Canada. Parl. Senate. Standing Comm.on Natural Resources, 1947.

1947 SESSION

THE SENATE OF CANADA

PROCEEDINGS

OF THE

STANDING COMMITTEE

ON

NATURAL RESOURCES

ON

THE SUBJECT MATTER OF A MOTION BY THE HONOURABLE SENATOR McDONALD (*KINGS*) WITH RESPECT TO CHEMICAL FERTILIZERS

WEDNESDAY, JULY 9, 1947

WITNESSES:

W. B. Timm, Director, Mines and Geology Branch, Dept. of Mines and Resources.
M. F. Goudge, Mineral Resources Division, Dept. of Mines and Resources.
L. H. Cole, Mineral Resources Division, Dept. of Mines and Resources.
G. S. Peart, Department of Agriculture.

OTTAWA
EDMOND CLOUTIER, C.M.G., B.A., L.Ph.,
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
CONTROLLER OF STATIONERY
1947

STANDING COMMITTEE ON NATURAL RESOURCES

The Honourable J. J. DONNELLY, Chairman

The Honourable Senators

Beaubien *(St. Jean Baptiste)*	Horner	Pirie
Bouffard	Hurtubise	Raymond
Burchill	Johnston	Riley
Crerar	Jones	Robicheau
Davies	Kinley	Sinclair
Dessureault	Lesage	Stevenson
Donnelly	McDonald *(Kings)*	Sutherland
Duffus	McGeer	Taylor
Dupuis	McIntyre	Turgeon
Ferland	McLean	Vaillancourt
Hayden	Nicol	White (34)
	Paterson	

ORDER OF REFERENCE

EXTRACT from the Minutes of the Proceedings of the Senate, Wednesday, July 2, 1947.

Pursuant to the Order of the Day, the Senate resumed the adjourned debate on the Motion by the Honourable Senator McDonald (*Kings*):

That, in view of the recent discoveries of high-grade phosphate rock in the Saguenay area in the province of Quebec, and of good quality potash in the province of Saskatchewan, the Dominion and Provincial governments confer with a view to taking prompt action to have mines developed in order to make available to our farmers, at fair prices, these high-grade chemicals, which are necessary in building up soils, and in the production of maximum crops, so that Canada may be self-sufficient so far as requirements of chemical fertilizers are concerned.

After further debate, and—

On Motion, it was—

Ordered, that the subject matter of the said Motion be referred to the Standing Committee on Natural Resources.

L. C. MOYER,
Clerk of the Senate.

93141—1½

REPORT OF THE COMMITTEE

WEDNESDAY, July 9, 1947.

The Standing Committee on Natural Resources have in obedience to the order of reference of 2nd July, 1947, considered the subject matter of the following Motion moved in the Senate by the Honourable Senator McDonald (*Kings*):—

> That, in view of the recent discoveries of high-grade phosphate rock in the Saguenay area in the province of Quebec, and of good quality potash in the province of Saskatchewan, the Dominion and Provincial governments confer with a view to taking prompt action to have mines developed in order to make available to our farmers, at fair prices, these high-grade chemicals, which are necessary in building up soils, and in the production of maximum crops, so that Canada may be self-sufficient so far as requirements of chemical fertilizers are concerned.

and now beg leave to report thereon as follows:—

1. The Committee heard and examined the following witnesses:—

   W. B. Timm, Director, Mines and Geology Branch, Department of Mines and Resources.

   G. S. Peart, Administrator, Fertilizers and Pesticides, Department of Agriculture.

   M. F. Goudge, Mineral Resources Division, Department of Mines and Resources.

   L. H. Cole, Mineral Resources Division, Department of Mines and Resources.

2. The Committee are in entire agreement with the terms of the Motion and beg to recommend that co-operative steps be taken by the proper Federal and Provincial authorities to continue the investigations into the possibilities of developing on a commercial scale the discoveries already made.

3. A copy of the evidence of the witnesses is appended hereto.

4. The Committee recommended that authority be granted for the printing of 500 copies in English and 200 copies in French of the proceedings of the Committee on the said subject matter; and that Rule 100 be suspended insofar as it relates to the said printing.

All which is respectfully submitted.

J. J. DONNELLY,
Chairman.

With leave of the Senate,

The said Report was adopted.

MINUTES OF EVIDENCE

THE SENATE,

OTTAWA, July 9, 1947.

The Standing Committee on Natural Resources to whom was referred the subject matter of the motion of Hon. Mr. McDonald (*Kings*) with respect to commercial fertilizers, met this day at 10.30 a.m.

Hon. Mr. DONNELLY in the Chair.

The CHAIRMAN: Gentlemen, I see a quorum. We are here as a result of a motion in the Senate by the Honourable Senator A. L. Beaubien: "Honourable senators, if I am in order I will move that the subject matter of the motion be referred to the Standing Committee on Natural Resources." Perhaps the senator would give us an idea of what he has in mind.

Hon. A. L. BEAUBIEN (*St. Jean Baptiste*): The only thing I had in mind was this, Mr. Chairman. Senator McDonald, from Nova Scotia, put a motion on the order paper for the purpose of discussing chemical fertilizers, and it left the impression with me, and I think with most members of the Senate, that this is a very important question, not only from the standpoint of production but from the point of nutrition. And I thought that, even at this late stage of the session, it would be advisable to have some information as to what is being done in these two fields of Quebec and Saskatchewan, in order to get the raw materials to produce fertilizers. I believe Hon. Mr. Crerar got in touch with the Department of Mines and Resources, to have present here somebody who would know something about these fields and would be able to give us that information this morning.

