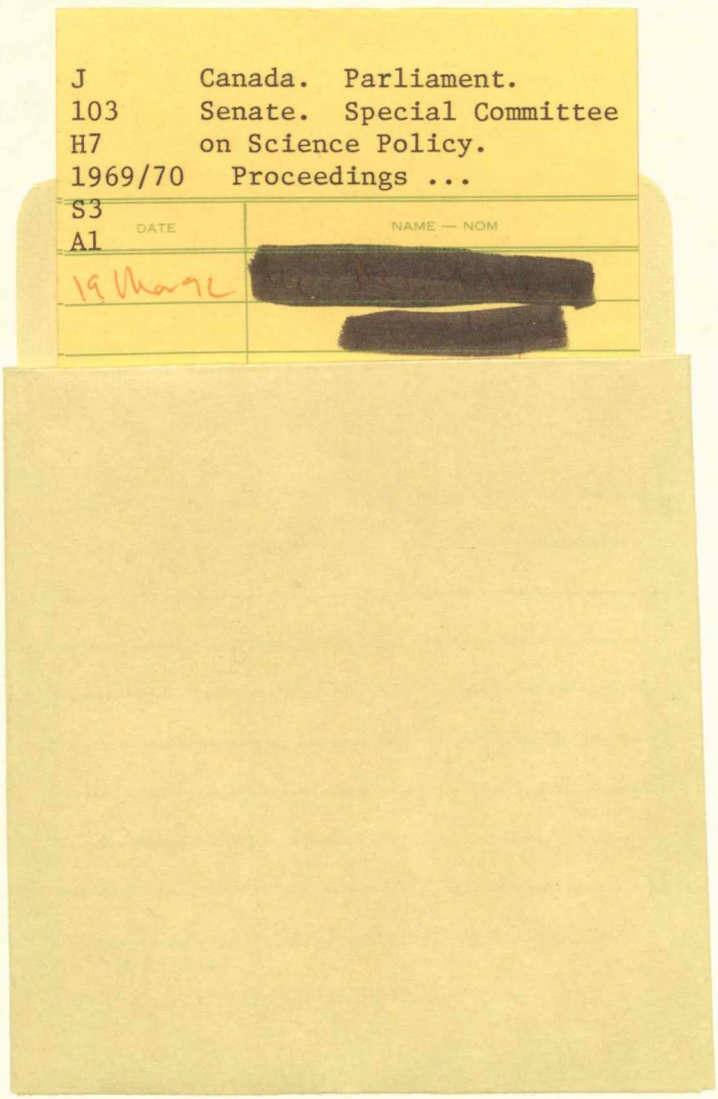
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Senate. Special Committee
on Science Policy.
Proceedings ...
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19 March

Second Session—Twenty-eighth Parliament
1969-70

THE SENATE OF CANADA

PROCEEDINGS
OF THE
SPECIAL COMMITTEE
ON

SCIENCE POLICY

The Honourable MAURICE LAMONTAGNE, P.C., *Chairman*
The Honourable DONALD CAMERON, *Vice-Chairman*

No. 1

MONDAY, FEBRUARY 9th, 1970

JOINT SESSION WITH THE
COMMITTEE ON SCIENCE AND ASTRONAUTICS
OF THE HOUSE OF REPRESENTATIVES OF
THE UNITED STATES OF AMERICA

21717—1

MEMBERS OF THE SPECIAL COMMITTEE

ON

SCIENCE POLICY

The Honourable Maurice Lamontagne, *Chairman*

The Honourable Donald Cameron, *Vice-Chairman*

The Honourable Senators:

Aird
Bélisle
Blois
Bourget
Cameron
Carter
Desruisseaux
Giguère
Grosart
Haig
Hays
Kinnear
Lamontagne
Lang
Leonard
McGrand
Nichol
O'Leary (*Carleton*)
Phillips (*Prince*)
Robichaud
Sullivan
Thompson
Yusyk

Patrick J. Savoie,
Clerk of the Committee.

ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate, Tuesday, October 28th, 1969:

"The Honourable Senator Lamontagne, P.C., moved, seconded by the Honourable Senator Burchill:

That a Special Committee of the Senate be appointed to consider and report on the science policy of the Federal Government with the object of appraising its priorities, its budget and its efficiency in the light of the experience of other industrialized countries and of the requirements of the new scientific age and, without restricting the generality of the foregoing, to inquire into and report upon the following:

(*a*) recent trends in research and development expenditures in Canada as compared with those in other industrialized countries;

(*b*) research and development activities carried out by the Federal Government in the fields of physical, life and human sciences;

(*c*) federal assistance to research and development activities carried out by individuals, universities, industry and other groups in the three scientific fields mentioned above; and

(*d*) the broad principles, the long-term financial requirements and the structural organization of a dynamic and efficient science policy for Canada.

That the Committee have power to engage the services of such counsel, staff and technical advisers as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to examine witnesses, to report from time to time, to print such papers and evidence from day to day as may be ordered by the Committee, to sit during sittings and adjournments of the Senate, and to adjourn from place to place;

That the papers and evidence received and taken on the subject in the preceding session be referred to the Committee; and

That the Committee be composed of the Honourable Senators Aird, Bélisle, Blois, Bourget, Cameron, Carter, Desruisseaux, Giguère, Grosart, Haig, Hays, Kinnear, Lamontagne, Lang, Leonard, McGrand, Nichol, O'Leary (*Carleton*), Phillips (*Prince*), Robichaud, Sullivan, Thompson and Yuzyk.

In amendment, the Honourable Senator Haig moved, seconded by the Honourable Senator Grosart, that the motion be not now adopted, but that it be amended by striking out paragraph 3 thereof and substituting therefor the following:—

"That the Committee have power to send for persons, papers and records, to examine witnesses, to report from time to time, to

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print such papers and evidence from day to day as may be ordered by the Committee, to adjourn from place to place, and notwithstanding Rule 76 (4), to sit during sittings and adjournments of the Senate."

After debate, and—

The question being put on the motion in amendment, it was—
Resolved in the affirmative.

The question being put on the motion of the Honourable Senator Lamontagne, P.C., seconded by the Honourable Senator Burchill, as amended, it was—

Resolved in the affirmative."

Robert Fortier,
Clerk of the Senate.

MINUTES OF PROCEEDINGS

MONDAY, February 9th, 1970.
(1)

Pursuant to adjournment and notice the Senate Special Committee on Science Policy met this day at 9.30 a.m. in Joint Session with the Committee on Science and Astronautics of the House of Representatives of the United States of America.

Present for the Senate: The Honourable Senators Lamontagne (*Chairman*), Belisle, Carter, Grosart, Haig, Kinnear, Phillips (*Prince*), Robichaud and Yuzyk. (9).

In attendance: Philip J. Pocock, Director of Research (Physical Science) and Lt. Col. Jacques Ostiguy, Special Research.

Present for the House of Representatives: The Honourable Emilio Q. Daddario (*Chairman*), James G. Fulton, Charles A. Mosher and James W. Symington. (4)

(*A curriculum vitae of each Representative follows these Minutes.*)

In attendance: Dr. J. Thomas Ratchford, Science Consultant for the U.S. Committee on Science and Astronautics, Mr. Herman Pollack, Director, Bureau of International Scientific and Technological Affairs, Department of State, and Lt. Col. Noel Wilson, U.S.A.F.

At 12.00 noon the meeting adjourned to the call of Senator Lamontagne.

ATTEST:

Patrick J. Savoie,
Clerk of the Committee.

CURRICULUM VITAE

Daddario, Emilio Quincy, Democrat, of Hartford, Conn.: born in Newton Center, Mass., September 24, 1918; graduated from Tilton (N.H.) Academy in 1934; attended Newton (Mass.) Country Day School for 1 year; graduated Wesleyan University in Middletown, Conn., B.A. degree, 1939; graduated University of Connecticut School of Law, 1942; member of Connecticut and Massachusetts bars; enlisted in Army in February 1943; assigned to Mediterranean Theater; awarded U.S. Legion of Merit and Italian Medaglia d'Argento medals; mayor of Middletown, Conn., 1946-48; judge of Middletown Municipal Court, 1948-50; reactivated with the 43d Division at the outbreak of the Korean conflict; served as major with the Far East Liaison Group in Korea and Japan; resumed practice of law in Hartford in 1952; member board of trustees, Wesleyan University; member of the board of regents, University of Hartford; married the former Berenice Carbo of Middletown, Conn., in 1940; three sons; elected to the 86th Congress, November 1958; reelected in 1960, 1962, 1964, 1966 and 1968; member of the House Committee on Science and Astronautics; chairman of the Special Subcommittee on Patents and Scientific Inventions; chairman of the Subcommittee on Science, Research and Development; member of the Manned Space Flight Subcommittee.

Fulton, James G. Republican, of Dormont (Pittsburgh), Pan.; member of Science and Astronautics Committee and Foreign Affairs Committee; son of James Ernest and Emelie Fetterman Fulton; grandson of Rev. Dr. John Lockhart Fulton and Judge Charles Sylvester Fetterman, families active since the 1700's in civic affairs in Western Pennsylvania and South Hills section of Pittsburgh; Penn State, A.B.; Harvard Law School, LL.B., 2 years Fine Arts Department of Carnegie Tech; owner, Mount Lebanon News, Boro News, Chartiers Valley Times Progress, The News (South Hills), The Tribune, Pittsburgh, Pa., and News Progress, Washington County, Pa.; rancher, lawyer, formerly partner Pittsburgh banking law firm; member Allegheny Co. Board Law Examiners, 1934-42; solicitor, Dormont Borough; Pennsylvania State Senator, 1939-40; lieutenant, U.S. Naval Reserve on active duty in 1942; elected to the 79th Congress on November 7, 1944; returned from Pacific combat area to Congress, 1945; reelected 12 times to date; member, Board of Visitors, Annapolis Naval Academy, on appointment of Speaker, 1947; chairman, special subcommittee on displaced persons of the Foreign Affairs Committee, 80th Congress; United States delegate to United Nations Conference on Trade and Employment 1947-48, on appointment by President Truman; chairman, subcommittee for Europe, of House Foreign Affairs Committee, 83d Congress; appointed U.S. delegate to 14th General Assembly of the United Nations by President Eisenhower, 1959; adviser on space to U.S. mission at U.N., 1960-67, appointments by President Kennedy and President Johnson; decorated by the Republic of Italy; recipient of Columbus Medal on recommendation of Latin American Ambassadors; member, American Judicature Society, American Academy of Political and Social Science; member, board of governors, National Rocket Club, 1959-62; member, International Institute of Space Law; congressional office Pittsburgh, 2117 Federal Building, phone 644-2876; town address, 2850 Espy Avenue, Pittsburgh, Pa., 15216, Golden Pheasant Farm, Mt. Lebanon, Pittsburgh, Pa., 15228; Green Meadows Ranch, Oak Forest Road, Waynesburg, Southwestern Pennsylvania.

Mosher, Charles Adams, Republican, of Oebrlin, Ohio.; born in DeKalb County, Ill., May 7, 1906; graduated from Oberlin College, A.B., cum laude, 1928; married Harriet Johnson, 1929; son, Frederic A., and daughter, Mary Jane; employed on daily newspapers in Illinois and Wisconsin 1929-38; president of Oberlin Printing Co., and publisher of Oberlin News-Tribune, 1940-62; member of Oberlin City Council, 1945-50; member of Ohio Senate five terms, 1951-60; vice chairman, Ohio School Survey Commission, 1954-55; Ohio Legislative Service Commission, 1955-59; member, Oberlin College Board of Trustees, January 1, 1964—; advisory member of the Commission on Marine Science, Engineering and Resources; elected to the 87th Congress November 8, 1960; reelected to the 88th, 89th, 90th, and 91st Congresses.

