A. Volume and quality.

Q. Did you say volume?—A. Yes.

Q. Is that not related entirely to the weight per bushel?—A. No.

Q. Take the Stanley and Marquis; you get the same weight of bushel?—A. One wheat will produce more bran than another wheat.

Q. But if you have the same weight per bushel, you get the same quality?—A. Not necessarily.

By Mr. Totzke:

Q. A high quantity of protein does not always indicate a high quality of protein?—A. That has something to do with it; the quality of the protein is a factor.

Q. Is it not a major factor?—A. I could not say, I do not know enough about it.

By Mr. Vallance:

Q. There is one thing I want to ask you about. Occupying the office you do in the Pool, is the Pool approaching this whole question from the standpoint of how much they can get on the average bushel for the producer? Do you think that it is a fair thing, after taking into consideration these things which we say are factors in the lowering of our standards, and which would indicate that the farmer in the north part of the wheat belt must of necessity not be growing as high a quality of wheat as we are in the south; what we would like to do in the south is not to grade according to the quality in the north; what we would like to do is to give the farmer in the southern wheat belt what his wheat is worth and let the other fellow take what his wheat is worth. I can see that the Pool cannot take any other attitude, but that is the way we feel about it, growing the hard wheat on the bald-headed prairie?—A. To some extent this amendment of No. 3 Northern Wheat would take care of that situation, because that damp starchy wheat would not grade No. 3 as it does now; it would go into No. 4, and they would get as much for that No. 4 as they get for the No. 3 now.

Q. But raising his would not raise our price; you would raise the standard?—A. You would get a better price for No. 3 Northern.

Q. The spread would not be as great?—A. No.

By Mr. Coote:

Q. Will you explain how your proposed raising of the Standard No. 3 will keep the other out?—A. Yes. It will not have 25 per cent hard red vitreous kernels.

Q. The wheat the Old Country miller would get might be 75 per cent less starch?—A. He would still have the value in the 25 per cent. It is a three-grade business, not a one-grade, and it must be something that will take care of No. 3 Wheat. You could not have your No. 3 on the same high standard as No. 1. It is a scaling down; your No. 1 takes care of 60; your No. 2, 45, and your No. 3, 25 per cent.

Q. But there is lots of No. 3 that has a high percentage of hard, red vitreous, but it is graded down by damage, or something of that nature. You are going to give the private terminal operator a splendid opportunity of mixing that No. 3 with wheat with more starch, or of some other description?—A. He would have the chance, but we would be limiting his opportunities.

[Mr. E. B. Ramsay]

By Mr. Vallance:

Q. You would be raising the standard?—A. We would be giving No. 3 Northern a definite value.

By Mr. Donnelly:

Q. Do you agree with this, Mr. Ramsay? It is on page 108 of our Proceedings:

Q. You do not think that this complaint that we have in England concerning our wheat is based on the varieties at all?—A. I cannot find any evidence to that effect.

Q. Where do you find the cause for complaint?—A. The only complaints that they made to me over there were on the question of grading.

Those are two questions I asked of Mr. Newman?—A. It is not entirely a question of grading.

Q. You think that by changing this No. 3 Northern it will do away with that grading?—A. It would, with that grade. I think we will always have a squabble in lower grades, because there is a variety of shipments; you will get one-five wheat coming out, and then you have a wet spell and the one-five wheat following it is an entirely different wheat.

Q. The Inspectors here told us that the complaints over there were on account of our varieties. This man comes along and tells us it is not a question of varieties at all, but it is entirely a question of grading, and he puts the blame altogether on our Inspection Board as a reason for any complaints.

Mr. STEELE: Neither one is entirely correct.

Mr. VALLANCE: It was suggested that we take the survey of the country and tell the farmers just what they can grow within an area, which proves again that the type is wrong, there must be something wrong with the mixture which is going across. If we are to take a survey of the country, cut it up into blocks and tell the individuals what they can grow in those various blocks—

The WITNESS: That information is available now. You cannot enforce it unless you make it law, unless you can say that a man must grow that wheat. A great deal of experimentation is going on among the farmers. There are a lot of them buying seeds which have no relation to the variety. I have been stung myself in that respect.

By Mr. Coote:

Q. We got the impression from Mr. Newman that the objection to the grading of our wheat by the old country millers was largely on account of the dried wheat; do you agree with that?—A. Yes. I think last year the dried wheat they put in No. 3 was to all intents and purposes useless for milling. They have not recovered from it; they are suspicious of the grade, on account of what might go into it.

Q. Have any measures been taken to prevent that recurring next year?—A. I understood that after the Research Council made the report they came to an agreement as to how the dryers should be set up. They put in regulating thermometers, so that they could not run too fast. The moisture content of some of this wheat this year is low, it is just over the line. I am of the opinion that the drying business should be very strictly regulated by the Board of Grain Commissioners, and not rely upon a gentleman's agreement.

Q. You would not be in favour of dried grain going in with tough grain?—A. We have had experience with that in the Pacific coast shipments. All tough wheat has to be dried there before shipment. They will not allow you to ship tough wheat and dried wheat. Dried No. 1 and dried No. 2 wheat appears to be very hard to sell; they practically have to sell on the sample.

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By Mr. Millar:

Q. You say they are not allowed to ship tough wheat, on the Pacific coast?
—A. Yes.

Q. Was there not a cargo went out last year?—A. Yes. They will ship it, but at the shipper's risk.

By the Acting Chairman:

Q. When wheat is dried under proper conditions, can it be distinguished from wheat that is dried in the field?—A. It will be bleached, of course.

Q. But can it be distinguished?—A. No, I think not.

Mr. STEELE: Not with any degree of accuracy.

By the Acting Chairman:

Q. Would it be feasible to have that dried wheat inspected as it was dried, so that the elevator operator would know how to dispose of it, to know whether he would be allowed to have it mixed with the other grades?

Mr. STEELE: It would be a difficult proposition, I think.

The ACTING CHAIRMAN: The Inspector himself admitted that it could be improperly dried. Would it be feasible to so control it that the man drying it would know that he had done an improper job of it?

Mr. STEELE: That is up to him. The onus is on him.

WITNESS: Why not take a sample as it was dried?

The ACTING CHAIRMAN: That is what was in my mind. Grade it by sample and inspection.

Mr. STEELE: Let no dried grain go out until it is sufficiently proved that it has not received any damage.

By Mr. Millar:

Q. Do you consider the present grading system a really good method of evaluating wheat; is it anywhere near accurate at all?—A. I would say it has some disadvantages, but substantially speaking it is a practical way of marketing wheat.

Q. Do not our Canadian millers quite frequently pick out a No. 2 or a No. 3 and prefer it in value to a No. 1?—A. It all depends upon what they are looking for. I should think, Mr. Millar, that they would not do that as a rule.

Q. Not as a rule, but they do frequently do that?—A. Yes. I have known of instances where they would buy No. 4 wheat because of some particular quality it had over some particular shipment.

Q. That is not the point. Do they not sometimes take a No. 2 or a No. 3 and consider it of greater value than No. 1, not on the basis of No. 2 or No. 3, but would they not have the choice of No. 2 or No. 1 and simply take the No. 2?—A. At the same price as No. 1?

Q. Yes.—A. No; I have not come across a case like that.

Q. I am quite sure I have, that they will sometimes take a wheat that they believe is as strong as No. 2 and sometimes as No. 3 and prefer it to a more starchy wheat. You raised the point a while ago in regard to the proposal before the Committee; that is one of the things they discussed. You say it would raise a difficulty in regard to the street wheat. Might it not possibly work out in this way; it is always hard to tell how a new proposal will work out, but generally the practice will dovetail into the legislation; would it not be possible for those who are selling street wheat to create this practice of sending samples to inspection points, say Winnipeg, and have a test before they are delivered? I am told that in the United States, where protein content is a large factor, it becomes known in the early part of the season what their wheat will test, by sending samples in this way. Might that not be done in

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Canada? They would have it graded, and would know exactly what it was like, by inspection; could not that be done?—A. I doubt if it is very practicable, taking into consideration the present facilities.

Q. Just why?—A. You are talking about street wheat?

Q. Yes?—A. What are you going to do with the load of grain while you are waiting for the grade on it?

Q. There would be this; at the present time the country elevator man does not know exactly what he is going to get. He would have a better chance to know now, I will admit, when he has some characteristics to go by, and if that is any guide at all, it is a fairly good guide. The other way he would be content to buy a load or two loads if he could, and as a matter of course he could continue as he does now and take a chance, whether it was 400, 500 or 700 bushels under the carload. I do not see why it could not be worked out?—A. It could, no doubt, if the flow of wheat through the country elevators was normal. But what are you going to do in the rush time?

Q. A practice would grow up that the farmer would send down a sample before he started to grade and the elevator man would take the sample and a part of it would be set aside for future reference and probably they would send a sample to Winnipeg, and that would be a guide. If there was any doubt, he would have his sample?—A. I am afraid the elevator man would have to send his own sample to test out each load.

By Mr. Donnelly:

Q. We are very much interested in keeping our standards as high as we possibly can in the world markets; your two suggestions are for the definition of No. 3 Northern. Would you suggest that both these definitions should be put in, or just one, or which do you prefer?—A. It is all one suggestion.

Q. You would suggest that they be put in as a definition of No. 3 Northern Wheat?—A. Yes.

Q. We are told that some mixing of wheat takes place at our ports along the Lakes and at Buffalo; have we Inspectors at those points?—A. There are Inspectors at Montreal.

Q. Have we any along the coast?—A. No.

Q. Do you think it would be wise to have Inspectors there to prevent mixing?—A. The wheat is special binned. You see, the situation at these places is, if you have trouble with your shipments through a certain elevator you just abandon that elevator. I do not think we suffer very much from any mixing operations on the seaboard.

Q. We are told that there is mixing taking place. I think I can show in the evidence of Mr. Fraser that mixing takes place both on the lakes and at the seaboard, that mixing takes place in the United States and other places. Do you not think we should have Inspectors there to prevent that, if it does take place? I think I can prove that from Mr. Fraser's evidence, somewhere, that mixing does take place?—A. The closer supervision you apply to any business, the better service you get, as a rule.

By Mr. Millar:

Q. Are you as a Pool committed to the practice of mixing as a policy?—A. No, not at all.

Q. Are you not?—A. Not at all. We are not interested in grain profits of any kind.

Q. Let me make sure that you understand my question. As a wheat Pool, are you not committed to the practice of mixing as a policy?—A. No, we do not make a policy of mixing. We do mix, there is no question of that.

Q. Are you simply mixing because other companies are mixing, and you feel compelled to do it?—A. No.

Q. Or, are you committed to the practice of mixing as a policy?—A. We run our big terminals, Mr. Millar, as publics, in which no mixing takes place. That is four and six, the big terminals out there will not have it. Any mixing we have is at comparatively small houses; No. 1, 2 and 3, and No. 5. And we use that very largely for the conditioning of lower grades.

Q. Can I say this; that the Pool is opposed to the policy of mixing?—A. No, I would not like to say that.

Q. They are in favour of the policy, then?—A. No.

Q. You would not say that either?—A. No, I would not. I think individually, the members object to it, but we have not seen our way yet to clear up the situation.

By the Acting Chairman:

Q. You say it is a practical situation you have to meet?—A. Yes, we have to apply a practical remedy to the marketing of this grain.

By Mr. Donnelly:

Q. Are there not some members of the Pool who are in favour of mixing?—A. No, I do not think so. There are some of them willing to abandon it.

Q. Are there some of them in favour of doing away with mixing?—A. Yes, quite a few.

Q. And would you not also say that there are some who are in favour of it?—A. Yes, possibly there are. When you consider the export situation where you must have uniformity of shipment, it is difficult to see how you can get away without it.

Q. There are some that are neutral?—A. Yes, quite a few sitting on the fence.

Q. They are not unanimous?—A. No, it is a very debatable question at the present time.

Q. Then what I referred to in regard to Mr. Fraser's evidence is this. The question was asked, page 57 of the Minutes of Proceedings and Evidence:

What about our wheat going over to the Old Country this year. Have you any complaints?

Mr. FRASER: You mean our shipments? There have been a few.

Mr. DONNELLY: Any last year?

Mr. FRASER: In some cases they consider the wheat too poor for the grade given. In one complaint there was a case of some mixtures that had taken place.

Mr. DONNELLY: Where do you think this mixture had taken place?

Mr. FRASER: I think in the United States, the mixtures might have taken place in some of the transfer houses—the Bay ports, Port McNicholl, Buffalo or Montreal, or in the States at some of the Atlantic ports down there.

He says there is apparently mixing taking place at our lake ports, and at our seaboard as well. Now, do you not think that the inspectors should see that this mixing did not take place at the ports?—A. It would be very nice to be sure that there were no abuses taking place, and if an inspector could do that, it would certainly help.

Mr. MILLAR: Here is a statement made when we were discussing this question of mixing in 1925, right in the same Committee. Mr. Murray stated: "May I take a moment to explain the views of the pools on the subject. The pools have during the past year been operating a mixing house, and they hope that they will not be deprived by the Act, of continuing the operation of this house." I do not ask whether you concur with that or not,

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but that was a stand taken at that time, just when we were trying to put the mixing houses out of business, and it gave us a lot of trouble.

Mr. DONNELLY: Mr. Chairman, if we have to look over these samples, it is getting on to one o'clock—unless there are other questions from Mr. Ramsay.

WITNESS: I would like to explain that in mixing, the pool's position is on behalf of the farmer, and for his benefit, which is an entirely different situation from some one making a practice of mixing for profit purposes for himself. Now, we have always taken the attitude that if we can get more money for the farmer by using those practices, it is to our advantage to do so providing we can arrange an equitable settlement with the individual member. That is the difficulty, to get the mixing profit back to the individual. I think probably we have surmounted that difficulty this year.