Hon. Mr. DAVIES: Is there any object in starting this investigation, which will probably necessitate several meetings of the committee, at this late date, or would it be better to postpone this inquiry and have a motion put on the order paper when we meet next session, and then start in and have a number of meetings dealing with it? I am just asking the question.

Hon. Mr. BEAUBIEN (*St. Jean Baptiste*): What I thought was this, that these officials are available; we might have one or two sittings; and whatever information we get could be taken down in shorthand and mimeographed, and at the next session of parliament the investigation might be proceeded with and we could then use the evidence which has been mimeographed, in order to guide us next year.

The CHAIRMAN: I quite agree that it is a very important matter and should be gone into very fully. Senator Vaillancourt made a very strong plea the other day that the subject should be inquired into. It is for the committee to decide on the suggestion of Senator Davies, and to determine whether we should go on at this late date in the session or not. Of course, representatives of the department are here and we could get a lot of information from them.

Hon. Mr. DUFFUS: I suggest we hear from the gentlemen who are here.

Hon. Mr. PATERSON: Certain statements have been made about cartels. I happen to have some knowledge of the development of fertilizer from Trail, British Columbia, and I do know that the Consolidated Smelters gave away plenty of samples in order to get their stuff introduced. I do not believe

that they can be accused of holding up production. Possibly we might give them the chance to defend themselves. I do not know whether they are represented here or not; but we do not want to be unfair.

Hon. Mr. BEAUBIEN: (*St. Jean Baptiste*): No, I do not think that is the intention of any honourable senator. Of course there was no such intention on my part. But we thought we should get some information with regard to these fields in Saskatchewan and Quebec which Senator Vaillancourt has mentioned, and with that in view have here gentlemen from the department. Senator Crerar, you know whom they are better than I do.

Hon. Mr. CRERAR: Since we are at the end of the session, it is impossible to go into any exhaustive inquiry on the matter of cartels and the control of fertilizer and its distribution in Canada. I would hope that our inquiry now might be a sort of preliminary inquiry which could be resumed at the beginning of next session. Then, if the committee desired to inquire into the operation of cartels, if there are any—I am myself very doubtful if there are any; I have no evidence of it—we could do so. What I, as a member of the committee, would like to get is some information from the officials of the Mines branch, and then, from officials from the Department of Agriculture, as to what available sources they have in Canada for the production of fertilizers, where those sources are located, and in that way get some information of a general character.

Hon. Mr. SINCLAIR: And what is being done to develop them.

Hon. Mr. CRERAR: Yes. Very little has been done up to the present to develop them, but our inquiries in that way will give us information. But certainly I look upon the work of this committee in the one or two sessions it can hold now—and it cannot hold more than two—as being purely preliminary, to get a start made on the subject; and then I would hope that next session we could resume more intensively, and perhaps arrive at some practical and useful conclusion.

Hon. A. L. BEAUBIEN: Mr. Chairman, I move that we hear the gentlemen that are present from the Department of Mines and Resources.

Hon. Mr. DUFFUS: I second the motion.

The motion was agreed to.

Mr. W. B. Timm, Director, Mines and Geology Branch:

The CHAIRMAN: Mr. Timm, we are anxious to hear where there are natural resources suitable for fertilizer and what the possibilities are for developing them. Would you give us a general statement on that, and the members of the committee will put questions to you?

Mr. TIMM: Mr. Chairman, I have read the Senate debates of June 19 and July 2, and I quite agree with the statements made by honourable senators that we have a problem in connection with finding raw resources in Canada to be used for the production of commercial fertilizers. So far we have not found these raw resources in economic quantities for the production of phosphate and potash fertilizers. However, there are a great many occurrences of both phosphates and potash salts in Canada, and lately there has been found in a few holes which were drilled for oil in the province of Saskatchewan, beds of potash salt at a depth of from 3,600 to around 7,000 feet.

Hon. Mr. CRERAR: Where were they located?

Mr. TIMM: These potash beds have been located in wells drilled principally for oil from near the town or village of Unity in Saskatchewan down to

the south eastern border of Saskatchewan. These various wells are located in a line that is more or less parallel to the Rocky Mountains or to the pre-cambrian contact.

I have with me here today two of my associates, Mr. M. F. Goudge, and Mr. L. H. Cole of our Mineral Resources Division of the Bureau of Mines. These gentlemen have been following the development of potash and phosphate very closely and will be able to answer any questions much better than I can. Before I sit down I might say that the Department of Mines is very interested in the problem of finding raw resources in Canada. We realize that as far as phosphates and potash salts are concerned, our supply of them comes entirely from the United States at the present time. The phosphates come mainly from Florida and Montana, and the potash from New Mexico and California.