Symington, James Wadsworth, Democrat, of Clayton, Mo.; born September 28, 1927, son of Senator and Mrs. Stuart Symington; attended St. Louis Country Day School, Deerfield Academy, Yale, B.A., 1950, Columbia Law School, LL.B., 1954; enlisted in U.S. Marines, 1945-46 (pfc.); assistant city counselor of St. Louis, 1954-55; associate member of the law firm of Cobbs, Armstrong, Teasdale & Roos, St. Louis, 1955-58; U.S. Foreign Service, London, 1958-60; associate member of the law firm of Arnold, Fortas and Porter, Washington, D.C., 1960-61; deputy director, Food for Peace, White House, 1961-62; administrative assistant to Attorney General Robert F. Kennedy, 1962-63; director, President's Committee on Juvenile Delinquency, 1965-66; consultant, President's Commission on Law Enforcement and Administration of Justice, 1965-66; chief of protocol, Department of State, 1966-68; member, Missouri Bar, Metropolitan St. Louis Bar, District of Columbia Bar, Federal Bar, American Bar Associations; admitted to practice before United States Supreme Court; Episcopalian; married Sylvia Schlapp, of Clayton, Mo.; children: Julia Hay and Jeremy W.; elected to 91st Congress November 5, 1968.

SPECIAL SENATE COMMITTEE ON SCIENCE POLICY

Ottawa, Monday, February 9, 1970

The Special Committee on Science Policy met this day at 9.30 a.m.

Senator Maurice Lamontagne (*Chairman*) in the Chair.

The Chairman: Honourable senators, it is indeed a great pleasure for me as Chairman of this Special Committee of the Senate on Science Policy, on behalf of the members of that committee, to welcome our distinguished American guests this morning. Last May at their invitation we visited Washington and had informal discussions with them at which time, you will remember, we had the opportunity of meeting the President's top science advisers, including, of course, Dr. DuBridge. That visit was most useful to us.

Today we are particularly pleased that our distinguished guests were able to accept our invitation to come to Ottawa at this time. I very much regret, however, that Chairman Miller was not able to accompany and lead the delegation. I am told that he has a bad cold. I hope it is not too serious and I certainly hope he will be feeling better soon, because, when we were in Washington, we were able to observe that it was under his inspiring leadership that the Committee on Science and Astronautics was working so well. It was certainly partly due to that leadership that that committee acquired through its hearings and publications the very high international reputation it has as certainly the most qualified group of parliamentarians in the world on policy issues as raised by science and technology.

This high reputation of the committee is certainly also due to a large extent to Congressman Daddario. All of us here know him because we have read his numerous articles on the subject of science policy. He is, as you know, Chairman of the Subcommittee on Science Research and Development and has acquired on his own a very high international reputation as an expert on science policy matters.

We also know, sir, from having seen you in operation in Washington that you are firmly convinced that the complex problems raised by science and technology must be approached at the political level in a non-partisan way, and I am sure that Congressman Fulton shares your views at least on that question.

In addition to being an expert on foreign affairs Congressman Fulton has been keenly interested in issues of science policy for many years, and with his broad background he brings the vital contribution of the social sciences to bear on these questions.

We are also very pleased that Congressman Mosher and Congressman Symington who were also very active members of the Committee on Science and Astronautics have been able to accept our invitation and to participate in this series of meetings.

Since our visit to Washington at the beginning of May last year, our own committee concluded its scheduled program of public hearings at the end of June, 1969, and since the beginning of those public hearings we have received representations from more than 300 government agencies and private groups and individuals. We have accumulated more than 10,000 pages of evidence and we have received at least 200 specific recommendations as to changes to be made in our approach to science policy.

In the early fall we visited seven countries in Europe, including Sweden, West Germany, France, The Netherlands, Belgium, Great Britain and Switzerland, and we had most fruitful discussions with what were in our opinion the most qualified experts on science policy in western Europe. Since then we have also received a number of distinguished visitors. At the end of October we had a visit of Sir Solly Zuckerman. I am sure you know him. He is the chief science advisor of the British Government, and a few days later we had Sir Henry Melville, chairman of the British Scientific Advisory Council who was accompanied by Mr. Embling, deputy undersecretary to the Department of Education and Science. Then in November we had the pleasure of welcoming Dr. DuBridge and some of

his colleagues in Ottawa. At that time we had, as we had in Washington, a most interesting discussion with him. Last week we received a visit from Mr. Theo Lefebvre, Minister for Science Programming for Belgium who was accompanied by Dr. Spaey his chief advisor, and others.

Meanwhile we have been busy at the long and difficult process of preparing a report. The progress of that work has not been as rapid as we expected, or at least as I expected at first. Perhaps I was, even at my age, too naive, but with a very limited staff—we do not have the kind of staff that you have in Washington, and I am sure that this is a complaint from which you also suffer, even though you have much more assistance than we have—it is not an easy task to review and appraise more than 10,000 pages of evidence, including, as I have said, the great number of recommendations that have been submitted to us. Moreover the O.E.C.D. Report on Canadian Science Policy which was supposed to appear in June of 1969 was released only at the beginning of December. However, substantial progress has been made in the preparation of our report. I do not think it would be going too far to say, and I am sure my colleagues will allow me to say this even if this is a public meeting, that we now have prepared first drafts of most of the chapters of that report. Nevertheless, despite the substantial progress that has been made, I would be surprised and very happy if we were in a position now to make that report public before May. Again I may be naive and perhaps too conservative, but I would be surprised if we were in a position to make that report available before that date.

Thus, your visit, Mr. Chairman, could not come at a more appropriate time for us. You may expect us to try some of our tentative conclusions on you in the course of our two meetings *in camera* this afternoon and tomorrow. We probably would not dare to try these proposals with you in public, not because we would be afraid of your answers, but because we would probably be afraid of our own questions. I would suggest, however, that for this morning we limit ourselves to discussion of current issues of science policy in the United States, and I hope also that we will hear about the most recent activities of your committee and your subcommittee on Science, Research and Development. If this suggestion is acceptable, I shall in a moment invite Chairman Daddario to speak first, to be followed, of course, by his colleagues who want to add to his remarks. Then we will have a coffee break and then the discussion period. According to our program we must adjourn at 12.

One last word: we have issued a special invitation to leading scientists and science administrators in the Canadian Government to join with us this morning so that we have an audience which, while it is rather small, is of very high quality indeed. Finally, I would like to welcome Mr. Herman Pollack who is the director of the Bureau of International Scientific and Technological Affairs for the State Department and Dr. J. Thomas Ratchford who is a consultant to the committee.

That concludes my initial remarks, and I would invite you now, Chairman Daddario, to address the committee.

The Honourable Emilio Q. Daddario, Representative from Connecticut: Mr. Chairman and honourable senators of the Special Senate Committee on Science Policy, we are very honoured to have the opportunity to be with you again. We note that we are participating in your final public meeting. This adds to the interest in this particular occasion, because it means that you are at the end of what is an arduous task. Your work, I believe, will be extremely helpful in developing for your country, for us in the United States, and for other countries throughout the world who are interested in science matters, an attitude which will help the governments of many nations in regard to matters of science and public policy.

My colleagues who are here with me, Messrs. Fulton, Mosher and Symington, have over a long period of time taken a great deal of interest in this particular subject. This subject ideals specifically with the knowledge-producing mechanisms within our society, the way in which these are managed and administered, and how this knowledge which is produced may be better directed towards the cure of the social ills of our society and indeed of world society.

I have been pleased with the constant contacts that we have had with your group since our last meeting.

I was extremely pleased that Senator Grosart attended our annual seminar which took place a week ago in Washington, together with a number of other Canadian representatives who are related to the subject with

which we are dealing. That meeting was in itself one of particular significance because it showed the tremendous interest that is developing in the Congress of the United States on matters affecting science and the place that it fills in our Government and in our society.

The large number of people from throughout the world who come to these meetings give them a truly international flavour. Communications and information processing on a world-wide basis, properly put together in a flexible way to meet the demands of world society, is necessary for world problem-solving. Problem-solving mechanisms throughout the world must necessarily be flexible because what is good for one country obviously may not be good for another. Yet the information that will lead to that problem-solving might be the same. We must understand how information may be used, how it may be made available, and how quickly it can be adapted to the questions that arise from time to time during the course of a nation's development.

Because Chairman George Miller has been unfortunately detained from coming here, I feel we should not let the opportunity pass for the remarks which he had prepared for this meeting to be put in the record.

With your permission, I will ask Congressman Symington if he would be kind enough.

The Honourable James Symington, Representative from Missouri: Thank you, Chairman Daddario and Chairman Lamontagne. The remarks prepared by Chairman Miller are as follows:

Colleagues, honourable senators:

It is a distinct pleasure for the other members of the Science and Astronautics Committee and myself to join you in these joint meetings on science policy. This is an important issue for both Canada and the United States. Science policy questions, just like the results of scientific research, cut across international boundaries and often require co-operative solutions.

This is an especially propitious time for us to meet on this subject. The OECD report issued in December, 1969 brought into sharp focus many of the questions which we will consider here today and tomorrow. That report clearly states the potential problems and opportunities faced by Canada in this regard. It is a clear challenge to the legislature to meet the requirements of the future.

The report states:

> Canada, with its already high level of scientific achievement and its rich resources is exceedingly well placed to evolve and deploy its scientific effort to provide a continuous impulse to national development. By this, we mean not only material prosperity and the progressive evolution of society, but national well-being in the most general sense, extending from Canada's power to influence world affairs, to the richness of individual life. To achieve this is not easy in face of the flood of new specialist knowledge and our still primitive structures of industry and government. Above all, the complex inter-relationship of the various sciences and the intractability of many of the current problems facing society, can all too easily lead to too facile solutions which would give rise to still more difficult problems later.

During the past years, changes of great import have occurred in Canada respecting the role of scientific research. This is clearly emphasized in the OECD report, which I should like to quote further:

> One must regret the passing of the era of informal contacts and decision-making, which worked so well in Canada in earlier, simpler days. The real safeguard lies with the scientists themselves. An effective scheme for policy must accept, as a central point, the need to establish and maintain conditions propitious for highest creativity in research and this can only be achieved by responsible and collective advice from the scientists who will sit on the various advisory bodies.

The United States and Canada historically have had a close friendship. This has logically resulted in extensive co-operation in many fields, including that of science policy.

Our own committee has a long and continuing interest in many of those questions which you are actively considering today. My close fiend and fellow committee member, Congressman Emilio Q. Daddario, has continuously inquired into the issues of science policy since 1963. That was the year in which the Subcommittee on Science, Research and Development, of which he is chairman, was created.

There have been numerous studies and hearings conducted under his subcommittee leadership. Numerous reports have been issued

which have been extremely useful in guiding the evolving science policy in the United States.

Some of the issues which his subcommittee has addressed include: Scientific-Technical Advice for Congress—Needs and Sources; Geographical Distribution of Federal Research and Development funds; Basic Research and National Goals; Government, Science, and Public Policy; The Junior College and Education in the Sciences; Institutional Grants Program; Environmental Quality; and Technology Assessment.

It has always been heartening to me to observe the bipartisan nature of our deliberations within the committee on questions of science policy. Our committee members have approached the issues not as Democrats or Republicans, but as conscientious legislators looking for solutions in the best interest of society.

I want to point out that the contributions of Mr. Fulton and Mr. Mosher, the Republican members of our group here today, have been invaluable to the progress of the committee in dealing with the issues facing it.

In the United States Congress we have seen a distinct change in the emphasis on and interest in scientific research. Our budget for the space program is declining. Competent political leaders have moved from questions of science policy to other issues which they consider more immediately relevant. But our own committee has retained an abiding belief in the importance of science, and we think that its impact on the future will be even greater than in the past. Recent events, however, have shown that change is necessary in our governmental institutions, both administrative and legislative.