By Mr. Millar:

Q. That removes one of the objections?—A. Yes.

Mr. DONNELLY: Mr. Chairman, I understand that Mr. George Langley will be in the city to-morrow, to appear before the Committee on Immigration and Colonization. Mr. Langley has taken a very active part in wheat, and he has just returned from the old country. He has first-hand knowledge about our buyers of wheat in the old country markets, and I would like to have him appear before the Committee and give his views. I move that the Chairman interview Mr. Langley, and find out when it will be convenient for us to have him here.

The ACTING CHAIRMAN: To have him speak on this question?

Mr. DONNELLY: Yes.

Mr. VALLANCE: Mr. Langley is appearing for the United Farmers of Saskatchewan.

The ACTING CHAIRMAN: Yes, on the immigration question. It will be for the Chairman to make arrangements. Is it your pleasure that the Chairman be instructed to try to arrange to have Mr. Langley here?

Agreed.

By Mr. Millar:

Q. One more question, Mr. Ramsay. Has the Pool done anything on the subject of devising a scheme where protein would be a factor in grading? Have they done anything along this line themselves?—A. No, except to extract a premium from the mills for any selections they make.

Q. Extract premiums from the mills? What mills? The American mills at Buffalo?—A. Yes.

Q. What is the highest premium they have been able to get?—A. I have seen it as high as four cents; usually around two cents.

Q. Is that for a particular car shipment?—A. Car shipment.

By Mr. Lucas:

Q. In that case, do you guarantee the amount of protein?—A. No.

By Mr. Fansher:

Q. It is hardly fair, Mr. Ramsay, for this Committee to expect you to take sides either for or against the grading of wheat on the protein content for the reason that you are marketing the wheat for all growers, for high content or not.—A. To be perfectly frank with you, we have had so much work to do that it has not been given very much consideration up to now. I think probably in the near future, they will have to consider ways and means in connection with it.

Q. A research council?—A. We are considering a research department of our own. It is gradually working towards perfection, but we have not got that far yet.

By Mr. Millar:

Q. I am afraid you are a long way from it—A. I hope so. It makes the future more interesting.

The ACTING CHAIRMAN: Any more questions you wish to ask the witness?

WITNESS: If you will permit me, Mr. Chairman, I would like to suggest that if any changes were made, the same principle should be applied to the Durum grade. That is to pegging the value of a grade to amber Durum equal in milling value to Kubanka.

By Mr. Donnelly:

Q. To give what grade?—A. In two.

Q. Would you give your suggested changes of the Act?—A. The Act says at present:

No. 2 Canada West amber Durum wheat shall be sound, reasonably clean, and weighing not less than 60 pounds to the bushel, and shall be composed of 60 per cent hard amber kernels.

Now, No. 1 is also the same way. That is all right as long as you are just growing the Kubanka, but recently there are varieties coming in of Kubanka here which are of practically very little use for macaroni, and the idea is that No. 1 and No. 2 Western amber Durum shall be defined as being equal in milling value to Kubanka which is a Durum wheat, which corresponds to the Marquis and Spring wheat.

Q. How will it read?—A. Just the insertion of that: "Equal in milling value to Kubanka Durham." That also was Mr. Serle's suggestion.

Q. For what grades is that?—A. One for Two Durum. There is a South African Durum being grown extensively this year: "Golden Ball," which I am told is a feed grain. It will have to grade One Durum. It is a beautiful wheat. Have you it there, Mr. Steele?

Mr. STEELE: We have not any proof of it being equal to a feed, but they went into it extensively in the United States, and they have gone out of the production which is proof enough for us that it is not equal to the Kubanka Durum. If it is equal, the amendment will not affect it.

By the Acting Chairman:

Q. Have our own millers tested it?

Mr. STEELE: They are testing it now. There is a very efficient system of testing macaroni wheats. Everything is based on the bread wheats, but we are testing those now. That is a milling Durum.

WITNESS: Actually, "Golden Ball" looks the better wheat.

Mr. STEELE: It is a heavier wheat.

Mr. DONNELLY: We have a number of samples here which we should take time to examine.

The ACTING CHAIRMAN: Is there any further evidence which you want taken down? If not, we may proceed with the discussion.

Discussion followed.

The Committee adjourned until 11 o'clock a.m., May 8th, 1928.

HOUSE OF COMMONS,

TUESDAY, May 8, 1928.

The Committee met at 4 p.m., Mr. Brown presiding, and resumed consideration of the question of wheat grading.

Hon. GEORGE LANGLEY called.

The CHAIRMAN: Mr. Langley, you know a lot about grading wheat and marketing it. Have you anything arising out of your own experience that you would like to give to the Committee, or would you prefer to answer questions?

Mr. MILLAR: Perhaps Mr. Langley will make a statement as to how he found Canadian grain arriving at the other side of the ocean?

Hon. Mr. LANGLEY: Mr. Chairman and gentlemen of the Committee, we were indebted in our itinerary, or whatever it is, to Mr. Wilson, of the staff of the Commissioner of Agricultural Products for the Federal Department, stationed in London; he arranged practically at every place we went interviews with Departments of Commerce. We went on the Corn Exchange at Liverpool, saw the Exchange in operation, examined a number of samples of wheat, Canadian especially, and we met in Manchester a similar body, who answered whatever questions we liked to put to them, and again in London and again in Glasgow. We had no complaint in reference to Canadian grown wheat at either Liverpool or Manchester except the complaint that Canadian grown was too dear, too expensive. I mentioned that this morning. When we got to London we met a number of gentlemen connected with the commercial business, one representing particularly the grain and flour trade. He complained, and complained very severely, that Canadian wheat was losing its intrinsic character because of being not a wheat to which they had been accustomed such as our old Red Fyfe or the Marquis variety which has largely displaced it, but that it was composed of numerous varieties, and the larger number of them were not of the high character for milling purposes which they had been accustomed to in the former Red Fyfe and Marquis. He was particularly anxious that when we got home we should call the attention of our authorities to these matters.

At Liverpool the chairman of the Corn Exchange—and they call it the Corn Exchange over there—delivered an address to us and told us there were qualities in Canadian wheat—which I think most of us knew—that they could not get anywhere else. He told us of an experiment they had encouraged. They had samples of pure-bred pure variety Marquis wheat purchased in Canada, sent to the Argentine and used as seed and grown there, but when they harvested the product it had not the Canadian quality. Something had happened which they were unable to account for and which I suppose most of us would be more or less unable to put into words, so that the high protein and gluten contents of our native grown Marquis wheat were lacking in the Argentine grown Marquis wheat. Sometimes those of us who have studied wheat for years think that it is the character of the weather we get in the maturing time which gives special qualities to northwestern Canadian wheat. Every one who has had experience in farming in the Canadian west knows that sometimes we have very hot weather at the end of July and the early part of August when the maturing process is going on, so that everything in the field or the garden is flagged down by the end

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of the day. Directly, however, the sun drops over the horizon the air cools, very often the northern lights come out, and the farmer is worried nearly to death during the night wondering whether the temperature is going down below the frost line. The result is that the next morning everything that had flagged in the way of growth is stiffened up again, and we begin the new day with a new process of warmth. Many people believe that it is that particular thing which gives the special qualities to our northwestern Canadian wheat and the wheat grown under similar conditions in the northwestern States, below the line.

At any rate, whether it was the lack of these qualities or not, when they milled the Argentine grown Marquis wheat the chairman of the Corn Exchange at Liverpool assured us that it did not possess the Canadian qualities.

We had a short address from Professor Biffen, the cerealist of the University of Cambridge and he told us he had been experimenting to see whether it was not possible to get the qualities of Canadian wheat in wheat grown in the Old Country and he told us that he had got them. I was interested, because I was a particular grain growing member of our touring party. He said they put it in well prepared and well fertilized land in the Old Country and it grew and matured as Spring wheat, but when they harvested it from land which would have grown British wheat forty bushels to the acre, they had only sixteen bushels to the acre, and he said that while he was sure they had the right kind of wheat they could not afford to grow it under those circumstances.

When we got to Glasgow our friend Mr. Wilson had again arranged that we should meet a portion of the Chamber of Commerce, and we met there a gentleman representing the flour and grain trade, and he, without any qualifications, stated frankly that in Glasgow—my friend Mr. Ramsay as the representative of the Pool will know this—where they used a larger proportion of Canadian wheat than they do in any other part of the British Isles, they had no complaint to make; the wheat was all right; the flour was all right, and we had a complete endorsement of the Canadian wheat. We did not at any place have a complaint such as I have seen in the papers since I came back about the millers being dissatisfied with the quality of the grading, except the one about which I have told you.

Now, may I make a remark on my own account? You gentlemen know that we had a Grain Act passed in 1912, a consolidation of the Manitoba Grain Act. That continued in effect until 1925 when it was revised and altered. Under the old Act there was a special statutory definition of No. 1 Northern and No. 2 Northern, No. 1 Hard being merely a superior quality of No. 1 Northern, and No. 3 Northern was not specifically set out in the statute at all. It was known as the inspector's grade. The law ran something like this—I am quoting from memory—"All wheat not good enough for No. 2 shall at the discretion of the inspector be placed in No. 3," and No. 3 became a specified grade under those conditions. It had an enormous quantity of good wheat in it because if we had delaying weather in threshing and our No. 1 wheat was left out in the weather and became bleached and discoloured, whether it interfered with its intrinsic milling properties or not, it was invariably put into No. 3 by the inspector, so that very often we had wheat weighing 60, 62, and even more pounds to the bushel.

Now, under the new Act of 1925 they undertook to specify No. 3 Northern, and in specifying it they spoiled the grade. I do not think there is any doubt about that. I am speaking now of Saskatchewan, although it applies practically to all three provinces. We have had three years when the weather during both harvest and threshing—I was going to say, had been rotten, but perhaps that is hardy fair—has been very undesirable, very wet and the wet had been protracted, and we had threshed a good deal of the crop in a tough

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condition, some of it in a damp condition. The consequence was that the bulk of the wheat went into No. 3, and it went into a No. 3 which had been deliberately lowered by the alterations of the Act.

Now, those are matters to which I hope you will give special attention. I do not think we can go back to No. 3 as it used to be, but in the No. 3 under the definition which the law gives now it admits of certain other varieties of wheat being put into the No. 3 grade. I think that the lines should be drawn tighter in connection with that, and that a straight variety should rule the No. 3 exactly as it does in No. 1 and No. 2.

I wonder if I might, without offence, give an A.B.C. lesson in grading wheat? Nature, gentlemen, does not know anything about grades; nature does not produce wheat in grades at all. Grades of wheat are not like sizes in boots. Grades of wheat are made in this way: the perfect berry—or as near perfection as such things can be—is produced under certain conditions, and then there gradually appear defects in the berry and you allow the defects to go on down to a certain line, and when it gets there you say, "We will cut that off, and all above that line shall be No. 1." The same thing goes on and the defects increase until you get to another line, where you again cut it off any say that all above that line shall be No. 2. It goes on again with the defects increasing and you get to another line, and you cut it off and say that all above that line shall be No. 3. That is the philosophy of grading wheat, and it is upon those lines that the inspector acts when he grades the wheat sent from the farms. You say that all below the low line of No. 1 is No. 2 until you get to the low line of No. 2, and then all below that is No. 3 until you get to the low line of No. 3. That is how wheat grading goes on. I am not going into the question of mixing as that would take up too much time, but there should be a distinct integrity of variety in all our first three grades, No. 1, No. 2 and No. 3, so that our customers overseas buying either of those grades would know exactly what variety of wheat they were going to have.

We have a number of gentlemen in our western country who have become amateur experimenters in breeding wheat. It is being carried on at different places all over the west, and hybrid varieties are produced. It is generally known that wheat grows in sexes. There are male and female varieties. You can get crosses by using the pollen of the male variety with the female variety and it will produce a cross breed of wheat, generally known as a hybrid variety. We have quite a number of those in the west, and they are all detrimental to the essential qualities of western wheat. I wanted to say that to you. Now nobody understands this thing very much better than your own colleague and my old friend, Mr. John Millar. When we get beyond No. 3, we have not been accustomed to use the word "Northern." We do not say 4 Northern, or 5 Northern, or 6 Northern. Having got 1, 2, and 3, Northern, the other wheats have no statutory difference. But we have a body of men that are called together each season who examine the degree of imperfections that constitute a class of wheat nearest to No. 3, and that we call No. 4. And so they go on grading, not by definition. You cannot define it, Mr. Chairman, you grade it by appearance, and samples are sent out to all the buyers in the country to the effect that while 1 and 2 and 3 must be of a standard variety defined by statute, 4 and 5 and 6 and feed are not defined by statute at all, but are defined by the fiat of the Standards Board. I am quite correct, I think, Mr. Millar? Yes. Well now, I do not know what you can do. In the earlier days, with No. 1 and No. 2 and No. 3 Northern, we did not allow White Fife to be used. White Fife was a soft wheat and did not produce a standard quality of flour. Now, whether you can do anything by legislation, I do not know, to keep the undesirable varieties out

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of our high class wheats; but if anything can be done, gentlemen, you are the masters of the situation. You make the laws. If anything can be done you should do it; it should be done.

There is just one other point I wanted to express a word on; and that is the new form of grading which is advocated, I believe, in your own midst. The grading by protein content. I think Mr. Millar had or has, or both had and has, a resolution in the House along those lines.