I might say that some years ago when the Consolidated Mining and Smelting Company were looking into the question of controlling the fumes from their smelter stacks at Trail they were looking for an outlet for the sulphuric acid that would be produced from that operation, and they made a considerable search of raw materials that could be used in connection with this sulphuric acid production. In the Rocky Mountains they found phosphate beds, but these beds were of too low grade to be of economic interest. They did a tremendous amount of work, and so did we in the Bureau of Mines, in trying to beneficiate these phosphates to bring them up to grade so they could be used, but so far that has not been accomplished. As you know, the plant at Trail is importing from the state of Montana, where there are high-grade phosphate deposits.

In connection with potash, we have these recent drill holes in Saskatchewan. Potash salts have been encountered (in a few drill holes that have been put down). The shallowest depth in the holes that have shown any results so far is around 3,700 feet.

Hon. Mr. DAVIES: Is the potash there in quantity?

Mr. TIMM: We do not know. That is the problem. A great many drill holes will have to be put down before we can tell the extent of the deposit and whether we have the highest grade there.

Hon. Mr. HORNER: Do you know what depth they go in Montana?

Mr. TIMM: That is for phosphates, but now we are talking about potash.

Hon. Mr. WHITE: It would have to be a fairly substantial bed to mine profitably, would it not?

Mr. TIMM: It would have to be a substantial bed to mine profitably at a depth of 3,700 feet. I believe the beds in the state of New Mexico are much shallower, probably from 1,000 to 1,500 or 1,600 feet.

Hon. Mr. HAYDEN: How do they mine there, in open pits?

Mr. TIMM: No; they mine through a shaft; it is underground mining.

Hon. Mr. HORNER: I understand a company has been formed to operate in Saskatchewan.

Mr. TIMM: So far as I know, no company has been formed as yet. A company has been formed to operate on a couple of wells near the town of Unity, for salt. I understand that the province of Saskatchewan has reserved the rights to any potash that is in those wells.

Hon. Mr. VAILLANCOURT: Have you any information about the Buckingham area?

Mr. TIMM: As honourable members know, some years ago—I think from 1870 or so to 1892—we had a phosphate industry centered in the Gatineau district, and there were certain properties also in this eastern part of Ontario. Considerable potash was mined and produced, but these mines have not been commercial since the discovery of the Florida phosphates.

Hon. Mr. VAILLANCOURT: Can something not be done to make sure whether or not we have some phosphates or potash in Canada?

Mr. TIMM: The Department of Mines is very much interested in discovering new sources of raw materials in Canada. We are looking for them all the time. We have done considerable work on the phosphate deposits north of Ottawa, to try to bring them up to grade so that they can be used, but so far we have not succeeded in producing a phosphate to compete with the imported material from Florida.

Hon. Mr. CRERAR: These deposits here are of low grade?

Mr. TIMM: They are of low grade.

Hon. Mr. CRERAR: And you have found no way of beneficiating them?

Mr. TIMM: We have found a way of beneficating them, but even after benefication they cannot compete with the Florida phosphates. Of course, during the war small lots of phosphates were produced from the various mines here north of Ottawa and also in this eastern part of Ontario and sold to the Buckingham refinery, but it is very doubtful whether these mines will continue to produce.

Hon. Mr. VAILLANCOURT: I have here a report from the Department of Mines of Quebec saying that phosphate from Buckingham, in the Gatineau, is of very good quality.

Mr. TIMM: No question about it, the quality can be produced, but it is a matter of economics.

Hon. Mr. VAILLANCOURT: But if we develop it at the bottom, the quality is very good, and we can operate inexpensively.

Mr. TIMM: That may be quite true; we might do a considerable amount of exploratory and development work on these deposits and find some phosphate deposits that are economic, but that requires a lot of money. I do not think the government can spend money on that work. It would have to be done by private enterprise, and so far private enterprise has not found deposits that are economic.

Hon. A. L. BEAUBIEN: As far as the department is concerned, it is not spending any money in order to find deposits of high quality fertilizer?

Mr. TIMM: The only money we are spending is on our geological surveys, sending field parties out not especially to find phosphates and potash but to survey the country.

Hon. A. L. BEAUBIEN: But you are really looking for minerals?

Mr. TIMM: We are looking for minerals.

Hon. Mr. DUFFUS: You are looking for anything of value?

Mr. TIMM: Anything of value.

Hon. Mr. HORNER: From Senator Vaillancourt's remarks I take it that he believes cartels are operating and that they are interested in preventing these operations at Buckingham, Quebec?

Mr. TIMM: I have very little knowledge of cartels. I understand there was a fertilizer cartel for some years but as far as I know we are receiving raw materials from the United States at what I should say is a very fair price.

Hon. Mr. TAYLOR: And in sufficient quantity?

Mr. TIMM: In sufficient quantity.

Hon. Mr. PATERSON: At as low a price as the Americans have to pay?

Mr. TIMM: No, certainly not because of the transportation. I imagine the price is the same before the transportation is added.

Hon. Mr. PATERSON: Is there a duty on it?

Mr. TIMM: I am not sure; I do not think there is a duty on the materials coming to the country. Probably some of the other gentlemen could answer that.

Hon. Mr. CRERAR: Perhaps we should get one of the men that has examined into the potash discoveries in Saskatchewan.

Mr. TIMM: Then would you call Mr. Cole.

Hon. Mr. SINCLAIR: Mr. Timm, is it fair to assume from your remarks that it is more profitable from a commercial standpoint to import a high grade phosphate than to develop the low grade that we have here?