The United States policy for the support of science has, to use a good American colloquialism, "grown like Topsy". In a very real sense it has developed like our economy. Our support of science has had many of the attributes of a free market economy.

The users of advanced technology and research, such as the Department of Defence and the Atomic Energy Commission, have had a major role in determining the resources invested by our country in basic science, but now we must adapt to changing priorities and new demands of society. To do this effectively, we must also change our institutions and procedures.

The science, Research and Development Subcommittee is leading the way in its critical study of the need to reform our institutions for the support of our sciences. It has performed a thorough study of the generation and use of technical information for the Congress. Hearings on proposed methods of centralizing our federal science activities showed there was no overwhelming desire for radical change within the scientific establishment.

However, I am not sure that this answer is the same one which we will get a year from now. Therefore, we plan to have a comprehensive set of hearings to determine the form which changes in our institutions should take.

We hope to determine how science can develop a constituency to prevent violent fluctuations in funding and program emphasis. It is these fluctuations which are so destructive to the progress of science.

We must ask the questions: (1) Is a national policy for science desirable? (2) If so, what form should it take?

The activities of your committee since its establishment in 1968 have been truly impressive. The volume of testimony received during your hearings on science policy has been exceeded only by its quality.

(The chairman mentioned then that in his youth he could not lift together all the volumes of your hearings. I do not see how I could, either.)

Your visit to Washington in May of last year demonstrates a keen desire to be apprised of all information relative to your studies. Your planned report should in itself be of great value in sorting out valid solutions to the many questions which have been posed.

I am confident that we can use these two days of meetings to explore in ways valuable to both groups the important science policy questions which we share.

I should now like to ask the chairman of our subcommittee on science, research and development, Mr. Daddario, to identify some of those areas which he thinks would have special emphasis, and to pinpoint the issues for us all.

Congressman Daddario: Mr. Chairman, I had felt that Chairman Miller's views ought to be brought before you, because he had given considerable thought to your report and our relationship. I think it is a significnat one which certainly pervades the chairman's remarks as read to you by Mr. Symington.

I do not believe that there is any need for us to go over again all the ground which we covered when we met in Washington then, as

you recall, we touched on the early days of our own committee, the development of it as a new mechanism within the Congress, so that the Congress could develop a confidence in its ability to deal with the highly complicated problems of science.

Mr. Miller, in his remarks, has touched on some of the points that we have been particularly concerned with. As we look back over the years, it has not been so much the subject matter, although I believe that to be important, but rather the ability of congress to develop within it a mechanism to increase the ability of the Congress to handle these particular matters. In other words, to improve the legislative process is the most fundamental and important objective of all the work that we have done. It appears to me to be the basic strength behind the work that you are doing. When you have finished, the recommendations that you will make will cause the government to be able to take a more penetrating, analytical and objective view of the way in which the knowledge-producing mechanism of your country can be applied to its problems.

The last year has indicated that in the United States, and in our Congress especially, we are reaching an understanding about the necessity that this be so. Up until recently it was very difficult to get people to be concerned over scientific matters. It was difficult to get people to be disturbed about the second order of consequences of our technology. There is not a man in the committee who has not from time to time spoken out on these problems and has found them in truth not to be the kind of issues, important as they are, to have the political appeal to develop around them the kind of public opinion necessary to make headway in the legislative area.

Suddenly things have begun to fall in place, and I think that is important. President Nixon, in his State of the Union Address, made the environment, the improvement of it, a major issue. This major objective of his administration is of fundamental importance because, for the first time, it gives executive leadership and direction to the needs of this particular area. We can see that much support for this objective has come from our activities. It is important that during the last two years we held a colloquium on the environment. That colloquium was inspired by this committee in order to overcome the divided jurisdiction of the House and the Senate Committees. We simply invited all of the members of Congress and all the Chairmen of Committees that had anything whatsoever to do with matters affecting the environment in the broadest possible way to this colloquium. It was attended by the public in large numbers and it had testimony from witnesses who represented the cabinet. Some of the most knowledgeable people so far as environment and conservation were concerned thoughout the country.

From that colloquium came a White Paper which has had tremendous influence on the development of environmental activity within Congress. There is now a Council on the Environment, which has become law recently. We see the President appointing, for example, a committee under Mr. Lawrence Rockefeller, one of the world's greatest conservationists. We see the appointment recently of Judge Russell Train, to head the Council on the environment. We see all kinds of people who, over a long period of time, have been groping to participate in these activities now finally coming to the fore. We believe it to be a tangible sign, evidence of the developing interest that has stemmed from this Congressional activity.

The other point I would like to make is that this committee, over a period of time, has been concerned about Technology Assessment. In my talks with you, Mr. Chairman, and other members of your committee, I have seen a tremendous interest in technological forecasting, the assessment of our technology and its effect on our society. I believe this to be one of the most important developments, which again stems from legislative activity.

We see signs of concern about the need for a Technology Assessment mechanism developing in many, many places, not only in the Congress and not only in your committee. UNESCO has recently published a report on Technology Assessment which shows that there is significant concern in Europe about this matter. This gives me confidence that we are beginning to recognize for the first time the importance of this particular subject, and to tangibly develop a mechanism which can in fact deal with the second and third order consequences of technology.

The National Academy of Sciences, the National Academy of Engineering, and the Library of Congress have recently finished studies in this matter which have been dealt with in public hearings. We, in our committee, expect to be making legislative recommendations, and also recommendations to the

executive about the needs within the executive branch for the development of Technology Assessment capabilities within the various agencies of government. We do believe that this will be an important step in our ability to deal with our environment and with other problems of technology.

Among other signs in this area is the concern of many of our industrial people about Technology Assessment. Countless speeches made by some of our industrial leaders show a significant concern about their need to develop a mechanism for Technology Assessment in order to overcome second order consequences. A candid realization is shown through these speeches that industry must, in fact, look at second order consequences, and develop an internal policy towards them so that it can handle them in the first instance rather than have control imposed from outside their own operation. There is the recognition too that it is a requirement that they must impose controls upon themselves before they are in fact imposed upon them by the public at large as the result of the tremendous public concern.

So, there seems to be developing a proper concern throughout the whole broad spectrum of government, business, and the general public about our abilities in this regard. It gives me hope that we can in fact do something of a formidable nature about this very soon. The chairman, in his remarks, touched upon the question of a national science policy, and asked whether that was desirable in our country. I know that this is one of the questions, Mr. Chairman, with which you are dealing, and, in my opinion, it is important that it be dealt with. There should be a formal policy in this regard in our country. I shall be very interested to see how your report deals with this particular subject.

The importance of doing this very soon is exemplified in our planning by a very important set of hearings which we expect to last for the better part of a month sometime during this summer and for which planning has been going on now for several months. We believe that these hearings will be able to examine the subject in a very analytical and objective way and so be able to give a judgment about it.

I would like to touch upon just one further thing, Mr. Chairman. It is my desire in this hearing today to put up before you and your committee some of the thinking that I and other members of our committee have so that a two-way discussion may take place. We can go into specific detail about these matters, and I would like to touch on one point in particular.

Unless the importance of science and these knowledge-producing mechanisms is understood, there can be during times of stringent budgets, such as the present time in our country and in most other countries throughout the world an attack on the fundamental research activities which in the final analysis affects the knowledge-producing mechanisms. It affects our long-range ability to develop not only knowledge but the manpower necessary to handle the problems of our society in the time ahead. We can, because of economy measures, run into a lost generation of manpower. People with the kind of abilities we need in the near future will not be available, and this will certainly do great harm.

We can see a very strange development taking place, which I think we touched on when we last met, Mr. Chairman. In our country the question of basic research had been explored, and the kind of support that it needs has been examined time and time again. We have begun to see the effects of budget cutting on the Department of Defence, the AEC, and other agencies. We recognized, as transfers from one agency or another to the National Science Foundation took place, they were not accompanied by increased funds for the National Science Foundation. The obvious effect of this was to impose upon the National Science Foundation, as the agency through which general-purpose basic research was supported, an obligation to take on many of these projects, and to support under our system of peer judgment the highest quality work in various areas of science. This must then necessarily have an adverse effect on our younger scientists, who could not compete with established research groups.

Part of our national policy in science must necessarily apply to whether or not we can in fact continue to have as our only criteria high quality. Without enough funding to go around, we must have the ability to support at the other end of the spectrum young people who will some day be scientists of highest quality. We must not short circuit ourselves regarding needed abilities in the future. At any rate, Mr. Chairman, these are some of the problems with which we are dealing.

We can go from this into other areas as we continue our discussion. I believe that it is

necessary and helpful for other members of the committee who are here to informally discuss points of interest to them. I would appreciate the opportunity to have Congressman Fulton make some comments about this particular subject. He has been as close to it as I, and has had a tremendous interest in it, together with the ability to express his views. I would appreciate it if you would make a few remarks.

The Honourable James G. Fulton, Representative from Pennsylvania: You are very kind, Mr. Chairman. I think Mr. Daddario has pointed out a general direction which is new in parliamentary government. That is a field where party lines and party organization is ancillary and helpful, but not controlling. This is what has been happening on our Science and Astronautics Committee, as a matter of fact. The universe is a mighty big place, but so far as the United States is concerned, space is not big enough for politics. We have kept politics out of our decisions.

The second point is that we look at this differently than does the average Congressional or parliamentary committee. Our members have a different kind of dedication, because science is not something, such as health, education and welfare, of great emotional interest, that sways the crowds and has you on the soapbox with them cheering and throwing their hats in the air.

Another point is the need for continuing hard study. We go into the heart of government and learn how to relate science, technology, research and development to it. It is amazing that until this generation nobody ever tried to arrive at any kind of general interface. Science was balkanized in rigid compartments or disciplines. There was very little interdisciplinary cross-breeding and very little direct access to government. The interchanges between government and science were at worst desultory and a very thin reach at best. I was a member of the original Space Special Committee, which we call a Select Committee. We considered how to set up NASA, with the Speaker, Sam Rayburn, whom I have always respected and honoured very much. The Chairman of that committee was our majority leader and Speaker, a very fine man, John McCormack. We had our minority leader, Joseph Martin of Massachusetts. When we started out in the Space program in the United States the Congressional leadership took part across party lines and gave the program impetus. You have to have leadership right from the top down to those of us who are the work-a-day fellows you are hearing today. Creating an interface between science, technology, research and development is not easy. It is a very complicated task. It is a function of mathematical permutations and combinations. In this kind of world where science has gotten to be a race among nations as well as a theoretical pursuit of people in scholastic chambers, it is a much different matter. You say well, where does science come in? It comes in first in the inquiring mind of every one of us. Every one of our citizens has it. It comes in the environment. As I was sitting here I was thinking this is your land. It is our land too. It is your Canadian land and it is our American land, because we share this continent. We are the peoples that own it and live here. I almost started out by saying fellow polluters of the Great Lakes basin. Unless the Government rises and takes a look at the environmental problems, just as your senators are doing, the country and the people are going to be left just as people were left with the heritage of the Sahara Desert. Do not blame it on the goats. No, blame it on the people.

You see in this room an inquiring mind. I thought you had two arches here supporting that middle beam and the lighting fixtures. Why in the world would you have those vegetable choppers in a small room like this where they take up so much room? Actually, there is a trade-off. They do fill more of the cubic space in this room, but they are obviously baffles so that Senators do not get echoes, maybe. But they have another purpose. Unless somebody is sitting and thinking what effect does this have? We in government are making all these decisions as if we are John Stuart Mill and often as if we had the control of a Hitler or a Lenin, which we do not have. How then do you take these immutable laws of science, which are so involved, and fit them into a government that is already operating in our case on a medieval basis. Our controls of individuals are just an outgrowth of what occurred in the medieval times.

