Room 10-A
[redacted].

Canada. Parl. H.of C. Special Comm.on War Expenditures, 1944/45.
Minutes of proceedings.
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DATE | NAME - NOM

Canada. Parl. H.of C. Special Comm.on War Expenditures, 1944/45.

SESSION 1944

HOUSE OF COMMONS

SPECIAL COMMITTEE

ON

WAR EXPENDITURES

MINUTES OF PROCEEDINGS

No. 1

THURSDAY, FEBRUARY 24, 1944
WEDNESDAY, MARCH 1, 1944
FRIDAY, MARCH 3, 1944
WEDNESDAY, MARCH 8, 1944
THURSDAY, AUGUST 10, 1944
FRIDAY, AUGUST 11, 1944

Including

FIRST, SECOND, THIRD, FOURTH, FIFTH and SIXTH REPORTS TO THE HOUSE

OTTAWA
EDMOND CLOUTIER
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1944

ORDERS OF REFERENCE

TUESDAY, 22nd February, 1944.

Resolved,—That a Select Committee be appointed to examine the expenditure defrayed out of moneys provided by Parliament for the defence services, and for other services directly connected with the war, and to report what, if any, economies consistent with the execution of the policy decided by the government may be effected therein, and that notwithstanding Standing Order 65 the Committee shall consist of twenty-four members, as follows: Messrs. Black (*Cumberland*), Cleaver, Donnelly, Dupuis, Edwards, Fauteux, Ferland, Gladstone, Golding, Hill, Homuth, Hurtubise, Jackman, Knowles, McGregor, Nixon, O'Neill, Picard, Pinard, Pottier, Reid, Shaw, Tripp, Winkler, with power to send for persons, papers and records; to examine witnesses and to report from time to time to the House.

Attest.

ARTHUR BEAUCHESNE,
Clerk of the House.

TUESDAY, February 29, 1944.

Ordered,—That the said Committee be empowered:—

1. To sit while the House is sitting and notwithstanding any adjournment of the House, and to adjourn from place to place.

2. To determine the manner and extent to which the evidence, proceedings and reports shall be printed or typed, and that where the same are ordered to be printed there be printed 500 copies in English and 200 copies in French, and that Standing Order 64 be suspended in relation thereto.

3. To appoint subcommittees, to fix the quorum of any such subcommittee and refer to such subcommittees any of the matters referred to the Committee; any such subcommittees so appointed to have power to send for persons, papers and records, and to examine witnesses under oath or otherwise, to sit while the House is sitting and notwithstanding any adjournment of the House, to adjourn from place to place, and to report from time to time to the Committee.

4. To employ such staff as it may deem necessary.

5. In cases where consideration of national security precludes the publishing of certain recommendations and of the arguments upon which they are based, to address a memorandum to the Prime Minister for the consideration of the War Cabinet, provided that the Committee shall, whenever it has exercised such powers, report the fact as soon as possible to the House.

Ordered,—That during any adjournment of the House the Reports of the said Committee shall be deemed to have been Tabled when filed with the Clerk of the House and seven days have elapsed after the date of such filing.

Ordered,—That six members shall constitute a quorum of the said Committee and that Standing Order 65(3) be suspended in relation thereto.

Attest.

ARTHUR BEAUCHESNE,
Clerk of the House.

THURSDAY, March 2, 1944.

Ordered,—That the name of Mr. Factor be substituted for that of Mr. Gladstone on the said Committee.

Attest.

ARTHUR BEAUCHESNE,
Clerk of the House.

MINUTES OF PROCEEDINGS

THURSDAY, February 24, 1944.

The Special Committee on War Expenditures met at 10.00 o'clock a.m.

Members present: Messrs. Black (*Cumberland*), Cleaver, Donnelly, Edwards, Fauteux, Ferland, Gladstone, Golding, Hill, Homuth, Hurtubise, Jackman, Knowles, Nixon, O'Neill, Picard, Reid, Shaw, Tripp.

On motion of Mr. Golding, seconded by Mr. Hurtubise, Mr. Cleaver was elected Chairman.

Mr. Cleaver took the Chair.

The Committee having proceeded to the consideration of its first report to the House, Mr. Golding moved that the Committee report as follows:—

Your Committee recommends that it be empowered:—

1. To sit while the House is sitting and notwithstanding any adjournment of the House, and to adjourn from place to place.

2. To determine the manner and extent to which the evidence, proceedings and reports shall be printed or typed, and that where the same are ordered to be printed there be printed 500 copies in English and 200 copies in French, and that Standing Order 64 be suspended in relation thereto.

3. To appoint subcommittees, to fix the quorum of any such subcommittee and to refer to such subcommittees any of the matters referred to the Committee; any such subcommittee so appointed to have power to send for persons, papers and records and to examine witnesses under oath or otherwise, to sit while the House is sitting and notwithstanding any adjournment of the House, to adjourn from place to place, and to report from time to time to the Committee.

4. To employ such staff as it may deem necessary.

5. In cases where consideration of national security precludes the publishing of certain recommendations and of the arguments upon which they are based, to address a memorandum to the Prime Minister for the consideration of the War Cabinet, provided that the Committee shall, whenever it has exercised such powers, report the fact as soon as possible to the House.

Your Committee further recommends:

1. That during any adjournment of the House its reports shall be deemed to have been tabled when filed with the Clerk of the House and seven days have elapsed after the date of such filing.

That six members constitute a quorum and that Standing Order 65 (3) be suspended in relation thereto.

On motion of Mr. Homuth,

Resolved,—That a striking Committee consisting of the Chairman and Messrs. Golding, Hill, Jackman, Knowles, Shaw and Reid be appointed to select the subcommittees.

Mr. Black having suggested that the Committee give immediate consideration to the question as to whether the Committee's sittings were to be open or *in camera*, it was agreed to defer consideration of this matter until the next sitting.

On motion of Mr. Reid, the Committee adjourned to the call of the Chair.

WEDNESDAY, March 1, 1944.

The Special Committee on War Expenditures met at 3.30 o'clock p.m., the Chairman, Mr. Cleaver, presiding.

Members present: Messrs. Black (*Cumberland*), Cleaver, Donnelly, Edwards, Fauteux, Ferland, Golding, Hill, Homuth, Hurtubise, Jackman, Knowles, Nixon, O'Neill, Picard, Pinard, Reid, Shaw, Tripp.

The Chairman having suggested that members of the press be asked to retire, Mr. Homuth objected and moved, seconded by Mr. Jackman:

> That all committee meetings, both of the main committee and subcommittees, shall be held in public except where matters of national security be involved.

The motion was debated, and, at one stage of the debate, to permit of the Chairman participating, the Chair was occupied by Mr. Golding.

The question being put on the said motion, it was negatived on the following recorded division: *Yeas*,—Messrs. Black, Homuth, Jackman, Knowles and Shaw (5)—*Nays*,—Messrs. Donnelly, Edwards, Fauteux, Ferland, Golding, Hill, Hurtubise, Nixon, O'Neill, Picard, Pinard, Reid and Tripp (13).

Mr. Fauteux moved:

> That all meetings of the main committee be held in secret excepting when, on motion, the Committee decides to hold public sittings, and that the sittings of subcommittees be in secret except when leave is requested and obtained from the main Committee to hold public meetings with respect to any given subject of inquiry; and that seven copies only of the proceedings and evidence in sittings in secret be made in type script, one for the Chairman of the whole Committee, one for the Chairman of the subcommittee, one for the Clerk of the Committee, one to be sent to the witness for correction and return, and three for the use of members of the Committee; all copies to be in charge of the Clerk of the Committee when not in use.

Motion carried on division (*Yeas*, 13; *Nays*, 5).

Mr. Knowles moved:

> That no report based on secret evidence be issued by the Committee unless the report be unanimous.

The Chairman expressed the view that the motion was futile in that by majority vote any future meeting of the Committee could decide otherwise, and suggested to the mover that his object had been attained by bringing his views to the attention of the Committee and that the motion should be withdrawn.

Mr. Knowles withdrew his motion.

The Committee adjourned at 6.00 o'clock, to the call of the Chair.

FRIDAY, March 3, 1944.

The Special Committee on War Expenditures met at 11.00 o'clock a.m., the Chairman, Mr. Cleaver, presiding.

Members present: Messrs. Black (*Cumberland*), Cleaver, Donnelly, Edwards, Ferland, Golding, Hill, Homuth, Hurtubise, Jackman, Knowles, McGregor, Picard, Reid, Shaw.

The Chairman submitted the report of the Striking Committee respecting the appointment and personnel of subcommittees.

Before proceeding to the consideration of the said report, Mr. Homuth expressed the opinion that the Committee had exceeded its powers in deciding to hold secret sittings, and quoted paragraph 551 of Beauchesne's Parliamentary Rules and Forms, Third Edition, viz: "When in the opinion of the House, secrecy ought to be maintained, Secret Committees are appointed, whose enquiries are conducted throughout with closed doors, and it is the invariable practice for all members, not on the committee, to be excluded from the room throughout the whole proceedings."

Mr. Homuth requested that a ruling be given in this matter and that the Committee and its subcommittees hold no sittings in secret until such ruling had been given.

The Chairman replied that a ruling would be given at the next sitting.

The Committee then proceeded to the consideration of the Striking Committee's report which was amended and, on motion of Mr. Homuth, adopted as follows:

"The Striking Committee of the Special Committee on War Expenditures recommends:

That three standing subcommittees be appointed and that the entire War Appropriation Estimates 1944-45, as well as all past war expenditures regarding the same items be referred to them as follows:

1. That subcommittee No. 1 be appointed to inquire into the following:

(*a*) All Naval services estimates, War Appropriation 1944-45, excepting Item 5: personal supplies and services, viz.—food, medical and dental stores, clothing and personal equipment;

(*b*) All Air services estimates, War Appropriation 1944-45, excepting Item 5: personal supplies and services, viz.—food, medical and dental stores, clothing and personal equipment;

(*c*) Item 4 of Army services estimates, War Appropriation 1944-45, being construction, purchase, repairs and operating expenses of properties. (This item as to Air and Naval services is included in sub-paragraphs (*a*) and (*b*) above noted);

(*d*) Cargo and all types shipbuilding.

That such subcommittee consist of Messrs. Cleaver (Chairman), Black, Dupuis, Factor, Ferland, Golding, Hill, Hurtubise, Knowles, McGregor, Pottier, Reid and Shaw, and that the quorum be 3.

2. That subcommittee No. 2 be appointed to inquire into the following:

(*a*) All Army services estimates, War Appropriation 1944-45, excepting Item No. 4 which is construction, purchase, repairs and operating expenses of properties;

(*b*) Item No. 5 of Naval services estimates, War Appropriation 1944-45, and Item No. 5 of Air services estimates, War Appropriation 1944-45, these items being for personal supplies and services, viz.—food, medical and dental stores, clothing and personal equipment;

(*c*) Salvage.

That such subcommittee consist of Messrs. Edwards (Chairman), Fauteux, Factor, Nixon, McGregor, O'Neill, Pinard and Shaw, and that the quorum be 3.

3. That subcommittee No. 3 be appointed to inquire into the following:—

(*a*) Department of Munitions and Supply estimates, War Appropriation 1944-45;

(*b*) Sundry services—all three Defence services, War Appropriation 1944-45;

(*c*) Wartime Boards;

(*d*) Government-owned companies and all types of military equipment and supplies not above allotted;

(*e*) Corporate taxation.

That such subcommittee consist of Messrs. Picard (Chairman), Donnelly, Homuth, Jackman, Knowles, Tripp and Winkler, and that the quorum be 3.

4. That the Chairman be ex-officio a member of all subcommittees.

5. That in addition to the three standing subcommittees, further special subcommittees be appointed from time to time to inquire into individual matters of inquiry.

6. That an Agenda Committee be appointed to decide from time to time the subject matters to be inquired into by special subcommittees and to nominate the membership of such special subcommittees; such Agenda Committee to consist of Messrs. Jackman, Shaw, Knowles, Reid and all acting chairmen of subcommittees already appointed and to be hereafter appointed."

The Committee adjourned to the call of the Chair.

WEDNESDAY, March 8, 1944.

The Special Committee on War Expenditures met at 3.30 o'clock p.m., the Chairman, Mr. Cleaver, presiding.

Members present: Messrs, Black (*Cumberland*), Cleaver, Donnelly, Edwards, Fauteux, Ferland, Factor, Golding, Hill, Homuth, Hurtubise, Jackman, Knowles, McGregor, Nixon, O'Neill, Picard, Pinard, Pottier, Reid, Shaw, Tripp, Winkler.

Before proceeding to the order of business the Chairman gave his ruling on the point of order raised by Mr. Homuth at the last sitting, on March 3, viz.—

> I promised at the last meeting of this committee that I would, at the opening of this meeting, make a ruling in regard to the point of order raised by the honourable member for Waterloo South. The point of order which he has raised is that this Special Committee on War Expenditures has no power to hold any sessions other than public sessions and that if the committee decides to hold any secret sessions it must first obtain power to do so from the House of Commons. In support of his point of order the honourable member has referred me to the Third Edition of Beauchesne's Parliamentary Rules at page 200, Rule 551.
>
> I have considered the matter carefully and I now rule that the point of order is not well founded and that this committee has the power to hold secret sessions as it may decide. It is my opinion that Rule 551 is quite clear. It is intended to provide for the appointment of a committee which in the opinion of the House must hold *all* of its meetings in secret. The rule reads as follows:—
>
> > When in the opinion of the House, secrecy ought to be maintained, Secret Committees are appointed, whose enquiries are conducted throughout with closed doors, and it is the invariable practice for all members, not on the committee, to be excluded from the room throughout the whole of its proceedings.
>
> It is my opinion that the rule in question applies only to committees with reference to which the House at the time of the appointment of the committee deems it advisable to make it mandatory on the part of the committee to hold secret sessions only.

Should any further argument be necessary with respect to this ruling there is ample British as well as Canadian precedent. The first War Expenditures Committee of this House was appointed in 1941 and since then scores of secret sessions have been held both of the main committee and of the different subcommittees. Our order of reference appointing the special committee on War Expenditures is in exactly the same terms as the British order of reference appointing the war expenditures committee in Great Britain with only one exception. Here the word "current" is deleted which has no bearing on the present point of order. In Great Britain the War Expenditures Committee has held all of its main committee meetings and all of the subcommittee meetings in secret. Both here as well as in Great Britain the Commons did not make it mandatory on the part of the committee to sit in secret but left the matter to the discretion of the committee. In my opinion there are no restrictions upon the right of the committee to decide as to whether its meetings are to be public or secret. The debate in the House which took place when the committee was first appointed clearly indicates that it was the intention of the House to give the committee complete freedom of action in this regard and there is nothing in the order of reference which in any way limits the type of meetings to be held by the committee.

By unanimous consent, Mr. Homuth was permitted to make a brief statement expressing disagreement with the Chairman's ruling. He also questioned the set-up of the Committee, and gave notice that the Chairman's ruling would be appealed to the Speaker of the House.

On behalf of the Agenda Committee, the Chairman submitted the following report:—

The Agenda Committee of the Special Committee on War Expenditures begs leave to report as follows:—

Your committee recommends:

1. That the Clark boot charges be referred to subcommittee No. 2 for consideration.

2. That the McGregor statements respecting the construction of No. 2 shell filling plant at Pickering, be referred to subcommittee No. 1 for consideration.

3. That a special subcommittee (No. 4) be appointed to inquire into the following:

(*a*) Rentals and purchases of buildings for war purposes, the request of Mr. A. H. Bence, M.P., addressed to the Committee to be referred to the said subcommittee for consideration.

(*b*) Manufacture of ammonium nitrate at Calgary.

That the said subcommittee consist of the following members: Messrs. Tripp (Chairman), Shaw, Jackman, Nixon, Golding and Winkler, and that the quorum be 3.

On motion of Mr. Golding the report was adopted.

On motion of Mr. Picard,

Ordered,—That the name of Mr. Jackman be added to the list of members on subcommittee No. 2; that the name of Mr. Factor be struck out from the list of members of subcommittee No. 2 and added to that of subcommittee No. 3; and that the name of Mr. Pottier be added to the list of members of subcommittee No. 3.

The question of members' expenses when the Committee adjourns from place to place was discussed, and on motion of Mr. Reid, it was resolved that the Chairman enquire into this matter and also make repre-

sentations to the effect that a per diem expense allowance be paid to each member of the Committee while sitting during any long adjournment of the House.

On motion of Mr. Donnelly,

Ordered,—That the minutes of proceedings of the main committee be handed to the press by the Clerk of the Committee.

The Committee adjourned to the call of the Chair.

THURSDAY, August 10, 1944.

The Special Committee on War Expenditures met at 11.30 a.m., the Chairman, Mr. Cleaver, presiding.

Members present: Messrs. Cleaver, Donnelly, Fauteux, Ferland, Golding, Hurtubise, Knowles, McGregor, Nixon, O'Neill, Picard, Tripp.

On motion of Mr. Golding,—

Ordered,—That the Minutes of Proceedings of the Committee and Reports tabled in the House, be printed.

Mr. Picard, Chairman of Subcommittee No. 3, presented a report of the said subcommittee on the rubber situation in Canada.

The said report having been considered in part, the Committee adjourned until 4.00 p.m. this day.

AFTERNOON SITTING

The Committee resumed at 4.00 p.m.

Members present: Messrs. Cleaver, Donnelly, Knowles, McGregor, Nixon, O'Neill, Picard, Tripp.

Mr. Cleaver, Chairman of Subcommittee No. 1, presented a report of the said subcommittee on aircraft production.

The said report having been considered, Mr. Golding moved that it be adopted as the Committee's Second Report to the House.

Motion carried on division.

The Committee then reverted to the consideration of the report submitted by Subcommittee No. 3.

The said report having been further considered and amended, Mr. Tripp moved that the report as amended be adopted as the Committee's Fifth Report to the House.

Motion carried on division.

Discussion arose as to the advisability of holding Committee sittings during the impending adjournment of the House. Members of the Committee present were agreed that the government be requested to include in the Supplementary Estimates an appropriation for this purpose.

The Committee adjourned until 11.30 a.m. on Friday, August 11.

FRIDAY, August 11, 1944.

The Special Committee on War Expenditures met at 11.30 a.m., the Chairman, Mr. Cleaver, presiding.