Mr. TIMM: It is more profitable to import the raw materials from the United States than to develop our low grade materials, so far.

The CHAIRMAN: Thank you, Mr. Timm. I think the committee would be pleased to hear Mr. Cole, at Mr. Timm's suggestion.

Mr. L. H. COLE: Yes, Mr. Chairman.

The CHAIRMAN: Mr. Timm has suggested that you have a better knowledge of the prospects of getting raw materials for fertilizer purposes.

Mr. COLE: Only as to potash. Two or three years ago there were a number of deep wells put down in Saskatchewan and Alberta in search for oil, and these wells encountered beds of sodium chloride, which is common salt, and in the top part of this salt strata they encountered, in some of the holes, indications of potash. The first potash found was in the form of chloride, that is sylvite, and it was associated with sodium chloride, which is common salt. In one of the more recent holes they have found another potash mineral, carnallite, which is potassium magnesium chloride. When the department found that salt was being discovered in a number of these wells it started to get all the information together. We went to the West and were able to examine the original cores obtained from a number of these wells. There were about eighteen wells altogether in which sodium chloride was encountered. In five or six of them we encountered potash minerals in the upper strata running from one per cent up to a considerably higher quantity. When we finally obtained the analyses of one of the wells near Unity, we found that there was a bed near the top of salt formation which ran around 21 per cent K_2O.

Hon. Mr. WHITE: What would be the depth of that bed?

Mr. COLE: That was around 3,700 feet below the surface.

Hon. Mr. WHITE: The depth of the bed?

Mr. COLE: It was 11 feet thick. That is the highest percentage to date. Since that well was drilled the Saskatchewan government has signed an agreement with the salt company known as Prairie Salt Company to develop the salt beds at and near Unity which is close to the original discovery well. It is about twelve miles from the discovery well. This company has put down recently two wells just southeast of Unity in which have been found salt strata practically the same thickness as found in the discovery well. The potash beds are present in the top of this formation in these two wells, but I have just completed the sampling of them in Montreal, and the analyses are underway at the present time.

Hon. Mr. WHITE: Have you any idea of the area of the beds?

Mr. COLE: No, we have just got these two wells, and the original well, which are twelve miles apart.

Hon. Mr. PATERSON: So that you have plenty of it if it extends across?

Mr. COLE: If there is continuation between the two wells it is twelve miles anyway.

Hon. Mr. DAVIES: Is the salt company a Canadian company?

Mr. COLE: It is the Dominion Tar and Chemical Company of Montreal, the same company that operates at Waterways, Alberta.

Hon. Mr. DAVIES: I am not quite clear as to how the Saskatchewan government comes into it. I thought the minerals were under the control of the Dominion Government.

Mr. COLE: No, they are under the provincial governments, I understand.

Hon. Mr. CRERAR: They belong to the provincial government.

Hon. Mr. DAVIES: But the Dominion Government does the experimental work?

Mr. COLE: We are assisting them as much as we possibly can on the development of it, because of it being of national interest.

Hon. A. L. BEAUBIEN: Is your department making any investigation beyond the sampling of the mineral?

Mr. COLE: We are getting all the data together that we can, plotting the cores and seeing what possible chances there are and where the best places would be for future drilling, if it is carried on.

Hon. A. L. BEAUBIEN: And when you come to the conclusion as to the best place for drilling, do you do the drilling?

Mr. COLE: I do not know about that.

Hon. Mr. CRERAR: What was the quality of the potash salts up to date in the second hole twelve miles away?

Mr. COLE: It was very similar in appearance—have you seen a sample?

Hon. Mr. CRERAR: No. You say the first was about 20 per cent.

Mr. COLE: About 20 per cent K_2O. That is the way we refer to all potash salts, everything is converted to K_2O equivalent. If we have 96 per cent to 98 per cent potassium chloride, it is about 60 or 62 per cent K_2O; they convert it all to K_2O, so as to compare the potassium sulphate, potassium chloride or any of the other potassium salts. This is a piece of the core taken from one of the wells down in southern Saskatchewan at around 7,600 feet.

Hon. Mr. CRERAR: What is that?

Mr. COLE: That is sylvanite, a mixture of potassium chloride and sodium chloride.

Hon. A. L. BEAUBIEN: In what percentage will the two be.

Mr. COLE: They run about 30 per cent to 40 per cent KCl, and the rest will be NaCl.

Hon. Mr. DAVIES: What do these terms mean?

Mr. COLE: NaCl is sodium chloride, or common salt; potassium chloride.

Hon. Mr. DAVIES: That is KCl is?

Mr. COLE: That is KCl. At the present time all we have to go on is the one well at Unity; and the possibilities of these other two wells down southeast of Unity.

Hon. Mr. CRERAR: On which you have not yet got the final test?

Mr. COLE: We have not got the complete analyses of these wells yet.

Hon. A. L. BEAUBIEN: Are they drilling many wells for oil in that district?

Mr. COLE: As far as I know there are none in progress in that district at the present time.

Hon. A. L. BEAUBIEN: In order to get a finding you would have to wait for someone to drill?

Mr. COLE: I think that is true, or holes would have to be put down definitely in search for potash.

Hon. A. L. BEAUBIEN: Who would put those holes down?

Mr. COLE: I do not know.