In opposition to what was, we freed ourselves. That is where the Chairman's words are very important. He is perceptive about it, that once we have freed our minds we have to get into a method of organizing. If I have given anything to our committee or to the United States, it was when we were discuss-

ing science, technology, research and development under our Space Act. I added one word and believe I sold them on it in secret sessions. Do you know what that word was? Research, development and "exploration". You do not know what is there. Just go for the going. Be a Colombus of space, a Colombus of anything, but keep the breadth so that some people have a goal. I remember when you were down there and all the scientists were saying how they were do-gooders, how wonderful it was they had all these ideas, and how they looked down at us in Pittsburgh. Who was it that looked down at me?

Senator Grosart: McGeorge Bundy.

Congressman Fulton: Yes, McGeorge Bundy. He is with the Ford Foundation. He looked down his nose and said, "You people who have the plants and so on, you breathe bad air." I said I was from the City of Pittsburgh, that we had cleaned it up, and that we were cleaner than New York City where he came from. I told him, "Maybe we have a little bad air because the plants are operating. There is a trade-off. You can be a purist. You can have your plants and your pure air up in the mountain."

You cannot get this trade-off or balance unless there are people who make these judgments. People must be trained to do this, so that there is a scientific interface with government; they must be within the reaches of government and mesh with other interfaces. This is where government in your country and government in our country is sadly lacking, even to this day. I therefore compliment your chairman, Senator Lamontagne, Senator Grosart and the other senators who are looking at this overall problem. They are taking the time, as we did, to have a full scale look at all the disciplines.

I am from Pittsburgh, which is really a suburb of Ottawa. Our governments have not realized that on a plane going 1,000 miles an hour we, who are directly south of you, are less than half an hour away. On a 1,900 mile an hour plane we are only 15 minutes away. We would be considered a suburb if we were 15 minutes away by automobile, or in an ordinary ox cart or buggy. Thinking in terms of an ordinary automobile in traffic, in our X-15 we are only ten blocks away. Our X-17 travels 4,000 miles an hour, so travelling the 400 miles in one-tenth of an hour we are just six minutes away from you. We are closer than you realize. We are closer to everybody in the world than we realize, because going around the world in 89 minutes in orbit you are mighty close to everybody.

It is a changed world. It is trite to say we are neighbours. We are not only neighbours; we are rubbing shoulders with each other. If we are to develop this continent we must do so through each government on a scientific research and development base. We started 11 years ago to work as a team on these problems. We now need liaison between our legistatures at this level.

It is amazing that we do not have a cold war any more. There is no cold war in culture, science, the arts and humanities. We are exchanging information on space with the U.S.S.R. Even though we are parties to the Treaty for Peaceful Uses of Outer Space, our U.S. Air Force came near violating the spirit of the treaty. We were to have a manned orbit laboratory built by the Air Force. Some of us opposed this because we had a National Aeronautics Space Administration manned orbital workshop doing the same thing for peaceful purposes. Our military would not even tell our committee what they were going to do in the manned orbit laboratory. But that is now cancelled. We got the former Associate Director of NASA appointed head of the Air Force and he just closed the thing down and moved the astronauts over to NASA for peaceful tasks.

The peaceful uses of science, research, technology and development are endless, and we must have funds in the budget for them. How do scientists have an effect on your national budget? I would guess almost everybody in this room could tell you how. They would have to go in through some agency with four walls and come up with a part of that agency budget. How do scientists in different disciplines such as a biologist and a physicist, get together? They could only get together across the high walls between departments with widely different points of view. There is something wrong in this respect with our government.

How do you do it? You must look around in your Parliament and find people, such as you sitting here. There are people intensely interested, willing to raise their sights above the corn on either side of the road they are hoeing. They look around and see the environment and realize that every country has a self-interest in the environment.

I think it is wonderful that we are here, and we appreciate this invitation. You are our neighbours and we should be talking with

you. Mr. Daddario and I were in Brighton, England, seven or eight years ago. The United States had only been talking of science policy for three or four years. The European nations, including our sister country Britain were beginning to notice there important issues also.

This is a good forum for not only finding knowledge but distributing it, disseminating it and using it. What is more important to your government is getting the correct facts, the right knowledge, the methods of disseminating it and the methods of using it. I am very glad to be here and I might say in conclusion that Congressmen are well known for having been born with no terminal facilities.

The Chairman: Thank you very much, Congressman Fulton, for your very wise words.

Congressman Daddario: Mr. Chairman, I would now like to ask Congressman Charles Mosher of Ohio to make some remarks. He has been my counterpart on the Republican side of the Subcommittee on Science, Research and Development. To show the bipartisan or non-partisan nature of our activities, on many occasions he and I have jointly submitted bills to the Congress about matters affecting science and public policy. The latest was a bill to restructure the Department of Interior into a Department of Natural Resources and Population. This has developed considerable interest—I regret to say, more on the Republican side than on the Democratic side. But since there is now a Republican President in the White House that means it probably has more of a chance than otherwise. I would appreciate hearing at this time from Mr. Mosher.

The Honourable Charles A. Mosher, Representative from Ohio: Mr. Chairman, of course I also feel very privileged to be here this morning. I have been very much stimulated by the opportunity to look over some of the material that has been produced by your committee. I am fascinated by noting that the problems you are wrestling with reflect the same ones that we have. However, my mood here this morning is to be more of a learner and questioner than a speaker. One question comes to my mind, because I am very conscious of the difference between our governmental processes. The relationship between our legislative branch and executive branch is very different from yours. Therefore I should like to know what will be done with your report. You have had many specific suggestions made to you, and you will be making specific recommendations. Will these be strictly advisory to the Government or can you, in your Parliament, initiate specific legislation to carry out some of your recommendations even if it might be against the wishes of the Government?

I am thinking of a particular situation in our own Congress. We took the initiative back in 1966 in another committee on which I serve. I am the ranking minority member of the Subcommittee on Oceanography for the Merchant Marine Committee. We took the initiative in creating a commission which was chaired by J. Stratton, the very distinguished scientist and leader in our country. The commission, after two years of solid accomplishment, brought in specific recommendations for the reorganization of our Government regarding the uses of the seas. It recommended the creation of a new independent agency to be named the National Oceanographic Atmospheric Agency which would give new visibility to functions that now are terribly fragmented and scattered through many Government agencies.

I cite this as a specific example of a legislative initiative intended to improve the mechanism by which science policy is made in our country. That recommendation met with immediate resistance in the executive branch. It would require removing from the Department of Commerce, the Environmental Science Services Agency. ESSA would be put in this new agency, with the Coast Guard from our Department of Transportation and the Bureau of Fisheries from the Department of the Interior. In the bureaucracy there was immediate and terrific resistance. The Nixon Administration has asked us specifically to wait and not to act on this legislation which has already been processed in our subcommittee and is before the full committee for action. The Nixon Administration is asking us to wait until at least April or May when they expect to make some recommendations. Interestingly enough, on a completely bipartisan basis the mood within the committee is not to wait, because we feel that we have so much momentum in what we consider to be an extremely important area to meet a crucial need. Our mood is to keep up that momentum and to keep the pressure on and maintain the leverage on the executive in order to accomplish something in this field and not let them sit back and forget. We are, therefore, proposing to bring this legislation to create the new

agency out of our committee and to move it on the Floor of the House, hopefully to get action by the House of Representatives. There is a parallel enthusiasm in the Senate where hearings are now being held.

I cite this as an example of how, in our process, we cannot only make a recommendation, but pick up the ball and run with it and keep the pressure on the executive and demand action.

We are inevitably going to have to make some accommodations with the executive branch and get together later on. We are not going to sit back and wait. Do you have that same opportunity with whatever recommendations your committee is going to make? I would be interested to hear some discussion about this.

The Chairman: I suppose we could take that up a little later. We have a great constitutional expert in our membership and I am sure you will get a full answer to that question.

Congressman Daddario: Mr. Chairman, if I might just take a little bit more time for another purpose. Mr. Mosher reminds me, as I approach this next point, that in this area of Congressional initiative, some years ago we determined that the National Science Foundation needed to develop within itself certain administrative strengths. It did not have enough management strength, and we proposed legislation at the initiative of the Congress and again received the kind of resistance from the executive branch. This was bit by bit overcome, and that initiative finally became law. During the course of that we saw the recognition and the need for a stronger relationship of science to the formation of our foreign policy. We made recommendations in our report that there be an opportunity for this to increase through certain requests that the Secretary of State could impose upon the National Science Foundation. The National Science Foundation now has the permissive authority to respond to these requests, and bit by bit the relationship in this area has developed strength in a formidable way. During the course of this we have worked very closely with Mr. Herman Pollack, who has already been identified to you by your chairman as being an official of our State Department.

Even though this is a meeting of two Congressional Committees, it did appear to me, Mr. Chairman, that it would be helpful if Herman Pollack could come with us here to Canada and if he might say a few words about this subject we are talking about. It gives it a strength for us in our committee, a bridge to the executive, which you have already within your system. I feel his remarks would be very helpful to you, and therefore I would like to introduce Mr. Herman Pollack.

Mr. Herman Pollack, Director, Bureau of International Scientific and Technological Affairs, Department of State, U.S.A.: Mr. Chairman, honourable senators, I am with the Department of State and head the Bureau of Scientific and Technological Affairs. I might say that the Department of State has spent 20 years trying to find a way to deal with the subject of international scientific and technological activities and its interaction with the foreign policies which my department is responsible for. I have been with this function for just about six years now and we are still not through groping our way to a better answer.

One of the things which became clear in the mid-sixties was the fact that science and foreign policy were no longer two separate subjects but were best thought of as a single topic.

The United States Government is beginning to learn that when it uses the attraction of its scientific capabilities as a way of promoting scientific relations, we end by serving our political objectives abroad. This is because scientific relations have loomed very large in recent years as a major aspect of cultural relations among nations.

Secondly, we have come to learn that increasingly in fields such as atomic energy, space, the seabeds, the scientific policy, the foreign affairs problem arises in the very development of technology and is inseparable from the technology.

The United States Government, as a whole, has not organized itself to recognize these facts and we do not have a single instrument in the United States Government that equips it to deal internationally with scientific and technological matters. You have heard reference here to mission agencies. International scientific and technological affairs in the United States Government, on the whole, over the years have been the responsibility of mission agencies. The mission agencies by definition are set up to carry out a mission and that mission is not the foreign relations of the United States. As a consequence, the aspects of policy that our department was concerned with would sometimes be well

served and sometimes poorly served but in any case it was accidental and incident to their basic missions.

These were problems which our department, as well as this Committee of Science and Astronautics in the House, were becoming aware of more or less simultaneously.

We took this problem to the committee, both in camera and in open hearing—not with any answers but with the nature of the problem to be discussed and analyzed. Out of this process emerged the concept of expanding the capability of the National Science Foundation to deal in international scientific relationships, not with any specific domestic mission in mind but with the purpose of serving national policy.

The mere fact of the open hearings, testimony on the part of the Department of State, the mission agencies as well as the National Science Foundation, has served to make it quite clear that United States policy favours the liberal use of relationships in the scientific field internationally as a part of United States national policy, and in turn United States foreign policy.

This combination of circumstances—specific language of the NSF act—and the opportunity to create a consensus of attitude on the part of the executive branch and on the part of Congress—the most effective way of expressing national policy—has worked very well.

As you know, we speak often of the separation of powers, the balance of powers, in the United States. In our system this occasionally results in very well publicized conflicts. But those are the exceptions. Much more customary and typical for a practising bureaucrat in the executive branch is the constructive partnership relationship with people who share concern in the same problem. And out of this process of exchange of views does come about, as Mr. Mosher was saying, usually an accommodation and it makes very good sense, among other reasons, because you can thus bring your objective to fruition.