Protein is the body-forming property in wheat; that property in wheat which gives substance to the animal form. It becomes, under certain circumstances, a gluten variety of protein, and that given the buoyant character to wheat which is a special characteristic of Canadian wheat. Now the question is, can you use those characteristics for grading purposes? There was a friend of mine, fairly well known—well known in the Pool, and one of the officials there—who was very much in favour of grading wheat by protein content, because one year the wheat in his own district had a very high protein content; but curiously enough, the next next season they discovered that it had one of the lowest protein contents in the northern part of Saskatchewan, and he was just as much against grading by protein content when the protein content of his own district was low as he was in favour of grading in that way when the protein content of his own district was high. It is those shifting forces of climate and whatever it is, soil, and all that sort of thing, that make the difficulty in protein content grading; and it is a very serious difficulty.

I think I have said nearly all I want to say. I have always been, Mr. Chairman, an opponent of skimming the grades of wheat; allowing anyone to come in and say, we will buy all the high grades in No. 1 and leave the lower grades to be shipped abroad. I think we are injuring ourselves when we allow that. And the same in connection with any grades. I do not think our grades of wheat should be skimmed.

By Mr. Campbell:

Q. Have you any idea how you could prevent that by law?—A. Well, let us say we send up three carloads of wheat; one of them is the most perfect form of the berry that we can get; it is what we call "High No. 1"; the second car is not so good; it is what is known as a medium form of No. 1. And the third is right down to the line; that is what we call a line grade. That is the low form of No. 1. Now if you put them altogether, store them together, you have in the combination of the three carloads the No. 1 grade. Don't you see if you take away the high carload and only put the other two together you have a lower quality of wheat, Mr. Chairman. Have I made it plain?

The ACTING CHAIRMAN: Yes, but Mr. Campbell's question was how could you prevent that scheme.

By Mr. Campbell:

Q. If you have a car of high grade No. 1, and ship it in the ordinary way, and at Winnipeg a miller who is watching the grades finds that is extra good, and he bids a few cents above the average price, and gets it there and diverts it to his own mill—A. Did he send you the money? I mean, if he sent you the money you came out pretty well. Because there are so many cases where they keep the money and don't send it.

Q. In a great many cases the companies may get the premium. But the point is, how are you going to prevent that from being diverted from Winnipeg to the mill instead of being handled at Port Arthur and raising the average standard of the grain?—A. Well, I think you had better join the Pool, and leave it to the Pool Officials and they will prevent that being done.

Q. I belong to the Pool. That is not the point I was trying to bring out. And the same thing happened in the Pool elevator, exactly the same thing.

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By the Acting Chairman:

Q. You would not consider it good policy—I think that is the point of the question—for the Pool to pursue that practice, of selling the higher grades on this side of the water?—A. I should strongly object to it. If all your grain is committed to the custody of the Pool, shipped to the Pool, they will take care that the miller does not do the thing you say he does. I know they will do it if they can. As a matter of fact there is a good deal of looseness in the trade, as it is carried on along those lines. A good deal of it. But the more control the Pool gets—and when I speak of the Pool, I do not speak of the men but the institution and the method, that is a central market method of selling wheat—the less we will have of these difficulties. Where you and I as producers hand our wheat over to the selling agency and trust them to sell it and take out the cost of handling it and return the balance to us, I think, Mr. Chairman, on this question of the high mark of the grade and the low mark of the grade we have to compromise a little. Mr. Campbell and I both send our wheat to the Pool; this year his grain is close to the high mark of the grade and mine is close to the low mark. Well, you see if we are both paid equally as we should be, both for No. 1, he helps to support me this year, and next year probably mine will be the best and his will be the worst and I shall return the compliment to him. You see that, don't you, Mr. Campbell?—A. Yes.

Q. My point, of course, is that a great deal of the better or the best of the grades is skimmed off in that way at Winnipeg so that we get a lower average out of the terminal than we get at Winnipeg?—A. I don't think the millers do very much of that now, Mr. Chairman, and I will tell you why. All our large millers have lines of elevators. They do the thing in their own elevators. They buy grain and they select the finer qualities of the grades and pass them on to their mills, and the lower qualities of the grade they send to the public terminal for exportation.

By Mr. Donnelly:

Q. Is that not just the same thing?—A. Yes, but how are you going to prevent it? I do not see any way of preventing that.

The ACTING CHAIRMAN: That is the question you were asked a while ago.

The WITNESS: Well, I don't see any way of preventing that. But so far as our loss, when we take it to the miller, is concerned, we avoid that when we take it to the Pool. I would suggest to any farmer that the first thing that he should do is to join the Pool.

By the Acting Chairman:

Q. Have you anything more to say on the point of protein content?—A. I do not think I can pursue that any further. It is a highly scientific point. However, one difficulty in grading by protein content is the difficulty of segregating your samples and qualities. I think it is generally understood that in exporting wheat the lowest unit for exportation will be about from eight to sixteen thousand tons.

By Mr. Millar:

Q. Mr. Langley, will you allow me to interrupt you here? There are two main schemes that have been proposed in recent years in regard to the discussion of protein in wheat. The one is to grade as at present, and then have in addition to that, as they do in the States, another certificate made out indicating the amount of protein. That would be the scheme you propose. It would not be necessary to have those cars of average height and put them together. The proposal before the Committee now is entirely different from

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that. It is that all the wheat be graded on a basis similar to our present grading system, except in one specification. Instead of judging the strength of the wheat by the appearance, by the colour, the proposal is to judge it by a chemical test; replace the colour or appearance test with the chemical test. That is an entirely different proposition, as you will see.

Mr. DONNELLY: For example, we would say No. 1 Northern to contain 13 per cent or more; No. 2, Northern, 12 or more and No. 3 Northern, 11 or more, and yet have all the requisites required at the present time in 1, 2 and 3.

There is only one thing, Mr. Chairman, I would beg of you to do in connection with that. The producer only represents one side; the miller, the buyer, represents the other side. You should know before you undertake to do that, in the interests of the producer, what the buyer or the manufacturer is to do in connection with it.

By Mr. Miller:

Q. You spoke of the quality of our wheat on the other side, and you referred a short time ago to the fact that they spoke of the quality not being up to what it was some years ago, and the quality of the grain even when grown in South America and shipped back to England did not possess the quality. What quality did they refer to; was it the strength?—A. They referred to the milling quality of the grain.

Q. That would be probably the strength?—A. Yes.

By Mr. Donnelly:

Q. Or the quantity of flour?—A. No, it is not altogether the quantity of flour.

Q. The baking test?—A. Yes. Old Country flour from wheat grown in England, that wheat will produce, bushel for bushel, practically an equal amount of flour to ours, but it will be quite a different kind of flour.

Q. It is not so good for baking?—A. No.

Q. It is the baking test that counts?—A. In fact the Co-operative of Manchester told us that they produced the flour they required by using 5 per cent of Canadian wheat. We found there was a little shuffle on that. We went through the mill, Mr. Chairman, and talked with the employees in the mill, and we found that in actual practice the 5 per cent had increased to 15.

Q. Might that not be because the wheat we were putting in was low in protein?—A. No, they did not contend that; they said that was the general run.

Q. Mr. Langley, you said when you were in Liverpool at the Corn Exchange you received no important complaint there. At Liverpool, at the Corn Exchange, did you see this letter which was sent to Mr. Malcolm, our Minister of Trade and Commerce, and a letter sent to the Prime Minister, complaining about our grades?—A. No. What is the name signed to the letter?

Q. This is signed by F. W. G. Urquhart, Secretary of the Liverpool Corn Trade Association.—A. May I ask, before you read the letter, that it was the President who gave us his address—Mr. Harker.

Q. Urquhart?—A. No, Harker.

Q. He signs himself F. W. G. Urquhart, Secretary, Liverpool Corn Trade Association. I have here a couple of extracts, which I will just read to you. The first is in a letter addressed to F. J. Rathbone, Secretary of the Board of Grain Commissioners for Canada, Fort William, which reads as follows:—

“There is no doubt whatever that, during the last two years—1926-1927 and 1927-1928, so far as the latter has gone—there has been a very serious deterioration in the quality and condition of Canadian wheat shipments, especially in respect of Manitoba wheat, grade No. 3 Northern,
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and my directors cannot accept the explanation that the weather has been entirely responsible for the poor quality of wheat received in this country and on the Continent.

"It is quite apparent that the standard sample of No. 3 Northern Manitoba wheat, 1927, is greatly inferior to the relative standard for 1925. My directors submit that to try to maintain a regularity of standard from year to year is essential and, if Canada has an inferior crop, that it ought to be graded accordingly."

These are just a couple of paragraphs taken from the letter?—A. Well, we had no complaint from the President. Would you allow me to state, Mr. Chairman, that in 1925 the practice of mixing the grades of grain became a legal operation under the new Act. Previous to that the various qualities and the different grades had been stored together in the public elevators, in bins, the usual size being 30,000 bushels capacity, and when it was drawn out it was a composite sample of the high, the low and the medium of the grain. That happened until the year 1926, when the new law came into operation, publicly and legally allowing mixing, which means that you will take enough of the best quality out of each grade to skim or grade down to the line, and the wheat which we ship to-day is skimmed wheat.

Q. It is down to the line?—A. It is down to the line.

By Mr. Millar:

Q. Are you speaking of the public elevators?—A. I am speaking of the general sample. Before grain goes into the public elevators, where there is no mixing or should not be, the grain companies are allowed to extract samples that will bear mixing. As far as possible, only the line grades go into the public elevator and only the line grades come out of the private elevator.

By the Chairman:

Q. So that practically there is no difference between what comes out of the public and what comes out of the private elevator?—A. Practically there is no difference.

By Mr. Donnelly:

Q. Do you think mixing is the cause of that?—A. I do not think it, I know it is.

Q. I have here an extract from a letter to the Prime Minister, which I might as well read also. The letter is from Mr. Urquhart:—

"In years gone by, complaints were few and far between, but since the autumn of 1926 they have been very numerous, and the confidence which the trade used to place in Canadian Certificates has been badly shaken. My directors find that the whole U.K. and Continental markets are becoming very dissatisfied with the arrivals of wheat under 'Certificate Final' and unless matters improve they are quite certain that there will be a strong agitation to discontinue this method of trading and to insist upon buying on Standard Samples in the same way as trade is done with other countries, such as the Argentine and Australia."

That is an extract from a letter from the same man to the Prime Minister?—A. Mr. Chairman, the result was unavoidable, directly they made the mixing of grades legal. It became a certainty, because the men who mix grain understand their business—they do. You do not get anything that is coming to you, in a mixed sample of grain delivered in a carload; it is all line grain. I saw a sample when at Liverpool of No. 3 Northern. I am very doubtful whether a farmer sending a carload of that wheat to Winnipeg to be graded could secure No. 3 for it.

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By Mr. Millar:

Q. Was it not graded in the Old Country?—A. It was exported, or rather in the Old Country it was imported, No. 3, No. 3 Northern. They say No. 3 Manitoba.

By Mr. Donnelly:

Q. Do you agree with what Mr. Newman said when he was giving evidence?—A. He was asked concerning complaints he had in England in regard to our grades of wheat, and this question was put to him:—

“Q. Where do you find the cause for complaint?—A. The only complaints that they made to me over there were on the question of grading.”

In other words, he thinks our grades are lower than they used to be, that our samples of grades coming in of our wheat are lower than they used to be?—A. Of course, Mr. Chairman, certain grain dealers over grade grain in their local elevators and pay for over grades, knowing perfectly well that in their private elevators in mixing grades and lowering the general grade they can recoup themselves with a profit.

Q. You were on the Continent as well as in England, were you not?—A. Yes.

Q. Did you go to any of the grain trade on the Continent at all?—A. No. We only went to Denmark. Denmark is importing quite a quantity of low grade wheat. Nothing I saw would be better than extremely poor No. 6 or No. 5.

By the Chairman:

Q. Before we leave, may I ask a question. Have you seen the proposed definition for the Act?—A. No.

By Mr. Donnelly:

Q. I have it here?—A. Will you kindly read it to me?

Q. Shall it read it to you, or pass it up to you?—A. You can read it to me.

Q. Here it is:—

“No. 3 Manitoba Northern Wheat shall consist of Red Spring Wheat, equal to Marquis; shall be reasonably sound and reasonably clean, weighing not less than 57 pounds to the bushel and shall contain 25 per cent of hard, red vitreous kernels.”

This is another alternative:—

“—or may be composed of soft varieties of Red Spring wheat of fair milling quality; shall be reasonably sound and reasonably clean, weighing not less than 58 pounds to the bushel, and containing not less than 35 per cent of red kernels, and may contain amber or red Durum singly or in combination up to 2 per cent.”

A. Cut out the second definition; keep away from soft spring wheat in all grading of wheat which will in some seasons (it did last season) contain over 50 per cent of the wheat we grew. You are going to allow soft kernels in it, soft spring wheat in it, and they never should be there. Keep to the first definition.

Q. And leave the second alternative out altogether?—A. Yes. Put it in the wastepaper basket.

By the Acting Chairman:

Q. What would you do with these other varieties, have special grades for them?—A. Have they not got that?

Q. No?—A. No. Mr. Millar is your authority.

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By Mr. Donnelly:

Q. He proposed grades of Durums?—A. Yes. I understood you were cogitating; you have not got beyond that. You were cogitating preparing special grades for a variety of wheat not suitable for our high-grade flour.

The CHAIRMAN: That statement has been made throughout the country. I got a letter indicating that, as Mr. Langley says, but I do not know anything beyond that.

Mr. DONNELLY: The Minister of Trade and Commerce introduced it.

Mr. MILLAR: The Bill of the Minister of Trade and Commerce provides for Nos. 1, 2, 3, 4 and 5, White Wheats.

WITNESS: But these are Soft Red Wheats. We cannot get the highest quality of flour from Soft Red Wheats.