Members present: Messrs. Cleaver, Edwards, Ferland, Golding, Hurtubise, Knowles, McGregor, Nixon, O'Neill.

Mr. Edwards, Chairman of Subcommittee No. 2, presented a report of the said committee on the purchase and inspection of boots and shoes for members of the armed services and other matters related thereto.

The said report having been considered, Mr. Nixon moved that it be adopted as the Committee's Third Report to the House.

Motion carried on division.

On motion of Mr. Nixon,—

Ordered,—That the Clerk of the Committee be instructed to return the exhibits filed with Subcommittee No. 2 by witnesses from the Inspection Board of the United Kingdom and Canada, and required for their office records, and those filed by William J. Smith, who was a witness before the Committee.

The Committee adjourned until 4.00 p.m. this day.

AFTERNOON SITTING

The Committee resumed at 4.00 p.m.

Members present: Messrs. Cleaver, Edwards, Fauteux, Ferland, Knowles, McGregor, Nixon, O'Neill, Tripp.

The Committee proceeded to the consideration of its Sixth Report to the House.

Mr. Ferland moved,—

That the said report be adopted and presented to the House.

Motion carried on division.

By unanimous consent, the Committee gave reconsideration to the report of Subcommittee No. 2, adopted at the previous sitting.

The said report was further amended by adding the following recommendation:

That steps be taken to institute inspection and suitable identification of sole leather at the tanneries, and that shoe manufacturers should be compensated by an increase over their basic contract price as an incentive to the use of the higher gauge leather instead of keeping their costs down by keeping as close as possible to minimum specifications.

Mr. Nixon moved that the amendment be adopted and the report adopted as amended.

Motion carried on division.

Mr. Tripp, Chairman of Subcommittee No. 4, presented a report of the said subcommittee on the manufacture of ammonium nitrate at Calgary.

The said report having been considered, Mr. Knowles moved that it be adopted as the Committee's Fourth Report to the House.

Motion carried.

The Chairman thanked all members of the Committee for their co-operation and the Committee adjourned *sine die.*

R. ARSENAULT,
Clerk of the Committee.

REPORTS TO THE HOUSE

First Report

Thursday, February 24, 1944.

The Special Committee on War Expenditures begs leave to present the following as its First Report: Your Committee recommends that it be empowered:—

1. To sit while the House is sitting and notwithstanding any adjournment of the House, and to adjourn from place to place.

2. To determine the manner and extent to which the evidence, proceedings and reports shall be printed or typed, and that where the same are ordered to be printed there be printed 500 copies in English and 200 copies in French, and that Standing Order 64 be suspended in relation thereto.

3. To appoint subcommittees, to fix the quorum of any such subcommittee and to refer to such subcommittees any of the matters referred to the Committee; any such subcommittee so appointed to have power to send for persons, papers and records and to examine witnesses under oath or otherwise, to sit while the House is sitting and notwithstanding any adjournment of the House, to adjourn from place to place, and to report from time to time to the Committee.

4. To employ such staff as it may deem necessary.

5. In cases where consideration of national security precludes the publishing of certain recommendations and of the arguments upon which they are based, to address a memorandum to the Prime Minister for the consideration of the War Cabinet, provided that the Committee shall, whenever it has exercised such powers, report the fact as soon as possible to the House.

Your Committee further recommends:

1. That during any adjournment of the House its Reports shall be deemed to have been tabled when filed with the Clerk of the House and seven days have elapsed after the date of such filing.

2. That six members constitute a quorum and that Standing Order 65 (3) be suspended in relation thereto.

All of which is respectfully submitted.

HUGHES CLEAVER,
Chairman.

Second Report

Saturday, August 12, 1944.

The Special Committee on War Expenditures has received from its Subcommittee No. 1 the following report on aircraft production which it has considered and adopted as its Second Report to the House.

Report of Subcommittee No. 1

Subcommittee No. 1 was appointed on the third day of March, 1944, to inquire, *inter alia*, into the following:—

All Air Services Estimates. War Appropriation 1944-45 excepting Item 5.

Your subcommittee begs to present its first and final report of findings and recommendations with respect to aircraft production, as a supplement to report of Subcommittee No. 1 bearing date January 27, 1943. In the course of its

inquiry your subcommittee revisited the plants of de Havilland and Victory near Toronto and of Fairchild and Vickers near Montreal, as these plants were in the stage of production change-over at the time of the committee's previous visit. The subcommittee also visited the plants of four main sub-contractors. The subcommittee held fifteen meetings and examined twenty-four witnesses.

All of which is respectfully submitted.

HUGHES CLEAVER,
Chairman, Subcommittee No. 1.

1. Your subcommittee made a full inquiry into the subject of aircraft production in Canada, during its sittings in 1942 and 1943. Since its inquiry no contracts for the production of new types of aircraft have been entered into and the only changes which have occurred with respect to the prime contractors are the expropriation by the government of the Victory Aircraft Plant at Malton and the appointment of a Controller at the de Havilland plant.

2. The following is a statement showing the total production of aircraft as of June 30, 1944, and the balance still to be produced under existing contracts:—

Manufacturer	Type of Aircraft	Number Ordered	Number Accepted to June 30	Balance to produce from June 30
Boeing Aircraft Limited.....	Shark	15	15	....
	P.B.Y.	380	233	147
Associated Aircraft Limited...	Hampden	160	160	....
Canadian Car & Foundry.....	Grumman	15	15	....
	Hurricane	1,451	1,451	....
	S.B.W. 1	1,000	196	804
	S.B.W. 1 (Mod.)	30	24	6
Canadian Vickers Ltd.	Delta	8	8	....
	Stranraer	32	32	....
	P.B.Y.	369	112	157
De Havilland Aircraft of Canada Limited.....	Tiger Moth	1,384	1,384	....
	Menasco Moth	136	136	....
	D.H. 98 Bomber	670	276	394
	D.H. 98 (F. Bomber)	773	1	772
	D.H. 98 Trainer	57	....	57
Fairchild Aircraft Ltd.	Bolingbroke	626	626	....
	S.B.F. 1	300	50	250
	S.B.F. 2	280	....	280
	S.B. 2C-1 Modif.	125	125	....
Federal Aircraft Limited.....	Anson II	1,832	1,832	....
	Anson V	1,300	742	558
Fleet Aircraft Limited.....	Fleet El. Trainer	431	431	....
	Fleet 60	101	101	....
	Cornell	500	500	....
	P.T. 23	93	93	....
	P.T. 26A	1,142	1,142	....
Noorduyn Aviation Limited...	Norseman	350 / 796 } 1,146	539	607
	Harvard	3,120	2,278	842
Victory Aircraft Limited.....	Lysander	225	225	....
	Lancaster	600	81	519
		18,301	12,908	5,393

The total amount of capital assistance extended to this branch of war production as of March 31, 1944, is as follows:—

Program—	*Allotment*
Anson	$ 2,523,809 43
Cornell	1,454,610 51
D.H. 98 (Mosquito)	10,436,105 84
Harvard	3,587,143 92
Hurricane	79,509 75
Lancaster	7,313,080 97
Norseman	1,676,342 14
P.B.Y.	11,090,951 25
S.B.W.-1 and S.B.F.-1	6,223,770 71
Overhaul Program	15,588,707 34
General	8,589,418 01
Total	$ 68,563,449 87

As to all of our capital expenditures the Crown has title to the assets produced by the expenditures with minor exceptions as to rehabilitation of and additions to existing plants. The total amount of capital expenditures as to which the Crown has no title is $207,442. In addition to capital assistance special depreciation has been granted to these industries, mostly in regard to sub-contractors with respect to expenditures of a total amount of $5,996,005.25. From this amount should be deducted the post-war value of these assets which has been fixed at $993,458, and in order to arrive at the net amount of special depreciation extended the normal depreciation with respect to these assets should also be deducted.

Recommendations

As a result of its investigations to date the subcommittee makes the following recommendations in addition to those already submitted in its report dated January 27, 1943.

(*a*) That a plan of profit-sharing by labour now in operation at the Vickers plant at Montreal should be carefully studied by all other manufacturers in this industry and so far as possible should be universally used. This plan has resulted in an increased production and substantially lower cost per plane. Not only is production speeded up but the savings greatly exceed the cost of the bonus.

(*b*) As to the Victory Aircraft plant at Malton this plant is now well managed and is maintaining its estimated production. Your subcommittee is of the opinion that a large percentage of the cause for disappointing results in the past at this plant is due to the fact that the plant did not have long term contracts but was constantly changing its production as well as the fact that it is definitely handicapped by the fact that it is located too far from any large urban centre. At the time of its first visit to this plant the subcommittee urged that transportation facilities for workers should be improved and that some transportation allowance in addition to wages should be considered. While considerable improvement has been achieved in regard to this problem your sub-committee believes that if anything further can be done in this regard it will have beneficial results.

(*c*) That active steps should be taken now to plan for the post-war problem which will arise when the war is over with respect to Canadian aircraft plants and that with this end in view as to any new orders which may be undertaken on either United Kingdom or United States account they should be with respect to army transport planes rather than fighter craft or bombers.

All of which is respectfully submitted.

HUGHES CLEAVER,
Chairman.

THIRD REPORT

SATURDAY, August 12, 1944.

The Special Committee on War Expenditures has received from its Subcommittee No. 2 the following report which it has considered and adopted as its Third Report to the House.

REPORT OF SUBCOMMITTEE No. 2

Subcommittee No. 2 was appointed on the third day of March, 1944, to inquire into the following:—

(*a*) All Army services estimates, War Appropriation 1944-45, excepting Item No. 4 which is construction purchase, repairs and operating expenses of properties;

(*b*) Item No. 5 of Naval services estimates, War Appropriation 1944-45, and Item No. 5 of Air Services estimates, War Appropriation 1944-45, these items being for personal supplies and services, viz., food, medical and dental stores, clothing and personal equipment.

Your subcommittee begs to present its first and final report of findings and recommendations with respect to the provisioning of footwear for the armed services of Canada.

The subcommittee held fifty-four sittings, all of which were held in secret in accordance with the direction of the General Committee. The subcommittee heard twenty-nine witnesses all of whom were sworn before giving their evidence, which comprised six hundred and eighty-three typewritten foolscap pages and eighty exhibits. The subcommittee visited the plant of one shoe manufacturer in Montreal, as well as the shoe repair and rebuilding depot operated by the Army in that city.

All of which is respectfully submitted.

MANLEY J. EDWARDS,
Chairman,

Subcommittee No. 2.

Scope of Inquiry

The scope of the subcommittee's inquiry embraced the acquisition, control and distribution of essential materials and the processing of same; the specifications of service footwear; the methods and controls used in estimating service requirements; the awarding and distribution of manufacturing contracts; and the prices paid; the methods and procedures adopted for inspecting the manufacturing process, component parts used and the finished product; the practices in the respective services in regard to provisioning, fitting, repair and replacement of service footwear and the salvage and disposal of same when no longer serviceable.

Procedural

Your subcommittee had before it responsible officers of the Army, Navy and Air Force; officials of the Department of Munitions and Supply, the Inspection Board of the United Kingdom and Canada, hereinafter referred to as the "Board", the Wartime Prices and Trade Board and their technical advisers; representatives of the leather tanning and shoe manufacturing industries; as well as Mr. James Clark and Mr. W. J. Smith, both former employees of the Board.

By arrangement with the Chairman, Mr. Clark accompanied by his Counsel appeared before the subcommittee on April 25th and 26th and after having

first been advised by the Chairman that all sittings of this subcommittee were in secret and what was said and done must be so regarded by all who were privileged to be present, Counsel for Mr. Clark tendered to the subcommittee a typewritten summary of his client's charges and the reply of the Board thereto, as published in the Toronto Globe and Mail newspaper on the second day of February, 1944, and then announced that his client would not give any evidence unless the subcommittee sat in open session. A motion having been put and defeated that the subcommittee request the General Committee for leave to sit in open session, Mr. Clark and his Counsel, as well as three members of the subcommittee, two from the Progressive Conservative Party and one from the Social Credit Party, withdrew from the sitting. On the following day, April 26th, Mr. Clark having been formally summoned to appear before the subcommittee, did so, but refused to be sworn. The subcommittee having adopted the practice of swearing all witnesses appearing before it, refused to hear Mr. Clark until he had been sworn, and he having refused to take the oath, withdrew from the meeting and did not subsequently appear before it.

Your subcommittee draws attention to the fact that when on the previous day Mr. Clark, his Counsel and three members of the subcommittee withdrew from the meeting, no testimony other than an unsworn and impassioned speech by Counsel had been heard in support of Mr. Clark's allegations and yet all saw fit to disregard the obligations of secrecy imposed upon witnesses and committee members alike. The fact that the Opposition members of your General Committee had previously taken an appeal to the Speaker of the House of Commons against the decision of the General Committee that all subcommittees must in the absence of special permission from the General Committee, sit in secret, and that the three members knowing of this ruling saw fit to not only recount to an expectant press reporter from the *Globe and Mail* the incidents above referred to, but have since absented themselves from all sittings of this subcommittee, is one which this subcommittee feels should be reported to the House of Commons in order that it may properly appraise the weight or value to be attributed to these reports, and the justification for the actions of the committee members who withdrew from the sittings and have since absented themselves therefrom. Your subcommittee further draws attention to the fact that the gravamen of Mr. Clark's charges are directed against officials of the Board which is the creation of the Government of Great Britain as well as of Canada by whom it is jointly maintained, and for whose operations, maintenance and actions the two governments are jointly responsible. It is not unreasonable to assume in any injquiry by this subcommittee that the same practice of secrecy would be followed as is done in Great Britain by similar committees appointed to conduct inquiries into governmental war expenditures.

Specifications for Service Footwear

Prior to November, 1941, each of the Services provided their own specifications for their footwear requirements. On the above date a joint Standing Committee on Specifications for clothing and shoes was set up composed of representatives from the Army, Navy and Air Services, together with representatives from the National Research Council and the Department of Munitions and Supply. This committee is a purely advisory one, but performed a very useful service as a clearing house for information and new ideas, not only for the improvement of Service footwear as revealed by the experience and experiments conducted by the Services and the National Research Council, but in recommending modifications in these specifications to meet fluctuations in the supply and availability of the raw materials and the manufacturing capacity of the nation to meet the competing demands as between the Services themselves and the requirements of the civilian population.

Your subcommittee is of the opinion that the Chairman and personnel of this Advisory Committee on Specifications or any committee which may succeed it, should not only be composed of the most capable and experienced technical experts of the various departments concerned, but be enlarged to include the technical experts as well of the civilian producers, processors and manufacturers. Any difficulties heretofore encountered have arisen by reason of sudden and large demands from the Services for Service footwear and uncertainty as to available supplies of leather and components to meet the demands. It is a satisfaction to know that since the outbreak of war the life of Army footwear by careful inspection and reports, has been prolonged from six months to ten months. It is a satisfaction to know that the Services are continuing their investigations and experimentation in conjunction with the National Research Council with a view to improvement of Service footwear consistent with the available supply of raw materials and the manufacturing capacity of the country.

Some limited and localized complaints followed the adoption of a cork and resin filler which is a compound most commonly used in civilian footwear regardless of the price thereof. While no general complaints were made in regard to the use of this filler which is still used in nearly all Service footwear other than the Service boots, the committee recommend that felt should be readopted as the filler as soon as the supply of this material was available.

Early in 1942 there was an increased demand for Service footwear in the Army occasioned by rapid increases in enlistments and the adoption of a new "boot, ankle, C.A.C." required for the mechanized and armoured units overseas. To supply these increased requirements presented a problem to the suppliers of leather as well as to the shoe industry. There was at the time a prospective diminishing supply of suitable domestic hides and an increased demand upon shared available foreign supplies, some of which had been lost by reason of enemy action. To meet what threatened to be a desperate situation, a concession was made to the tanners and manufacturers with regard to gauge and quality of sole leathers and the Air Force found it possible to postpone some of its requirements. Fortunately, both the foreign and domestic supply improved later in the year and the shortage was not as great or prolonged as had been anticipated. It was found that of the 1,005,204 pairs of boots and shoes produced between November 5, 1942, and February 28, 1943, the period during which the concession was in force, in less than 8 per cent of the boots and shoes produced was any advantage taken in regard to the gauge of sole leather used. That some of the Services had overestimated their requirements and that the suppliers had underestimated available and prospective supplies of materials and thereby induced the committee to recommend to the Services amendments to their shoe specifications is something that cannot be charged against this committee, but does emphasize the importance of seeing to it that there should be the closest liaison between the Armed Services, the manufacturers and producers of material in order to avoid exaggerated estimates of service requirements and accurate, factual evidence of available supplies.

The subcommittee was impressed with the possibility of improving the character, wearing quality and durability of sole leathers and while passing no opinion on the validity of the claims of impregnated leathers or synthetic substitutes for leather, it does recommend that these be given fair and adequate trials to establish their relative merits and adaptability for service footwear having in mind that present foreign hide supplies have already diminished and may entirely disappear.

The subcommittee feels that a determined effort should be made to standardize the design, model and construction of service footwear in all Services, where used for the same or similar purposes. While recognizing that

a special design and construction may be necessary in footwear for special kinds of work, it nevertheless feels that a substantial saving could be effected in material, manufacturing equipment and cost as well as in the cost of maintaining reserve emergency stock and the availability of same, if this is found possible. Your subcommittee finds it difficult to believe that in time of war at least, a man entering any of the Services requires a work boot, walking out shoe or rest shoe, made on a different last with a different design or pattern and of a different construction to that worn by the same man performing the same or similar work in any of the three Services.

High gauge and good quality sole leather is admittedly the foundation of good shoes, and in order to ensure that all available supplies find their way into service footwear your subcommittee recommends that steps be taken to institute inspection and suitable identification of sole leathers at the tanneries and that shoe manufacturers should be compensated by an increase over their basic contract price as an incentive to the use of the higher gauge leathers instead of keeping their costs down by keeping as close as possible to minimum specifications.