This has been our experience in the evolution of national science policy in so far as it affects our foreign affairs in the United States. Later on I will be able to go into more detail on this.

Congressman Daddario: Mr. Chairman, last night I had an opportunity to talk to Mr. Drury and as we discussed these meetings a very important aspect of this relationship came up. I would just like to touch on it for a moment, because it has in a sense come to fruition since the last time we met.

This is the extreme importance that our committee feels to attract to us as much advisory capability as we can from the private sector. This has developed over the course of time with the National Academy of Science, the National Academy of Engineering, with research organizations both public and private, and with individuals who have the competence to discuss a specific subject with us. Of most recent date there is developing a strong advisory relationship with the learned societies in our country such as the American Chemical Society, the American Biological Society, various engineering groups. These societies for years felt as though they had no reason or opportunity or place in the legislative process. This has radically changed and there has been tremendous interest. In numerous places we now find public service committees being formed. The most recent one which has been productive has been the American Chemical Society committee on the environment, delivering to us a study which is entitled "A Cleaner Environment". This is a formidable study which puts in catalogue form a whole series of steps which can presently be taken about our environment. It spells out areas where research is necessary and gives us the kind of advice which certainly will strengthen the legislative process.

The initiative that has been taken in this regard from the learned societies, I believe, will be of formidable help to the Congress in the time ahead. Beyond giving us expert advice, it also helps us to develop a relationship with the private sector for the building up of public opinion by important opinion-makers on matters affecting our environment, which certainly will stimulate the legislative process.

Thank you, Mr. Chairman.

The Chairman: Perhaps, just before we adjourn, I could comment very briefly on what you have just said, Congressman Daddario.

As a committee we also felt that there was a need for getting more advice from the private sector and the so-called learned societies in Canada. We realized during the course of our hearings that our own scientific community was rather widely dispersed throughout the country, and at some stage we counted approximately 60 different national associations which had some kind of interest and

some kind of output or contribution to make to the development of science policy. We realized very quickly that these people were so isolated and so diffuse that they were not in a position to make any kind of important contribution to the national effort.

As a result of our committee's prompting them, some of the leaders of these learned societies organized a meeting last July in Ottawa at Carleton University to which they invited all learned societies. At that meeting, which lasted for three days, they discussed various ways and means of reorganizing themselves in order to set up a new super organization which would give them a better opportunity first of all to discuss among themselves the various problems and then to decide how to make contributions to our committee, to the Government and to Parliament in general. They decided at that meeting last July to organize a new association. Consequently, though I was not able to attend that meeting, it is my understanding that such an organization was definitely set up in the middle of January of this year.

That organization is a by-product of the activities of our committee, in that as we progressed in our deliberations we felt the necessity of having that kind of advice from the private sector and, more specifically, from those learned societies.

It is our hope that by this time next year that new organization will be in a much better position to help us than it has been up to now.

I think this would be an appropriate moment to adjour for approximately 15 minutes.

The committee recessed.

(Upon resuming)

The Chairman: Now that we have resumed, I gather there is some confusion about the nature of our meeting of this afternoon and tomorrow morning. Let me emphasize that these two meetings are *in camera* and are restricted to our guests and to members of the committee. Unfortunately we are not in a position to invite representatives from the government.

Perhaps we should start by asking Senator Grosart to deal with the question raised by Congressman Mosher. After that I am sure there are other members of the committee who will have questions.

Senator Grosart: Thank you very much, Mr. Chairman.

I am sure our guests have noticed that we reverse the seating arrangements here. We put the guests up in the high seats and the ordinary members of the committee down in the pit. Therefore, on behalf of the pit, I know my colleagues would wish me to add their words of welcome to those spoken by the chairman. I say this because we do not always agree with the chairman in this committee and so I want to make it clear that in this instance we are unanimous.

In reply to a very interesting question posed by Congressman Mosher, I might say, Mr. Chairman, that he and I had the privilege of traversing the NATO front line some years ago together, but I shall not get into the subject of NATO this morning.

The Chairman: I hope not.

Senator Lang: Go ahead.

The Chairman: If so, I will join the pit too.

Senator Grosart: The chairman has had some difficulty in the Senate because of his views on NATO which he says represent the far left of the Liberal Party.

The Chairman: This is the usual Conservative distortion.

Congressman Daddario: That sounds like a much more interesting subject to discuss than the one we are on.

Senator Grosart: I might say in that respect, Mr. Chairman, that we are very interested to see the non-partisan manner in which your committee and subcommittee have proceeded, although I must say in view of our chairman's last remarks, that I am very much delighted to notice from the remarks of Congressman Fulton and Congressman Mosher that there is a small "c" conservative influence in your committee which no doubt accounts for much of its remarkable success.

In reply to Congressman Mosher's question which ranges over the entire matter of our peculiar Canadian Constitution, I should say at the start that there is a great difference between the theory and the practice in respect to the relationship between the two legislative chambers and the executive. I think the main difference between our two systems might be described very quickly by saying that your executive veto tends to come at the end of the legislative process whereas ours is very likely to come at the beginning.

Congressman Mosher: Can you at that point override the veto?

Senator Grosart: In saying that I mean to indicate that under our system it is the exclusive prerogative of the executive, that is the cabinet, to introduce any legislation that involves the spending of public money, so much so that when such legislation is introduced it is necessary for the Prime Minister or the Minister introducing the legislation to say he has just heard from the Queen that she needs the money. This means that no member of the opposition, or indeed, any of the parties in opposition in the House of Commons or the Senate as a body is in a legal position to introduce any bill which would involve the spending of public money. That is the theory but it has been got round a bit because, of course, any legislation necessarily involves the spending of some public money. Therefore, the principle has developed that if you look at the pith and the substance of the bill and if it is not spending money in large sums other than for, say, secretarial expenses or other expenses of an incidental nature, a bill can be introduced to change public policy.

Now, in direct answer to your question, in theory our Senate is really in a much better position to introduce legislation because the official opposition in the House of Commons relies largely on what we call "supply days" which are roughly eight days a session set apart for the opposition to move a motion of non-confidence or, theoretically, to move the adoption of a bill. But it could not, of course, involve the spending of public money.

We have a private members' hour, which lasts about one hour, two or three days a week, and the practice there is to talk out all private bills. Hundreds of them are introduced. I think there are about one hundred now before the House of Commons, and none of them has much chance of getting through, unless the Executive says it is acceptable. So, under the Canadian system there is practically no power of initiative on the legislative side other than from the executive.

What, then, is the use of a committee such as ours, or the other device we use for inquiring into matters of public policy—that is, royal commissions? Such bodies will influence executive action and legislation, if their recommendations are considered to be good by the executive. I think Mr. Drury made that clear recently when he said that the Executive would be likely to pay some attention to the report of this committee, if the recommendations were good. That is about where it sits.

However, we in this committee are very happy to be able to say to you that already a good deal of executive action has been taken as a direct result of evidence heard before the committee. For example, I would mention the separation of the Science Secretariat from the Science Council. I feel sure that this committee can take some credit for that. Originally, the Secretariat, which is the Science Secretariat of the Privy Council, was also the Secretariat of the Science Council, which is, theoretically at least, an objective, part-time body whose responsibility is to give long-term guidance in science policy. It was obviously an unworkable situation where the Secretariat of the Government was also the Secretariat of the so-called objective body. We pointed this out in this committee, and the separation was made.

In this committee there has been a great deal of discussion on the fragmentation of public policy in the matter you raised, Congressman Daddario, pollution. As was pointed out in this committee, there are in Canada at the moment about 228 political entities, all with responsibility in the area of water pollution alone. Not too long ago the Government gave the federal aspects of those responsibilities to one department, the Department of Energy, Mines and Resources. So there has been at least a degree of co-ordination of public effort in that field.

We have had a good deal of evidence in this committee on the effectiveness or otherwise of a number of Government incentive policies to upgrade the level of research in industry.

It has been said publicly that all of these are now under intense examination by the Government, and there is not much question, in my mind, at least, that substantial changes will be made following some of the criticism of these plans—and there are five or six of them—made in the committee.

The chairman has also referred to the learned societies, which is a direct example of some influence on public action by this committee. It so happened that we had the Canadian Association of Chemists and the Canadian Association of Physicists and...

The Chairman: The engineers.

Senator Grosart: Yes. They were before us one night. We had been at it with them all day, but it was late at night and we were getting a little annoyed. We finally said: "Will you stop complaining about a lack of government interest, and tell us with whom in the science community the Government should co-operate?" They called some of us down to the Chateau Laurier at 11 o'clock that night, poured us some double whiskeys, and asked: "If we organize a meeting will the members of your committee come and repeat that challenge?" This was done, and the result is that we have the nucleus for the first time of a national science body from the side of the learned societies. They have had two meetings now, and they are well on their way.

We may before very long not be the only Western country that does not have anything approximating a national academy of science. We have been in that position. This highlights the point made by Congressman Fulton. It is very true that we are on about the second year of a course which you have been following with great success for ten or eleven years. We sometimes say that we missed Phase 1 of the great debate on national science policy; that we came in on Phase 2, or perhaps Phase 3.

We see some disadvantages, and one is the proliferation of fragmentation and confusion in any science policy that develops on an *ad hoc* basis, as ours has done. On the other hand, we see some advantages. We even think that we might have benefited from some of your mistakes. Certainly we should benefit from some of the mistakes that have been made by other countries at whose very serious attempts to develop a mechanism for the determination of national science policy we have looked.

Our legislative-executive system is, of course, quite different from yours in many respects. As I understand it, your committees have authority in the matter of appropriations, whereas ours do not, although there has been recently a very interesting development. In the last session of Parliament a major change was made in the relationship of the committees of the House of Commons to the work of the House itself. Previously a Government bill might or might not be referred to a Commons committee. Under the new standing rules every Government bill is introduced on second reading more or less in these words: It is moved that this bill be now given second reading, and referred to such and such a committee. The effect of that is that the committees of the House of Commons are now taking a much more active part in the scrutiny of legislation, and are recommending at times fairly substantial changes.

The House of Commons has not quite worked out the mechanism of the interface between those recommendations and Government policy. The other day a committee brought in a report which lay around for a while. Finally, an Opposition member of the committee moved its adoption. There was a bit of a procedural hassle, but the Speaker ruled that it was a proper motion, and this has really broken ground in our constitutional development. All our committees have a majority of the party in office, but some of us who are interested in constitutional development see in this a new status and authority for the Commons committee. It is an amelioration of this rather hard line of separation between the power of the executive to initiate or make major changes in legislation and the power of the legislature.

Congressman Mosher: Mr. Chairman, I greatly appreciate this very illuminating response to my question. It is obvious that your committee has reason already to have a sense of accomplishment. You can look forward very definitely to further impact even though, as I understand it, at the moment your committee is dissolved at the time you make your report.

The Chairman: This is the present situation, but we have received an almost unanimous recommendation from all those who have been before us, both from the private and the government sectors, that this committee should continue to operate. I think that our committee will make a recommendation to that effect.

Congressman Daddario: Senator Grosart, is that not the real answer to Mr. Mosher's inquiry, that from a practical point of view your committee, Mr. Chairman, has developed support for its activities. People who originally resisted your activities began to see the need to support what you are doing. Even though your committee was set up for a limited time, you have developed support which indicates, at least from what I have been able to learn in this regard, that it should continue. Is this not the practical result of what you have been doing?