By Mr. Donnelly:

Q. What would you do with them?—A. Have special varieties for them, have special grades for them.

Q. Would you make grades for those as well?—A. Yes.

By Mr. Millar:

Q. Mr. Langley, in regard to the complaint in Great Britain about the mixture of a number of varieties in our highest grade wheats, did they look upon that as a serious objection?—A. They looked upon it as a most serious objection, because it was doing away with the intrinsic quality of our wheat, which they rely upon for special mixing purposes in their flour.

Q. Jumping to another question altogether, in regard to mixing at elevators, how are you going to dispose of your numerous varieties of wheat? What would you think of this proposal, that mixing as carried on now in the mixing elevators be prohibited, by private concerns, but that hospital elevators be established to take care of the off-grade wheats, soft wheat, damp wheat, putting them all into proper shape the same as mixing elevators do now?—A. That is to say, there should be a special purpose in processing wheat. I think that is the better term. You have a wheat which will bear a grade; for instance, you have No. 3 Smutty. Well now, that never should go in to straight No. 3. I came down to this place (Ottawa) to bear testimony in connection with a man named King, who used to have an elevator, and who treated smutty wheat at Port Arthur. The old gentleman had worked up quite a case. He said the week after he had treated it, it was better than wheat without smut. We joined forces with the millers, and the millers said "Well, if you have improved the quality of wheat sell it by itself, and get the value." But, that was not what they wanted. They wanted to hide it in the general grade. There are ways of getting all the good qualities out of it, without mixing it with our higher grades at all, and they never should be allowed to be mixed into our higher grades. There are those studying this question, Mr. Chairman, who will give a better decision than I can.

I do not know whether you can dry damp wheat or very tough wheat, because tough wheat and damp wheat are different degrees of moisture; that is all, Mr. Chairman. I may send in a carload of wheat, and it may only have one per cent of moisture, but it is turned damp, and I am deducted, or I have been in the past, and any of you are deducted for that tough wheat. I understand that that matter is being discussed, however by a very responsible and competent body, and you will be called upon to deal with that in legislation. And, gentlemen, may I ask you to keep your eye on matters that you can attend to, and allow the other matters to mature, because, getting back to what I have said, farming is a progressive science, and the handling of the products

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of the farms is also progressive. We do not know it all to-day, but we know a good deal. The worst of it is, Mr. Chairman, we do not put our knowledge to good use. Now, you deal with the matters you do know of, and one of those matters is the weakening of the quality of hard wheat by poor varieties, and you should be able, gentlemen, to provide machinery by which that can be discontinued.

By Mr. Millar:

Q. You might express your view there, Mr. Langley, in that connection, of the proposal to create machinery now for grading the white wheats. There are five separate grades of white wheat. Do you care to express yourself on that?—A. Well, there are two reasons for grading white wheat, and they are the two principal and practically the only reasons. One is that it makes excellent feed. It is just as good for feed purposes to the ordinary animal as the highest quality of wheat we can grow. Another reason is that the white wheat will generally give a higher yield than the hard red wheat.

For those two reasons, where grown, they should be separated, and, in my judgment, a penalty should be attached to a farmer for delivering those wheats, because our farmers are not the ignorant class that many people think there are. The man who is growing an inferior quality of wheat in nine cases out of ten knows it, and he should not be allowed to deliver that wheat at the ordinary country elevator, except under penalty.

By Mr. Donnelly:

Q. Mr. Langley, if the mixing of wheat was provided for by law at our private terminals, do you think it would raise the average of our wheat?—A. It could not avoid it.

Q. Would we get a bigger price for our wheat than in England?—A. I am not very sure about that. But, there is one thing I am quite sure of, and that is, that the good man in business to-day, studies the wants of his customers. That is what has made Denmark what she is, Mr. Chairman. Denmark went into England to sell butter and bacon, and she said, "I will find out the class of butter, and the class of bacon England wants, and I will send her that." And she has. She has made for herself in the British market a position that nothing at present can disturb.

You ask me whether we would get a better price in England. Well, I am not sure that we would, but we should have a satisfaction among our customers over there that would make us secure from the competition of any other nation in the world.

By the Acting Chairman:

Q. Let me put the question in another way, Mr. Langley. I understood you to express your opinion, that it was poor policy for the Pool to try to segregate all the high quality wheat, and sell it alone in this country?—A. Yes.

Q. Well, now, suppose we get at the matter from the other side. We always have large quantities of poorer wheat to dispose of. Would we be able to sell that lower quality of wheat at a profitable price, or at such a price, comparable to what we should be getting for it now, if it were absolutely segregated; that is, if the mixing were prevented. Is not that one reason that is often advanced for mixing, that the lower qualities of wheat are more easily disposed of and we want to sell it.—A. When we are selling wheat for feed, Mr. Chairman, whether it is in feed alone, or in No. 6 and No. 5 and feed, when we are selling wheat for feed—any kind of processing—I am speaking of ordinary animal feed as different from flour—any kind of processing, any kind of mixing should be permitted that will allow of its being disposed of to its best advantage.

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By Mr. Donnelly:

Q. Would you advise then, that in our hospital elevators, say wheat that goes out of them, wheat that goes out mixed should be marked as processed wheat, or mixed wheat?—A. Oh, most certainly. There should be a registration of the wheat that goes in. It should be graded in, and there should be a registration of the wheat that comes out. It should be graded out. And the two registrations should agree. For instance, say you have got a quantity of No. 5 and No. 6 and feed in an elevator. You take in 20,000 bushels of each. In sending out the processed wheat, or the mixed wheat, you should send out a mutual quantity, as you put it in, only instead of going out 20,000 of each, it will go out 60,000 of one quality.

By Mr. Millar:

Q. I would like to ask two questions, Mr. Langley. You have been asked by the Chairman and by Mr. Donnelly if our wheat would not bring a better price in the Old Country market if it were not mixed, and your answer was that you were not certain. I would like to ask you this: Considering the amount to be skimmed off by those who do the mixing, the profits made by them and returned to the producers, is it not certain that the producers would receive more?—A. Will you repeat that last sentence, please?

Q. Is it not certain that if mixing were prohibited so that the average of the grade that passes Winnipeg would reach Liverpool is it not certain that the producers would receive more?

Q. That the producers would receive more money than he does now?

Mr. DONNELLY: The producer of the good wheat anyway?

The WITNESS: Yes. The English miller thoroughly understands his business. He is not prepared to buy a low-priced article if he can in competition get something similar at a lower price, and, sooner or later, we are going to increase our production, Mr. Chairman. And, we are going to find ourselves at a loss to dispose of our wheat that is only equal to other wheat that can be bought at a less price. I do not think there is a doubt about it. You satisfy your customer, and then when he is looking around for the thing he wants, he will put his hand on that, and he will say "This is what I want, and if it costs me two or three or four cents more per bushel, it will be cheaper to me than a thing I do not want."

By Mr. Donnelly:

Q. That would mean that the man who produces good wheat would get more money for it?—A. Well, it would.

By Mr. Fansher (Last Mountain):

Q. You were speaking, Mr. Langley, of being over in Denmark, and that they were importing a low grade of wheat there. Just aside for the moment, would you tell us what they are using that wheat for? Is it for feed purposes, or what?—A. Well, Mr. Chairman, Denmark is a very small country, but it maintains a large quantity of cattle which are kept for milking purposes. It feeds an enormous quantity of pigs. The wheat is bought for both purposes, for feeding the cows and for feeding the pigs. There is, in the most congested portion of Denmark, practically no pasturage at all. When the cows are put out to grass, they are put out on a tether, and they rely on the products of—what do you call these upright things?

The ACTING CHAIRMAN: Silos.

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The WITNESS: Silos, yes. When you grow older these names play the bother with you. The product of the silo mixed with meal is used for both the hogs and the cows. They are a wonderful people. I cannot speak to you about Denmark to-night, but they are a wonderful people.

The ACTING CHAIRMAN: And a lot of the wheat that goes there is not used for flour purposes at all?—A. Not at all. They have as good bread in Denmark as we have in Canada.

By Mr. Donnelly:

Q. Some of the reports we have say that that the reason for a lot of the complaint in England is because we have mixed dried wheat, or damp wheat, or wheat that has been damp and has been dried, mixed, and put in our straight grade Three. Would you advise, in cases of that kind, therefore, that all our wheat that has been dried should be so sold, or should be so marked and so sold?—A. Before I commit myself on that question, Mr. Chairman, I should like to have had, by those competent to make it, a thorough investigation into the qualities of dried wheat. That is being made, gentlemen, and you will be able in the course of time, with a little patience, to get the result. Anything that lowers the natural quality of an article—I do not care what it is—is something that should not go into that article, if you can keep it out.

By Mr. Millar:

Q. One more question, Mr. Langley, with regard to those five grades provided for, of white wheat. Do you think it is possible to grow white wheat to any considerable extent through Western Canada without having it mixed with all our red wheat? Is it possible to keep it segregated?—A. No. For that reason, I am not very much in favour of the policeman. I think if you get too much into the hands of the policeman, you are going to get into trouble, and, for that reason, it is difficult to make penal laws forbidding a man to grow wheat, which is a useful commodity, if he feels inclined to grow it, Mr. Chairman.

The ACTING CHAIRMAN: If you can make money out of growing it?—A. And especially if you can make money out of growing it. But, I have a grave suspicion that in five cases out of six, the man who is growing the low quality of wheat, grows it with the intention of mixing it in with the high quality, if he can get the chance.

By Mr. Millar:

Q. Do you not think that many of those low qualities of wheat have no merit over the good milling wheats, but get just as much as the good milling wheats?—A. Just as much.

The ACTING CHAIRMAN: We have reached six o'clock, and that is the hour at which all those meetings close.

The WITNESS: I am ready to close, Mr. Chairman.

The Witness retired.

The Committee adjourned until 11 am., May 9, 1928.

HOUSE OF COMMONS,

MONDAY, May 14, 1928.

The Select Standing Committee on Agriculture and Colonization met at 11 o'clock a.m., Mr. J. L. Brown presiding.

The Committee proceeded with the consideration of the grading of wheat.

JOHN MILLAR, M.P., called.

The WITNESS: Mr. Chairman, I have not tried to arrange these excerpts in any kind of sequence, because one may relate to two or three points. The first is an extract from Kent-Jones who I understand is a high authority in Great Britain. Speaking of Manitoba wheat he says:

Manitoba wheats from Canada are the popular strong wheats, and they are extensively used by all English millers. It is a wheat very much like the Northern Spring, but, possibly because grown on less exhausted land, it is generally regarded as being a trifle stronger than the American wheat. This, however, as has already been pointed out, is not always the case. The grain is red, hard, and has a moisture content of about 10-11 per cent. The wheats are carefully harvested and officially graded. No. 1, for example, is the pick of the wheat. Its weight per bushel is often as high as 65 pounds. The grain is slightly larger than that of Northern Spring. The flour from Manitoba is normally very strong and will produce fine big loaves, and, having (as the Northern Springs) a great water absorption, will yield a large number of loaves per sack. Loaves made from Manitoba flour are usually particularly well flavoured. The lower varieties, No. 4 for example, have a slightly higher moisture content, a lower natural weight, are not so plump, and sometimes contain frosted and occasionally sprouted grains. They, in consequence, do not yield as well as the No. 1, and require more careful milling. The fact that they are thin, etc., may not mean a deterioration in strength. Even the lower grades of Manitoba, having much frosted grain, are strong. They may not be quite up to No. 1, but, judging purely from a strength standpoint, the difference is not very great. They have, of course, from a milling point of view, other disadvantages. One of the strongest flours the author has examined was a sample entirely made from No. IV Manitoba. ('K-J' figure 76.0). It should be borne in mind that Manitoba wheat is occasionally very deficient in diastase. Some years are more marked than others in this respect. Certain parcels of the 1922 crop puzzled many English millers who had not realized that it had this defect. The divergent opinions on this crop furnish a case in point of the disagreement of millers. Loaves made entirely from No. 1 Manitoba were often disappointingly small. The doughs handled with the accustomed elasticity, but the final result was not what was expected. The addition of a little malt extract would have made all the difference to the loaf. Millers were surprised at

[John Millar, M. P.]

the better results they obtained by different methods of using their conditioners, and many spoke of how they had increased the strength of their Manitobas. It is probable that what they did, amongst other things, was to condition in such a way as to produce the necessary diastatic activity.

By Mr. Totzke:

Q. When was that book written?—A. 1924. I have an extract from the proceedings of the International Wheat Pool Conference held at St. Paul, Minnesota, February 16, 17 and 18, 1926. This seems to be largely in the form of questions and answers.

Mr. Cox (Kansas Pres. Kansas Wheat Growers' Association): We have a washer. I will say in our state our basic wheat runs from 12 to 12½ per cent protein. We pay our farmers premium on all wheat that tests above that in protein, dockage on all wheat under that.

For instance this 2,700,000 bushels we have taken in, wheat from local elevators. Local elevator managers were docking farmers outside the pool anywhere from 4 cents to 20 cents a bushel. That wheat went into our terminals with wheat delivered by our members and we did not sell one bushel of No. 2 wheat.

Mr. Plumer: Processing seems to work all right.

Mrs. Williams: I understand the North Dakota mills did not process or mix. Will someone from North Dakota tell us if that is correct?

Mr. Scott: The state mill processes every bit of wheat; they have a test of 12.5 per cent protein. It has been our contention for two years and we have tried to get the state mill to put out a mixture for our association that we could sell the mills. They are trying to fix a plan now. We find certain places in North Dakota owned by old line elevators, where they are doing a great deal of processing.

Mrs. Williams: Is our state flour mixed with soft wheat?

Mr. Scott (N. Dakota): We use a great deal of Manitoba wheat; they brought some wheat from Canada during Nestos' administration.