Hon. A. L. BEAUBIEN: Your department would not do it?

Mr. COLE: I do not know whether it would be a federal or provincial project.

Hon. Mr. DAVIES: This company that is working out there now is developing salt mines. Is that correct?

Mr. COLE: They have no rights to the potash; if they come across any potash or recover any potash it has to be turned over to the Saskatchewan government.

Hon. Mr. CRERAR: Can you give us any information on how these potash salts could be taken out of the ground? Can they be mined like coal? What is the process?

Mr. COLE: There are two possibilities: one is by solution and one is by straight mining.

Hon. Mr. DUFFUS: Drilling?

Mr. COLE: Yes, by drilling; by putting water down the hole, dissolving the salt, making a solution, pumping it up and evaporating it to get salt.

Hon. Mr. CRERAR: Is that the way they get salt?

Mr. COLE: That is the way they get salt. They put the water down, dissolve the salt, pump the brine up and evaporate it and get salt. Of course they cannot control what part of that salt strata they are going to dissolve; that is the trouble in mining potash beds by solution, you cannot tell where hose solution channels are going to go. If you start in a potash bed you might have saturated brine with respect to potash, after about two or three months the channels might have worked down and go into straight sodium chloride or ordinary salt and you might get brine that is ordinary salt with no potash in it at all. You have no control of that method.

The mining method is costly, and there are a number of serious problems associated with sinking a shaft. Three serious problems are: You might encounter water and have to shut it off; the second is the possibility of encountering natural gas, which would be most difficult to shut off; the third would be the difficulty about the shales which lie above the salt beds; when water touches them, they start to swell and creep. So that what method would be finally adopted, if the beds are there in sufficient quantities, to recover the potash, we do not know at the present time.

Hon. Mr. HORNER: Do you know anything about the operation in Manitoba of the salt mines? Is that done by evaporating the brine?

Mr. COLE: That is accomplished by evaporating a brine which is not even saturated; it is only 70 per cent saturation. It is a natural brine underground, around fifteen hundred feet, which they pump up and evaporate to recover their salt.

Hon. Mr. DAVIES: Is it only in Saskatchewan where you discover any potash?

Mr. COLE: We have a small percentage of potash in one of the wells, so far, in Alberta, but it only analyzes around 4 per cent. I might say there are two localities down in south eastern Saskatchewan, one at Radville and the other at Ogema. This is from the Ogema salt, in which we have encountered potash of anywhere from 10 to 20 per cent K_2O; but that is at great depth. In Alberta the only one we found is at Provost, where the highest analysis we got was about 4 per cent K_2O.

Hon. Mr. BEAUBIEN (*St. Jean Baptiste*): Suppose you discovered a large bed around Unity, Saskatchewan, with possibilities, what percentage would you have to get to make it commercially feasible to develop?

Mr. COLE: Well, they are operating at the present time down in New Mexico beds of potassium chloride, that is sylvite, that has an average grade for 1945 of around 21·34 per cent K_2O; that is, working around anywhere from a thousand to sixteen hundred feet in depth. We would have to work at double that depth.

Hon. Mr. CRERAR: How do they take those out in New Mexico?

Mr. COLE: It is mining.

Hon. Mr. CRERAR: Straight mining.

Mr. COLE: Straight mining process.

Hon. Mr. CRERAR: Shaft?

Mr. COLE: Shaft and chambers and pillars, and then afterwards it is beneficiated by flotation and other means to bring up the grade to 96 and 98 per cent potassium chloride.

Hon. Mr. DAVIES: Do you know by the soil, or how do you decide where to investigate those things? I was wondering, for instance, if you would be liable to find any of these fertilizers in northern Quebec, or in Alberta, or is it just in the prairie provinces that you look for it?

Mr. COLE: Well, it is more in the sedimentary deposits in the west that we are looking for them at the present time, although we have got a tremendous amount of salt all through Canada except in one province, the province of Quebec. There is no salt, as far as I know, in the province of Quebec that we have come across. That does not say that we won't find it at some time.

Hon. Mr. DUFFUS: Do you use some salt in producing fertilizer?

Mr. COLE: I don't think we use any salt at all in fertilizer. That is, the ordinary sodium chloride, the common salt.

The CHAIRMAN: Mr. Cole, as I understand from you, potash and salt are practically side by side. Would the way to mine that be by making some arrangement with the salt company to bring the potash up, and divide the product later on?

Mr. COLE: Well, they are doing it by the solution method. They are dissolving their salt out, and it is not known how much they will get in the way of potash in their brines. Of course there would be that recovery, when they start.

The CHAIRMAN: As far as you are concerned it is only in the experimental stage so far.

Mr. COLE: It is only in the experimental stage. We do not know how much we have there, or anything about it except that we have a few analyses of these salts, and we have encountered the potash in a number of wells at widely separated points, but we have no knowledge of whether they are continuous beds or just isolated occurrences.

The CHAIRMAN: Well, perhaps we can hear from Mr. Goudge.