Awarding of Contracts

Since setting up of the Department of Munitions and Supply all demands of the three Services for footwear and repair materials are contracted for by this department. The increasing requirements of the armed services for footwear, all of which is manufactured by the Goodyear welted process, created a condition where as high as 75 per cent of the productive capacity of all welted shoe manufacturers (30 in number with a normal weekly peak capacity of approximately 100,000 pairs) had to be used. The general practice adopted has been to call for tenders, and then with the price of the lowest bidder as a guide to negotiate with the individual firms in an endeavour to have them approximate the lowest price, having due regard to the actual production costs of each firm. The maximum price variance in this regard is less than 8 per cent. The manufacturers generally were reported as co-operative despite the disruptions of their normal civilian production. The department has an effective control instrument through its priorities control of hides and leather, and in this way is able when and if necessary to command any situation. The manufacturing costs and the profits are subject to careful inquiry by this department, and while the price of service footwear has risen, as in the case of the Army boot from an average of $4.50 per pair in 1940 to $5.50 in 1944, which is accounted for by cost of living bonus, wage increases and increased cost of material, the evidence showed that the profits were below 5 per cent on sales and did not exceed 18 cents per pair. The major difficulties and complaints of the manufacturers arise from fluctuations in service footwear demands which disrupt civilian production schedule and disorganize manufacturing processes in plants.

With respect to the awarding of contracts your subcommittee makes the following recommendations:—

(*a*) Orders should be placed with manufacturers a sufficient period of time in advance of delivery dates to permit the manufacturer to maintain a steady flow of production. Peaks and depressions in production are wasteful.

(*b*) Contracts to individual firms should in regard to types be issued to those firms which on account of their factory facilities and the training of their personnel are especially suited to achieve the best results with respect to the different types.

(c) There are many sizes and widths of footwear produced in every type. These sizes should be rateably distributed among each of the manufacturers to whom contracts are awarded for a given type. Each individual contractor should not be required to go to the delay and expense of producing all sizes and widths in any one type.

Provisioning of Service Personnel

The evidence submitted shows that greater care and expert attention has been given by all services to not only providing better boots and shoes, but seeing that the service personnel are properly fitted by experts assigned for this purpose. The committee commends the responsible officers for having instituted a system of regional repair depots operated by service personnel wherein footwear is repaired more speedily and at a substantial saving to the nation in repair costs, with greater efficiency, and with question to comfort of the wearer who now receives back after repair the shoes to which his feet have been accustomed.

Your subcommittee found that surpluses had accumulated of very small and very large sizes earlier in the war in anticipation of accessions to the army, which were not realized, and that with the adoption of the new boot some quantities of the old last (469) accumulated in the army depots, but these surpluses were all disposed of without monetary loss to the army either by sale to allied nations or other agencies of the government.

Inspection

Inspection of footwear in the previous war was limited to inspection by the services of the finished product in ordnance depots. In this war, inspection starts at the source. The components, the manufacturing processes, and the footwear in process of production are constantly under inspection by civilian inspectors employed by the Inspection Board. The fact that the Inspection Board, which has responsibility for the inspection of all types of war supplies and equipment, purchased by both Governments in Canada and in the United States, employs a staff of over 15,000 personnel and has had over 40,000 employees during its lifetime will give some indication of the magnitude of its task. Inspection results depend upon the qualifications of the individual inspectors and their honesty. The fact that in this vast army of inspection personnel difficulties or complaints have arisen in respect to a negligible number speaks well for the efficiency of the Board and its administrative officers, as well as for the competence and integrity of its employees. It need scarcely be stated that the quality of Canadian war equipment, and in particular the service footwear, is a tribute to the diligence and integrity of the producers and the Inspection Board, which opinion is shared by your subcommittee, after an exhaustive inquiry into the Board's methods and operation.

Clark and Smith Charges

As to the Clark and the Smith charges the subcommittee made thorough inquiry with reference to all of the matters referred to in these charges to determine as to whether any organization changes should be made or any additional safeguards should be instituted to protect the interests of the public purse, but found that any necessary action in this regard had already been taken by the Inspection Board. When the Canadian War Expenditures Committee was appointed it was patterned after the British Committee and Parliament clearly indicated that it was to function in the same manner as the British Committee. It is not a Public Accounts Committee nor is it a scandal hunting committee. The sole task of the War Expenditures Committee is to effect economies in our war effort. At the time of its appointment it was given the power to inquire into past as well as current expenditures whereas the British committee was only empowered to inquire into current expenditures.

At the time of the appointment of the Canadian War Expenditures Committee it was clearly indicated to the committee that any inquiry which it might make into past expenditures should be for the sole purpose of effecting present and future economies. This practice, notwithstanding repeated criticisms, has been universally followed and in the present instance should be strictly adhered to on account of the fact that the Inspection Board is the creature of the British as well as the Canadian Government.

As a result of its inquiry your subcommittee finds that no additional inspection safeguards to those already in force are necessary. Occasional infractions by and isolated indiscretions of inspectors have occurred but when discovered were adequately dealt with by the Inspection Board. Your subcommittee fully appreciates the fact that those sponsoring the charges will not be content with anything short of a public inquiry and punitive action should the facts justify it. All of the normal remedies are still available but this subcommittee does not feel that it should usurp the functions of the Public Accounts Committee or the courts.

Finding

The Canadian Army boot is unquestionably the most important of all service footwear requirements both as to quality and quantity. The present Canadian Army boot is in the opinion of all suppliers of material, manufacturers and technical experts, not only superior in every respect to the boot supplied to the Army in the last Great War, but is superior to that being supplied to any part of the civilian population regardless of price. In material, design, construction, fit, foot comfort, durability and repairability it can be confidently stated that this boot manufactured for the most part from Canadian material by Canadian workmen in Canadian factories and supplied to our Canadian soldiers, is now the equal, if not superior, to the boot supplied to any soldier anywhere, and the same may be said with equal assurance with respect to the essential footwear supplied to the Navy and Air Force, and your subcommittee is gratified to be able to report that this opinion is shared by the service personnel who wear them.

All of which is respectfully submitted.

HUGHES CLEAVER,
Chairman.

FOURTH REPORT

SATURDAY, August 12, 1944.

The Special Committee on War Expenditures has received from its Subcommittee No. 4 the following report which it has considered and adopted as its Fourth Report to the House.

REPORT OF SUBCOMMITTEE No. 4

Subcommittee No. 4 was appointed on the 8th day of March, 1944, to inquire *inter alia* into the following:—

Manufacture of Ammonium Nitrate at Calgary

Your subcommittee begs to present its first and final report of findings and recommendations with respect to ammonium nitrate.

All of which is respectfully submitted.

J. P. TRIPP,
Chairman,

Subcommitte No. 4.

1. The Crown owns a plant at the City of Calgary which was built for the express purpose of manufacturing nitric acid and ammonium nitrate, solely for war purposes. This plant was built under the supervision of Canadian Industries Limited and Consolidated Smelters Limited, which Companies placed all information at their disposal, as well as trained staff, and which services were supplied by the Companies without profit. The agreement provided:—

> "The Government agrees that at all and any times during which the plant is being operated by or for the Government, the products of the plant shall be used only in the manufacture of military explosives."

And in addition the agreement gave the companies an option to purchase in the following terms:—

> "The Government agrees that it will not dispose of the plant or any part thereof whether by sale or upon lease or licence or otherwise howsoever without first offering the plant or such part thereof to the Consolidated. If such offer does not result in the disposal of the plant or such part thereof to the Consolidated the Government agrees that it will not until the expiration of fifteen years next ensuing after the termination of the present war dispose of the plant or any part thereof to any third party whether by sale or upon lease or licence or otherwise howsoever without first giving to the Consolidated an opportunity for thirty days to acquire the plant or such part thereof as the case may be at the same price and upon the same terms and conditions as the Government is able to obtain and is willing to accept from such third party. The Government agrees that any such offer shall include the land on which the plant or part thereof being dealt with is erected and undertakes to procure all proper assurances of such land according to the circumstances together with the benefit of all servitudes thereof, and hereby intervenes the said Consolidated which hereby accepts the stipulations made for its benefit in this clause."

2. During the operation of the plant for war purposes surpluses developed and on account of the scarcity of commercial fertilizer, caused by the war, research work was done and a process was perfected for the production of commercial fertilizer, which has been sold in Canada and abroad at a profit. This was prohibited by the agreement but the consent of the company was obtained to it.

Recommendations

As a result of its investigations the subcommittee makes the following recommendations:—

(*a*) That the plants at both Calgary and Niagara Falls should remain the property of the Crown and should be operated as a government enterprise for the purpose of the manufacture of ammonium nitrate for the use of Canadian agriculture and other chemicals. The subcommittee fully appreciates the fact that this recommendation is contrary to the existing agreement but believes that the manufacture of ammonium nitrate and other products is of sufficient importance to Canadian agriculture that the terms of the agreement should be renegotiated after the war.

All of which is respectfully submitted.

HUGHES CLEAVER,
Chairman.

FIFTH REPORT

SATURDAY, August 12, 1944.

The Special Committee on War Expenditures has received from its Subcommittee No. 3 the following report on the rubber situation in Canada, which it has considered and adopted as its Fifth Report to the House.

REPORT OF SUBCOMMITTEE No. 3

When Subcommittee No. 3 was appointed on March 3, 1944, it was allotted, inter alia, the following subjects: Government owned Companies and Department of Munitions and Supply estimates, war appropriation 1944-45.

When your subcommittee first met, it decided to make a review of the activities of Polymer Corporation Ltd., a government-owned company incorporated in February, 1942, for the manufacture of synthetic rubber.

This decision was prompted by the interest of the general public in the rubber situation in Canada and the speculations as to the advisability of investing nearly 50 million dollars in a plant erected at Sarnia by that Company.

After devoting five meetings to the evidence of the officers of Polymer Corporation, it became apparent that in order to present the facts clearly to the House and to the public, it was necessary to look into all the aspects of the rubber problem.

Rubber is not only one of the vital necessities in the war machine; it is manifestly a necessity of our economic life, and no citizen of our country is disinterested in the outcome of the Government's effort to ensure adequate supplies.

It was therefore considered highly advisable by your subcommittee to make a thorough study of the question in order that the public might obtain a fuller knowledge of the problem and be able to understand some of the steps that have been taken by the Government both for the conservation of existing supplies and for the maintenance of adequate rubber stock piles.

The survey covered the following matters:—

1. The rubber situation and rubber stock pile as at December, 1941.
2. Steps taken towards the conservation of existing supplies; rationing of rubber and of motor vehicles; army regulations on use of motor cars;
3. Scrap and reclaim rubber.
4. The possibility of domestic production of natural rubber.
5. Synthetic rubber.

Your subcommittee heard eighteen witnesses and held sixteen meetings, all in camera, between March 14 and June 6, 1944, and visited the plant of the Polymer Corporation at Sarnia on May 24, 1944.

The evidence received related directly to two of the Government owned companies that is: Polymer Corporation Ltd. and Fairmont Company Ltd., and it dealt with the Munitions and Supply estimates for the office of the Rubber Controller and the office of the Motor-Vehicles Controller.

Other evidence submitted dealt directly with the rubber situation although it did not come under any of the specific items referred to your Subcommittee.

A number of scientists gave evidence concerning the different methods that could have been used in producing synthetic rubber as well as on the research made regarding the possibility of supply from domestic rubber plants. Other evidence adduced had reference to Army regulations concerning the use of rubber and to the different methods adopted by the Department of Munitions and Supply and by the Army for testing synthetic rubber.

Your subcommittee begs to present its first and final report of finding and recommendations with respect to "the rubber situation in Canada". All of which is respectfully submitted.

L.-PHILIPPE PICARD,
Chairman, Subcommittee No. 3.

Rubber Situation and Supply Stock Pile in December 1941

In order to pass judgment on the advisability of spending vast sums of money to finance the manufacture of synthetic rubber, we have to revert to December 1941 when the Japanese victories in the Far East cut us off from 90 per cent of our source of rubber supply. This brought about a situation responsible for the Government's policy on synthetic rubber production.

In our normal peacetime economy, prior to September 1939, Canada's average yearly consumption of crude rubber was 34,400 long tons. Additional demands of the war brought our yearly consumption in 1940 and 1941 to slightly more than 50,000 tons a year. In 1941 notwithstanding the fact that the manufacture of rubber products for civilian accounts was wholly stopped in the very early part of December we had on hand slightly less than 50,000 tons of rubber. We imported a considerable quantity during the year, and at the end of 1941 we had less than 30,000 tons of rubber, a quantity insufficient to take care of our normal peacetime requirements.

That constituted Canada's largest supply of crude rubber in its history and was due to a wise program of stock piling which had been in operation for some months.

In May 1940, Fairmont Company Ltd. was incorporated as a government owned corporation to deal in critical materials as authorized by the Minister of Munitions and Supply.

The main function of the Company was to purchase and store crude and synthetic rubber and to sell and distribute it to manufacturers on allocation of the Rubber Controller.

The primary reason, however, for the incorporation of the company, was to purchase and store a reserve supply of crude rubber of British origin to be available for use in the manufacture of military equipment. In view of the presence of enemy submarines and surface raiders in the Pacific in early 1940, it was thought prudent to have in Canada such reserve stock for use in case of emergency although at that time it was contemplated that the supply from the East would be completely cut off.

On the day following incorporation, the Company negotiated the purchase in Malaya of 1,040 tons of crude rubber and in July, 1940, a further 1,500 tons were purchased through New York rubber dealers. In October, 1940, an agreement was signed between His Majesty's Government in Canada, the International Rubber Regulation Committee and Fairmont under which the Government agreed to advance to Fairmont the money necessary to purchase up to 18,000 tons of crude rubber to be held as a reserve stock, and the International Rubber Regulation Committee agreed to permit the release of a sufficient quantity of rubber to accomplish this purpose. In this agreement, purchase price limits were set and a program for the release and sale of the reserve stock was formulated.

Currently with the signing of this agreement, agreements were entered into between Fairmont and thirteen Canadian rubber companies under which these companies agreed to continue their current purchases of crude rubber for their own account in sufficient volume to meet their current requirements and to maintain, either within Canada or in transit to Canada, until the end of the present war, a trade stock of crude rubber totalling 7,500 tons in all.

The rubber companies further agreed to store for Fairmont Company the 18,000 ton reserve stock to be purchased. In return, Fairmont Company agreed to purchase from each company that company's stock of rubber on hand at that time over and above its agreed proportion of the 7,500 tons to be held for its own account.

Each manufacturer agreed to extend his buying facilities to Fairmont free of cost for the purchase of the proportion of the 18,000 tons to be stored by that manufacturer.

Fairmont purchased rubber under this arrangement until early in August, 1941. It was then deemed expedient to bring the Company's buying policy more closely in line with that of Rubber Reserve Company and a rubber buying committee was appointed. This committee consisted of the president of Fairmont, acting as chairman, and five other members designated as buying agents for the company. These five members were chosen one each from the five large Canadian rubber companies having buying connections in the Far East. Four of these companies are subsidiaries of the American rubber companies which at that time were acting as buying agents for Rubber Reserve.

By Order in Council No. P.C. 7191, dated September 12, 1941, Fairmont was authorized to buy rubber from any person in Canada and it was ordered that no other person in Canada should buy rubber from anyone except Fairmont. Fairmont was also instructed to use every effort to increase the reserve supply from 18,000 tons to 50,000 tons by April 1, 1942, and to maintain the reserve at that figure unless otherwise directed by the Rubber Controller. Any and all rubber sold by Fairmont was to be sold at prices set by and on allocation of the Rubber Controller and subject to such restrictions as he should from time to time impose. At the same time the order instructed the minister to cancel the agreement with International Rubber Regulation Committee and instructed Fairmont to cancel the existing agreements between Fairmont and the rubber manufacturers.

At this time also the buying committee was instructed to employ rubber dealers to assist in securing our requirements in the Far East.

Naturally the outbreak of war with Japan on December 8 seriously affected the operations of the company, but despite the fact that there were heavy purchases of rubber awaiting shipment at Singapore and other far eastern points, the Government instructed the Company to continue to purchase rubber for shipment to Canada. It was felt that despite the possibility of loss through enemy action it was important to continue to buy rubber and have it available to load any and all vessels that might become available.

When the rubber producing areas of Malaya were overrun by the Japanese, it became necessary to purchase rubber wherever available. At this time, on representations of Fairmont, all import duties on rubber in Canada were lifted.

Fairmont importations of crude rubber from the Far East ceased in September, 1942, the last shipment arriving from Ceylon in that month. In April, 1942, Fairmont stocks of certain grades of crude rubber had declined to such a point that it became necessary to secure new supplies. By arrangement with Rubber Reserve Company purchases were made from them, at their current selling prices to their own manufacturers, of sufficient rubber to bring our supply in these grades to a five-month position ahead. Since that time we have made seven additional purchases from Rubber Reserve—that is drawing down on the American stock pile.

It is consoling to note that due precautions were taken from the start of the war to build a reserve stock pile of rubber and to control production and sale of rubber. This control of uses of crude rubber and the methods employed for the conservation of existing supplies will be the object of the next section of this report.

But these increased purchases of crude rubber prior to December, 1941, and these Control and Conservation orders could not in any way compensate for the unexpected loss of our crude rubber supplies from the Far East, and our stock pile in December, 1941, although the largest we had ever accumulated was, due to heavy war demands, dangerously inadequate.

It became imperative to spread the available supplies of crude rubber over sufficiently long a period to last until new substitutes were available and a great many steps were taken, some of the most important of which were:—

1. Reduction in uses of crude rubber to approximately 15 per cent of peace time volume for civilian purposes; (treated under conservation).
2. Collection of approximately 25,000 tons of scrap rubber throughout Canada for use in the manufacture of reclaim rubber as a substitute for crude rubber and increase in reclaim rubber manufacturing capacity; (treated under scrap and reclaim rubber).
3. Development of synthetic rubber plant at Sarnia.

Rubber Control and Conservation

In September, 1941, rubber was placed under control and became subject to administration by the Controller of supplies. Already the Fairmont Company had started to purchase rubber in the world market to accumulate a reserve stock pile of crude rubber. It soon became evident, even before Pearl Harbor that war necessities were such that the building of an adequate stock pile was partly dependent on the reduction in the consumption of rubber for civilian use.

Regulations were made effective reducing the quantity of crude rubber which the manufacturers in Canada could process for civilian purposes on sliding scales as follows:—

During October, 1941, 90 per cent of the average monthly consumption for civilian purposes during the 12 month period ending May 31, 1941; November, 85 per cent; December, 80 per cent; January, 1942, 75 per cent; February, 70 per cent; succeeding months, 70 per cent, or such percentage as fixed by the Controller from time to time.