Mr. Mahoney: As far as milling is concerned, all mills must process to get flour at one standard. They build up a standard or patent of flour and they must process wheat to reach that standard. Whether soft wheat or hard wheat they always process to the point of getting the same patent.

Mr. Cox (Kansas): If you grind a carload of flour out of 16 protein, another out of 14 and another out of 11 protein wheat it has not the same baking qualities that it would have if it was all 12¾ protein, so that when you grind between 12 and 12½ protein it standardizes the baking qualities. The bakers are really responsible for compelling mills to do that.

Our high protein wheat in Kansas brings a very high premium over and above low grade wheat. We have sold 48 lb. wheat during the average price of the year for more money than we have sold 62 lb. wheat, as much as 4c. and 5 c. a bushel more on the average, accounted for by the protein.

For instance 48 lb. wheat carried 16½ protein, 62 lb. wheat only 10.40. That was the average of that grade of wheat throughout the year.

Mr. Scott: That is a particular case, not the average; that was only one particular sale?

Mr. Cox: That is more or less true all the way through. These spreads on protein vary from the beginning of the year to the last, the spread is not the same all the time.

Delegate, North Dakota: How long has the grower known of that protein?

[John Millar, M.P.]

Mr. Cox: Our growers never knew much about that until the pool started. The fact is that the 10,000 growers in the Kansas pool are the only farmers in Kansas who can receive the benefit of their actual protein up to the present time, through their own association. It is impossible for a grain man to give exactly what it is, when in the country, because he has no way of testing it. We own our own laboratory and our growers take a sample with the elevator man of every lot of wheat, and it is sent to our own laboratory. We run the protein and send that test to the head office, there we have an individual account with every grower and put down exactly the protein he is entitled to. Then we get grades from him and the elevator man at the time of delivery, from the wheat ticket. The sample goes to the laboratory and back to the office and in that way he gets credit for the protein and at the end of the year he is settled with according to grade and protein.

Question: Do you take that sample from every load?

Mr. Cox: We authorize that a teaspoon of wheat be taken from every load and put into the sample sack; if the grade changes too much he sends in two samples.

North Dakota Delegate: The mills of North Dakota and the United States have bought that wheat for many years on the same basis but the grower knew nothing about it.

Mr. Cox: Yes, they bought it for a long time. There are times here at Minneapolis when there is a high premium paid for that high protein wheat. We send lots of high protein wheat to Minneapolis and St. Paul, premiums are awfully high at certain times of the year for this grade of wheat.

Mr. Bakken, North Dakota: Consequently, I understand, the pool really has brought that protein test about?

Mr. Cox: To the farmer, yes sir.

Mr. Bakken: We understand that in North Dakota, but I wanted to be certain about it.

Mr. Croes, South Dakota: Do you find any instance where the growers attempt to take advantage in preparing samples to send in to get the protein of their wheat?

Mr. Cox: The elevator manager watches that quite a bit himself. We advise in the contract that the grower and the elevator manager shall send the sample in jointly, or if they do not want to send it jointly, they may split the sample and send it in that way and generally the elevator man sees that the grower sends in the identical wheat.

Here is the reason, the elevator man has signed a contract with the association to deliver an equal amount of grade and quality as delivered to him by the grower, so at the end of the year if he would try to beat us too much we might call him. We do not have very much grievance along that line.

I will say I do not think we are treated as well as we should be, that is why we are advocating local elevators, we must educate our growers—let them have local elevators of their own. That tendency is coming fast, to make our local elevators service elevators.

We claim in Kansas that the local farmer elevators were the first step in co-operative marketing. They lowered the spread from 6 to 10 cents a bushel.

Question: Are the samples sent in in sealed containers?

Mr. Cox: We furnish a little sack; they are not sealed.

Mr. Scott: We find a sample in a sack will run higher in protein than a sample in a sealed container, the moisture has something to do with it.

Mr. Cox: We run our own laboratory. We have a man who is as good a chemist as there is in the state; he worked in the State laboratory. I was talking to him a while back. He had a few complaints about members not receiving the right amount of protein on wheat which had been tested in other laboratories. I said this might be because we have a lot of different kinds of wheat that grow in the same field. He only uses five drams to make this test. You can easily see where he might get this five drams out of one of the different samples which would make the protein vary a little. In running this protein you absolutely cannot get down to an exactly accurate point. All laboratories in our state vary to some extent in running samples to ascertain protein.

Mr. Hutchinson, Alberta: How long a time elapses from the time you send in the sample and the farmer gets his return as to what his test is?

Mr. Cox: I should judge 8 to 10 days. The laboratory is pretty busy and while they run samples every day it would be about eight to ten days from the time the sample is sent in.

Mr. Hutchison: How do you identify that man's grain until your elevator man knows what the protein is?

Mr. Cox: His name comes in on the sample. The laboratory makes the protein test and sends it to the office and the office furnishes it to the man, also transfers it to his account.

Mr. Hutchinson: How does the elevator man handle it? When he gets a load of grain, does he put that into a bin with other grain before he knows the protein?

Mr. Cox: After he puts that in a car, then we run the laboratory test on the car and we know what the car is and of course keep track of that in our bins in the terminal and when we ship it out we use it for processing.

Mr. Hutchinson: You do not maintain the identity of the wheat?

Mr. Cox: Not after it goes into the elevator.

Mr. Ernest Frisell, Nebraska: We do not handle the protein question quite that way. Our average protein is 13 to 14 in the western part of the state and in the eastern end 10 per cent, varying between there. We pay a protein premium at the end of the year of one cent per bushel on each quarter of one per cent above 11, based upon our average protein at that station on cars shipped through, so our expense is very little. I wonder if your expense is not excessive. It would seem to me the expense of your laboratory would be quite high.

Mr. Cox: Our laboratory cost about \$3,000 for machinery. We charge the same test the Kansas State Grain inspection department charges, and after paying all overhead we had \$2,600 clear profit in running our own laboratory test, so we are doing it for the actual cost.

While we set up the charge we exposed some of the charges we have been charged heretofore. As for the average protein at a station we find this, there is hardly any station but what there is a considerable difference in the protein. Sandy ground and what we call black ground or clay ground makes a lot of difference. I believe as a policy for the future, it is well to educate the farmer that he is going to get exactly what he raises.

[John Millar, M.P.]

Mr. Croes, South Dakota: Do you hold your elevator responsible for the same kind and quantity and when you figure up your protein and find that you are entitled to a higher grade of protein than the elevator has delivered, do you ask that elevator to make good?

Mr. Cox: Not so much on protein as on the grades. On the protein, we have not quite got to that. Here is what we do notice, that our grain buyers when wheat first starts to be delivered in July always average the protein at a station and they will call a certain station a 14 protein station, another station probably a 10 per cent protein; they figure it on the average. We are not exactly accurate, we cannot be that yet, but we are getting closer to it all the time.

Mr. Croes: I wondered if you had particular instances where you had been able to find your protein getting away from you and save yourself that value, which could more than take care of the expense. That could happen in some localities.

Mr. Cox: I think so; I think by following this up and watching it close we can do that. We can work it out until that would considerably more than take care of the expense. I do not think there is really an additional expense and feel sure it is well worth while to run our own laboratory as we are doing.

The next is an excerpt from the *Journal of Agricultural Research*, vol. 34, No. 3, Washington, D.C., February 1st, 1927. At page 242:—

Frank, and Mangels and Sanderson have reported figures comparing the protein content of different lots of wheat and the percentage of dark and vitreous kernels in these lots, and their conclusions are that high protein content is not always associated with a high percentage of dark, hard and vitreous kernels.

And at page 243:—

In each of the above cases the relationship—

That is, between protein content and dark, hard vitreous kernels,

—was such that it was apparent that an estimation of the percentage of dark, hard and vitreous kernels was only a general index of the protein content of the wheat. A low percentage of dark kernels did usually indicate a low protein content, and sometimes a high percentage of dark and hard kernels was associated with high protein content, but as an exact measure of the protein content of wheat this determination is not reliable.

Also at page 245:

During the last few years the protein content of wheat has been assuming increased importance in determining the market price of wheat. Transactions are known where as much as 30 to 40 cents a bushel premium were paid for wheat of the same numerical grade but of higher protein content.

Such investigations as those of Zinn Bailey, Thomas, Stockham, Sherwood, and Mangels, wherein the protein content of the wheat has been compared with the baking data, have given evidence which tends to substantiate the practice and value of judging baking strength by a determination of the protein content of the wheat. It is agreed that there are individual cases in which the relationship between the percentage of protein in the wheat and the associated baking test does not hold because of the influence of other factors that affect baking strength; yet, when purchases are made on a large scale and the wheat is blended, the individual differences seem to disappear, and a close relationship is shown to exist.

[John Millar, M.P.]

Also at page 246:—

An examination of Table 6 shows that there was a decided relation between the loaf volume of the bread and the protein content of the wheat up to and including the 12 per cent protein area. When the 13 per cent area was reached, however, there was a decided break in the quality of the gluten, as 20 of the 34 samples of wheat having 13 per cent of protein and over produced loaves of bread having a volume of 1,999 cubic centimeters or less. From a statistical angle, therefore, these samples counterbalanced the very high relationship which would have been found with the samples of wheat that had a protein content of 8 to 12 per cent.

I have here a letter from The National Testing Laboratories, Limited, of Winnipeg, dated February 23, 1925, addressed to myself, part of which reads as follows:—

In the evidence given before the recent grain inquiry, it was stated that the time required to make a test was one hour. Our experience has been that it takes one hour and ten minutes from the time that the sample arrives in the Laboratory until the result of the test is telephoned to the customer. This does not, however, mean that every sample takes the same time. With our particular equipment if we receive twenty-four samples at one time, the first four would be reported in the above time and the balance would come off in groups of four in five minute intervals. So that while it would take one hour and ten minutes for one sample, twenty-four could be reported in one hour and thirty-five minutes after being received in the Laboratory.

We find that under present conditions it is quite satisfactory to our customers if they get the results of the tests within two hours of the sample being delivered to us.

The cost at which a commercial laboratory can do this class of work at a profit depends entirely on the volume of business.

Referring again to the grain inquiry it was stated in evidence that at Kansas City the cost of protein determinations is 45 cents a sample. With the extra cost of chemicals, etc., in Western Canada we could not approach this figure with the volume of business that we had during the past grain season but if our present equipment was at work to the limit of its capacity, that is, working for twenty-four hours in three shifts we could, I have no doubt, get down to this figure.

I have another letter from The National Testing Laboratories, Limited, Winnipeg, date February 12, 1925, addressed to myself:

The Winnipeg Free Press of this morning's issue has a synopsis of a resolution which states that a bill is to be presented by you to Parliament providing that in addition to the grading now in operation for wheat each car should be tested for protein content as well and that the farmer should receive payment on the protein content basis as well as the basis now in vogue.

Anticipating such a movement we have equipped our laboratory in Winnipeg with the latest facilities for the determination of protein and can handle a very large number of samples per day.

The cost of such a determination is in the neighbourhood of 75 cents per sample but this cost could be materially reduced on a large volume of work.

[John Millar, M.P.]

I have also a letter from Mr. F. W. Bliss, of the F. W. Bliss Chemical Laboratories, Minneapolis, Minn., dated March 5, 1925, which reads in part as follows:—

Replying to your letter of February 17, I beg to advise you that the time required for making protein tests on wheat varies. The minimum time required by our laboratory is approximately one and one-half hours. The cost of analysis is seventy-five cents.

This laboratory issues certificates of analysis and these are used in trading, but have no connection with the State grades.

The matter of having tests made is dependent on the selling agent, although such tests are often advised by the shipper. This condition is explained by the fact that this particular method of selling wheat is comparatively new, and therefore is not a universal stipulation of the shipper.

The following is an extract from the Grain Dealers' Journal of September 25, 1924:—

Individual grain dealers, firms or mills, in the Omaha, Neb., territory now have at their service the fine protein testing laboratory recently installed by the Omaha Grain Exchange.

It is located on the eighth floor of the exchange building. Complete electrical equipment speeds up the work of testing the grain for protein. A capacity of approximately 500 protein determinations daily is reached by the sixty digesters and sixty stills.

The Inspection Department of the Exchange has supervision of the laboratory. Harry K. Clark is chief. M. D. Mize, a graduate chemist from Kansas City, where he gained five years' experience in protein work for large flour mills, is directly in charge.

The Omaha Grain Exchange has extended invitations to grain handlers and mills outside of Omaha to make use of the new facilities. A charge of seventy-five cents a test is made to help defray the expenses of running the laboratory. The Inspection Department furnishes the sample when an official protein analysis on wheat moving in or out of the Omaha market is requested. Samples from individuals, firms, or mills are treated as submitted samples and certificates are issued for them.

Mr. H. M. Bainer, Director of the American Southwestern Wheat Improvement Association, says in part.

Mr. TOTZKE: What are you quoting from, Mr. Millar?

Mr. MILLAR: I cannot give you the paper that this was printed in. It is an article headed "Experiments in American Wheat."

Mr. TOTZKE: It is a newspaper clipping though?

Mr. MILLAR: Yes, a newspaper clipping. It is as follows:—

More attention is being paid to good seed and adapted varieties than ever before, and while the fanning mill is finding increased use in improving seed, yet it is felt that there is great need of increasing its use still more.

The next is a letter from the Board of Trade of Kansas City, Missouri:—

The grading of wheat in this country is done under the standards established by the Department of Agriculture and the State Grain Inspection Departments work under the supervision of the Federal Department.

The Federal standards do not include a protein test as a part of the grading; consequently there is no law covering this factor.

[John Millar, M. P.]

The State of Kansas has established laboratories at different places, including Kansas City, where the handler of wheat can secure a protein test on samples submitted for which a fee is charged. This is done for the convenience of the trade without being a part of the required inspection and has been so established because the trading in this country is very largely based on values established on the protein content.