Senator Grosart: Yes, that is very true. We in the committee are naturally very

encouraged to see that the Government has paid the attention which we would like it to pay to our proceedings. We are rather amazed that they have been reading them as thoroughly as they have and are making these changes in the meantime. It worries us a little that they are stealing some of the thunder of our report but, as long as we get things done, we do not worry too much about that. As a matter of fact, some of us are beginning to wish we were not going to write a report, because it will be somewhat anticlimactic. Our hearings have been the first occasion in Canada that Government departments themselves had an opportunity to come before parliamentarians and explain what they were doing about science *per se*. In more than one brief we read the statement that this is the first time that this department ever made an assessment of its science spending *per se*. Some of them rather boasted about this, to our surprise. I think it is true to say that nobody in Canada knew how much the federal Government was spending on science and development. We had contrary figures before us, which were quite far apart. In my mind there is no question that some of the evidence before the committee, and some of the statements made by members of the committee, caused the Dominion Bureau of Statistics, and the Science Council to get together, and they have now come up with figures that I think are pretty reliable. This indicates how far back we were.

The first time we knew what was going on in Canada in the global sense in research and development was from an OECD report. It took some outsiders to come in with the breakdown between fundamental applied and development, and between funding and performance of in-house, universities and industry research. Until the OECD report there was no document available in Canada with these very important figures.

When Senator Lamontagne introduced his original motion in the Senate to have this committee set up, the great debate had not reached Canada. Of course there were scientists who were aware of it, but in the sense of any legislative or public interest in the question that you, Mr. Daddario, raised yourself—whether we needed a national science policy—there was no public discussion of that. Today there is a good deal of public discussion. I think one of the achievements of our committee has been to spark this discussion and provide a forum for a period of a year and a half to which anybody could come. For example, we had representatives of the universities in this room who had never sat down together at any time to discuss the problems of funding science and the performance of science in the universities as such.

The Chairman: We had 40 in a week.

Senator Grosart: We introduced some of them to each other, and certainly introduced them in the context of a discussion of science policy.

Congressman Daddario: There are many interesting and parallel developments between your work and ours. I think it important to note that these common boundary conditions impose certain requirements upon the people with whom you and our committee are dealing. Over and over again we found it was illusory to think that many of these people had a fixed philosophy about science matters. This was a false assumption made not only by ourselves but by them. When they were brought together, introduced to each other and began talking to each other, they discovered that they were not really operating on the same wavelength. In these discussions there have been some remarkably good developments, which have been helpful in this process of elucidating science policy questions.

One other interesting parallel you drew was in reference to certain people in government who never had had a chance to appear before a parliamentary committee. When we first approached the National Academy of Sciences we found they were very delicate about this relationship, and in fact not anxious to work with Congress in this regard. We finally did work it out and established the first formal relationship Congress had ever had with the National Academy of Sciences, which had been in existence for 102 years. From that time the relationship has become a very casual and easy one, demonstrating that many times we create artificial barriers. It seems to me that what your committee has already done is to break down so many of these barriers and this is tremendous progress.

Senator Grosart: This is true. We had some quite adamant refusals from some quite important public bodies to appear, but after awhile it became fashionable to appear before the Science Committee and almost a status symbol.

The Chairman: I suppose that other members of the committee want to ask questions on what you have said. We will have an opportunity of course this afternoon to go on with this kind of dialogue.

Before I ask the other members of the committee to ask questions I should like to add to what Senator Grosart has already said about the impact this committee has had. We have had in Canada a Cabinet committee on scientific and industrial research since 1916, but that Cabinet committee, which was supposed to deal with all of these matters, very seldom met and in the last 10 years apparently never met at all. As a result I suppose of our inquiry too, and I am sure also due to the initiative of very first class public servants as well—we have one here with us this morning, Dr. Uffen—this Cabinet that never used to meet is now meeting regularly. I am sure that this is a big improvement at least in the central machinery for dealing with science policy matters. This is another impact that can be attributed to the work of our committee.

Senator Grosart: Mr. Chairman, may I make this comment? I would not want it to appear that my remarks were intended to be critical of what you have called the "solitudes" in our science establishment. On the contrary, I think it is greatly to their credit that they seized this opportunity to the extent they did and went to the trouble to present the very, very excellent briefs that we have had.

In commenting on the result of the ad hoc development of what passes for science policy, I was not suggesting that the fault lay entirely with them. In fact, in my opinion it lies entirely with the legislature, because parliamentarians in Canada have not, until recently, involved themselves in the problem of science policy.

Senator Carter: Mr. Chairman, I should like to preface my question by saying what a pleasure it is to have Chairman Daddario and his colleagues from the United States Congress here with us this morning. I would like to compliment them on the excellent presentations they have made to us. After listening to them my first reaction is that we shall probably have to add another chapter to our report.

The Chairman: I hope not.

Senator Grosart: What is the title?

Senator Carter: Mr. Daddario put his finger on one of the basic problems that has confronted our committee as well as his and that is the desirability of technical assessment for the future and trying to get forecasts of technical advancements and their possible effects on society and what can be done about undesirable effects. He has pointed out how difficult it is to accomplish that in a society where we have no control and where we believe in a philosophy of free enterprise and free consumer choice. If I understood him correctly he stated that somehow we have got to find way of getting industry to take measures voluntarily on their own part before reaching the point where they have to be forced to do something.

That reminded me of a current discussion that is going on now about the use of detergents which I heard last night over television and again this morning. Apparently, a committee has made some investigation on detergents and they have discovered that phosphate contents of detergents on this side of the ocean range all the way from 48 per cent down to 23 per cent, but over in Sweden they have a fairly satisfactory detergent which has only 10 per cent. Our Government has given up any hope of achieving any voluntary action on the part of industry and is about to bring in a law which will force industry to eliminate phosphate or at least to bring it down to a satisfactory level in their product.

I was wondering if Mr. Daddario would elaborate a little further on this. How does he see it? What mechanism does he see we should employ to try to bring industry to act voluntarily before the situation gets so bad that Government has to enforce action.

Congressman Daddario: Of course, Senator Carter. You ask one of the very difficult questions with which we are faced in government, that is, the relationship of government to the private sector. What I did want to point out is that in our hearings on technology assessment which have been on the way now for four to five years, we have developed a concern in the country on this subject. This concern reflected favourably on the way in which these basic ideas had permeated the thinking of some of our industrial groups. Leaders of these groups have made statements about the need to do something about the second order consequences of their technological activities.

I pointed out that only as communication increases could we expect to take advantage of these ideas. One of our great companies

has come to me recently and has advised that they have in a very quiet way had a meeting about technology assessment and what they need to do. This is an example of a company developing within themselves a new policy about the second order consequences, so we see already voluntary action taking place.

Whether that will reach out far enough ahead to take care of the situation is another matter.

I would expect that there will need to be correlated activity from a governmental point of view. I see this developing somewhat in this way. The Congress must build a new mechanism through which technology assessments can be made in areas of immediate importance. These assessments must be done with such strength and be formidable enough in the nature of their presentation to the public, that from these will come voluntary adjustment to what need to be done in these areas—detergents could be a good example. But if voluntary action is not taken there would then be back-up activities which would immediately move in to do what was necessary.

I doubt that this, as we go along, will be as big a problem, Senator Carter, as you indicate. I do not say this because I believe the people have become unselfish and would not look for advantage, but rather because I think it is becoming recognized that the failure to act, in itself, imposes restrictions on us anyway. These restrictions can become so weighty that they can change the whole nature of our society and the way in which we, as a people, can live freely in the kind of environment that is being developed.

It appears to me that the relationship that we are developing through the involvement of the kinds of people we are talking about is a good development. It will allow us to do much more of what the Government needs to do in this area. It will encourage the private sector do more, because we are relating to each other better than we have ever done in the past. This is one of the most important functions that we as legislators can serve: to bring together early enough the people who are going to be affected so that we can come to an understanding and so that people can in fact develop the right solutions.

Senator Carter: Thank you.

Senator Grosart: I have a supplementary, if I may, Mr. Chairman. Sir, you have spoken of the second order of control, or the second order of action. What have you to say about first order action? Have you any body of laws now requiring firms that are starting up to meet certain standards?

Congressman Daddario: There are many regulatory agencies in the country, at the federal state and local levels. They do a presentable job in many areas, although certainly not in all areas.

There are regulations and there are controls in that regard. The important thing here, however, is to look not at one development but at them all. For example, there is the supersonic airplane problem and the noise pollution problem. There are the meteorological effects of the SST. These are matters which the people are generally concerned with. What are we to do about them? Do we allow the airplane to be built at any noise level or do we in the first instance impose on them the requirement that they cannot fly unless they restrict themselves to certain levels?

That is one area of importance; another, for example, is the detergent field. Should a company be allowed to dump detergents and say they will pay damages for any harm that results, which would be an external cost? Or should we say, rather: how can these problems be considered in the first instance, internally, in the companies' own accounting systems? How can they in fact come to early conclusions about what might be the consequences of their technology? Bearing that in mind, should we impose upon them the requirement in the first instance that there are certain levels beyond which they cannot go?

This takes a tremendous amount of doing from the standpoint of research, and legislative understanding about what this will amount to. We are in the process of developing these mechanisms now. We would hope that we could specifically establish, as we go along, ways and means through which the second order consequences will be better fitted into the economics of industry, which is one of the fundamental problems.

Congressman Fulton: If I may interject here, on the federal level the budget for pollution has been increased from $200 million to $800 million under President Nixon. This will pay for sewage-disposal plants which are erected to meet local situations. We in Pittsburgh are on the greatest mineral wealth in the world, the Pittsburgh coal seam. But by virtue of local statutes and ordinances we are

not allowed to burn coal unless there has been some special treatment. We also have the problem coming up of what to do with disposable items such as beer cans. An aluminum beer can will outlast the pyramids or even Noah's Ark. The proposal has been made that we should tax the article on sale to pay for the clean-up job. So that, in answer to Senator Carter's question, you put a curative tax on the item at the time of sale of the product so that when a lady buys her detergent or hair spray or whatever it is, she would be required to pay for the cost of the cleaning up right then, and not later. I think you could do it better at that time than trying to clean up later after the mess has been made.

Senator Yuzyk: I would like to finish on a note which I think is very important to us. First of all we appreciate the fact that we have co-operation on the international level. We realize, of course, that science is international and that such co-operation is necessary, but what came out today specifically, I think, is that we will have to deal with a new aspect of science policy, which is science policy as an integral part of foreign relations and foreign policy. This is an aspect that we have not actually looked at up to now. Of course, we did realize in Europe and other countries that the embassies always have, or at least most of them that we are associated with have, advisors in science. This goes to show that the international aspects are very important. I think it is only right that we should give credit to the fact that this is a fruitful discussion as a result of which matters have come to our attention which we will probably take up later. Now my question is, and I do not know whether you will be in a position to answer it, are you willing to carry on the exchange of committees here regarding science policy as has been initiated so far?

Congressman Daddario: Well, Mr. Mosher's question and Senator Carter's answer and what has followed from them indicate that we certainly should. I would hope that regardless of what the results of these deliberations are, there will be a mechanism developed through which this exchange can continue. It has already been extremely helpful to us. Congressman Fulton points out that we are the occupants of this land, and the air flows over it and the rivers flow across it. Therefore we must of necessity work together and I have no doubt that we can do so. These meetings have proved to be very helpful and I sense a very real desire that they should continue. I have no doubt that their results will prove to be helpful and significant.

Congressman Fulton: The amazing thing about this is that we are a House Committee and we are dealing with senators abroad.

Congressman Mosher: I live on the shores of Lake Erie, right across the so-called water from Ontario and I certainly am aware of the necessity of our working together, only to mobilize national but also international effort to save the Great Lakes.

Congressman Fulton: We have the problem in Pennsylvania and in Ohio where sewage is dropping into the Monongahela and Allegheny Rivers. They in turn flow into the Mississippi, and when it overflows it overruns the cities in the fertile delta. I remember when I was a Naval Reserve Officer I said to another officer "here's to you; we are part of your great success in fertilizing the great delta." He turned to me and replied "Here's to you, Mr. Lieutenant, on your successful round trip."