This program was in effect when the Japanese attack on Pearl Harbor completely changed the situation. Three days after this attack, all dealings in new tires and new tubes were prohibited except by permit, and the following day all processing of crude rubber for civilian purposes was prohibited until January 2, 1942. These temporary freezing orders were replaced as rapidly as possible with more permanent regulations which resulted in a reduction of 85 per cent in the use of crude rubber for civilian purposes. The following table gives the outline of the extent to which the use of crude rubber for other than war purposes has been reduced by Rubber Control regulations:—

Average yearly consumption, prewar.....	34,400	long tons
1942 civilian consumption.....	5,031	" "
1943 " "	4,390	" "

By agreement with the Rubber Director in Washington, controls in both countries have been substantially parallel and the rubber stockpile has been treated as a U.S.-Canada reserve. The crude rubber stockpile has been reduced as follows during the past three years:—

Stocks as at Jan. 1/41-42.....	533,344	long tons
January 1, 1943.....	422,714	" "
January 1, 1944.....	139,594	" "

In the same years the following quantities of crude rubber were brought into North America:—

1941	1,029,007	long tons
1942	282,653	" "
1943	55,329	" "

On January 5, 1942, the first rationing order replaced the freezing order. It released tires and tubes in accordance with certain limiting conditions. Under these, no person could purchase any tire, casing or tube whether new, used, retreaded, recapped or repaired, unless it was essential to the operation of a vehicle owned by the purchaser, and unless he had no more tires, casings, and tubes but authorized dealers, dealers in scrap rubber, reclaim manufacturers, and retreaders were exempted from this restriction. No new tire or tube could be supplied for use on any vehicle other than one defined as an "eligible" vehicle.

Except for use by doctors, visiting nurses, ambulances, police and fire departments, and for trucks, buses, and some essential business and public services, no new tires, casings or tubes, other than those used on bicycles could be sold. Taxicab owners, department stores, milk, bread and coal companies, and all others delivering direct to the home, had to get their existing tires retreaded, buy used tires, or do without them altogether.

Those persons or organizations permitted under the order to purchase new tires and tubes, were required, at the time of making the purchase, to prove their need on a form authorized by the Controller, and to deliver a used tire or tube removed from a running wheel or from the spare tire rim. They were forbidden from accepting payment for the old tire.

On May 15, 1942, tire rationing was established and has remained in force until now.

To-day Order No. Rubber 4, as amended, provides the machinery for the rationing of tires and tubes. When Japan entered the war, existing stocks were frozen and rationed tightly until supplies of synthetic rubber were available for replacements. Limited quantities of synthetic rubber are now available for the manufacture of passenger and truck tires and tubes for essential civilian replacement. Because synthetic rubber takes longer to process, existing capacity cannot produce as many synthetic tires as it could natural rubber tires; capacity as well as materials therefore restricts supply.

The method of rationing tires is briefly:—

1. A group of eligible vehicles was described using the following basic points in determining eligibility and degree of essentiality:—

(*a*) Are the services of the individual essential in time of war?

(*b*) Is the vehicle really necessary for performance of the services, considering distance, other transportation service available, and the time element (particularly for skilled individuals and transportation of strategic materials and supplies)?

(*c*) Is the vehicle driven 75 per cent or more in annum mileage to perform such duties?

2. Eligible vehicles were then described in broad detail and divided into priority classes as follows:—

Class A: (Section 5 of Order No. Rubber 4)

Includes practically all trucks (except those used in household delivery of products other than ice, fuel and in some instances milk); and passenger cars used by doctors, nurses, police, firefighting, health, sanitation and public utilities services, transportation of people and goods, and clergy serving two or more congregations or a rural area.

Class IB: (Section 6 of Order No. Rubber 4)

Includes largely the less essential passenger cars in their orders of essentiality. At present priority is given under Section 6 to war workers; company cars for transportation of personnel engaged in essential services; mail carriers; certain National War Finance workers; war production inspectors; agricultural experts, persons engaged in the essential processing of food and food products; certain lumbering activities; taxicabs; and to the extent that quota will permit,

as the group is very large; to farmers who have trucks. Covering farmers' needs is the greatest problem because half of the cars in Class B appear to be farmers' cars. Tires are spread around as equitably as possible, and over a period of time the needs are taken care of, although not always as promptly as desired. Other important individual cars in other paragraphs of Class B are taken care of when the essentiality is sufficiently clear.

Class C: (Section 7 of Order No. Rubber 4)

This class was set up originally to provide a third group of vehicles which were considered worthy of consideration for continued operation if possible. Eligibility for new tires and new tubes may be extended to this class if and when supplies are sufficient. At present they can secure only used tires or tubes if available. Under certain conditions horse-drawn vehicles, farm implements, tourists' cars, a car owned by a farmer who also owns a truck, most of the clergy, and salesmen in essential industry are the major groups included in this classification.

Vehicles without classification:

It has been estimated that approximately 450,000 out of 1,250,000 passenger cars, and about 200,000 out of approximately 250,000 trucks are included in Classes A and B. All other passenger cars, whether used for business or for pleasure, have eligibility for retreading services. All trucks, whether or not provided eligibility for new or used tires, may secure retreading services.

3.—Eligible users may purchase new tires and tubes when:

(*a*) They have no suitable tires beyond those mounted on running wheels and the spare rim;

(*b*) The tire to be replaced is no longer safe for operation with or without repair;

(*c*) A tire ration permit has been approved.

4.—Number of tires available—Quota.

Since only a limited number of tires can be manufactured without interfering with war requirements, and this fluctuates according to the needs of war, a quota has been established to assure that no more tires than can be made available will be distributed, and that a reasonable reserve will be kept on hand against emergency requirements. This quota is broken down by various areas, according to registration and the experience of need.

5.—Method of issuing tire ration permits for purchase of tires and tubes.

Tire rationing officers have been established in 14 regional and 106 local offices of the Wartime Prices and Trade Board to receive applications, determine eligibility class under the tire order, and issue permits for the purchase of new tires and tubes up to the limit of their current quota and in the order of priority as outlined above.

Within the provisions of the Order and of the various letters of instruction on the application of the order, reasonable discretionary power is given to the Tire Rationing Officer because it has been found entirely impracticable to describe sufficiently in detail the greatly varying conditions under which tires are really needed for essential purposes.

In 1942, the allied rubber situation became progressively more serious and it was felt by the Department of Munitions and Supply that the regulation of rubber in Canada was important enough to justify an individual control on that one commodity and on November 2, 1942, the jurisdiction over rubber was removed from the Supplies Control and the new Rubber Control was established.

To complete the very important control of tire consumption it was provided that only the most essential civilian articles such as surgeons' gloves, belting, industrial tubing and waterproof footwear could be made.

Rubber reclaimed from scrap was under the same rigid control and was being utilized to as large an extent as possible in the making of essential war supplies. Some reclaim was being released for civilian use, but only for a restricted list of articles.

By the end of 1942, much had been done to substitute reclaim in whole or in part for crude in making many essential articles, including military tires and other war supplies. Rubber processors were under very tight control, and the rubber they used, whether for war or civilian manufacture, had to be processed according to mandatory specifications. No rubber was released, even for war purposes, except by permit, and no part of the civil allotment could be carried over by a manufacturer from one month to another.

No new passenger tires have been made from crude rubber since Pearl Harbor. In 1943, approximately 542,000 passenger tires were released to those qualifying under the Tire Rationing Order for new tires. These were all old prewar tires, with the exception of 314,000 tires which were manufactured during the year, chiefly from reclaim rubber, although a few were made from synthetic. Some of these reclaim tires were still in inventory at December 31, 1943. In 1944 the program provides for the rationing of 840,000 passenger tires practically all made from synthetic rubber. Manufacture and rationing of adequate quantities of truck tires for essential civilian use has been continued.

Your subcommittee has been supplied with all adequate information on the detail of tire rationing and all restricting orders, the number of tires rationed to each district of the Wartime Prices and Trade Board, and for each category of users, and there is ground for being highly satisfied with the apparent equity which governed the imposition of the restrictions and the application of the rationing orders.

Isolated cases may be found where citizens have suffered from lack of understanding of their eligibility on the part of ration officers, but such cases have been dealt with as efficiently and as promptly as possible by the head office.

Your subcommittee feels that the lack of competence or of diligence of some Wartime Prices and Trade Board officials in some minor cases accounted for the dissatisfaction of the public at times but that on the whole tire rationing has been an efficient and equitable job.

Conservation of Rubber by Army

Your subcommittee felt that at a time when the civilian population was limited to its bare needs in rubber consumption and was the object of strict tire rationing, it was in order to inquire what steps had been taken by the Canadian Army to limit and control the use of rubber and conserve its available supplies of rubber equipment and tires. The Director of Mechanization of the Army, supplied your subcommittee with considerable data and information on the manner in which the Army, conscious of the rubber shortage, had readjusted its requirement programs and passed strict conservation orders.

At the inception of the war, the army program called for the manufacturing of runflat tires. This type of tire, developed by the British shortly before the war, is now known in the U.S. Army as a combat tire and requires approximately twice as much rubber as the normal standard tire.

As soon as the tire situation appeared critical due to the impossibility of getting any more natural rubber, the Canadian Army overseas was asked to ascertain what vehicles could satisfactorily release runflat tires. As a result the number of such vehicles was reduced from approximately 150 types to half a dozen types, consisting of armoured cars, scout cars, reconnaissance cars and certain ambulances where flat tires would be very embarrassing and liable to cause difficulty. Up to that time vehicles used in Canada had been equipped with runflat tires, since the troops in Canada were training with the same type of equipment as that which was being used overseas for some of these vehicles. Immediately a change-over program was started, consisting of produc-

ing standard commercial type tires with ordinary all weather tread, cross country tread, and just the thin wall pneumatic tire which uses less than half the rubber used on the runflat tire. That change-over program took nearly a year to be accomplished. Approximately 10,000 vehicles had to be gone over, with the result that there were piled up in Central Mechanization Depot in London, Ontario, 40,000 runflat tires which had been taken off vehicles in Canada. They were replaced with tires requiring half the quantity of rubber. Those runflat tires which were piled up at Central Mechanization Depot have been diverted into the overseas stream. Vehicles are produced in Canada to-day equipped with runflat tires worn up to 50 per cent, and these vehicles are sent overseas so that the army will still be using those tires even though they have had half the life taken out of them in Canada, and will use them in combat. Surpluses beyond our own requirements have been disposed of to the motor companies to put on equipment going to the British armies or those of other countries under Mutual Aid. At the present time (May, 1944) there are still approximately 10,000 of these tires left. They are going out at the rate of 500 a day.

Up to the time when the rubber situation appeared critical rubber was also extensively used for rubber bogie wheels and rubber track pads on Ram tanks and a number of M-4 tanks in operation in Canada. These rubber track pads are used on the continuous chain that drives the tank. The experimental work on repairing bogie wheels and in repairing these tracks pads proved successful in Canada and experts were sent overseas to set up a plant in a Canadian base ordnance workshop in England where rubber track pads could be taken after they had been worn down and retreaded similarly to retreading an automobile tire.

At the present time no rubber tracks are used in Canada other than retreaded tracks, and in conjunction with the United States, Canadian army has developed a number of all-steel tracks.

One of them is a purely Canadian development known as the Canadian dry pin track, C.D.P. track. This is propelled on mounts being produced in Montreal.

As to the use of rubber on universal carriers, this was the subject of an exhaustive study, but the problem proved to be difficult.

The universal carrier is suspended on three bogie wheels running on a steel track, and even with natural rubber at the beginning some experiments and tests proved that tires only lasted eight miles. Fortunately the rubber companies in Canada were able to develop a rubber which should last up to a thousand miles. Work was done with natural rubber which would enable tires by changing compounds to last as much as 2,000 miles, but not in general use. It is about 1,000 normally. Synthetic rubber was tried on these three wheels, but unfortunately one of them is overloaded. That overloading condition creates heat, and heat being the deadliest enemy of synthetic rubber, it was found impossible to get into synthetic rubber on the bogie tires there. Synthetic rubber is used however in all the idler wheels where they do not take the load. Development work is going ahead on an all-steel wheel.

Other steps were taken by the army to reduce the rubber content on motor-vehicles. Rubber mud flaps as well as rubber strappings on top of tarpaulins were eliminated and rubber strappings were replaced with canvas. Foam rubber cushions were removed from seats. Rubber crash pads to protect the men's heads from crashing against the top of the car when riding in rough territory were removed. Hose lines throughout the hydraulic brakes and air lines, etc., were all checked and have all been changed to synthetic rubber wherever possible. Natural rubber crash padding in tanks was eliminated and afterwards had to be replaced with a synthetic known as koroseal.

Considerable evidence was given to the subcommittee concerning the Special Canadian Army Routine Order dealing with the use of rubber and more particularly the maintenance and care of tires. Your subcommittee was

satisfied that all due precautions were taken by the directorate of mechanization to insure the proper use of tires and their conservation. Enforcement of these orders come especially under the Branch of the Adjutant General. The chain of responsibility goes down, through the Unit Commanders, to the N.C.O. and drivers. Great care was taken for the policing of the army as concerns the application of these orders.

A typical order of that type was the following:—

All commanders will ensure that officers and N.C.O's are instructed that all cases of speeding and negligent operation of Department of National Defence vehicles should be handled as follows:—

(*a*) The number of the car and if possible the name, number and unit of the driver should be ascertained.
(*b*) Where the circumstances so warrant the driver should be placed under close arrest and care taken that the vehicle is returned to its unit or to other proper custody.
(*c*) Where arrest is not necessary the driver should be warned to adhere to regulations.
(*d*) A complete report should be made to the Officer Commanding the Unit or to other proper authorities.
(*e*) All personnel charged with speeding or reckless operation of a motor vehicle shall be immediately grounded and placed under open arrest by the Officer Commanding the unit until such time as the charge is disposed of.

The subcommittee has been given a considerable number of exhibits of rountine orders dealing with the matter; all of which pointed out the extreme emergency of conserving rubber and setting in detail the precautions to be taken therefor.

Provision is also made for the salvage of all rubber no longer useful.

The civilian population may rest assured that all necessary steps have been taken by the army authorities so that the sacrifices that they have been asked to make for conservation of rubber are more than duplicated in the army.

Army activities concerning the conservation of rubber can be summed up as follows:—

An extensive tire maintenance program has been formulated by the directorate of Mechanical Maintenance which has a two-fold purpose:—

(*a*) To prolong the life of tires presently in use by means of preventive maintenance, thereby reducing the demand on the rapidly diminishing crude rubber stock pile.
(*b*) To recondition worn and injured tires through recapping and repairing, thereby returning them for further service.

The execution of proper tire maintenance in the field is under the supervision of officers and other ranks skilled in tire maintenance. Briefly this program is as follows:—

(*a*) Tire maintenance officers and other ranks have been allotted to each military district according to vehicle concentration. The duties of this personnel are educational and directional and they are responsible for the inspection of each tire on every vehicle on their particular area. This includes all wheeled vehicles (trucks, passenger cars, jeeps, trailers, etc.), tracked vehicles (bogie tires and rubber track pads) and artillery gun carriages mounted on rubber tires. Inspections at each military unit are carried out monthly.
(*b*) Two special inspection report forms have been designed; one being a tire report form for use by the tire inspector to record the condition of each tire, the other is a tire summary which summarizes the recom-

mendations for all tires in a unit requiring attention. This tire summary report is prepared in triplicate and distributed as follows:—

one to Unit Commander,
one to Tire Maintenance Shop,
one to N.D.H.Q.

This distribution is to insure control of this activity. The summary report of the officer is considered an authorization and his recommendations are carried out immediately.

(*c*) Twenty-eight tire maintenance shops have been established with sufficient equipment to allow for the execution of tread and sidewall spot vulcanizing, vulcanizing of tubes and the adjusting and repair of valve stems. Physical inspection of casings is properly carried out by the use of power spreaders.

(*d*) The tire maintenance shops co-operate with all units in the various areas regarding the removal, installation and processing of tires and all other relevant questions. This includes road service which is an important factor now that only one of every five vehicles is issued with a spare tire.

(*e*) Vehicle tire gauges are regularly tested for accuracy. To this effect each tire has a master gauge that is used for that purpose only.

(*f*) The location and telephone number of the tire shops are publicized in camp orders and brought to the attention of all officers commanding units.

(*g*) Tire inspectors are constantly striving to obtain the maximum tire life from every casing. They are alert for evidences of the following improper tire operations—"Over and under inflation, external injury, evidence of internal injury distortion, improper mating of duals, misalignment, heel and toe wear, bleeding, missing valve caps, improper fitting of chains, cold patching of tubes, use of tire boots or shoes and failure to rotate tires at prescribed mileages."

3. (*a*) The importance of the drivers' responsibility in the tire conservation program has been stressed, as therein lays the basic essential of tire conservation, that is, the preservation of tires during the period of wear on the original tread.

(*b*) To this effect a tire maintenance pamphlet was published in 1942 outlining the general tire operating conditions within the drivers' control and containing information and instructions on the points referred to in paragraph 2. (*g*) above. Distribution was made to all officers, N.C.Os., mechanics and drivers of wheeled and tracked vehicles.

(*c*) A revised tire inflation table was drawn up based on maximum load capacity for general operations in the field, and correct tire pressures were stencilled on the inside door panel of every vehicle.

4. All tires on Canadian Army vehicles are recapped several times. To ensure that tires will stand several recaps, it is essential that the equipment used must not subject the tire sidewalls to excessive heat. A survey was made and inventory taken of all recapping and retreading plants in Canada and it was discovered that only a limited quantity of this type of equipment was available. It therefore became imperative for the army to install and operate recapping and repair plants at C.M.D., London, Ont., Camp Debert, N.S., and Vancouver, B.C. At the present time the London and Debert plants are in operation. The Vancouver plant is in the process of being installed and should be in operation by the end of July, 1944.

Regarding the policy of tire maintenance followed by the Canadian Army overseas, it is our understanding that it is closely associated with that of the British Army and that British facilities are used.

Motor Vehicle Control

In the course of its review of the rubber situation in Canada, your sub-committee has seen fit to look into the administration of the Motor Vehicle Control because, although it has no direct relation to rubber allotment or tire production, it has an indirect connection with the tire supply problem inasmuch as the Motor Vehicle Control has to do with the production and distribution of motor vehicles.