The work of making these tests, however, is very largely by commercial laboratories. The actual work of securing a proper protein test, which requires exceptionally accurate work, takes at least two hours.

The delay on cars on which samples for protein have been submitted runs anywhere from two hours to twenty-four hours, according to the volume of movement and is a serious factor in the expeditious movement of grain, as retests and rechecks of protein unless accurately secured in the first place may delay the movement of cars several days.

The protein runs from 10 to 15 per cent on the different samples and in this market the colour or quality of the grain is no indication of the protein content.

A letter from the Tenney Company, Grain Commission, Minneapolis, Minnesota:—

Buyers of wheat containing a high protein content will pay a premium for the same proportionate to the amount of the protein. They then special bin the wheat, keeping the average proteins as far as possible, separate from other wheat, and when the wheat is sold, this high protein wheat brings a considerable premium over the ordinary wheat. As an illustration,—On the basis of the market here to-day, 1 Dark Northern wheat of 13 points is worth 30 cents over Minneapolis May, whereas 1 Dark Northern wheat without any protein guarantee is selling at 3 cents over.

An extract from the *National Grain Journal*:—

Congressman O. B. Burtness of North Dakota has introduced a measure in the present Congress, designated as H.R. 106. This Bill would amend the United States Grain Standards Act by inserting a new section, providing for licensing and establishing laboratories for making determinations of protein in wheat and oil in flax. The Bill has been referred to the House Committee on Agriculture.

A letter signed by "Micros" appearing in a Liverpool paper called *Milling*, on February 20, 1926:—

Our American brethren, to use their own expression, tell the world, and unfortunately as a result one is apt to think that they are the only people actively engaged in research and the trying out of new ideas and methods. Many mills to-day in these isles are, however, supplementing their previous 'rule of thumb' methods by utilizing the protein test. One big stumbling block to British millers appears to be the fact that they are still hoping for the perfect test which will wipe out all others and stand alone in its glory. I am afraid they are doomed to certain disappointment; the wheat berry is far too complicated for that. If, then, the protein test can be considered as a valuable supplementary test, it will be found of proved value, as all who use it regularly know. It is, however, no good expecting an Australian wheat and a Manitoba wheat to replace each other because they both happen to test 12 per cent protein; there are other factors that must be taken into account in comparing two wheats of such a different type. But since there are, although many do not realize it, great variations in different wheats belonging to the same type, the test can be of great use in selecting the most profitable from a 'gluten quantity' point of view.

[John Millar, M.P.]

In considering protein tests, the objection usually raised is that they are only a measure of quantity and not quality of gluten. But is it really requisite to know the quality of the gluten in the original unconditioned wheat? A superficial examination is sufficient to indicate if the wheat is diseased, frosted or shrivelled, and in these cases the protein test is not required. The quality of the gluten in unconditioned wheat is not of vital importance, since the business of conditioning is to improve and modify the gluten out of all recognition to its original state. How is the miller to know that he is getting a sufficiency of crude gluten for him to treat? How is he to find out if the reputed high quality or high-priced wheats are really valuable to him, in that what he requires is a quantity of gluten, whose quality within fairly wide limits is matterless, as he will be able to alter and correct same by the experienced use of his conditioners? What is required, then, is some test that will accurately give him the percentage of gluten or protein in the wheat that he is able to obtain. Users of the protein test will agree that the test can be made to yield this desired information in a most reliable and accurate manner, as the question of the personal factor does not enter into the test as it does in such an operation as washing out glutens. Unfortunately, the test can really only be carried out by a chemist with suitable apparatus and facilities; probably this is the reason the test is not so popular in this country as it is in America. The knowledge gained, as will be shown later, will, however, materially help financially towards a chemist's remuneration and make the proposition well worthy of serious consideration by all millers, large or small.

He makes a comparison of the amount of protein in Australian wheat, which is as follows:—

District	Range of protein
Queensland..	11.6 to 12.8
New South Wales..	9.8 to 12.3
Western..	9.5 to 10.9
Victoria..	9.2 to 10.5
Southern..	8.2 to 10.8

It will be seen that the overlap on the last three is sufficient to make it impossible to separate them and yet shows that all three are capable of containing wheats of comparatively high protein content.

Then, there is a description of two blends used by the British miller that I think perhaps will be of interest:

Suppose the mill is running on Mixing A, which, from the protein values of the individual wheats and subsequent results, gives a sufficient quantity of protein in the particular class of flour being milled. The Australian (Southern) in use is to be followed by a better Australian (Queensland) of higher protein value. How is this to be used so as to obtain the fullest possible benefit from this extra quantity of protein? Mixing B, shows how this can be used, keeping the same relative proportions of the different types of wheat and at the same time effecting a considerable saving in cost. In the ordinary course of events, Australian would follow Australian and no change be made in the mixing, with the result that irregularities frequently occur solely through the varying quantities of protein in the mixing.

[John Millar, M.P.]

Mixing A	Parts Wheat	Protein	Price	Number of Parts ex Protein	Number of Parts ex Price
4	English.....	9.2	52/6	36.8	210/-
4	Australian (South).....	10.0	56/6	40.0	226/-
2	C. W. Karachi.....	9.0	55/6	18.0	111/-
4	No. 3 Manitoba.....	12.4	58/6	49.6	234/-
3	No. 2 Manitoba.....	13.1	60/-	39.0	180/-
8	No. 1 Manitoba.....	13.2	61/6	105.6	492/-
25				25)289.0	25)1,453/-
				11.56	58/1½

Average protein in mixing, 11.56 per cent.
Average price of mixing, 58/1½.

Mixing B	Parts Wheat	Protein	Price	Number of Parts ex Protein	Number of Parts ex Price
4	English.....	9.2	52/6	36.8	210/-
4	Australian (Queensland).....	12.0	56/6	48.0	226/-
2	C. W. Karachi.....	9.0	55/6	18.0	111/1
5	No. 4 Manitoba.....	12.0	56/6	60.0	282/6
7	No. 3 Manitoba.....	12.4	58/6	86.8	409/6
3	No. 1 Manitoba.....	13.2	61/6	39.6	184/6
25				25)289.2	25)1,423/6
				11.57	56/11½

Average protein in mixing, 11.57 per cent.
Average price of mixing, 56/11½.

The next is an extract from Bulletin No. 37 of the State of Minnesota:—
Report of Operation, State Testing Mill, Minneapolis”, which reads as follows:—

Since the percentage of crude protein as an index of the approximate gluten content of wheat, is becoming a factor of increasing importance in wheat merchandising, an effort has been made to represent graphically in Figure 2 the description of the samples examined on the basis of the crude protein content of the flour. This graph gives the results of observations of three crops, those of 1921, 1922 and 1923 respectively, and indicates that the majority of the samples examined fell in the range of 11 per cent to 13 per cent. Thus only 11 of the 60 wheat samples tested, or 18 per cent, yielded flour containing less than 11 per cent of crude protein, whereas in the case of the 1922 crop, about half the samples yielded flour containing less than 11 per cent of crude protein. As in the case of the 1922 crop, there were several samples of No. 1 northern spring wheat which contained a higher percentage of crude protein than the average of the No. 1 dark northern and the average protein content of the flour milled from the No. 1 northern wheat of both of these crops was slightly higher than that of the No. 1 dark northern spring wheat flours. This illustrates the difficulty of classifying wheats on the basis of their texture, or the percentage of dark, hard and vitreous kernels, as is attempted under the Federal Wheat Standards in assigning samples to the dark northern and northern spring sub-classes. The presumption is that the dark northern wheats will yield flour higher in percentage of crude protein than will the northern spring wheats. This has not proven to be the case in the samples examined of the last two crops. The

[John Millar, M.P.]

average loaf volume follows the average protein content in both of these crops when No. 1 dark northern and No. 1 northern spring wheat flour are contrasted, the advantage being in favour of the No. 1 northern flours in both seasons. This suggests that careful consideration should be given to the possibility of classifying wheat on the basis of protein content rather than on the basis of the less tangible factor of the percentage of dark, hard and vitreous kernels, since the crude protein is determined with far greater precision and is probably more definitely related to baking strength than is the kernel texture.

Then, an extract from the "American Miller" of March 1, 1928:—

If there is anything that will stimulate wheat culture with the object to be attained, a larger percentage of protein, it is the fact that acceptable to bakers, resulting in an active competition among millers for wheat of high protein content, and a high price for choice wheats; a premium of 50 cents per bushel is now being paid over the May option. An increase in protein has been accomplished by the use of certain plant foods in plants grown side by side, one treated and one untreated, their experiments will continue and it is hoped result in a success commercially.

I have forgotten where that "American Miller" is printed, but I think it is Minneapolis.

Next, I quote from a letter from the United States Department of Agriculture, the Bureau of Agricultural Economics, Chicago:—

Practically all wheat sold and purchased in this country is marketed by grade. In recent years, however, there has been a demand created for bread wheat of high protein content which usually commands a premium over wheat of average protein content. That the producer or country shipper may take advantage of these premiums, they are having the protein determined upon arrival of the wheat at terminal markets before the grain is offered for sale. Laboratories to perform this service have been established by private concerns, boards of trade and in one instance by a state grain inspection department. Charges for making these tests range from 65 cents to \$1. (In Kansas City, Missouri, the laboratories can make 3,000 tests per day.) In the Hard Red Winter and Hard Red Spring wheats, those containing less than 11.0 per cent protein usually bring the average daily market price for their numerical grades; for wheats containing above 11.0 per cent protein the premiums for each $\frac{1}{4}$ per cent will range from one to two and one-half cents per bushel. The protein content is not shown on the inspection certificate but is shown on a separate certificate issued by the laboratory making the test.

An excerpt from "The Food Research Institute, Stanford University, California, February, 1926."

Nevertheless, all things considered, the amount of gluten that is, of protein, seems in the light of the present-day knowledge to be the nearest approach to an ideal index of baking strength available. The baker who depends upon it alone will now and then be deceived. If, however, he knows the variety and place of origin of the wheat from which the flour is milled, he will often be misled.

A later letter from "The National Testing Laboratories, Limited" of Winnipeg. It is dated 11th April, 1928, and is in response to a letter from me.

We have your letter of the 31st ultimo inquiring as to the staff necessary to make 2,400 protein tests in twenty-four hours.

[John Millar, M.P.]

Since your letter came in we have given considerable thought to the matter. We may say that we have never contemplated turning out work on this scale and such information as regards to the men and output as we can give you is very largely theoretical. We understand that in the Government Laboratories in Kansas City and Omaha they handle protein work on a very large scale and they would probably be able to furnish fairly accurate information as to costs where a large number of protein tests have to be run off in twenty-four hours. However, the following information may be some guide to you.

We figure that it would require three 8 hour shifts of thirty men and thirty-six boys each to handle the actual work in the laboratory. With a proper layout each of these shifts would be able to handle 800 samples. There would require to be at least two supervisors for each shift. Men to do this class of work would probably have to be paid at the rate of \$6 per day and the boys \$2 per day; the supervisors \$7.50 per day. In addition to this there would require to be two men continually making up and standardizing solutions. The rate of pay for these men would have to be the same as for the supervisors.

This makes a total of approximately \$400 in wages for twenty-four hours and would be equivalent to 17 cents per sample.

In handling the above quantity of work the following chemicals would be used by each of the three shifts in a day:—

Sulphuric acid, 50 pounds.	Boric acid, $\frac{1}{2}$ pound.
Sodium Sulphate, $4\frac{1}{2}$ pounds.	Indicator, $\frac{1}{2}$ gram.
Copper sulphate, $1\frac{1}{2}$ ounces.	Standard acid, $1\frac{1}{2}$ gallons.
Mercuric sulphate, $\frac{1}{3}$ pound.	Distilled water, 15 gallons.
Sodium hydrate, 36 pounds.	Gas for heating.
Sodium sulphide, 1 pound.	

The total cost of chemicals (Winnipeg prices) and gas for heating on the basis of 2,400 samples would be approximately \$272 or 11.3 cents per sample.

Another expense that would have to be considered is breakages of glassware. This might come as high as \$200 per day or approximately 8 cents per sample.

We have assumed that to handle the work a special laboratory with all labour-saving devices available would be necessary. The cost of equipping this laboratory would be in the neighbourhood of \$10,000 and the rent for same would probably be \$1,200 per year.

The office work, etc., in connection with handling 2,400 tests per day could probably be done by six girls at an approximate cost of \$15 per day.

Another factor that would have to be taken into consideration is that the work would be seasonable and probably not last for more than four months in the year. We have only figured on carrying the staff for this period of time. It might be necessary to carry some of them a full year.

Here is one that I missed:—

By Mr. Fansher (Last Mountain):

Q. The cost, according to that letter, would be a little less than 30 cents per sample?—A. Did you take breakages into consideration? I have just one other excerpt to read. This is largely to indicate what they are doing in the United States in connection with this work. This is from the Grain Dealers Journal, Chicago, March 10, 1925.

[John Millar, M.P.]

The present value of hard wheat is being controlled by the percentage of protein, very much the same as the value of milk and cream is controlled by the percentage of butter fat, says H. M. Bainer, Director, the Southwestern Wheat Improvement Association. Wheat that produces the best grades of flour must contain from 12 to 12½ per cent protein. But when we stop to consider that the bulk of our wheat contains less than 12 per cent, we can readily understand why high protein wheat must sell at a premium.

General run wheat contains from 9 to 12 per cent protein. The miller, in order to maintain his best grades of flour, is compelled to purchase considerable quantity of higher than 12 per cent protein wheat to bring up his average to 12 per cent or more. And it often happens that the miller is not able to secure enough of this high protein wheat at home and is forced to ship some of it in from the outside. The premium now being paid for high protein wheat runs from about 7 cents a bushel for 12 per cent protein to 18 cents a bushel for 14 per cent protein.