Mr. M. F. GOUDGE: In connection with our fertilizer resources in this country, we have to consider supplies of nitrogen, phosphate, potash, and sulphur, as well as the liming materials—limestone, dolomite, magnesite, and so on. We are well off in respect to nitrogen. Although we have no deposits of soluble nitrate minerals we have those tremendous plants at Trail, Calgary, Niagara Falls, and elsewhere, that extract nitrogen from the air, so we did not have to worry in that respect. In phosphates, though, we are not so well supplied. As Mr. Timm said, we have hunted around quite a bit for phosphate. The largest deposits of phosphate rock are in western Canada, in the Crows Nest Pass; they were found by the Consolidated Mining and Smelting Company, and that Company has done a lot of work on them with the object of using the material for fertilizer, but it is too low grade and they have been by-

passed in favour of phosphate rock from Montana. The Consolidated Mining and Smelting Company has three big mines over there from which it draws its supplies for making Canadian phosphatic fertilizers. In the east, there is a great deal of apatite, (tri-calcium phosphate) distributed in many small deposits in the Gatineau-Lievre district, and Bedford and Burgess townships in eastern Ontario. Production of apatite is an industry that has gone on for many years, but I do not think that in any one year since 1910 was there much more than a thousand tons production, and we require roughly—I speak subject to correction by Mr. Peart—300,000 tons of phosphate in Canada for our fertilizer requirements. Indeed, that is hardly enough. Apatite as a source of phosphate is very expensive. It occurs with other minerals, commonly mica, and sometimes is obtained as a by-product of mica mining. The entire Canadian production is at present taken by the Electric Reduction Company at Buckingham for the making of elemental phosphorus, baking powder and other phosphorus products. So there is no great source of phosphate in our apatite deposits.

For a number of years we have known of deposits of titanium-iron ore along the Saguenay river near Arvida. They have in the past been of interest mainly as sources of titanium, but in some parts of these deposits is a lot of this phosphate mineral, apatite. Most of the work done to date on these deposits has been in connection with the iron and titanium, and we have not looked greatly into the phosphate possibilities, but we propose to look into it from that angle very shortly, and we shall have some further information in a month or so's time.

That pretty well disposes of the phosphate, except for the slags. In Nova Scotia at the plant of Dominion Steel and Coal Corporation they use a high-phosphorus iron ore which comes from Newfoundland, and there is quite a content of phosphate in the slag. A plant is being built to utilize this basic slag for its phosphate content, and to provide at the same time a source of lime for the soil. That is a Nova Scotia government project.

The potash situation in Canada has been dealt with by Mr. Cole.

There is a great deal of sulphur goes into fertilizers; in fact I think they account for by far the greatest use of sulphur, either as elemental sulphur or as sulphuric acid, on this continent. We have no native sulphur in Canada, but we have large resources of sulphates and sulphides, that is minerals in which sulphur is combined with other materials. In connection with the smelter at Trail, everybody has heard of the fume problem out there years ago. That was turned to good account by recovering sulphur compounds from those fumes. It was the sulphur compounds that did the damage; and now Trail is a great source of sulphuric acid for fertilizers. Noranda mine has a lot of pyrites, iron sulphide, in its ore. They are recovering this pyrites, and have been selling it for years as a source of sulphur. It is also available at Waite Amulet and at the Britannia mine of Britannia Mining and Smelting Company. Pyrites is a great source of sulphur in Europe, particularly in Spain, Italy and Germany. In Germany it is utilized a great deal. We have possibilities in Canada of our pyrites supplying large quantities of sulphur. Then, down in the maritimes, we have huge beds of gypsum and anhydrite. Gypsum is calcium sulphate with some water in it; and anhydrite, is the straight calcium sulphate. Anhydrite is not used at present to any extent. There is now a proposal to use it as a source of sulphur, mixing it with phosphates that are brought up from Florida. This proposal has very real possibilities. You have a by-product there of Portland cement. The success of the whole thing depends largely on the selling of the Portland cement. If you cannot sell the Portland cement by-product it is not economic in competition with supplies that can be brought in from the United States.

Out west we have a lot of sulphate, in the form of sodium sulphate, found in large deposits on the prairies. The market for this is in the east: it has to be brought to Ontario and Quebec and the maritimes.

I was in Germany two years ago, after the war, investigating various industries using non-metallic minerals, and I was greatly impressed with some of the expedients the Germans went to in the utilization of domestic raw materials. They seemed to be economic and worthy of some work being done on them in this country, particularly in regard to utilization of domestic sources of sulphur. They got much of their pyrites from Spain, but towards the end of the last war, and in the first war, a lot of these developments took place when they were worried about their supplies of sulphur; they turned to their local sulphur minerals, which are pyrites, anhydrite, and gypsum similar to what we have in Canada, and developed new fertilizers and new processes of making them, which seems to be going over very well. Probably Mr. Peart has further information on those products. There are great possibilities in this country of combining certain non-metallic minerals including pyrites, which we generally consider a non-metallic or industrial mineral, and making valuable products out of them for the fertilizer business.

As regards the liming materials, which are considered of basic importance—you have to have your soil well provided with calcium and in part with magnesium before the concentrated fertilizer will take full effect—we are well supplied with these materials right across Canada. There is no trouble about that. All of our limestone quarries producing crushed stone in the provinces of Quebec, Ontario, Manitoba and British Columbia have tremendous piles of waste limestone dust which can be used on the land. It is just a transportation problem.

I think that pretty well covers the field in a general way. I would be glad to answer any questions that I can.

Hon. Mr. DUFFUS: The fact that the supply seems to be readily available, is it economically sound to ship it to Ontario?