Activities of this office further came within the purview of our reference in connection with the study of the estimates of the Department of Munitions and Supply.

The functions of this control are to establish manufacturing quotas for motor vehicles and motor vehicles replacement parts, to provide for the conservation of motor vehicles and parts, and to issue permits for the purchase of those items of which it permits the manufacture. It instructs manufacturers what to manufacture and it supervises the distribution in accordance with the actual requirements of the country to keep essential transport moving.

The problem confronting the Motor Vehicle Controller and the original set up of the control can be described as follows:—

1. *Analysis of the problem and planning:*

The automobile industry is one of the largest industrial activities in Canada with millions of dollars invested in plants and equipment.

Supplies and materials are secured from hundreds of subsidiaries and allied industries that have large investments in plants and employ thousands of personnel.

The finished products of the manufacturers are distributed through a nation-wide organization of dealers and distributors, each having large investments in plant and equipment and employing a corresponding number of personnel to carry out the distributing of the products and the servicing and repairing of the product in the hands of the consumer.

Because of the type of equipment required to meet the demands from the armed forces, it was a predetermined fact that the facilities of the automobile manufacturers and their allied industries would be required to produce war supplies to the maximum capacity of their plants.

In the planning of the program for diverting the facilities of the industry from the production of civilian requirements to the production of war supplies and the maintenance of civilian requirements, three major problems had to be dealt with in addition to the many other problems which presented themselves. Those problems were:—

(*a*) Rate at which the conversion would be made to conserve material, manpower and manufacturing facilities.
(*b*) Providing of war supplies as quickly as required and as economically as possible.
(*c*) Provision for civilian requirements, commensurate with production of war supplies.

The industry as a whole was vitally interested in the method of dealing with each problem, with special interests subdivided under the following groups:—

(*a*) Motor vehicle manufacturers.
(*b*) Parts and accessory manufacturers and wholesale suppliers.
(*c*) Dealers or distribution organization.

The Motor Vehicle Controller, therefore, formed three advisory groups under each of the above categories, consisting of the heads of each of the companies concerned, or the appointed directors of the organizations concerned. These groups were officially recognized as Advisory Committees and were so appointed. (For detail—see Schedules (3), (4) and (5).)

The committees met at the request of the controller from time to time, during which meetings all problems pertaining to their particular activity were outlined and discussed.

The advantages of working with committees are here outlined:—

(*a*) Most of the difficulties in connection with any plan could be solved before inauguration of the plan.
(*b*) Securing of sound advice and frank discussions before making final decisions.
(*c*) Knowledge of the problems by each of the representatives permitted them to transmit to their respective companies, or members of their associations the proper interpretations of any actions taken or restrictions necessarily enacted to accomplish the results.

In general, the activities and responsibilities of the Motor Vehicle Control resolved themselves into various categories and the subsequent actions taken in each of the classifications require that they be outlined in the following order:—

(*a*) Restrictions on production of passenger motor vehicles and the program established to meet essential civilian requirements.
(*b*) Restrictions on production of commercial motor vehicles and the program established to meet the demands of essential civilian requirements.
(*c*) Control of production, distribution and sale of motor vehicle replacement parts and accessories to meet civilian requirements.
(*d*) Supply of motor vehicles and replacement parts for essential civilian requirements in foreign countries.
(*e*) Price control of motor vehicles and motor vehicle replacement parts.
(*f*) Activities for conserving motor vehicles, motor vehicle replacement parts, and conservation of critical materials in the production of motor vehicles and replacement parts.
(*g*) Manpower required for the servicing of motor vehicles in operation.
(*h*) Miscellaneous problems, and subsequent action taken to solve the difficulties.

The next statement deals with the restrictions on the production of passenger motor vehicles; that is, vehicles carrying less than ten passengers.

One of the first problems facing the controller was brought about due to the fact that the Minister of National Revenue desired to conserve United States exchange, and, under the War Exchange Act of 1940, established a restricted quota under which passenger automobiles might be imported into Canada. The result of such restrictions tempted some United States manufacturers that had no manufacturing plants in Canada to establish and build passenger cars in Canada to supply the market for which they formerly imported cars.

A development such as this would require the supplying of additional materials and manpower not previously employed.

To prevent such an activity, the Motor Vehicle Controller issued an order No. 001, dated March 23, 1941, to the effect that any person not making automobiles in Canada on the 2nd day of December, 1940, could not establish a plant and make more units in Canada than the quota as established by the Minister of National Revenue. For details—*see* schedule (6).

At this period the controller was also confronted with two major problems—(1) the establishing of a sound and fair basis of restricting production of passenger cars for civilian requirements in order to make available manufacturing capacity for war materials, prevent a "war boom," and encourage the manufacture of the lower priced cars at the expense of the higher priced

automobiles. (2) The co-ordination of restrictions covering the importing of vehicles by manufacturers established in Canada, with the production by the same company, of vehicles in Canada, and for which components were secured from United States source, having as its objective the conservation of United States exchange in accordance with the War Exchange Act wherein the quotas covering imported cars were established from time to time by the Minister of National Revenue.

The first step in solving the problem was taken by issuing an order that all manufacturers of passenger motor vehicles in Canada on and after May 31, 1941, must secure a licence from the controller covering such manufacturing activity, and further to furnish the controller with information, reports, and returns as he may require from time to time. *See* schedule (7).

The second step was approached by securing from each manufacturer a record of the number of passenger vehicles segregated by models which each manufacturer had produced during a reference period April 1 to December 31, 1940, together with the dollar value, in American funds, of the components secured from the United States for each model.

The total value of components imported from the United States was then computed in United States funds and converted into Canadian dollars at a premium of 11 per cent. The total amount in each case was converted to points at the rate of one point for each dollar expended and this was established as total "production points" for each manufacturer.

After a study of the market requirements together with the requirements indicated by the armed forces, it was decided that the civilian production should be restricted during the period April 1 to December 31, 1941, by 20 per cent of the number that was produced in the same period during 1940 and an order was issued by the controller to the effect that during the period April 1 to December 31, 1941, any manufacturer could produce passenger vehicles in such numbers that would absorb not more than 80 per cent of the total production points as established for such manufacturer during the period April 1 to December 31, 1940.

The order further permitted any manufacturer who, during the production period, had not imported automobiles to the full extent of the quota as established by the Minister of National Revenue to add the unused portion in dollar value to his total quota of "production points" for the purpose of producing Canadian made vehicles. Details of the order are set out in schedule (8).

The program covering the production of passenger vehicles for the calendar year 1942 was formulated early in July 1941 following a detailed study by the controller of the Canadian requirements, the supply of materials, the available manufacturing capacity and the requirements of army supplies.

Orders were issued that manufacturers of passenger vehicles in Canada must restrict production during the calendar year 1942 to such an extent that not more than 50 per cent of the production point as set up for the calendar year 1941 for such manufacturer may be used, however, providing that, should the manufacturer not use the total number of points established for him to cover the importation of special passenger vehicles, the unused points may be added to the points as allotted and used as a credit to produce additional cars in Canada.

The effect of the restrictions overall was to reduce total production in 1942 by 50 per cent of the 1941 production, thereby conserving material, manpower and manufacturing capacity and retard the importation of completed models which resulted in the conserving of United States exchange. (See schedule 9 for details.)

In December 1941 the overall Canadian war production programme had been so developed that it could be determined that, in order to carry out the

programme, the production of passenger vehicles must be discontinued as soon as it was economically sound to do so.

A complete study was made of the inventory on hand to produce passenger cars and a meeting was called by the controller of the manufacturers in Canada, and instructions were issued to the effect that parts already fabricated should be assembled into passenger automobiles, the assembly to be completed by March 31, 1942, or as soon thereafter as possible (See schedule 10) and plant capacity, so released, was to be converted as quickly as possible to the production of war materials.

The controller, anticipating the future requirements of passenger vehicles for emergency and essential purposes, ordered that four thousand five hundred units be held by the manufacturers for such purposes. Instructions for the storing, financing and release of the units were to follow as soon as the details could be developed.

A procedure covering the release of a new unit for the reserve "pool" to essential users was developed and the information publicized. It follows here in short form:—

(1) Application forms were distributed to all dealers in Canada, thereby making such forms available to all citizens.

(2) The consumer, if his requirements for any vehicle seemed to warrant it, completed the application forms, setting out the purpose for which the vehicle was required and submitted it to the Motor Controller.

(3) After analysing the application and the duties for which the vehicle was required, the controller referred it to the director-general, controller, administrator, or other government official, under whose jurisdiction the particular activity came, for recommendation as to the necessity of the vehicle for that activity, together with the request for any other information available that might have a bearing upon the granting of a permit for the release of a new unit.

(4) If a request covered a new unit which was to replace a vehicle now being operated by the applicant but considered by him to be no longer serviceable, provisions were made in the application form to have two qualified mechanics examine such a vehicle and a report of their findings made in writing on the application form.

(Qualified mechanics for such purposes were appointed with the assistance of the Federation of Automobile Dealers in every town and city in Canada and to function without expense to the government.)

On the approval of any application, a permit to purchase is issued to the applicant. This permit allows the applicant to purchase the vehicle, which he selects, from the authorized dealer of his choice.

A record was set up in the office of the Motor Vehicle Controller showing the make, model, serial number of every car held in the "pool" together with the name and location of the dealer storing the car.

The permit to purchase as issued to the applicant is presented to the dealer from whom purchase is to be made and the dealer, in turn, uses this permit for clearing the unit with the finance company and for making financial settlement with them.

The finance company completes the permit authorizing the release of the unit and forwards one copy to the Motor Vehicle Controller. This indicates that the unit has been released and that the government has been released from their obligation to the finance company.

Further activities of the Motor Vehicle Control concerned the conservation of motor vehicles, motor vehicles replacement parts and the conservation of materials in the production of motor vehicle and replacement parts.

In that connection an order was issued prohibiting the manufacture of white wall tires as well as the use in newly assembled cars of bright work, metal finish or body trim containing copper, nickel, chrome or aluminum. Spare tires were eliminated from any motor vehicles delivered on or after December 15, 1941. A further order prohibited the use of rubber and metals in the making of motor vehicles accessories except those accessories required by law with a view to effect conservation of materials, conservation of manufacturing capacity and conservation of motor vehicles now in operation and required to maintain the transportation system.

There was initiated a program of reconditioning motor vehicle parts and of acquainting the public with the interchangeability of parts between various makes and models of motor vehicles.

Information on maintenance procedure was widespread with a view to training new men in the repairing and inspection units or parts.

Another objective of motor vehicle control orders was to economize the manpower required for the servicing of motor vehicles in operation.

It is interesting to note that during a period extending over thirteen years, there had been an apparent average yearly total of 61,063 passenger vehicles and 10,839 commercial units scrapped. The problem to be solved was to reverse, if possible, this trend and to maintain these vehicles in operation.

The order that all newly delivered trucks be painted khaki green was mainly due to that effort in saving manpower hours.

In April 1942 a strict control was applied to the production and distribution and sales of motor vehicle replacement parts for civilian use. The production of non-functional parts was prohibited and quotas were established which permitted production of functional parts for passenger vehicles and light trucks at the rate of 70 per cent of the production rate during the year 1941 and, for medium and heavy trucks, passenger carriers, off-the-highway motor vehicles and motorized fire equipment, at the rate of 125 per cent of the production rate as produced in 1941.

This is a differential of 70 per cent for the passenger vehicles and 125 per cent for the trucks and other commercial vehicles. That was done on the basis generally that the passenger vehicle mileage was being severely restricted by the gasoline order and there would not be the necessity for so many spare parts, whereas truck parts would increase.

Your subcommittee got a report on the distribution of permits to large categories of users but a report was not available of the number of permits granted in each province or in each district of the Wartime Prices and Trade Board as had been supplied for tires by the Rubber Controller. Your subcommittee is of the opinion that a better picture of the permit distribution would have been available to the public had it been supplied with a more elaborate detail of categories of users to whom permits were granted and a report as to the number of permits supplied to each district of the Wartime Prices and Trade Board.

The subcommittee was told that there were no records existing of distribution by provinces or districts nor was there a breakdown of items to determine how many had gone respectively to mining, oil, lumber, farming, etc., and that the gathering of such data would require considerable work and time. Repeatedly the subcommittee was told that the controller's office had worked "not on distribution generally but on the essential features of each case" as determined by the permit analysts.

Available figures show that the building program of new truck units was split up among the Motor Vehicle manufacturers as follows:—

	September, 1941		1943 and 1944
	Under 10,000 lbs. gross rating	10,000 lbs. and over gross rating	
Ford	28·6	30·5	29·5
General Motors	29·8	29·5	29·5
Chrysler	23·4	20·0	22·0
International	18·2	20·0	19·0

The distribution was given to the subcommittee in the following manner:—

MOTOR VEHICLE CONTROL

TRUCKS AND CARS RELEASED BY MOTOR VEHICLE CONTROL

January 1, 1943, to December 31, 1943

	Trucks	Trailers	Buses	Cars	Snow-mobiles	Motor-cycles
War Work						
Independent Companies on Defence Work	282	23	..	19	..	..
Government Companies on Defence Work	6	3	..	1	..	..
Department of National Defence	25	1	..	32	..	..
Royal Air Force Ferry Command	3	..	..	1	..	..
United States Projects	1	..	..	..	2	..
Construction: Roads, Docks and Airdromes	181	8	..	4	..	..
Other Direct War Work	44	10	..	29	..	..
Other Indirect War Work	86	3	..	3	1	..
Total	628	48	..	89	3	..
Essential Services						
Medical Services, A.R.P., Red Cross and Public Health	72	..	..	202	23	..
Police	17	..	..	311	..	15
Postal	54	..	..	2	7	..
Public Utilities	237	6	..	12	1	2
Communications	5	..	..	2	..	..
Freight Transportation	358	11	..	..	1	..
Bus Operators	1	1	255	5	20	..
Mining, Lumbering and Oil	1,507	77	..	42	13	..
Government Departments (other than National Defence)	121	4	..	100	1	..
Other Essential Civilian Services	1,280	1	..	39	13	..
Newfoundland Government	12	..	..	..	..	..
Foreign Government	..	..	..	2	..	..
Air Transportation	10	..	..	1	..	..
	3,674	100	255	718	79	17
Grand Total	4,302	148	255	807	80	17

Applications received, January 1, 1943, to December 31, 1943: trucks, 7,710; trailers, 172; buses, 300; snowmobiles, 93; cars, 923; motorcycles, 17; total, 9,215.

MOTOR VEHICLE CONTROL

TRUCKS AND CARS RELEASED BY MOTOR VEHICLE CONTROL

January 1, 1944, to March 31, 1944

	Trucks	Trailers	Buses	Cars	Snow-mobiles
War Work					
Independent Companies on Defence Work	28	4	..	7	..
Government Companies on Defence Work	1	..	..	..	..
Department of National Defence	4	..	..	4	..
Royal Air Force Ferry Command	2	..	5	..	..
Construction: Roads, Docks and Airdromes	74	..	..	3	..
Other Direct War Work	105	2	..	19	..
Other Indirect War Work	64	..	..	..	..
Total	278	6	5	33	..

Essential Service	Trucks	Trailers	Buses	Cars	Snow-mobiles	Motor-cycles
Medical Services, A.R.P., Red Cross and Public Health	30	..	..	123	2	
Police	4	..	..	125	..	
Postal	22	..	..	3	..	
Public Utilities	52	4	..	10	..	
Communications	10	..	..	2	..	
Freight Transportation	110	5	..	..	1	
Bus Operators	..	..	55	..	4	
Mining, Lumbering and Oil	520	27	..	28	2	
Government Departments (other than National Defence)	41	2	..	44	1	
Other Essential Civilian Services	1,155	17	..	77	8	
Air Transportation	25	..	..	2	..	
Total	1,969	55	55	414	18	
Grand Total	2,247	61	60	447	18	

Applications for permits received: trucks, 5,849; trailers, 66; buses, 63; cars, 632; snow-mobiles, 20; total applications received, 6,650.

(The above figures include applications for United States Government Exemption Permits covering: 25 trucks and one trailer.)

Applications for export: 89.

Export production authorized for 79 trucks ex. quota.

The whole question of granting permits for purchase of new trucks was carefully surveyed by the subcommittee as it had been the object of much speculation by the public.

It was stated by the Deputy Controller that all the decisions on the applications submitted to his office were made according to the essentiality of the truck applied for in the maintenance of necessary transport, but that no specific rules existed outside of the principles which were the maintenance of essential transport in the country.

The matter can be better summed up by quoting part of the evidence:—

The CHAIRMAN: What we want to find out is whether there is any rule of procedure or definition in that regard. It would appear that you have not anything very definite to guide you.

Mr. BIRCHARD: No, we have something very definite to guide us.

The CHAIRMAN: You have some regulation or some rule to go by, or is it just the case that you judge each application on its merits and use your own judgment?

Mr. BERRY: These are the instructions issued under the heading, "Proof of essentiality":—

> On receipt of this application, the motor vehicle controller, in the case of trucks, chassis, trailers, or passenger cars (not including taxicabs), and the transit controller in the case of buses or taxicabs, will take such action as may be necessary *to determine that the motor vehicle applied for is absolutely essential and required in the interests of the war program*—such as referring the application for investigation and review to a controller, administrator, director-general, or other government official or agency having jurisdiction over the activity, industry, or operation for which the motor vehicle is required.
>
> The official or governmental agency to whom the application may be so referred shall promptly return same with certificate No. 3, attached to the form, duly completed, stating clearly reason for approval or disapproval as the case may be—
>
> (*a*) to the motor vehicle controller, if the application covers trucks, chassis, trailers, or passenger cars but not including taxicabs;

(*b*) to the transit controller, in the case of applications relating to buses or taxicabs. The transit controller will, in turn, forward such applications (including all forms and data as called for in paragraphs 1 and 2 of these instructions) with his recommendation, to the motor vehicle controller for clearance.

When the motor vehicle controller (or the transit controller) in regard to applications covering buses and taxicabs has determined that the unit is essential, it shall be the duty of the Motor Vehicle Controller to secure such other mechanical specifications and/or further details as he may consider necessary before issuing a permit for release or for the manufacture of the motor vehicles in Canada or before approving same for importation from the United States.