Witness retired.

The Committee adjourned.

RANGE OF PROTEIN CONTENT

The highest protein content of a sample of sound wheat tested in this laboratory was 17.5 per cent and the lowest 8 per cent. Other laboratories have reported as high as 22 per cent and as low as 7 per cent.

"STRENGTH" IN WHEAT AND FLOUR

The "strength" of a flour or wheat is closely related to the amount of protein it contains. One cannot expect equal strength from all samples of equal protein content since the quality must also be considered. There is a general increase in loaf volume as the protein content increases until a certain maximum is reached. This maximum is about 15 per cent. Many samples having a very high protein content are lower in strength than those having a medium content. This is probably due to differences in the composition of the protein.

PRODUCTIONS

Filed by Witness F. J. Birchard:

PROTEIN TESTS BY INSPECTION DEPARTMENTS IN THE UNITED STATES

The Protein Test is in addition to the Federal Grade and is now offered at the following Inspection offices:—

Oregon, Kansas City, Hutchison, Kansas, Wicheta, Great Falls, Montana, Omaha, Sioux City, Iowa, Minneapolis, Duluth, Superior, Wis., Bozeman, Montana.

DEGREE OF ACCURACY

It has been shown that when a car is carefully sampled the tests on duplicate samplings in over 90 per cent of the cases agree with 0.2 per cent or less. The range between the highest and lowest percentage found by different laboratories on the same sample of wheat should not be more than 0.21 per cent and the variation from the average not more than 0.1 per cent.

FACTORS WHICH INFLUENCE PROTEIN CONTENT OF SOUND WHEAT

The type and quality of wheat which may be purchased in any given agricultural area is determined largely by climatic conditions. The two factors of greatest significance are temperature and rainfall—and to a lesser extent soil fertility. Wheat grown on scrub land is almost always low in protein. It has also been observed that the protein content is least under the best conditions of growth, diminishing with either an increase or decrease in moisture from this point. Hot weather early in the growing season, and a short ripening period (preventing the transference of starch to the kernel) is also conducive to the production of high protein wheat.

PROTEIN AND COLOUR OF GRAIN

A low percentage of dark vitreous kernels or a high percentage of light spotted starchy kernels indicates *low* protein. A high percentage of dark kernels does not necessarily indicate high protein content—a laboratory test is the only true index of protein or gluten content.

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“STRENGTH” IN WHEAT AND FLOUR

The “Strength” of a flour or wheat is closely related to the amount of protein it contains. One cannot expect equal strength from all samples of equal protein content since the quality must also be considered. There is a general increase in load volume as the protein content increases until a certain maximum is reached. This maximum is about 15 per cent. Many samples having a very high protein content are lower in strength than those having a medium content. This is probably due to differences in the composition of the protein.

GLUTEN AND PROTEIN

When a dough is made from flour and water, allowed to stand under water for some time and then washed with running water a rubbery elastic mass is obtained known as wet gluten, when dried in the oven it is designated dry gluten. This gluten is closely related to protein, but is not pure protein since it contains about 80 per cent protein matter and the rest 15 per cent starch, fat and mineral matter. The baking strength of a flour is dependent on the amount of gluten in the same way as it is on the protein but it is much easier to obtain accurate protein results than it is to wash out the gluten. Consequently protein tests are now made almost universally where accuracy is required.

RELATION BETWEEN PROTEIN AND GRADES

Dark hard vitreous kernels contain more protein than light coloured soft starchy kernels. Consequently other things being equal, No. 1 hard will be higher in protein than No. 1, No. 1 higher than No. 2 and No. 2 higher than No. 3. Owing to the fact that frosted and green kernels often contain more crude protein than sound mature wheat, the lower grades frequently show a higher percentage of crude protein than the contract grades. Light bran frost such as is found in No. 3 does not affect the protein content except possibly to a very slight degree. Analysis shows that dark green immature kernels and heavily frosted kernels picked out of the same car of wheat contain about 1.5 to 2 per cent more than the sound kernels. Also kernels which have been subject to very early frost so that the shape of the kernel is badly affected, contain even higher percentages as compared with the sound kernels (3.2 per cent more in one instance).

PERMANENT STAFF REQUIRED AT WINNIPEG (ESTIMATED)

2 Chemists at \$3,000 per annum..	\$ 6,000
5 Chemists at \$2,000 per annum..	10,000
2 Cleaners at \$750 per annum..	1,500
2 Clerks at \$1,600 per annum..	3,200
2 Typists at \$1,000 per annum..	2,000

The remaining staff could possibly be dispensed with four or five months of the year.

The cost per test on the whole crop would probably be covered by thirty-five—forty cents (not more than fifty cents).

(Signed) F. J. BIRCHARD.

F. W. G. BIRCHARD, Esq.
 Secretary, Liverpool Corn Trade Association, 9 Brunswick St., Liverpool,
 England.

Dear Sir—
 No. 3 Northern Manitoba Wheat shipped per the ss. Alberta.
 With further reference to your letter of November 4th re the above ship-
 ment, I would advise you that the Chief Commissioner has discussed the

PRODUCTIONS FROM THE FILES OF THE DEPARTMENT OF TRADE
AND COMMERCE

The Secretary,
Board of Grain Commissioners for Canada,
Fort William, Ont., Canada.

November 4, 1927.

DEAR SIR,—

No. 3 Northern Manitoba Wheat shipped per the ss. Albertic

On the arrival of the above vessel from Montreal in Liverpool on the 31st October, Messrs. Josh. Appleby & Sons, Ltd., made a complaint with regard to two loads (8,000 bushels each) of wheat which they had received out of No. 2 Hold bottom and No. 1 Hold.

The Official Sampler of the Association went down to the dock and drew a sample from the barge *Bert Foster* into which Messrs. Appleby's wheat had just been discharged from the *Albertic*. Three of my Directors have examined the sample in the Arbitration Room here and are certain that a grave blunder has been made,—probably by the servants of the Harbour Commissioners at Montreal.

I am sending you a part of the sample so that you may see for yourself. The delivery, even in a year of inferior wheat, is exceptionally bad and should not have been covered by any certificate for this grade issued under your authority.

I cabled you to-day as undernoted and shall be glad if you will make an immediate investigation. Messrs. Appleby are entitled to full reparation which they estimate at three shillings per quarter of 480 pounds.

It is curious that the Certificates (copies of which I send you herewith) were dated at Winnipeg on the 17th October and were endorsed at Montreal only *two days* afterwards,—on the 19th October.

I shall be glad to hear from you as soon as possible.

Yours faithfully,

(Sgd.) F. W. G. URQUHART,

Secretary.

COPY OF CABLEGRAM

Serious complaints regarding Manitoba three Northern graded Winnipeg Certificates 15719 and 15720 transferred Montreal from Monroe C. Smith account Richardson to two hold bottom and one hold Albertic nineteenth October Stop. Request you obtain loading sample investigate immediately feel certain serious blunder Stop Writing fully with delivery sample.

CORNUCOPIA

BOARD OF GRAIN COMMISSIONERS FOR CANADA

FORT WILLIAM, Ont.,

January 12, 1928.

F. W. G. URQUHART, Esq.,

File 1243-A.

Secretary, Liverpool Corn Trade Association, 9 Brunswick St., Liverpool,
England.

DEAR SIR,—

No. 3 Northern Manitoba Wheat shipped per the ss. Albertic

With further reference to your letter of November 4th *re* the above shipment, I would advise you that the Chief Commissioner has discussed the cir-

cumstances in connection with this matter with your representatives of the Montreal Harbour Commissioners and Messrs. Jas. Richardson & Sons of Montreal.

The sample forwarded by you which was taken from the barge Bert Foster was also referred to Mr. J. D. Fraser, Dominion Chief Grain Inspector at Winnipeg, who compared this with the sample taken at the time the *Albertic* was loaded at Montreal, and Mr. Fraser reports to the Board that both samples are correctly graded as 3 Northern Wheat, and in both cases the wheat is similar to the crop of 1926. He admits that both samples have the appearance of being composed almost wholly of artificially dried wheat, both being badly bleached. The only difference between the sample forwarded by you and the one taken at Montreal is that the former contains $2\frac{1}{2}$ per cent of broken wheat, no doubt due to the breaking of the wheat through handling, while the Montreal sample is clean.

The Chief Inspector is satisfied however, that the wheat shipped on the ss. *Albertic* was No. 3 Northern.

With regard to the certificates which were received with this shipment being endorsed by the Montreal Harbour Commission as representing wheat certificated as being loaded at Fort William on October 17, it would appear from investigation made by the Chief Commissioner that the wheat in question was sold to the receivers on the 18th October and loaded on the 19th. The reasons why the certificates in question were forwarded was that Jas. Richardson & Sons did not have sufficient wheat in store in Montreal to fill this sale, but on making enquiries, found that a sufficient quantity of No. 3 Northern to complete the contract was in store in the Harbour Commissioners' Elevator. The shippers therefore arranged for ocean tonnage and as the contract called for delivery in the last half of October, the oldest certificates were applied against the shipment, as Messrs. Jas. Richardson at that time had large quantities of grain moving from Fort William to Montreal. If Jas. Richardson & Sons had not been able to obtain No. 3 Northern wheat which was in store in the Harbour Commissioners' elevator, great difficulty might have been experienced in fulfilling this contract for delivery in the last half of October.

During the rush movement of grain in the early part of the season, it was impossible to avoid this exchange of certificates and, while it is unusual to tender certificates covering grain which has not actually been received into the elevator, it is a practice which is difficult to overcome, particularly at the end of one crop season and at the beginning of the next.

The Board would point out that the certificates in question called for No. 3 Northern wheat, but, according to information furnished the Chief Commissioner, no stipulation was made in the contract that this shipment should consist of new crop wheat and as the samples in question had been determined as 3 Northern by the Board's Chief Inspector, the Board, under the circumstances, regrets that it cannot demand any compromise from the shippers in this case.

The Board also directs me to suggest that, if the receivers wish to purchase old or new crop wheat, it should be stipulated in any contracts which they may enter into, particularly during the early part of the movement of our crop.

Yours truly,

(Sgd.) F. J. RATHBONE,

Secretary.

February 15, 1928.

F. J. RATHBONE, Esq.,
Secretary, Board of Grain Commissioners for Canada,
Fort William, Ontario, Canada.

DEAR SIR,—

The Grading of Canadian Grain, No. 3 Northern Manitoba Wheat shipped per the ss. Albertic

I am instructed to acknowledge receipt of your letter of the 12th January.

My Directors thank the Chief Commissioner and the Chief Grain Inspector at Winnipeg, for making an investigation into this complaint, but are very clearly of opinion that it reveals a most unsatisfactory state of matters.

In the case of the *Albertic* the Grading Certificates stated that the 16,000 bushels of No. 3 Northern Manitoba Wheat had been inspected at Fort William on the 17th of October and shipped at Montreal two days later—a manifest impossibility—and the report to the Board of Commissioners admits that these Certificates were used to cover another parcel of wheat altogether and that the samples “have the appearance of being composed almost wholly of artificially dried wheat” and are “badly bleached”.

It is made perfectly clear from your letter that the Certificates were inaccurate. They are, in point of fact, untruthful and unreliable.

As regards your comments on the samples, it is not the experience of the Grain Trade here that wheat is broken to the extent of $2\frac{1}{2}$ per cent between the time of loading at Montreal and discharge at Liverpool, including both operations.

My Directors are sure that the British Grain Trade are not aware that a Government Certificate, in itself so utterly misleading, could be put to official use and they do not think that persons familiar at first hand with Canadian conditions, contemplate that any Certificate could be granted under the circumstances which you mention in your letter. In support of this view, perhaps I might say here that when Miss Cora Hind, the Commercial and Agricultural Editor of the “Manitoba Free Press” was in Liverpool recently, she expressed the view that the Certificates in question could only have been made out in error. However, the Certificates were issued, with the result that the British Miller who was unfortunate enough to have had this shipment foisted upon him, has lost a substantial sum of money. It is clearly the duty of this Association to inform the other Corn Trade Associations and the British Millers of what has occurred.

There is no doubt whatever that, during the last two years—1926-27 and 1927-28 (so far as the latter has gone), there has been a very serious deterioration in the quality and condition of Canadian Wheat Shipments, especially in respect of Manitoba Wheat Grade No. 3 Northern and my Directors cannot accept the explanation that the weather has been entirely responsible for the poor quality of wheat received in this Country and on the Continent.

It is quite apparent that the Standard Sample of No. 3 Northern Manitoba Wheat 1927 is greatly inferior to the relative Standard for 1925. My Directors submit that to try to maintain a regularity of Standard from year to year is essential and, if Canada has an inferior crop, that it ought to be graded accordingly.

It must be kept in mind that a great many shipments are arranged months before the Government Grain Grades are received in this Country,—the Buyers relying upon the Standards being fairly fixed, when they come to be made up consequently. What has been happening is that not only have the grades been lowered but the shipments, in many cases, have been inferior even to the lowered Standard. The *Albertic* shipment is an instance of this and the Buyers are, in

all justice, entitled to compensation. Their claim is for three shillings per quarter of 480 lbs., and my Board think that they are only asking for what is reasonable.

No doubt Canada has evolved an efficient method of dealing with the immense crop of cereals, but my Board submit that the present system is not necessarily perfect and that it requires revision and improvement from time to time. And the worst feature of the present system is that, when mistakes have been made, no method of redress is provided under the present Grain Acts. Obviously this is not only unjust but is, my Board submit, commercially unsound in Canada's own interest for the reasons after stated.