Mr. GOUDGE: Supplies of what?

Hon. Mr. DUFFUS: Lime.

Mr. GOUDGE: Ontario has been a relatively small user of liming materials. The maritime provinces and Quebec have been great users.

Hon. Mr. DUFFUS: I suppose a good deal of lime is used in concentrated fertilizer.

Hon. Mr. VAILLANCOURT: Lime is not a fertilizer.

Mr. GOUDGE: Properly speaking the term "lime" should be applied only to the oxide or the hydroxide and not to the unburnt limestone. There is very little lime used in the fertilizer business, but substantial quantities of pulverized limestone are incorporated into some mixed fertilizers as calcium is generally recognized as a necessary plant food.

The CHAIRMAN: It is very beneficial to heavy land.

Mr. GOUDGE: Yes. It lightens heavy land and improves its tilth and is essential to the proper growth of alfalfa, legumes and crops such as that.

The CHAIRMAN: It is of very great value as a fertilizer on certain soils.

Hon. Mr. CRERAR: Has any investigation been carried on to ascertain the possibilities that there may be suitable slag in mines like Noranda and Trail?

Mr. GOUDGE: Smelter slags are not of the type generally used in agriculture, as they contain little if any phosphorus. We have never made any thorough investigation of them, however.

The CHAIRMAN: Thank you very much, Mr. Goudge.

Mr. G. S. PEART, Department of Agriculture: I suppose I should make my remarks as an official of the Department of Agriculture instead of the fertilizers administration, as the latter has become extinct.

The CHAIRMAN: Use your own judgment.

Mr. PEART: We of the department are anxious that native phosphate and potash deposits in Canada be developed as soon as possible. Perhaps I had better start by explaining our experience during the war years. Canada has been short of phosphate and potash fertilizer for the last six years, but at the same time we have produced an excess of nitrogen above domestic needs. If Canada had had twenty per cent more phosphate and potash fertilizer this year it would have been sold to the farmers. They wanted it but could not get it. Down through that six-year period we had to reduce the analysis of phosphate and potash in the fertilizer in order to make it go around as best we could. It is desired that we get away as rapidly as possible from low-analysis fertilizer containing a lot of filler. We should like to get on a basis of supplying the farmer with plant food containing little if any filler.

Hon. Mr. CRERAR: What standard do you want for potash?

Mr. PEART: For example, instead of a 2-12-6 there could be supplied a 4-24-12. In that event the farmer would only have to handle half the quantity for the same amount of plant food, and his cost of plant food would come down proportionately. As to supply: This year the United States producers have just informed us that they will only supply about eighty per cent of the potash they supplied Canada with last year, which was barely seventy-five per cent of our requirements. We had to bring highly expensive potash from Germany last year, which cost the Canadian public in taxes $80,000 on one shipment alone to Halifax for meeting maritime requirements. The position as we see it is this: Ten or fifteen years ago Canada was using approximately 300,000 tons of fertilizer. Now, we are using approximately 750,000 tons. When the quantity used was relatively small we had no trouble in importing full requirements of potash and phosphate, but now that domestic consumption—has increased greatly and is still increasing, (some of us think that it will exceed a million tons in ten years)—outside countries may not be in a position to supply us fully in the future. Speaking particularly of potash, I read a report from Washington a year or so ago which stated that the U.S.A. total reserve of potash, based on present consumption, was just eighty years. Now, eighty years passes quickly in a nation's history, and unless other supplies are found on this continent in the meantime they will soon run short. On this account the U.S.A. has already asked their own fertilizer industry to import all the potash they can instead of using potash of American production. This is the main reason for reducing the supply to Canada this year.

Hon. Mr. CRERAR: Has Germany large deposits?

Mr. PEART: I understand they have very large deposits. In respect to phosphates we now draw all our supply of rock for eastern Canada from Florida. However, during the war years and particularly last year, eastern Canada could not get enough phosphate rock from Florida to keep the superphosphate plants going to capacity. We used to make 90,000 tons of superphosphate and are now making 250,000, which requires almost three times the tonnage of phosphate rock as formerly. As I see it, it is only a matter of time when this phosphate rock supply available from outside countries will be seriously short, particularly in times of emergency. The committee might be interested to know that during the war and post war period it cost the Canadian taxpayer four and a half million dollars on import subsidies for maintaining our price ceilings on phosphate and potash fertilizers. There was no subsidy paid on

domestic production. It was practically all paid on importations of phosphates and potash. I just mention this point to make the picture clearer. Are there any questions?

Hon. A. L. BEAUBIEN: Do you see any solution to this problem?

Mr. PEART: The solution as I see it is that we should develop our own natural resources as soon as possible. I have full confidence in the Mines Bureau in doing that.

Hon. Mr. CRERAR: That would mean that we have to find new sources of supply. From the information supplied by Mr. Timm, the available supplies of phosphate rock in Canada are of a very low grade quality, and it would therefore not be economic to develop them.

Mr. PEART: I suppose it would be a question of total supply. If we were able to get ample supply from foreign sources it might answer the question, but that supply may not be available to us.

Hon. Mr. DUFFUS: There may be agricultural impoverishment.