No clearances for importations from the United States will be given nor will a permit for release or for the manufacture in Canada of passenger cars, trucks, chassis, trailers, or buses be issued by the Motor Vehicle Controller until such time as he has secured, in the manner above stated, complete details proving the essentiality of the requirements.

I do not think, Mr. Chairman, that quite answers the question in full.

Mr. FACTOR: It does, to this extent, that there is no definition of essentiality. It is left entirely to the judgment of the controller under the procedure.

Mr. BERRY: I think that is a fair appreciation of the situation.

The CHAIRMAN: You mean the controller, or whoever his power is delegated to, decides and determines whether or not the application constitutes an essential application or an application for an essential user, and it is up to the controller or to his delegates to determine the essentiality?

Mr. BERRY: Yes.

The CHAIRMAN: It is not specially defined but is rather left open for determination by the controller or his representative?

Mr. BERRY: That is it.

Mr. BIRCHARD: Except that he must be an essential user.

The CHAIRMAN: Yes, but the word essential user is left for determination by the controller or his delegates.

Mr. BIRCHARD: There are certain yardsticks set up on that in connection with the rubber orders and the gasoline and fuel orders in that a man who cannot qualify so far as the rubber controller is concerned for tires, or for high category of gasoline does not get a car.

The CHAIRMAN: But you do not have a set of rules—one, two, three—but you do go so far as to say that if a man does not qualify in synthetic category B, for instance, he would not be considered an essential user. Determination of the term essential or essentiality is left to the appreciation of the controller or his delegate more or less. I am not protesting the statements that have been made in this regard. I am merely trying to get before the committee the rules that guide the determination of the essentiality or otherwise of an application.

From the evidence it is therefore very difficult for the subcommittee to arrive at any conclusion as to the operation of this phase of the Controller's work, except as to hope that the decisions of the controller and his assistants were fair and unbiased and that complaints heard at times in the public were not justified.

The subcommittee recognizes the difficulty and scope of the task of granting permits when the Motor Vehicle Controller has available for distribution less than half the number of trucks for which application is made, and while it does not make any definite recommendation as to how this condition of uncertainty in the public mind can be removed, the subcommittee does recommend

that the officials in charge should, as far as possible, establish definite rules to determine the basis on which truck purchase permits will issue.

Scrap and Reclaimed Rubber

The Canadian public have responded splendidly to the salvage campaigns especially such as concerned scrap rubber. After having taken an interest in the question, Canadians inevitably became critical when they saw scrap piles in Toronto, in Montreal where the product of salvage drives seemed to lay dormant and unused. Your subcommittee considered it advisable to look into the matter in order to be able to present the true facts of the scrap rubber story.

In early 1942 when all sources of crude rubber other than the American stock pile were cut off from Canada it was decided that all available scrap rubber should be collected. To accomplish this the Scrap Rubber Division of the Department of Munitions and Supply was organized in March, 1942. Its function was to promote the collection of scrap rubber and it was arranged that Fairmont would buy the resultant collections at fixed prices F.O.B. any point in Canada in carload lots. It was believed that this policy of equalizing prices at car loading points across Canada would stimulate collection but it was recognized that it would result in a substantial financial loss to Fairmont. The objective then set was 20,000 tons by March 31, 1943.

It was soon apparent that the arrangement outlined above, chiefly on account of divided authority, would not work satisfactorily and on July 1, 1942, Fairmont took over the functions of the Scrap Rubber Division of the Department of Munitions and Supply.

Fairmont immediately established a scrap promotion division which in conjunction with National Salvage Campaign and the Canadian Secondary Materials Association has since energetically promoted the salvage and collection of scrap rubber. Through the activities of Fairmont field men in Ontario, Quebec and the Maritime Provinces, the co-operation of National Salvage men in all parts of the country, the Post Office Campaign in Ontario and Quebec, the Wardens Campaign in the counties of southern Ontario, the promotion work stimulated by Fairmont Company, by Canadian Rubber Companies, together with drives by voluntary salvage corps in practically all centres of Canada as well as the effort of scrap dealers, Fairmont had received, up to February, 1944, 45,167 tons of scrap rubber of all kinds.

Scrap rubber purchased by Fairmont was at first sold to reclaimers in the United States as well as in Canada. This procedure was in keeping with that followed commercially and was considered desirable to ensure the continued flow of reclaim rubber purchased by Canadian processors in the United States. When the Rubber Reserve Board of the United States, on account of heavy collections in that country, closed the border to Canadian scrap rubber, it was deemed advisable by Fairmont to open two large storage yards. These yards were used to store collections which Canadian reclaimers had not the space to accommodate.

Because of the imperative need for technical knowledge and experience in operating these yards, Fairmont arranged with H. Muehlstein & Co. (Canada) Limited to operate the yard in Montreal and with Federated Rubber Graders Limited to operate the Toronto yard—both operations on a strictly no-profit basis to the operators. Experience has proven the arrangement to be a very satisfactory one for Fairmont.

One of the principal reasons for initiating the scrap rubber campaign was to insure a continuing supply of reclaimed rubber until the supply of synthetic rubber was adequate and also until its use as a substitute for crude rubber could be developed. The supply of crude rubber was at that time definitely diminishing and it appeared certain that it would continue to diminish.

In view of the fact that substantial progress had been made by the rubber industry in substituting synthetic for crude rubber in a wide range of products by January, 1944, Fairmont was directed by the Rubber Controller on February 3, 1944, to cease all purchases of scrap rubber as of February 15, 1944, and to proceed without delay to dispose of its inventories.

In May, 1944, Fairmont had in hand sales orders covering some 10,500 tons for shipment up to the end of September of which approximately 1,000 tons had already been delivered. The balance of their inventory amounting to about 10,000 tons will be disposed of as soon as opportunity offers. Therefore during the period of its dealing in scrap rubber, Fairmont turned to processors of reclaimed rubber about 35,000 tons of scrap rubber and had only 10,000 tons not yet contracted for in May, 1944.

It is interesting to note that 650 to 700 tons of scrap rubber are needed to make 500 tons of reclaim.

It appears that the scrap rubber salvage drives were of great benefit to the solution of the rubber problem because of the scarcity at that time of crude rubber, the quickly vanishing stock pile and the indefinite outcome of the synthetic rubber production plan.

Public interest has been served by this scrap rubber accumulation and the stock piles at Toronto and Montreal are the leftovers of a product that filled a very necessary need in our war program. It might be suggested that proper signs or boards be put up on fences erected at the Montreal and Toronto yards to acquaint the public with the nature of these yards and thereby avoid misunderstanding of the facts.

Reclaim rubber is processed in Canada in two plants operated by the Dominion Rubber Company and the Gutta-Percha Company with a productive capacity of 7,000 tons a year. A similar amount of reclaimed rubber is imported from the United States annually.

The scrap is made into reclaimed rubber by grinding, treating the ground mass to dispose of foreign materials such as cotton fibre and adding fillers and plasticizing agents to make the product easier to handle. The scrap is not reduced to the form of crude rubber, but the reclaimed rubber contains most of the chemical and filler which was originally compounded with the crude. The chief problem in increasing the facilities for reclaiming scrap rubber, once the scrap has been collected, is the removal of fabric content from the scrap.

It is an admitted fact that rubber reclaimed from scrap is not a 100 per cent substitute for crude rubber and has approximately 50 per cent of the wearing qualities of the latter. Reclaimed rubber has always been used in the past mixed with crude in lower priced tires and other manufactured goods. It was thought at one time that its use in the manufacture of tires would be substantially increased. Other hopes entertained by the public were that reclaim tires could be supplied in vast numbers for civilian use. Considerable quantities of reclaimed rubber were used for the manufacture of industrial rubber goods and a certain amount is used along with crude or synthetic in the production of tires but the advent on the market of synthetic rubber considered highly superior to reclaim, made it unadvisable to carry a considerable program of reclaim tire production. The most important reason however was that the facilities for producing tires were already used to capacity in the production of crude and synthetic rubber tires for army and civilian use.

The Rubber Controller and other witnesses are of opinion that if more tires were made of reclaim rubber, as was suggested, that many less would have to be made from synthetic rubber because manufacturing facilities are already used 100 per cent. Since tires made of synthetic rubber are considered better by all experts than tires made of reclaim rubber the present policy appears to be justified.

However in the manufacture of all rubber products at the moment 40 per cent of reclaim rubber is used, 40 per cent of synthetic and 20 per cent of crude rubber. Of the total rubber consumption, 60 per cent goes into the manufacture of tires and 40 per cent for other rubber goods. As there is very little reclaim rubber going into tires at present it is apparent that a considerable amount of reclaim is going into the production of other rubber goods, which was done in the last two years, whenever possible.

In conclusion it may be said that while at one time the building of stock piles of scrap and reclaimed rubber was of the utmost necessity changing conditions have made it inadvisable to carry on that policy inasmuch as a better product, synthetic rubber is now available due to the efficient operation of Polymer Corporation and its component units.

Domestic Rubber Plants

Considerable interest has been displayed in reports coming from the U.S.S.R. and the United States as to the possibility of producing natural rubber from many plants other than hevea which until now is the tree that has given rubber to the world.

Hevea has always grown in a wild state in the jungle regions of the Amazon basin, and its discovery in Latin America opened the door to revolutionary developments in our economic life. Transplantation in the Far East, where more than 700,000,000 trees were in production in 1941, was due to special climatic conditions that cannot be duplicated in our country. The United States Department of Agriculture has carried extensive experiments on the hevea tree in the Western Hemisphere and has made surveys in fifteen countries of suitable locations for plantations.

It is satisfactorily established that Canada could never be self-sufficient in natural rubber coming from the hevea tree.

Guayule, a rubber-yielding shrub, has for a while given hope of successful exploitation in the United States. It grows in Texas, Arizona and New Mexico in the United States; however, the largest development up to now has been in Mexico from where the United States have imported about 4,000 tons annually. It is beyond doubt that it cannot be acclimatized in Canada.

Experiments in Canada have centred on milkweed, goldenrod and Russian dandelion.

Fanciful stories circulated respecting the neglected sources of natural rubber left unexplored by the Canadian authorities prompted your subcommittee to get all possible data on the matter from the Botany and Plant Pathology Division of the Department of Agriculture, from the Division of Applied Biology, and from the Rubber Laboratory of the National Research Council.

Canadian research on native grown rubber was organized on a co-operative basis during the early spring of 1942. The broad program involved several government departments and a university. The Botany Division of Science Service, Department of Agriculture, was responsible for a survey of native plants for rubber content and for production of rubber-bearing plants. Laboratories of the National Research Council assumed responsibility for development of extraction methods and for quality and blending tests on the rubber.

Plant Investigation

The principal surveys of American plants for rubber content were made about the time of the war of 1914-18. These surveys dealt largely with plants of the western United States. Consequently it was considered desirable to analyse large numbers of Canadian plants in the hope that one might be found which would be of value in the present emergency.

A total of over 400 species of approximately 180 genera were studied, approximately 1,500 analyses being made by the Division of Botany.

As was originally anticipated, no startling discoveries of new Canadian rubber plants contained small amounts of benzene extract; in the great majority of cases these amounts were too small and the possibilities of securing or producing a large tonnage of the plant were too remote to make commercial production feasible. Of all the plants studied, species of *Asclepias* (milkweed) stood out as having relatively high content of benzene extract; at the same time it seemed possible to collect large quantities of wild milkweed and also to grow it commercially. Other species of such genera as *Solidago* (goldenrod) *Lactuca* (wild lettuces) and *Apocynum* (dogbane) gave some promise of possible utilization, but much further study is still necessary.

While the results of this survey were to a great extent negative, the Division was able to give factual answers to the many questions and suggestions received concerning the possible utilization of many native and introduced plants.

In view of the discovery in the U.S.S.R. of a dandelion containing considerable quantities of good rubber, it was considered desirable to investigate some of the arctic and sub-arctic species of this genus (*Taraxacum*) growing in stfood out as having relatively high content of benzene extract; at the same northern Canada. Most of these species have never been analysed for rubber. Through the co-operation of officers of the Department of Mines and Resources and of the R.C.M.P., a considerable number of seed lots of Taraxacum from northern Canada have been grown and roots dug for analysis. Analytical results are not yet available, but there seems little indication that any of these is as valuable as kok-saghyz. This material may, however, be most valuable in the breeding program with kok-saghyz, which is now under way.

Seed of the Russian rubber-bearing dandelion, *Taraxacun kok-saghyz* Rodin was first received in Canada in May, 1942, through the co-operation of the United States Department of Agriculture. Subsequently two shipments of seed were obtained directly from the U.S.S.R. This plant contains in its roots a considerable quantity of high quality rubber. According to rubber technicians, the quality of the rubber is almost comparable with good Para rubber and no changes in machinery are necessary for its utilization.

Considerable work has been done and numerous experiments have been made in the field and in the laboratory by Canadian scientists on Kok-saghyz.

Results at present may be summed up in the words of Dr. H. A. Senn, Assistant Botanist:—

"In conclusion, it may be said that Kok-saghyz offers a source of high quality rubber but at present there are numerous agricultural difficulties to overcome before large scale plantings can be undertaken. In order to bring the cost of production to a reasonable level, it will be necessary to produce varieties with high rubber content and large roots and to mechanize the whole process of planting, cultivating and harvesting."

Various species of milkweed of the genus *Asclepiae* proved to have as high or higher rubber content than any other native Canadian plants. Consequently special attention was given to species of this genus.

During 1943 a large number of analyses of milkweed leaves and stems were made both from wild material from various parts of Canada and from cultivated material from Ottawa. The results of these analyses indicated that milkweed leaves contain a considerable quantity of rubber as well as large amounts of resinous substances. Simultaneously studies by the National Research Council indicated that milkweed gum might be a most useful substance for blending with one of the synthetic rubbers, namely buna-S.

Extensive experiments were carried out in plantings and in seed germination.

Preliminary indications are that swamp milkweed may eventually be a more desirable species to use for rubber production than common milkweed. Further data is needed, however, and the difficulty of securing adequate supplies of seed would preclude large scale plantings of swamp milkweed at present.

Preliminary experiments have been conducted by the Division of Field Husbandry to determine the types of machinery which can be used most advantageously for the sowing and harvesting of milkweed. Further extensive experiments are needed on methods of harvesting and subsequent handling.

At the request of the Technical Advisory Committee on Synthetic Rubber of the Department of Munitions and Supply, the National Research council erected in 1943 a pilot plant to process a large quantity of milkweed leaves and thus secure sufficient gum for large scale commercial tests. The Division of Botany and Plant Pathology of the Department of Agriculture was charged with the responsibility of securing the necessary raw material for the operation of this plant.

A campaign was organized and approximately 71,000 pounds of dried milkweed was obtained.

In the words of the Assistant Botanist, we may conclude "that the future use of milkweed for rubber depends on the results of tests which are being conducted on the large quantity of gum obtained as a result of the collection campaign mentioned above. Should the material prove satisfactory, there seems to be no reason why large quantities of wild milkweed cannot be obtained in Canada and the plant successfully cultivated. Certain agronomic problems, especially as regards harvesting methods, remain to be solved. This is inevitable when the culture of an entirely new crop plant is begun."

Extraction Experiments

It was determined early in these experiments that milkweed was the native species with the highest known rubber content, and consequently, numerous methods of extraction of rubber from milkweed were studied. Studies were made with the object of finding a practical solution that could be developed sufficiently rapidly to constitute a contribution to the national emergency.

A pilot plant was installed, experiments were developed on a larger scale, and interesting data were obtained.

The evidence supplied to us indicates that the limiting factors for development of kok-saghyz appear to be related to production and agronomic problems, and not to difficulties of extraction.

In the case of milkweed, extraction is the major problem. Extraction of kok-saghyz is a simple proposition, but extraction of milkweed, though it is getting to be more simple, is still very complicated.

In conclusion it might be said that Canadian Government and university research workers have given careful consideration to the possibilities of natural rubber production. The only two apparently worthwhile species for Canadian cultivation are the common milkweed and the exotic kok-saghyz.

While, at present it does not appear likely that native rubber production in Canada can be on a significant basis in so far as the present emergency is concerned, careful informed study of all possibilities is under way.

The Canadian Government have not left unexplored the possibilities of securing rubber from Canadian-grown plants, but it is evident to your subcommittee that no relief from the dire situation existing in the supply of rubber in 1941 could have accrued from that source, and planning for rapid production of synthetic rubber was more than justified.

SYNTHETIC RUBBER

The rubber situation in Canada was so serious in the last months of 1941 as to cause grave concern to the Government. It is true that controls had been set up to regulate the use of crude rubber as early as September, 1941, and conservation orders were already in force. It is true that reclaiming of rubber from scrap was being organized and campaigns for the collection of scrap rubber

were already under way. It is true that the possibility of finding a source of natural rubber from Canadian plants was being explored. However none of these steps, nor all of these were sufficient to remedy the situation and to insure the replacement of the quickly vanishing rubber stock in the country.

Action had to be taken and taken promptly if the rubber that was needed for the war program was to be made avaliable within the shortest time possible.

By that time the United States had become convinced that there was no possible way to get the rubber they needed except by building synthetic rubber plants.

Shortly before Christmas of 1941, there was a meeting in Ottawa when discussions first took place about the advisability of producing synthetic rubber in Canada, or of making an arrangement with the United States which would ensure an adequate supply of synthetic rubber for the Canadian war program.

Other meetings followed in Ottawa and on December 27, 1941, Canadian delegates attended a meeting held in Washington, D.C., at which the results of U.S. Surveys of the synthetic rubber production were to be reviewed and plans for expanded production discussed.

As a result of this meeting between U.S. and Canadian Government officials and representatives of the four largest rubber companies in Canada and of their parent companies in the U.S. it was agreed that a survey should be made to determine what raw materials, if any, Canada could supply, and whether or not it would be possible to produce synthetic rubber in any substantial quantities in Canada, or to produce any of the principal ingredients that were required for its manufacture.

The Minister of Munitions and Supply who was in Washington at that time, decided that such a survey should be immediately instituted and that if it were possible for Canada to do so, plans should be made to produce a substantial quantity of synthetic rubber in Canada.

The survey was undertaken by a Committee made up of representatives of the Chemicals branch of the Department of Munitions and Supply, of the Oil Controller, of the Rubber Controller, of the Director General of Chemicals and Explosives and the Chairman of the Wartime Industries Control Board.