The Chairman: I am sure there are many questions regarding various matters deserving of our attention, but unfortunately, we are already five minutes late in our schedule. I propose that we reserve these other questions for our meetings this afternoon and tomorrow morning.

Before concluding this first meeting, and this last public meeting...

Senator Grosart: We hope!

The Chairman: Yes—on behalf of the members of our own committee, I would like to thank you very much indeed for having been with us this morning.

The committee adjourned.

Queen's Printer for Canada, Ottawa, 1970

Second Session—Twenty-eighth Parliament

1969-70

THE SENATE OF CANADA

PROCEEDINGS

OF THE

SPECIAL COMMITTEE

ON

SCIENCE POLICY

The Honourable MAURICE LAMONTAGNE, P.C., Chairman

The Honourable DONALD CAMERON, Vice-Chairman

No. 2

BRIEFS NOT SUPPORTED BY ORAL EVIDENCE:

(For list of briefs, see page 2:15)

ERRATA

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No. 2

BRIEFS NOT SUPPORTED BY ORAL EVIDENCE:

(For list of briefs, see page 2 : 5)

ERRATA

21719—1

MEMBERS OF THE SPECIAL COMMITTEE

ON

SCIENCE POLICY

The Honourable Maurice Lamontagne, *Chairman*

The Honourable Donald Cameron, *Vice-Chairman*

The Honourable Senators:

Aird	Grosart	Nichol
Bélisle	Haig	O'Leary (*Carleton*)
Blois	Hays	Phillips
Bourget	Kinnear	Robichaud
Cameron	Lamontagne	Sullivan
Carter	Lang	Thompson
Desruisseaux	McGrand	Yuzyk
Giguère		

Patrick J. Savoie,
Clerk of the Committee.

(*Quorum 5*)

ORDERS OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate, Tuesday, September 17th, 1968:

"The Honourable Senator Lamontagne, P.C., moved, seconded by the Honourable Senator Benidickson, P.C.:

That a Special Committee of the Senate be appointed to consider and report on the science policy of the Federal Government with the object of appraising its priorities, its budget and its efficiency in the light of the experience of other industrialized countries and of the requirements of the new scientific age and, without restricting the generality of the foregoing, to inquire into and report upon the following:

(*a*) recent trends in research and development expenditures in Canada as compared with those in other industrialized countries;

(*b*) research and development activities carried out by the Federal Government in the fields of physical, life and human sciences;

(*c*) federal assistance to research and development activities carried out by individuals, universities, industry and other groups in the three scienctific fields mentioned above; and

(*d*) the broad principles, the long-term financial requirements and the structural organization of a dynamic and efficient science policy for Canada.

That the Committee have power to engage the services of such counsel, staff and technical advisers as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to examine witnesses, to report from time to time, to print such papers and evidence from day to day as may be ordered by the Committee, to sit during sittings and adjournments of the Senate, and to adjourn from place to place;

That the papers and evidence received and taken on the subject in the preceding session be referred to the Committee; and

That the Committee be composed of the Honourable Senators Aird, Argue, Bélisle, Bourget, Cameron, Desruisseaux, Grosart, Hays, Kinnear, Lamontagne, Lang, Leonard, MacKenzie, O'Leary (*Carleton*), Phillips (*Prince*), Sullivan, Thompson and Yuzyk.

After debate, and—

The question being put on the motion, it was—

Resolved in the affirmative."

21719—1½

Extract from the Minutes of the Proceedings of the Senate, Thursday, September 19th, 1968:

"With leave of the Senate,

The Honourable Senator Lamontagne, P.C., moved, seconded by the Honourable Senator Benidickson, P.C.:

That the name of the Honourable Senator Robichaud be substituted for that of the Honourable Senator Argue on the list of Senators serving on the Special Committee on Science Policy.

The question being put on the motion, it was—
Resolved in the affirmative."

Extract from the Minutes of the Proceedings of the Senate, Wednesday, February 5th, 1969:

"With leave of the Senate,

The Honourable Senator McDonald moved, seconded by the Honourable Senator Macdonald (*Cape Breton*):

That the names of the Honourable Senators Blois, Carter, Giguère, Haig, McGrand and Nichol be added to the list of Senators serving on the Special Committee on Science Policy.

The question being put on the motion, it was—
Resolved in the affirmative."

ROBERT FORTIER,
Clerk of the Senate.

BRIEFS NOT SUPPORTED BY ORAL EVIDENCE

The Committee has received many briefs which were not supported by real evidence given before it. It has been decided to print these briefs separately from the ordinary Proceedings, in several volumes, of which this is the fourth.* The list of briefs printed in this volume is as follows:—

1. Brief submitted by Olivier Héroux, Ottawa, Ontario.

2. Brief submitted by G. C. Lawrence, Ottawa, Ontario.

3. Brief submitted by Canadian Library Association.

4. Supplementary brief submitted by Notre Dame University of Nelson, British Columbia.

5. Supplementary brief submitted by the Science Faculty, Saint Mary's University, Halifax, Nova Scotia.

6. Brief submitted by Dr. W. E. Razzell, University of Alberta, Edmonton, Alberta.

7. Brief submitted by J. L. Wolfson, University of Saskatchewan, Regina, Saskatchewan.

8. Brief submitted by J. D. Prentice, University of Toronto, Toronto, Ontario.

9. Brief submitted by The Nutrition—13 Society of Canada.

10. Brief submitted by Amarnath R. Kshatriya, Physics Department, British Columbia Institute of Technology, Burnaby, British Columbia.

11. Brief submitted by The United Nations Association, Halifax Branch, Nova Scotia.

12. Brief submitted by Norman S. Grace, Toronto, Ontario.

13. Brief submitted by G. W. C. Tait, Gibsons, British Columbia.

14. Brief submitted by The Council for Laboratory Animals, Vancouver, British Columbia.

15. Brief submitted by Mr. M. F. Wideen, University of Saskatchewan, Regina, Saskatchewan.

16. Brief submitted by The North American Lily Society, Inc., Burlington, Ontario.

17. Brief submitted by Tam Deachman, Vancouver, B.C.

18. Brief submitted by the Rapeseed Association of Canada.

19. Brief submitted by Dr. R. A. Cleghorn, M.D., Montreal, Quebec.

20. Brief submitted by The Canadian Society of Plant Physiologists.

21. Brief submitted by F. H. Northover, Carleton University, Ottawa.

22. Brief submitted by the Committee of Chalk River Nuclear Laboratories Professional Employees.

23. Supplementary brief submitted by The Canadian Construction Association.

24. Supplementary brief submitted by the Department of External Affairs.

25. Brief submitted by the Canadian Society of Laboratory Technologists.

26. Brief submitted by Mrs. Amaret B. Reynolds, Whitewood, Saskatchewan.

27. Brief submitted by Robert E. C. Wegner, Faculty of Administration, University of Saskatchewan, Regina Campus, Regina, Saskatchewan.

28. Supplementary brief submitted by the Association of Canadian Medical Colleges.

29. Brief submitted by J. B. Warren.

30. Brief submitted by the Association of Canadian Map Libraries.

31. Brief submitted by Dr. D. A. E. Shephard, M.D., Bedford, Nova Scotia.

32. Brief submitted by the Canadian Advertising Research Foundation.

33. Brief submitted by Export Credits Insurance Corporation.

34. Brief submitted by The International Synetics Foundation.

35. Brief submitted by the Canadian Medical Association.

36. Supplementary brief submitted by the University of Alberta.

37. Brief submitted by the Canadian Institute of Onomastic Sciences.

38. Brief submitted by French Canadian Association for the Advancement of Science.

Patrick J. Savoie,
Clerk of the Committee.

*Volumes 1, 2 and 3 have been printed in Proceedings Nos. 78, 79 and 80 of the Special Committee on Science Policy, First Session—Twenty-Eighth Parliament.

APPENDIX 1

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

OLIVIER HÉROUX

Inter-University Cooperative Research Centres in Biology

The National Research Council of Canada in its brief to the Senate Special Committee on Science Policy points out that "because of the unpredictability of scientific discovery, new scientific advances cannot be planned or centrally directed". Planning and decision making with respect to scientific research, at the Government level, should be primarily confined to the establishment of the appropriate scale of overall funding and provision for major research facilities.

Whereas we fully agree that new scientific advances cannot be centrally directed by the Government, we would like to point out in this private brief that new scientific advances can be planned by the scientists themselves.

Scientific research is now so expensive, so specialized and so diversified that it now becomes urgent to promote cooperative efforts in order to save time and money. With this in view and in an attempt to foster larger research units in University Departments, so that research can be planned and carried out by well integrated teams rather than on an individual basis, the National Research Council has in recent years awarded Negotiated development grants to get such teams off the ground. These grants are of a large order of magnitude moneywise and must perforce be limited in number. This is particularly unfortunate in the case of biology where the fields of research are so diverse that any particular research theme supported by

a Negotiated Development Grant can only bring together a fraction of the Departmental staff.

The Cooperative Research Centres we are advocating are a sort of poor man version of the Negotiated Development Grant. Their purpose is to achieve cooperative research planning not by bringing research teams up to a critical size within a University but by promoting inter-university cooperation by means of a format which would give substance and continuity to this much advocated and much elusive goal.

Financial support for this type of endeavour is only a fraction of the cost of Negotiated Development Grants and yet it fulfills some of the latter's more important functions. Furthermore, we have tried out this formula at the Station de Biologie de l'Universite de Montreal and we are satisfied that it is worthy of consideration.

Types of Scientific Cooperation

Scientific cooperation is nowadays becoming more and more popular and is done in many different ways: there are (a) field expeditions where a group of scientists join their efforts to study a problem where it exists, an example could be the adaptions of Eskimos to their own environment; (b) collaborations between different laboratories, different disciplines in a given institution; (c) sharing of equipment between different investigators; (d) workshops or study groups where different scientists pool their thinking; and (e) there could be cooperative research centres of the type described below.

Inter-University Cooperative Research Centres

Basically such a centre would consist of a small nucleus of scientists in a given University working in a given area and responsible for arranging periodical workshops with colleagues from other Universities. These periodical meetings might last two or three days during the school year and possibly two to three weeks during the summer months. An optimal size might consist of three or four universities or Government research establishments being involved and a total of maybe eight research scientists with a dozen graduate students or so and a minimum of technicians (plus the odd special guest). For such a scheme to be efficient and viable one of the scientists at the host University should be made responsible for carefully planning out these workshops and making sure that all the physical facilities required will be made available.

Advantages of such Centres

After careful planning, including the instrumental and technical side (outside scientists could bring their own specialized equipment), a concerted effort over a few days or weeks can prove more fruitful to all concerned than their isolated efforts over much longer periods of time. This would result from a pooling of both brains and equipment since the individual laboratories cannot afford all the equipment and technical help needed to carry out simultaneously the study of the various parameters that such a cooperative research centre would tackle. The participation of the graduate students would give the latter

invaluable experience. In a relatively short time, they would learn new techniques but most important of all, they would be in a position of "picking the brains" of a number of experienced scientists in their field.

Such a cooperative research centre could not fail to attract interest within the host University and would facilitate the integration within its research program of additional staff members desirous of contributing their own competence.

Two other advantages of this type of research should be mentioned. One bears on the standardization of methods. Lack of standardization between different laboratories is one of the most serious and most costly problems in research. The scientific literature is replete with conflicting results which can be explained by different experimental conditions. This is not to say, of course, that lack of uniformity cannot have its usefulness. Very often a discovery is made by repeating an experiment in a slightly different way. The other problem is that if different scientists tackle a given problem by making different measurements with different techniques, their results will be directly comparable only if they have all used similar animals of similar sex, age and weight, similar diets, similar environmental conditions, etc. Such standardization from one laboratory to another, let alone from one country to another, is almost impossible. A partial solution to this very real problem lies in occasional cooperative research such as we are advocating.