Mr. PEART: If it is desired to go into that angle of the question, I might say that phosphates are our most important plant food. Without them our farms are bound to become impoverished. Every time that meat, milk or grain is taken from the farm, away go the phosphates and they cannot be replaced on the farm by anything else. There is just so much of it to start with.

Hon. Mr. CRERAR: And ordinary barn yard manure does not replenish that.

Mr. PEART: It contains very little phosphate because the phosphate goes into the meat and grain and into the hoofs of the cattle, horses, pigs and so on, sold off the farm and once it is gone it is not going to come back again.

Hon. Mr. PATERSON: What district in Canada is the heaviest consumer of phosphates?

Mr. PEART: At the present time eastern Canada is the heaviest consumer.

Hon. Mr. PATERSON: What provinces do you refer to in eastern Canada?

Mr. PEART: The five eastern provinces, those east of the Great Lakes. The prairie provinces and British Columbia did not use it at one time but it is astonishing how much of it is being used there now. The fertilizer companies have had a hard time keeping the consumers satisfied.

Hon. Mr. DUFFUS: The consumption is increasing all over.

Mr. PEART: Yes.

The CHAIRMAN: You spoke about the increased use of fertilizer in Canada. That has been to some extent caused by people realizing the necessity of fertilizer. I remember that thirty years ago many farmers who were considered good farmers objected to using fertilizer.

Mr. PEART: Yes, the thinking in this country regarding fertilizer has entirely changed in the last generation. The name "fertilizer" is a misnomer and more people are finding out to-day that fertilizer is really a plant food, and that you have to feed plants the same as you have to feed animals. There are certain plant foods and if they are not supplied, the plant cannot develop to best advantage.

Hon. Mr. DUFFUS: Mr. Chairman, this matter of fertilizer or plant food is one of the most important questions before agriculture in the Dominion of Canada to-day.

Mr. PEART: I can see the time coming when we are going to have to do what was first done in Europe and now is being done in the United States. We shall have to develop a nutrition program for the nation based on population and the needs of food, and the basis of the whole thing is plant foods to feed the crops which feed the livestock.

Hon. Mr. DUFFUS: And the people.

Mr. PEART: And the people.

The CHAIRMAN: It is for the committee to decide now what further action is to be taken. The proceedings have been reported and can be printed. If we should decide not to go any further this year, the report will be available for next session.

Hon. A. L. BEAUBIEN: If we had typewritten or mimeographed copies of this morning's proceedings available next session they would be very helpful in the event that we decided to have an inquiry into this whole subject.

Hon. Mr. DUFFUS: Mr. Chairman, I think that copies of this morning's proceedings should be made available to members of the committee immediately, or as soon as possible.

The CHAIRMAN: The Chief Clerk of Committees informs me that the proceedings will be typewritten promptly, but that the Senate has no facilities for mimeographing.

Hon. Mr. DUFFUS: Then, Mr. Chairman, I move: That the committee report to the Senate recommending that authority be granted for the printing of 500 copies in English and 200 copies in French of the proceedings of the committee on the subject matter of the motion of the Honourable Senator McDonald (*Kings*) calling the attention of the Senate to discoveries of phosphate rock in the province of Quebec, and potash in the province of Saskatchewan, referred to the committee on July 2, 1947; and that Rule 100 be suspended insofar as it relates to the said printing.

Hon. A. L. BEAUBIEN: I second the motion.

The motion was agreed to.

Hon. Mr. CRERAR: There is no doubt about the importance of commercial fertilizers in Canada. And from what Mr. Peart has told us, it will not be many years before we find difficulty in obtaining enough raw materials, especially phosphates and potash, from sources outside this country. Therefore I would suggest that Mr. Timm and his associates should prosecute their inquiries as diligently as possible between now and the next session of parliament in order to ascertain what can be done with the resources that we have. I am bound to say that information so far secured about the potash deposits in Saskatchewan does not give us much ground for hope. However, as further drilling is done additional information may become available, and my suggestion would be that the Mines Branch try to gather all the information that can be obtained, and analyse it and have it ready for presentation to a committee next session.

I have another suggestion, and Mr. Timm will know much better than I do whether or not it is practicable. It is that inquiries be continued as to methods of beneficiating the low-grade phosphates that we now have, with a view to making them commercially feasible. I long ago ceased to wonder at what can be achieved by scientific investigations, and I know that in the Mines Branch we have a very competent staff in that particular field.

The CHAIRMAN: Do you wish to put your suggestion in the from of a motion?

Hon. Mr. CRERAR: Perhaps that would be better, Mr. Chairman.

The CHAIRMAN: The Chief Clerk of Committees has made a rough draft of a motion, and I will ask him to read it.

THE CHIEF CLERK OF COMMITTEES: This is in a very rough form as yet, Mr. Chairman. It reads:

> Your committee are in entire agreement with the terms of the motion of Honourable Senator McDonald (*Kings*) and beg to recommend

that co-operative steps be taken by the proper federal and provincial authorities to continue the investigations into the possibilities of developing on a commercial scale the discoveries already made.

Hon. Mr. CRERAR: Something along that line would be all right. I will move that.

Hon. Mr. DUFFUS: I second the motion.

The motion was agreed to.

Hon. Mr. TAYLOR: Is the National Research Council doing any work along this line?

Mr. PEART: No.

At 12 o'clock noon the committee adjourned.