It took the better part of the month of January to complete this survey, because there were a number of factors that had to be considered, namely, which base should be used for the manufacture of rubber, what type of rubber and what quantities of rubber should be produced.

The report was completed near the end of January and recommendation was then made by that committee to the Department of Munitions and Supply that Canada should embark upon a program for the production of 30,000 long tons of synthetic rubber per year. The report also recommended that in order to accelerate the program and get the plant constructed and in operation in the minimum of time a government-owned company should be established to take charge of the program. That recommendation was accepted by the government, and in the early part of February, 1942, instructions were given by the Canadian Government to incorporate the company which is now known as Polymer Corporation Limited.

Polymer Corporation Limited

Acting upon the advice of a committee of experts the Canadian Government caused to be incorporated on February 13, 1942, Polymer Corporation Ltd., a government-owned company with the purpose of producing synthetic rubber of the varieties known as "Buna-S" and "Butyl".

The Company got under way in March, 1942, and plans were started immediately for the erection of a plant. An Order in Council was passed on March 27, 1942, authorizing Polymer to take the steps necessary to erect such

a plant and arrange for the production of synthetic rubber. The following six weeks were employed in determining what the program should be and in surveying the different methods of producing Buna-S.

The considered views of the Polymer Board of Management were set out in a recommendation to the Minister of Munitions and Supply on the 18th of May, 1942. Therein they definitely recommended the erection of an integrated plant at Sarnia, Ontario, capable of producing 34,000 long tons of Buna-S rubber per year and the butadiene and styrene equivalent of that production.

Soon after an Order in Council was passed providing a preliminary amount of $45,000,000 for the erection of an integrated plant consisting of a Buna-S plant with a yearly capacity of 34,000 long tons and a butyl rubber plant with a capacity of 7,000 long tons, the main reason being that there were available pre-Pearl Harbor plans for the construction of a plant of that size which could get under way without delay.

Both the plant and the executive officers are located at Sarnia. Prior to the commencement of operations at Sarnia the head office of the company was in Toronto at 320 Bay Street, because all engineering and purchasing contacts had to be maintained out of Toronto which was much more central.

Plant

The plant located about two miles south of Sarnia, for which an initial sum of $45,000,000 was allotted by Order in Council passed on May 18, 1942, covers an area of 185 acres. It is bordered on the west by the St. Clair River and on the east by the highway and it is crossed diagonally by the Père Marquette Railway.

The plant comprises docks on the river, a coal storage area, a steam plant which is capable of producing 1,400,000 pounds of steam per hour and a pumping plant which is capable of supplying 140,000,000 gallons of water a day to the various units in the area; a Light Ends Recovery unit designed to take the materials from the Imperial Oil refinery and extract from them the ethylene required and a material referred to as a "butane-butylene cut". A butylene concentration unit; an isobutylene extraction unit; a butadiene extraction unit which purifies the butadiene, that is brings it to the degree of purity which is required for the production of Buna-S rubber; a series of plants called the Buna-S plant, that consists of a number of units, a series of storage tanks for the storage of butadiene and styrene; the pigment building for dry storage; a reactor building; a recovery building, a process building and a building for the storage of the finished product; the styrene plant which consists of a series of storage tanks; an ethyl benzene building; the cracking unit for getting crude styrene; and then a series of buildings called finishing buildings where the crude styrene is converted into finished styrene.

The styrene produced in these units is transferred by pipe line to the Buna-S plant where it is copolymerized with butadiene.

There is also a butyl plant which consists of a series of fractionating towers, a reactor unit, a compressor building, a finishing building, and a storage building.

There are also: the machine shop where all the machine work is done for the plant; the warehouse where all common stores are located; the laboratory where all the testing of the various products is undertaken; the time office and the administration building. Those buildings are used in common by those engaged in the enterprise.

Adjoining the Polymer property is located an Imperial Oil Co. refinery which is one of the reasons for the choice of the Polymer site since the decision was made to use petroleum in the production of buna-S. Oil is brought in from Oklahoma by pipe line which crosses the St. Clair River to the Imperial Oil plant where it is first processed in the refinery and in the suspensoid cracking

unit before the lighter parts of the crude oil are brought into the Polymer plant's light ends Recovery unit.

It is stated by Polymer company officials that no plant in the world compares with the plant at Sarnia, that it is unique in that the two principal ingredients of buna-S rubber and the ingredients of buna-S rubber and the ingredients necessary for the manufacture of butyl, both types of rubber that are required for the war program, are all produced at one site, with a common power house and common water pumping and treating station.

Evidence was given to your subcommittee as to the engineering and contracting firms engaged in the construction of various sections of the plant and extensive details were given as to the costs of each section, the nature of and contracts with such companies, the methods of auditing and controlling costs, etc.

The engineering and contracting firms were chosen for their special knowledge and previous experience with plants of a similar nature in the United States. The size and complexity of the plant and the urgency of completing the plant in a minimum time were such that the Polymer officials appear to your subcommittee to have acted wisely in securing the services of firms that had designed, supervised and constructed successfully similar units previously. It appears to your subcommittee that Polymer officials took due precautions not to enter in the field of adventure and were more than justified in drawing on the knowledge of companies that had long experience in the United States or that were parent companies in Canada of such U.S. companies.

As to the cost of this undertaking, the original estimate was $46,000,000, but as the result of having to bring the plant along to production as fast as possible, some delays that were not originally anticipated occurred, some due to changes in labour rates, and others to a shortage of common labour. There were some changes in the original estimates as the result of improvements in technique that were discovered as building went along. The actual cost, therefore, will be about 10 per cent higher than the original estimate and will probably reach $49,500,000.

To the end of January, 1944, the date up to which are available the latest figures from the company's balance sheet point of view, there were spent somewhere around $47,024,000. In addition to that, there were commitments on additional equipment to come in, of approximately $1,500,000 on the construction account. That will indicate that while the plants are in production there was still, in March, 1944, additional work to be done to bring them to the full stage of completion according to the present design.

As to the considerable details of costs given by Polymer officials your subcommittee is not in a position to pass a competent judgment except that it appears evident that proper cautions were taken by Polymer to competently audit and control costs.

A budget of projected expenditures was first gone over by a representative of the Controller of the Treasury; then all vouchers were certified by proper company officials to insure that the items referred to were really employed in the construction of the plant; all figures were audited by the company's own accountants and finally representatives of the Auditor General audited all costs.

The margin of profit of these engineering and building companies from figures supplied to your subcommittee by Polymer officials appears to be reasonable.

Fees were based in most instances upon operations that had been established by the U.S. Government for construction in the U.S. with proper readjustment to conditions of labour in Canada and other considerations peculiar to our country.

Although at the time the evidence was given to your subcommittee the entire costs of the plant were not yet available and many contracts with the building firms were still in the process of adjustment it appears from figures

submitted to your subcommittee that profits of the engineering and building firms would have been in the neighbourhood of 4 per cent to 5 per cent of the total costs of the plant.

Not being a public accounts committee but a fact finding body your subcommittee did not examine any auditing reports through accountants or otherwise and accepted the figures given by the Polymer officials and if of opinion that public funds expenditures have been carefully protected and that Polymer officials are to be commended for their care and precautions.

Site of Plant

In the opinion of the board of directors of the Polymer Corporation, expressed to your subcommittee by the President and the managing-director, Sarnia is the logical site for this industry in Canada, for the following reasons: It is the site of the only oil refinery in Canada that is fed by pipe line—a large oil refinery capable of producing the butylenes which are required for the production of upwards of 34,000 long tons of rubber, and with no chance of production being interfered with by tanker shortage. The second and most important factor influencing the decision in favour of Sarnia is the huge quantities of water that are required, both for the purpose of making steam and as cooling water in the different steps that are involved. One hundred and forty million gallons of water are used every day in this plant. That is more water than they use in the city of Montreal or the city of Toronto in a corresponding length of time.

Sarnia, on the banks of the St. Clair River, provides a ready flow of water at an average temperature of between 50 and 55 degrees, which is ideal for cooling purposes.

At Sarnia, the salt brine is extracted from the earth in the Dominion Salt Company plant located in Sarnia, and brought in by tank trucks in brine form and mixed with the butadiene and the styrene without going through cumbersome and expensive steps, handling and transportation charges being thus avoided.

The shipping facilities by rail and water in and out of Sarnia are also important.

Approximately half a million tons of coal a year are used at the plant. That coal is brought in by self-unloading barges in the open season of navigation from lake ports.

Substantial quantities of benzol are used in the manufacture of styrene; and Sault Ste. Marie is the cheapest source of benzol on the North American continent. During the open season of navigation the necessary benzol is brought in tankers and stored at Sarnia for use during the winter months.

Furthermore, the site that was chosen permitted the construction of a series of integrated plants on clay soil. In Sarnia, according to company officials building conditions are better than in any other part of Canada, other than British Columbia.

Another reason given to us why Sarnia is a good choice for the site is the fact that the plant is within easy shipping distance of the principal users of its products, that is, the rubber manufacturing companies, which are located in Hamilton, Kitchener, Toronto, and Montreal.

Operating Set-up

Polymer owns all the property, all the different units of the plant, all the materials that go into the production and all the finished product at all stages.

The operation of the plant is done through three operating companies: The Canadian Synthetic Rubber Ltd., the St. Clair Processing Corporation, the Dow Chemical of Canada, Ltd.

The Canadian Synthetic Rubber Ltd. was incorporated in March of 1942 and began functioning immediately. The Company is owned in equal shares

by the Canadian Goodyear, the Canadian Goodrich, the Canadian Firestone and the Dominion Rubber.

Its objective was: to assist Polymer Corporation Ltd. in the engineering of the plant, to act as supervisory engineers by getting technical assistance from parent companies in the United States; to train the necessary personnel for the operation of the Buna-S plant and, when the plant was erected, to operate it under the supervision of Polymer, incorporated in September, 1942.

The largest operating company is the St. Clair Processing Corporation. It is a subsidiary of Imperial Oil, brought into being solely for the purpose of operating the Polymer units at Sarnia that were included in the petroleum end of it, namely the feed preparation units, and the butadiene plant, which are closely allied to the operations of an oil refinery, and the butyl rubber plant where the isobutylene product of an oil refinery is converted into rubber.

To that company, which has the bulk of the load, has also been delegated the responsibility of operating the pumping station, the power house and the common facilities.

The Dow Chemical of Canada Ltd., a subsidiary of the Dow Company in the U.S., is operating the styrene plant.

These operating companies are paid management fees by Polymer. Management fee contracts are similar to some operating contracts that the United States have passed with corresponding branches of industry in that country. Organizations have been chosen which were felt to be competent to operate these highly technical and complicated units and the operation was made their responsibility, and those operating companies are to be paid what is considered reasonable fees for the services they render.

For instance, the fee in the United States for the operation of styrene plants is at the rate of so much per pound. It depends on the poundage. Dow operates four plants for the United States Government, a large plant in California and another one in Texas. If they were only producing 10,000 tons of styrene per year, they would get one fee, and the fee per pound is lowered as their production is increased. Polymer was able to work out with the Dow Company an arrangement whereby after March 31 of this year we pay the average fee per pound that is paid in the United States, which is considered a very fair arrangement, and it will be less than one-half of a cent per pound.

In the case of Canadian Synthetic Rubber Ltd., the management fee will be a little over one-half cent per pound.

As for St. Clair Processing Co., no definite agreement had yet been arrived at as of March, 1944.

All the buying is done by Polymer on the advice and upon requisitions of the operating companies. Advantages of the system are: the benefits in prices due to central buying of commodities that are common to all operations; avoidance of surplus stocks that would be incurred if buying were done individually by the companies; better facilities in the servicing and disposal of products by handling the traffic through a central organization.

The personnel of these plants were trained by the different operating companies as early as May, 1942, because there was nobody in Canada who had ever worked on the production of butadiene, styrene, buna-S, or butyl rubber.

Young Canadian graduate chemists and chemical engineers in most instances, in others, people who had had practical experience, and in one instance a number of young girls who had junior and senior matriculation education, were picked for special training.

The operators of the Buna-S Polymer plant were trained at Akron, Ohio, in a synthetic ruber plant being operated by the Goodyear Tire and Rubber Company which is owned by the United States Government and the construction of which had been authorized and was under way before Pearl Harbor.

In the case of the Dow Chemical Company, the styrene producers, they had about fifteen of these young Canadian chemists and chemical engineers who were sent to Midland, Michigan, for training in the latter part of September and the early part of October, 1942, and who trained there until May of 1943 when they came back during the final stage of constructions and they started on operations in June, 1943.

In a Buna-S Co., Polymer plant, it is rather interesting that with a total staff of approximately 325 operating three shifts a day, seven days a week, there is only one employee of that organization, the general manager, who is not a Canadian. We think that is rather unique and worthy of special mention.

Polymer employees are about 250 in number, which includes the accounting staff, the purchasing staff, the supervisory staff and the security staff. The Dow company have about 100 employees. Canadian Synthetic about 325, and St. Clair Processing approximately 1,100.

As to the advisability of this system of operation through separate operating companies, the managing-director of Polymer expressed himself as follows:—

"I do not think it would have been possible for the Polymer Corporation to have together the trained personnel to operate units that are as complicated and tricky as these are. The United States realized that in the early stages by following this course, and they had men with appreciably longer training in the field than we had because we had none at all."

Upon the evidence supplied to your subcommittee, it appears that the operating set up is arranged on an economical basis and was justified in view of the special nature of these operations, the urgency of rapid organization, and early production.

Patents

The astounding developments that resulted from the research in and the discoveries of substitutes for rubber were the object of patents for the ownership of which negotiations and fights have been of long duration in Germany, where the first practical results were obtained in transferring on plant scale the experiments of laboratories and in the United States where powerful oil and rubber companies became interested in these developments. Patent rights on the production of synthetic rubber were the object of agreements that had great influence on this new field of industrial activity. Considerable publicity was given in the United States and Canada to enquiries and investigations on the matter.

Your subcommittee did not feel however, it had to inquire into this aspect of the problem as all such questions were settled for the duration of the war when Canada decided to undertake the production of synthetic rubber.

Four series of patents were involved, all interdependent but of which the patents on Buna-S were the most important.

Early in the spring of 1942, before the order in council approving the outlay of $46,000,000 for the building of the Sarnia plant was passed, Buna-S had been made royalty free to the U.S. Government for the duration of the war through the Rubber Reserve Corporation. A similar agreement was granted to Polymer as soon as the order in council was passed.

The other series of patents involved are for the production of Styrene and Butadyene, the two components of Buna-S and for the manufacture of Butyl rubber, another synthetic.

On Butyl rubber the same arrangements were made as for Buna-S and no royalties will have to be paid for the duration of the war and six months thereafter.

On Butadiene, the same thing applies, that is, so far as patent rights on butadiene are those of the previous owners of the patent rights for Buna-S,

they are royalty free. Should, in the manufacture of Butadiene, other processes be used that were not covered in the Buna-S patents, royalties might have to be paid, but such has not been the case up to now.

On styrene the situation was different. All the companies that had produced styrene in the United States agreed to pass their patent rights and their technical knowledge and the United States Government undertook to pay them a flat royalty of one-eighth of a cent per pound and that agreement was extended to Canada.

So that it can be said that the only royalties Canada may expect to pay for patent rights on the production of synthetic rubber in Canada during the war will amount to one-eighth of a cent per pound.

Your subcommittee feels that Polymer officials are to be commended for the successful conclusion of their negotiations in this regard.

Buna-S

Buna-S rubber is made up by the combining or co-polymerizing of two chemicals known as butadiene and styrene.

Butadiene and styrene can be made from practically any hydro-carbon; they were made in Germany, where the process was originated from coal and limestone because these were the materials available which they could devote to that production; they were made in Russia first from alcohol made of grain or potatoes and then from oil; they were made in the U.S. first from alcohol because facilities existed for a rapid production from this source and later were made from petroleum because it meant a considerable reduction in the cost of production; Canada just as the U.S. had a choice of making them from grain alcohol or from petroleum, the present program has hinged around and involved the use of both commodities in quite substantial quantities; in the early stages it has involved the use of considerable butadiene and styrene made from grain alcohol, it is now on a petroleum or refinery gases basis.

At present 65 per cent of the U.S. program hinges on the production of butadiene from petroleum as at the Canadian plant of Sarnia.

Butyl Rubber

One of the further reasons for choosing petroleum as a base for producing butadiene is the important fact that by following the petroleum route a by-product is obtained: butyl rubber. While a separate plant is needed to manufacture butyl rubber, the raw material is a by-product of the manufacturing of butadiene from petroleum.

In the manufacture of butadiene, the bases are butylenes in the original cut from the refinery. There are two types of butylenes, normal butylenes and isobutylenes. Butadiene is made from purified normal butylene, and before normal butylene can be obtained out of which butadiene is made all the isobutylene must be extracted from what is called the butane-butene cut from the oil refinery, so that all isobutylene must be separated from that stream before butadiene can be made.

Having isolated isobutylene and having collected it makes it available to produce butyl rubber and implement the synthetic rubber production.

Butyl rubber has many and varied uses, its prime use being as inner tubes for automobiles. So far as present indications are concerned it is the best substitute for crude rubber in the manufacture of inner tubes. It also has valuable uses for flotation equipment gas masks and other products of that sort. In the course of their investigations the Polymer directors found that the indications were that they could produce butyl rubber economically at Sarnia.

Butyl looks more rubbery than Buna-S.

It is estimated that 3,500 to 4,000 tons will be needed annually for the manufacture of tubes and that about 3,000 tons would be a good supply for the manufacture of gas masks and other essential equipment of that character.

Compared to Butyl, Buna-S is a better type of synthetic rubber for the manufacture of tire casings. It has better wearing qualities, stronger resistance to abrasion and blends well with natural rubber while butyl does not blend.

It can be stated therefore that they complement one another and your subcommittee feels it was a wise move of Polymer to arrange its methods of producing butadiene so as to have as a result the elements necessary for the production of Butyl.

Cost of Production

Canada being one of the world's largest wheat producers it was to be expected that those entrusted with the carrying on of a synthetic rubber production program would scrutinize the possibility of advantageously using alcohol made from wheat in the manufacturing of butadiene and styrene; your committee is of the opinion that Polymer officials have not failed in that regard and that they have secured the best available information from Canadian and U.S. scientists and from those already conversant with the production of these chemicals before they definitely advised the Canadian Government to follow the petroleum route.