Canada is in the fortunate position just now of having not very many serious rivals in the World's Wheat markets—her most powerful competitor, Russia, owing to the form of Government at present ruling there, being almost entirely out of the picture, in the meantime, but it must be remembered that Canada *has* other competitors—Argentina in particular, and that the Russian Trade will revive in course of time. Wheat from the River Plate is sold subject to a contract mutually agreed on between Buyers and Sellers, whereby the Buyer has full redress when he can prove that he has suffered damage from inferiority of quality, condition or weight. And other Countries who are exporters of Grain (even Russia when she *does* export) offer conditions which are perfectly fair to both Seller and Buyer.

Canada has chosen to appoint judges under her Acts of Parliament, to determine the quality of her exportable wheat, and from the decision of these judges, there is, under the present Acts, no appeal. My Directors think that this is a mistake, the provisions of these Acts must be so framed that commercial men may be able to put their trust in them explicitly, otherwise the Country which seeks to enforce these Acts will suffer in the long run.

Our merchants and millers have, during the last year or two, lost a not inconsiderable sum of money owing to their having trusted in the value and independence of Canadian Government Grain Certificates, and if their confidence is not to be further shaken, my Directors state, emphatically, that it will be well for Canada to review her Grading System and to abolish its obvious faults.

As this letter goes far beyond the particular complaint regarding the *Albertic* shipment, and as the matter is of such grave importance, my Directors have instructed me to send a copy to the Prime Minister of Canada, in the hope that the Government will take immediate steps to make alterations which will meet the views of Canada's best customer for her exportable wheat and at the same time be approved by her wheat producers, millers, and merchants.

Yours faithfully,

(Sgd.) F. W. G. URQUHART,
Secretary.

THE LIVERPOOL CORN TRADE ASSOCIATION LTD.

9 BRUNSWICK ST., LIVERPOOL, February 15, 1928.

The Rt. Hon. WM. L. MACKENZIE KING, C.M.G., LL.D.,
Prime Minister of Canada,
Ottawa, Ontario.

The Grading of Canadian Grain

SIR,—I am instructed by my Directors, with great respect, to call your attention to the unsatisfactory grading of Canadian grain of this and the preceding crop.

The Representatives of the Board of Grain Commissioners were in England last summer, and my association, with other U.K. grain trade associations, put

before them the views of the trade and tabulated certain suggestions which the merchants and millers here thought would improve the present system and help to minimize, if not to eliminate entirely, complaints in the future. Since their visit, my Directors have been in communication with the Board of Grain Commissioners again with reference to certain shipments where the quality of the wheat was distinctly inferior to the Government standards.

My Directors wish to assure you that they do not forward any complaints until they have very carefully examined the shipments and are fully convinced that the receivers are justified in making them. They have refused to interest themselves in many instances where they have found, on investigation, that the complaints, though far from frivolous, were not sufficiently serious to call for action on their part. In years gone by, complaints were few and far between, but since the autumn of 1926 they have been very numerous, and the confidence which the trade used to place in Canadian Certificates has been badly shaken. My Directors find that the whole U.K. and continental markets are becoming very dissatisfied with the arrivals of wheat under "Certificate Final" and unless matters improve they are quite certain that there will be a strong agitation to discontinue this method of trading and to insist upon buying on Standard Samples in the same way as trade is done with other countries, such as the Argentine and Australia.

The methods of handling and the system of grading of Canadian grain are so important to Canada and to this country that my Directors think it well to let you have a copy of certain recent correspondence which has taken place between themselves and the Board of Grain Commissioners, Fort William, arising primarily out of a shipment of wheat, which had been certificated as No. 3 Northern Manitoba, received in Liverpool ex ss. *Albertic*. I therefore enclose copies of the following:—

Letter dated November 4, 1927, to the Board of Grain Commissioners; their reply, dated 12th January, 1928, and further letter to the Commissioners which deals, not only with the *Albertic* wheat, but also with the subject of the grading of Canadian grain in general. The date of this last letter is 15th February, 1928.

In the case of the *Albertic* the Grading Certificates stated that the 16,000 bushels of No. 3 Northern Manitoba wheat had been inspected at Fort William on the 17th of October and shipped at Montreal two days later,—a manifest impossibility, and the reply from the Board of Commissioners admits that these Certificates were used to cover another parcel of wheat altogether.

My Directors most respectfully request that, in view of the importance of the questions which they are raising, your Government will take prompt steps to make an investigation which will lead, my Board hopes, to alterations being made on the present statutes, with a view to meeting the constructive criticisms of the grain and milling trade in this country and which, at the same time, will be approved by the great majority of farmers, millers and merchants in Canada, who are, of course, just as much concerned in this matter, as sellers, as the merchants and millers here are, as buyers.

I have the honour to be, sir,

Your obedient servant,

(Sgd.) F. W. G. URQUHART,

Secretary.

OTTAWA, March 2, 1928.

F. W. G. URQUHART, Esq.,
Secretary, the Liverpool Corn Trade Association, Ltd.,
9 Brunswick Street, Liverpool, England.

DEAR SIR,—I am directed by the Prime Minister to acknowledge your letter of February 15, with reference to the grading of Canadian grain, and to say that Mr. King has been pleased to refer your representations to the Minister of Agriculture and the Minister of Trade and Commerce for their consideration.

Yours faithfully,
Secretary to President of the Privy Council.

PRODUCTIONS: FILED BY WITNESS L. H. NEWMAN

GARNET WHEAT TO DATE

(Experimental Farms Note)

In a bulletin entitled "Garnet Wheat" published by the Dominion Department of Agriculture, Ottawa, in the early part of 1927, fairly complete data were submitted regarding the field performance, as well as the baking value of this new variety, as judged by its behaviour up to and including the crop year of 1926. On the basis of this data it was concluded that Garnet is entitled to be classed as an early maturing, high yielding wheat of fair strength of straw, good weight per bushel and excellent colour of grain. In milling and baking qualities there did not appear to be any very significant difference between this variety and Marquis, except in colour of flour and crumb. In this respect Marquis gave a whiter colour than did Garnet.

As regards rust resistance, Garnet did not display any particular ability to resist those physiological forms of stem rust to which it was subjected at the Rust Laboratory at Winnipeg, nor did it demonstrate its ability to cope with rust successfully under field conditions. The fact that it matured from a week to ten days ahead of Marquis, however, created a hope on the part of the authors that the variety might be of value in rust areas by partially escaping this disease owing to its ability to mature early.

RESULTS IN 1927

In 1927 Garnet was subjected to still more comprehensive and exacting tests, the results of which confirm to a remarkable degree the conclusions summarized in the bulletin above referred to.

As regards yield, Garnet undoubtedly is entitled to rank among the most productive of our common wheat varieties, especially in districts for which it is adapted. In Alberta and in parts of northern Saskatchewan particularly, some astonishing yields have been recorded, but in districts suffering from stem rust, results have been much less encouraging. It would appear in fact that while this variety may frequently escape rust by reason of its early maturity, it is not sufficiently safe to grow in districts liable to rust epidemics.

In weight per measured bushel Garnet again has averaged slightly higher than Marquis in spite of the fact that the kernel has been smaller in most cases. The difference however, can hardly be regarded as significant.

In percentage of flour extracted from a given quantity of wheat Garnet has lightly excelled Marquis, although here again the difference is not great enough to be significant.

In hardness of kernel Garnet undoubtedly is inclined to produce a more vitreous kernel than is Marquis and appears also to hold its colour better under adverse weather conditions. In districts where Marquis is inclined to produce starchy or "piebald" kernels Garnet appears capable of producing grain of better quality in most cases. This would suggest that in such districts a higher grade of grain in general, may result from the use of Garnet.

BAKING QUALITIES

Baking tests conducted by the Cereal Division at Ottawa and elsewhere during the past season have given results which compare closely with those recorded in the original bulletin. These results indicate that the chief point in which there appears to be any significant difference between Marquis and Garnet is in colour of flour and crumb.

In spite of the fact that practically all of the large Canadian as well as Old Country mills employ various ageing or "maturing" processes which also whiten the flour, our Canadian millers appear to have a rather strong prejudice against any variety which produces flour less white than Marquis. While the interest of millers in this country must receive every consideration, yet the fact that so large a proportion of our annual wheat crop (60 to 65 per cent) is exported, the attitude of our Old Country and foreign customers should occupy an important place in determining the question as to how far Garnet should be encouraged in this country.

In order to obtain this information two different shipments of flour have been made to England during the past fifteen months. One of these shipments went to Dr. A. E. Humphries, c/o Coxes Lock Milling Co., Ltd., Addleston Station, England, while the other was consigned to Mr. J. M. Reid a large flour importer of Liverpool.

Report from Dr. Humphries:

Dr. Humphries who, through his long association with the National Association of British and Irish Millers and Bakers is eminently able to pronounce upon matters of this kind, submitted a most exhaustive report covering all of the various points which have any bearing upon the question of quality in flour and bread. The flour consigned to Dr. Humphries consisted of 280 pounds of unbleached material from Garnet and a similar quantity from Marquis, both lots having come from flour grown on the Dominion Experimental Station at Rosthern, Sask., in 1926.

Dr. Humphries has summarized his report in the following words: "Apart from the point of colour of flour and bread the differences I have found are small, sometimes in favour of one variety, sometimes in favour of the other, and seeing that the bleaching of flour is so generally practiced in all important countries where the two varieties are likely to be used, I am of the opinion that Garnet, inasmuch as it seems to favour the interests of the producer, can be recommended, at any rate in those parts of the Dominion where its virtues will be appreciated by the producer."

Report from Mr. Reid:

The shipment to Mr. Reid consisted of 600 pounds of flour obtained from Garnet and a similar quantity obtained from Marquis. Both wheats were produced in 1927 on the Experimental Station at Scott, Sask., and both were entitled to receive the same commercial grade, namely, No. 2 Northern.

Both wheats were ground by the same mill and under the immediate supervision of a representative of the Cereal Division, Experimental Farm, Ottawa.

Mr. Reid, co-operating with Mr. Harry Scott, Canadian Trade Commissioner at the Port of Liverpool, had these two flours tested and baked by three different baking concerns in Liverpool. These people subjected the flours to a critical test and submitted a detailed report as to the relative behaviour of the two varieties. According to these reports both varieties displayed the "high strength and stability of gluten" for which Canadian wheats generally are especially valued. Only one of the three bakers made any discrimination between the two varieties from the standpoint of colour of flour or bread. In the opinion of this particular firm the flour of Garnet was considered to be worth one shilling per 280 pounds of flour more than the flour of Marquis on account of colour of "bloom."

GENERAL CONCLUSIONS

In districts where Garnet for any reason is likely to produce grain of a higher commercial grade than are varieties such as Marquis, the former variety should be given a very thorough trial. From data thus far collected it seems safe to conclude that Garnet is not only a very early maturing variety but it is also inherently high yielder, almost equalling and sometimes excelling even Marquis in productivity.

As regards the various points which constitute milling and baking quality, Marquis and Garnet do not appear to differ to any appreciable extent except in colour of flour, in which respect Marquis is characterized by a whiter flour than is Garnet.

While Canadian millers discount Garnet at present on account of flour colour, the English miller and baker do not appear to regard the creamy shade of this variety as objectionable in view of the fact that Canadian wheats are always blended with English and other wheats and are valued primarily on account of the strength and stability of their gluten.

The precocity of Garnet, coupled with its productivity, bids fair to have an effect on the quality of Canadian wheat in a way not fully appreciated by those who, just now, are disposed to discourage the propagation of this variety in Western Canada.

Recent analyses by the Cereal Division, of overseas shipments confirms previous observations to the effect that certain old varieties of poor or mediocre quality and which were introduced years ago on account chiefly of their relative earliness of maturity, still persist to a greater or lesser extent in many districts. Such varieties as Preston, Stanley, Huron, Percy, Club and even Ladoga, as well as all sorts of combinations between these varieties and between these and later introductions such as Marquis and Ruby, with which they have become mechanically mixed, are most in evidence, and are most deserving of condemnation. The introduction of a variety such as Garnet which attracts immediate attention by reason of the remarkable degree to which it combines quick maturity with high yield is destined to have the effect of purging great sections of our finest wheat growing lands, of these discredited varieties and mixtures and to this extent should reduce the difficulties which at present confront the official graders of our commercial grain.

L. H. NEWMAN,
Dominion Cerealist.

ANALYSIS OF WHEATS: SAMPLES OF STANDARD GRADES No. 1, No. 2 AND No. 3 AND OF SHIPMENTS COLLECTED AT LIVERPOOL

No.	Designation	Loss on Cleaning	Weight per Bushel	Crude Protein	Flour Extracted	Absorption	Loaf Weight	Loaf Volume	Crumb Texture	Crumb Colour	Remarks
		%	lbs.	x %	%	x %	x gms.	x c.c	%	%	
287	No. 1. SS. "Mississippi," 1926.....	1.7	62.0	13.9	72.1	66.9	503	1,981	99	98	Excellent doughs.
288	No. 2. SS. "American Trader," 1926.	1.8	62.2	13.2	71.5	66.4	501	2,160	99	98	" "
289	No. 3. SS. "Minnewaska," 1926.....	2.3	60.8	13.0	72.4	65.8	494	2,361	93	88	gr. " "
	No. 1. W.G.S.B., 1926.....	2.0	62.6	14.1	71.3	66.5	505	2,135	98	98	" "
	No. 2. W.G.S.B., 1926.....	2.4	61.2	14.1	70.7	65.6	502	2,150	98	96	" "
	No. 3. W.G.S.B., 1926.....	2.7	60.0	13.5	70.5	64.1	494	2,109	96	94	" "

x On 13.5 moisture basis.

Protein determinations made by Chemical Division.

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