As previously stated the cost element was the dominant factor in arriving at this decision. Your subcommittee has therefore secured detailed evidence and data on the question, and is of opinion, from figures it obtained, that considerable sums have been economized by equipping the Sarnia plant for the production of the component elements of Buna-S from a petroleum base. Figures appear to be so conclusive on comparative costs of producing Buna-S from grain alcohol or from petroleum as to warrant the opinion that unless radical and presently unexpected changes in the extraction of alcohol from wheat are made possible, or unless petroleum became prohibitive in price or impossible to secure, the course presently followed by Polymer will remain justifiable in the future and the subsidizing of wheat in this regard will remain of very doubtful economic value to the country.

From the evidence of Polymer officials substantiated by actual figures of production, it would appear that Buna-S can be produced from petroleum at less than half the cost of producing it from alcohol. Since the company had to produce from alcohol in the early stages it is proven that the cost of Buna-S manufactured from that base was around 45 cents per pound which compared more than favourably with the cost of U.S. production. For the month of January, 1944, Polymer had reached an unexpected low of 42·668 cents per pound; it was established that from a petroleum base Buna-S is produced at 23·4 cents per pound and quite possibly at 17·272 cents per pound in the very near future. The Vice-President of the Rubber Reserve Company in the U.S. stated before a committee of the House of Representatives that in his opinion the price might go down to 15 cents per pound.

The cost of Butadiene made from alcohol is given at 35 cents per pound as compared with a cost of 12½ cents to 20 cents if petroleum is used.

The cost of Styrene made from alcohol is given at 17 cents per pound as compared with a cost of 10 to 12 cents per pound if petroleum is used.

It was stressed by Polymer officials that based on the yearly production capacity of the plant of 34,000 tons of Buna-S, for which 30,000 tons, or, 60,000,000 pounds of Butadiene are required, the increased cost to the country on that element only, if alcohol derived from grain was used, would be $12,000,000 per annum.

In the production of styrene from alcohol a proportionate increase in cost would have to be considered. To carry on the program of manufacturing 34,000 tons of Buna-S, 20 million pounds of styrene are needed and to produce that quantity of styrene 6 million pounds of ethylene are needed. To get ethylene from an alcohol base would cost between 24 and 26 cents while to get it from a petroleum base costs between 3 and 5 cents per pound. The comparative costs of ethylene for the execution of the yearly program would mean $1,500,000 if alcohol is used as compared with $180,000 to $300,000 if petroleum is used which would imply an increase of at least $1,200,000 if alcohol is used.

Polymer officials stated that in order to bring down the cost of producing Buna-S from alcohol to that of producing it from petroleum wheat would have to be delivered at the distillery where alcohol is made at 25 cents a bushel.

Evidence obtained from officials of the National Research Council corroborated that of the officials of Polymer on the matter of cost. The following words were used by the representative of the chemistry division: "Our opinion is that the petroleum route is undoubtedly the cheaper one of the two."

As to the possibility of getting a higher yield of alcohol per bushel of wheat than 2 imperial gallons the same witness stated that research has not in the last five years increased the quantity of alcohol derived from one bushel of wheat "substantially enough to change the picture". The representative of the applied biology division stated: "No! I would not say, over the last five years, that there has been a substantial increase in the amount of alcohol that can be produced from a bushel of wheat. It would not vary over 5 per cent from plant to plant".

As to the cost of producing these two imperial gallons out of a bushel of wheat the same two witnesses stated that prior to the war that cost "had probably gone down a little due to efficient operation" but that "it has gone up since the war began" due to labour costs and evidently also due to the much higher price paid now for wheat.

These witnesses also corroborated the evidence of Polymer officials that wheat would have to be paid 25 cents a bushel delivered at the alcohol distillery in order to produce butadiene at 12·8 cents a pound and therefore Buna-S at about 17 cents.

Your subcommittee was therefore satisfied that there was ample confirmation by the experts of the National Research Council of the figures submitted by the officials of Polymer Corporation and of the advisability of their decision to use petroleum as a base for the production of Synthetic rubber.

Cheaper Production of Grain Alcohol

Since publicity was given in the House of Commons to articles purporting to describe new methods which might reduce substantially the cost of producing alcohol from grain, and since it was intimated that this avenue had not been properly investigated before Polymer Corporation embarked on their program of using petroleum to produce Butadiene and Styrene instead of grain alcohol, your subcommittee has looked carefully into that question.

Evidence was given by officials of Polymer and by experts of the Chemistry and Applied Biology Divisions of the National Research Council.

As the discoveries of a young chemist of the Department of Agriculture are still in their experimental stage it could not be ascertained whether the process of extracting alcohol from grain will be substantially reduced. Furthermore two factors remained which prompted your subcommittee to feel that the right decision had been reached by Polymer at the date it was made, to follow the petroleum route even if the results of these experiments proved satisfactory. The first one is the question of time and urgency: Polymer could not have waited for the outcome of transferring laboratory tests to practical production

even on a pilot plant basis. The second is the repeated statements from the scientists who gave evidence as well as from officials of Polymer that even if alcohol could be extracted more cheaply than heretofore from wheat, the reduction in costs of extraction could not be such as to make it cheap enough to compete with petroleum as a base for producing butadiene and styrene.

Prices

For the years 1937-8-9, the price of crude rubber No. 1 smoked sheet ranged from 13 to 25 cents per pound f.o.b. New York. At the time the Canadian Government took control of rubber, the average inventory cost was 25·6.

Evidence supplied to your subcommittee was that plantation operations in the pre-war days indicate that rubber could be sold on the New York market at a fair profit to the plantation at a price somewhere between 17 and 20 cents per pound.

It is hoped by Polymer officials that after the war they can keep synthetic rubber prices around 20 cents and perhaps as low as 17 cents per pound; if this proves to be true it will have a very beneficial effect on the general rubber situation, because when synthetic rubber represents a very strong competition for natural rubber it will have a stabilizing effect on the world's market price of rubber. They consider that the techniques of using synthetic rubber will have advanced to a very high degree and that synthetic and crude rubber will then be mixed to produce better tires than could be done by using either one alone.

Testing of Synthetic Rubber Tires

In the evolution of a new product such as synthetic rubber whether it be Buna-S or any other synthetic, constant experimentation goes on, and once the result of an experiment has been put in material use, constant testing is in order.

It was therefore necessary for Canadian authorities to carry on tests under as favourable conditions as possible of the tires produced by the Canadian manufacturers in which entered any proportion of synthetic rubber.

Your subcommittee inquired into this question. The advisability of the Government policy on the methods of testing and on the location of testing grounds was looked into with special care with a view to ascertaining if there were any possible duplication of functions as between the Department of Munitions and Supply and the Department of National Defence.

The forced introduction of synthetic rubber, due to the cutting off of crude rubber supplies, made it necessary to develop tires with as high a content of synthetic rubber as possible in the very shortest time. The Army Engineering Design Branch of the Department of Munitions and Supply have the function of providing the Production Branches with specifications to cover articles required from industry. These specifications are developed in conjunction with industry and the user of the product.

No specifications were obtainable covering tires made of synthetic rubber for which plants were being set up in the United States and Canada. It therefore became necessary to develop such specifications and to prove them as they were developed. Amongst the United Nations, the United States led the way in the development of synthetic tires. They based their development on the pooling of all knowledge between industry and the Government and they set up Government test facilities for proving each stage of development, step by step, by full-load mileage tests on vehicle.

The requirements of a proving ground for such development testing are:—

(*a*) Reasonably high and consistent temperature throughout the year.
(*b*) Suitable cross-country terrain for proving the adequacy of tires against bruise breaks.

(*c*) Suitable percentage and type of gravel road to simulate conditions to be encountered in theatres of war.

Consistently high atmospheric temperatures throughout the year are essential in order to permit valid correlation of test results, since heat is a definite enemy of tire performance and it is necessary to know how synthetic tires behave under the worst conditions they are likely to encounter. Furthermore, operations at high temperatures accelerate test results, a very necessary consideration because of the extreme urgency for developing sound conversion specifications in the shortest space of time.

The United States Army Ordnance Authorities selected a site at Camp Normoyle, San Antonio, Texas, as meeting to the greatest degree each of the basic requirements mentioned, and set up an extensive establishment of vehicle workshops, vehicle maintenance men and drivers, rubber technicians and so on.

The United States program commenced with experiments on the conversion of the smallest size military tires. These sizes were chosen because they represented the volume sizes, and thus presented the greatest opportunity for mass conversion from crude to synthetic, as well as offering the least difficult problem from a technical standpoint.

The generation of heat within the tire increases with size and with the thickness of its various parts, and it has already been mentioned that heat is one of the worst enemies of rubber generally and synthetic rubber particularly. The progress made by the United States in these smaller size tires has been very remarkable.

In general, the United States Army is equipped with much smaller-sized tires than those on which the British and Canadian Armies have standardized. The United States Army has more multi-wheeled vehicles and has gone in much more extensively for dual tires than the British and Canadians. The use of dual tires (American practice) *vs.* single tires (British and Canadian practice) automatically permits the application of the smaller size and more lightly loaded tire noted in the preceding sentence. As a result, the Americans have attained a very high overall synthetic conversion percentage partially accounted for by the fact that they were able to secure production supplies of synthetic rubber some 9 to 12 months before Canada was able to do so.

The Department of Munitions and Supply has been able to establish a very close and friendly relation with the technical men in the United States Ordnance Department who are charged with the American synthetic conversion program. Their findings have been made an open book to Canadians. All of the Canadian tire manufacturers have close American affiliations and are, therefore, in a position to secure not only the information we may bring back to them via the United States Ordnance, but the actual American industrial picture which is obtainable from the affiliate plant. As a result, Canada has been able to apply the specifications covering synthetic tires in strictly civilian or commercial sizes that have been developed by the United States in Canadian production without any testing, which would be purely repetitive.

Unfortunately, however, these commercial tire sizes which have been released by the United States represent a very small proportion of the tire sizes used by the Canadian Armed Services at the present time. The question of switching to the smaller American size of tires was considered, but was very quickly thrown aside as being impractical. Over and above the fact that all indications are that from a military point of view, the large single tire is best, the Commonwealth Armies had hundreds of thousands of vehicles in the field for which large size tires had to be provided. The question of reducing the loads on vehicles was discussed and explored. The Armies refused to countenance such change because any reduction in load would have required a compensating increase in the number of vehicles, and such an increase in vehicles would have resulted in increase in driver's mates, plus many other complications.

It was, therefore, apparent that Canada was faced with a firm demand for the development of these large-size military tires which are peculiar to the British Commonwealth Armies. It was arranged that the pattern of development already in operation in the United States would be followed. Arrangements were made with the United States Government to have them expand the facilities at their test site at Camp Normoyle to enable us to send down vehicles and a small supervisory and technical staff. It was arranged that the vast majority of personnel, comprising mechanics and drivers, would be found in Texas and that the operation would be performed for Canada by the United States Ordnance and a contractor who was working directly for United States Ordnance, with all charges payable by the Canadian Government to the United States Government, Canada being free to lay on their tests and supervise each individual test as they choose.

This arrangement went into effect approximately May 1, 1943, and since that time, approximately two millions of truck miles have been traversed by our test fleet. Several synthetic conversions have been released, representing various stages in the substitution of synthetic in place of natural rubber. They commenced with a tire in which the carcass was 100 per cent crude rubber and the tread was 65 per cent synthetic rubber. Next the entire tread was converted to synthetic rubber. At the present moment, our factories are building tires in which the synthetic content is 70 per cent overall, and indications are that on the smallest of the sizes there is justification in hoping for satisfactory tires having a 90 per cent synthetic content. It is very questionable, however, whether this 90 per cent will ever be reached on the large sizes. Probably the ultimate will be between the present 70 and 90.

Army Engineering Design Branch are keeping even with the demands of the Rubber Controller for the saving of crude rubber, but are doing no more than keeping even. It is essential that undiminished effort be pressed forward. Officials of the Army Engineering Design Branch expressed their satisfaction of the approval by the Government of their proposition to use a Southern United States area for testing. To use a location in the Southern United States presents, at the beginning, a picture of tremendous expense. However, in Texas, tests can be run day and night (an average of 19½ hours every 24 hours, 6 days per week is maintained throughout the entire year). In Canada, because of the climate, there are less than five months which are really useful for tire testing, and there are not more than 6 months in which cross-country work could be done with any degree of uniformity. Had not Canada gone to the Southern United States for its test work, it is now very obvious that it would be in a very serious situation and might possibly be so short of tires as actually to interfere with vehicle production.

A very large proportion of the production of the Canadian Tire Industry is for the United Kingdom and other Commonwealth countries. Thus the importance of developing successful synthetic tires is related not only to the requirements of the Canadian Army, but to the British Army as a whole.

The question of the proper body to perform these tests was considered. Obviously, the various companies were not in a position to perform them individually with the speed and with the pooling of results that was necessary for an industry-wide changeover. It was deemed unwise to ask the industry as a whole to become responsible for the tests for several reasons, amongst which might be mentioned:—

(1) It is important that the Government maintain control of the release or approval of a tire.
(2) The tires under test in Texas are confined to strictly war department sizes and only can be fitted to army vehicles and, as none of these are available to the tire companies, it would have been necessary to loan the vehicles to the industry, whereas it seemed better to have Government property operated by the Government.

(3) Any costs in the development of a product naturally become a part of the selling price of the product, and, as a rule, form part of the basis upon which the profit is calculated. It was felt that this latter condition would be avoided and further that the test could be run more efficiently by combining with the U.S. Ordnance and the cost to the public would be reduced in the final analysis. Furthermore, as the American tests were being run by the United States Government, the American Officials charged with the responsibility of implementing Canadian tests expressed the desire to deal with Canadian Government representatives.

Based on the foregoing considerations, Army Engineering Design Branch recommended that these tests be carried through under its control at Camp Normoyle, Texas, using the facilities put at their disposal there by United States Ordnance.

Due to the foregoing conditions your subcommittee was of opinion that the advisability of using the testing grounds at Normoyle was amply demonstrated.

From the evidence supplied to your subcommittee it is apparent that there has been no duplication of tire testing in any shape or form.

Your subcommittee wishes to acknowledge with thanks the co-operation of the following witnesses who appeared before it:—

Messrs. R. C. Berkinshaw, President, and J. R. Nicholson, General-Manager of Polymer Corporation Ltd.; A. H. Williamson, Controller of Rubber; J. Martin, Deputy-Controller of Rubber; J. H. Berry, Motor Vehicle Controller; E. R. Birchard, Deputy Motor Vehicle Controller; J. A. Hodgson, Vice-President and Managing Director of the Fairmont Company Ltd.; W. G. H. Jephcott, Secretary-Treasurer and L. S. Eiler, Assistant Secretary-Treasurer of the same Company; Dr. A. Cambron, associate research chemist of the Chemistry Division of the National Research Council; Dr. A. Adams, Biochemist and Dr. N. H. Grace, Plant Biochemist, both of the Division of Applied Biology, National Research Council; Dr. H. A. Senn, Assistant Botanist, Division of Botany and Plant Pathology, Department of Agriculture and Mr. T. R. Griffith of the Rubber Laboratory, National Research Council; Colonel E. D. James, Director of Mechanization, National Defence Headquarters; Mr. R. E. Jamieson, Director General, Army Engineering Design Branch, Department of Munitions and Supply; Lt.-Colonel C. M. Letson, of the Directorate of Development of vehicles and small arms, M.G.O. Branch, Department of National Defence and Lt. W. A. Clarke of the Fire and Rubber Section, A.E.D.B.

RECOMMENDATIONS

As a result of the survey of the rubber situation in Canada, of the activities of Polymer Corporation Ltd., of Fairmont Company Ltd., of the Rubber Controller and the Motor Vehicle Controller, your subcommittee makes the following recommendation:—

(*a*) That a survey be immediately undertaken of Canada's post-war needs in rubber and in motor vehicles.

(*b*) That proper steps be taken at as early a date as possible, consistent with war conditions, for the conversion of tire producing facilities, at present devoted to special army specifications tires to civilian needs. That plans be immediately considered to speed up, as soon as war conditions make it possible, the readjustment of the motor vehicle industry from a war time to peace time basis with special consideration to the urgent needs of Canadian industry for trucks and other similar conveyances in order to enable the public to reorganize their activities in constructive channels that will necessitate expanded motor transport and the replacement of badly worn out equipment.

(*c*) That the methods used during war time to stabilize the labour output in the truck manufacturing be extended in the post-war period to all the automotive industry in order to avoid the alternate peakloads and low ebbs of labour experienced in that industry before the war and that proved so disturbing to economic conditions in areas where the motor industry is located.

(*d*) That the research work pursued at the National Research Council and in the Department of Agriculture on synthetic rubber and on the possibility of producing rubber from Canadian plants be further encouraged by the inclusion in the next estimates of substantial amounts specially devoted to that work.

(*e*) That in the post-war period the Sarnia plant remain with Polymer Corporation Ltd., as a Government-owned Company.

(*f*) That as soon as is convenient after the war is over Polymer Corporation Ltd., readjust its relationship with the Companies presently administering the different plants with a view to Polymer as a Government-owned Company operating and administering all these plants itself.

All of which is respectfully submitted.

HUGHES CLEAVER,
Chairman.

SIXTH REPORT

SATURDAY, August 12, 1944.

The Special Committee on War Expenditures begs leave to present the following as its sixth report.

1. A copy of the Minutes of Proceedings of your Committee is tabled herewith.

2. During the current session your committee and its various subcommittees held over ninety commitee meetings, but on account of the large legislative program of the Government found it extremely difficult to carry on the committee's work with any reasonable degree of continuity on account of the fact that its members were also members of other House committees. As a consequence your committee recommends that as to all future work of this committee, while the House is in session, its members should be relieved of service on other House committees as far as possible.

3. Your committee is of the opinion that the committee should sit during the coming recess, and recommends accordingly.

4. Your committee is of the opinion that the investigation of War Expenditures by a special committee should be continued until the conclusion of the war, and recommends accordingly.

All of which is respectfully submitted.

HUGHES CLEAVER,
Chairman.