(a) An ideal location. If such a centre were to be situated in a secluded but not too remote an area, scientists could work undisturbed but would be in a position to call on the host university for any additional laboratory instrumentation should the need arise. Investigators know from experience that in such ventures it is more often than not the most trivial but essential odds and ends that have been overlooked in the planning. One might add that the advantages of a secluded area lies not only in being away from the usual disturbances of a University campus but also that the researchers would continuously remain in close contact with one another, so that scientific discussions, exchange of ideas and continuous study of the results as the experiments progress, can be pursued at meal time and in the evening as well as during the laboratory hours. A congenial and well appointed laboratory and residence are obviously essential. Insofar as biological research is concerned, whether it is of an experimental nature or not, it would seem that a well established Biological Station would meet all our desiderata, if a working schedule can be arranged so that lab space and residence can be arranged. It has been our experience in a tentative venture of this kind that it was possible to make use of such facilities during "off-season" periods. (Appendix 1)

(b) Government support. To set up a research centre in an isolated area is of course a difficult task. All sorts of objections can easily be raised of which the main one is the economics of the whole proposition. It is clear that the cost of such a project would be prohibitive, were the necessary

installations to be set up exclusively for short periods of use throughout the year which would be the case if these installations were used exclusively for these concerted projects. However, the integration of concerted research activities to biological stations or other establishments that already satisfy the conditions mentioned above can be done without great financial expenditures, especially if the scientists bring their specialized equipment with them. Under such a working arrangement, the net result, financially speaking, is to maximize the use of pre-existing facilities thereby reducing the overhead in terms of total research carried out.

The scope of support envisaged need not exceed very much the sum of individual grants-in-aids awarded to the various scientists involved. It should limit itself more or less to paying at the onset the salary of a senior scientist at the host University plus his own research grant. His job would be to plan the periodical workshops in terms of research program, instrumentation, working and living facilities. He would act as the Chairman of the group.

To ensure the viability of such cooperative research centres, its research program and terms of reference should be clearly spelt out and the University should enter into contract with the granting body. It should agree to pick up on its budget the scientist mentioned above after a few years or at any time before if necessary. It should agree to provide the facilities for the workshops. Scientists from other Universities planning to participate in this venture should make their wishes

and views known directly to the granting body so that the latter would have a clear picture of the situation. They should be allowed to put on their own research grant enough money to allow them to attend the workshops.

In summary, the cost of such a project, over and above the individual grants-in-aid, would consist of: (a) the salary of the Chairman in the host University with his own research budget; (b) some measure of major equipment for the workshops; (c) travelling expenses for the participants from outside the host University.

Conclusions and Recommendations

Because of the value of such a project in creating research groups within a university and in stimulating inter-disciplinary approaches because of the cross pollination of ideas brought about by bringing in outside scientists, it is believed that the format we advocate is worthy of serious consideration in the light of its relatively low cost. It is therefore recommended:

(a) That the desirability of creating cooperative research centres of the type described above be carefully studied.

(b) That suitable terms of reference and contract forms be worked out.

(c) That the host University be given the funds necessary to launch these centres.

(d) That scientists from other Universities or Government establishments be allowed to put in their research budget the

amounts necessary for them to attend these workshops.

(e) That such centres, after a sound case has been made in each instance, be given a high priority in the allotment of funds by granting bodies.

Olivier Heroux
Senior Research Officer
National Research Council of Canada

Appendix I

A joint research project on the physiology of low temperatures

With the aid of a grant from the National Research Council, between 40 and 50 Canadian physiologists meet annually to take stock of their research work on the physiological aspects of low temperatures.

In 1967, the group in question examined the possibility of intensifying the co-operation that already existed between them. As a result of their examination, a group of five researchers from three different institutions decided to pool their respective efforts, knowledge and experience and undertake a joint research project.

With this aim in view, the following researchers met at the Biological Station of the University of Montreal on April 24, 25 and 26 to plan their project:

From the University of Montreal: Dr. E. Pagé and his graduate assistant, Mr. R. Gilbert

" " : Dr. J. Leduc and his graduate assistant, Mr. P. Rivest

From Laval University : Dr. J. Leblanc and his graduate assistant, Mr. A. Villemaire

From the National Research Council: Dr. A. deFreitas
Dr. G. Findley
Dr. O. Héroux

We agreed upon the following aims:

1 - to develop a new test for measuring the degree of adaptation to cold,

2 - to determine whether or not a correlation existed between the metabolic response to noradrenaline and resistance to cold in:

a) rats already acclimatized to cold in low-temperature chambers,

b) rats acclimatized outdoors to the various seasons of the year, and

c) rats rendered hypersensitive to noradrenaline through daily injections of the substance over a period of thirty days.

Thanks to the fullest co-operation from the Director of the St. Hyacinthe Biological Station, who asks nothing better than to see more frequent use made of the Station's ultra-modern laboratory and residential facilities, it was decided to take our instruments with us and do our research work there at times when the students would be absent. The Director's kindness extended to the obtaining of two thousand dollars' worth of basic equipment for us, which was to remain at the Station.

The site of the Station, in the mountains near a lake and far from civilization (it is two hours' drive from Montreal), seemed to us ideally suited to reflection, concentration and steady hard work, without the interruptions usually encountered in our laboratories.

We had already made two visits to the Station -- October 20-29, 1968 and February 10-15, 1969 -- to work on our new method of measuring the cold resistance of individual rats. At our last session, with the help of Mr. R. Charbonneau, an electronics technician from the Radio and Electrical Engineering Division of the National Research Council, we were able to check the possibility of using the latest telemetry techniques to measure the body temperature and muscular activity of our animals, and to record all our measurements simultaneously on magnetic tape for computer processing and analysis of our findings.

In but two and a half weeks, this joint endeavour enabled us to do what each of us working alone would have needed several months to accomplish, and we did it all at extremely low cost. It is nevertheless obvious that this joint work is inevitably going to entail some expenditure in the future.

The group hopes that the National Research Council will find a new mechanism for giving financial support to research in this new area.

Olivier Héroux
Co-ordinator

APPENDIX 2

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

G. C. LAURENCE

21719—2½

COMMENTS ON
"NATIONAL SCIENCE POLICY"
G. C. Laurence

National Science Policy has become the subject of many opinions expressed not only in briefs to the Senate Committee but also in technical journals, the daily press and in public addresses. It is difficult to find in this discussion a common understanding of the kind of statement a National Science Policy might be and the form it should take. Perhaps this is not surprising, for the views reflect a great variety of backgrounds in economics, business, politics and journalism, and others. The suggestions which are made often carry the weight of long experience in these various professions. In such discussion the scientist also has a perspective that is peculiar to his profession, but the difficulties he sees in applying the objectives, the criteria, and practices of the business world to scientific research deserve some thought.

Cost-benefit

The Order of Reference of the Special Committee directing the committee to consider and report on the science policy of the Federal Government makes it clear that its interest in "science policy" is concerned with priorities, budget and efficiency. It contains no suggestion that "science policy" can be expressed as a simple formula for reckoning what should be spent in a particular scientific field or on a particular scientific project. In the pleas from many quarters, however, that the government should formulate and make known a science policy, the impression is unavoidable that some are looking for a guiding formula that would relate expenditure to

foreseeable results. It is becoming the custom to call an attempt to express such a relation quantitatively "cost-benefit analysis."

A simple form of cost-benefit analysis is the old-fashioned bookkeeping of the corner grocer. It is generally fairly reliable because it deals with past events. Its usefulness is not questioned because it is obvious, and the significance of the resulting balance is understood. In attempting to apply cost-benefit analysis in budgeting for future benefit, on the other hand, a number of difficulties arise, some of which are particularly important when it is a matter of government spending.

The government's budget covers, besides research, other very different activities, e.g. technical services, regulatory functions, administration, etc. Also the benefits are of many different kinds, e.g. health, foreign trade, prestige, security, etc. The problem might be simple if we could assume that the contribution which each activity makes to the collective benefit is proportional to the dollars spent on it. Obviously there can be no justification for such an assumption. Cost-benefit analysis requires some identification of the contribution of each cost item to each benefit. Conversion factors must be introduced in the calculation to reflect quantitatively the relative importance of a dollar spent on different items. The assignment of values to these conversion factors, clothed in mathematical notation and accompanied by lavish use of unusual words, is likely to be left by default to the personal

judgment and prejudice of the analyst.

In the second place, the contribution of each activity to a particular benefit almost never can be considered as simply proportional to the expenditure on it. For example, in some cases there is a threshhold below which little benefit is possible. In some cases there is a diminishing return on increased expenditure. The analyst needs only a slight knowledge of mathematics to devise expedients to take these considerations into account, but in doing so he follows his own judgment, and there is no way of testing their validity except by retrospect years later. The quantitative appearance of the result is an illusion; mere use of mathematical technique does not insure an accurate conclusion if inaccurate or uncertain assumptions are introduced into the calculations.

As the cost-benefit analysis becomes more elaborate, in the hope that by taking into account every conceivable consideration the result would be more precise, the result depends more on the decisions of specialists in this kind of calculation than of persons with practical experience in the subject analyzed and understanding of the implications of decisions. Many of the arbitrarily assignable conversion factors should be a matter for political decision by government, for they depend on the relative weight to be attached to considerations of international credits, commerce, prestige, cultural values, technical progress, educational standards, and many other factors that are not commensurable. Cabinet Ministers cannot be expected to occupy themselves with mathematical detail;

hence elaborate cost-benefit analyses are likely to confront them with conclusions that are based on concealed policy decisions that should be their responsibility. If the conclusions offend their common sense, any scepticism they might express may meet with the reply that it results from detailed analyses by experts, and, in view of the cost of the computing machine that was used, its conclusions should not be despised.

Another difficulty in cost-benefit analysis of research is the inclusion of provision for the very important but very uncertain factors other than research that are involved in the hazards of innovation and successful competitive marketing. They include decisions of management, teething troubles in perfecting the final product, patent problems, prior successes by aggressive competitors, and the unpredictable whims of the market. Accordingly the apparent authoritative decisiveness of the conclusions of a cost-benefit analysis may be quite unreal.

Another cause of futility in applying cost-benefit analysis to research and to innovation is the impossibility of foreseeing when benefit will end. One innovation leads to another in an unpredictable sequence. However, the chain may be ended unexpectedly by the appearance of a better innovation from an entirely different antecedent sequence.

The spectacular successes of cost-benefit analysis have been in applications where the benefit can be uniquely described and soon can be tested. For example, operational research in warfare and production control in a commercial

enterprise. Unfortunately in many elements of government spending the benefits are diverse and incapable of quantitative expression by reference to any accepted standard; generally matters of subjective and political judgment, and frequently remote in the future.

The Finite Research Pie Concept

Part of the concern about science policy stems from the concept of a "finite pie" and the problem of its equitable division and distribution. There are several difficulties with this over-simplified analogy.

If the government should designate a certain part of the budget for research which was to be regarded as a "finite pie", it would be necessary, first, to define much more precisely what "research" includes. There is a trend today to apply the term to an increasing variety of activities, such as literature searches, patent searches, market studies, opinion polls, cost accounting, investigations of administrative procedures, compliance testing of manufactured goods, control laboratory operation, cost-budget analysis, etc. If all are fed from the same pie the slices must be smaller. With the increasing complexity of government and its increasing involvement with the physical, biological and social sciences, the distinction between research and associate technical activities is increasingly difficult to define and the edges of the pie become hidden in fog.

Deputy Ministers are concerned with the interdependence of research and other activities in their departments and may

not find it easy to correlate suitable slices from a research pie and a non-research pie. The Treasury Board, of course, will wish to have the assistance of competent advice in reviewing the research items in the departmental budgets, but to start with a predetermined allocation for all research activities is neither necessary nor desirable.

As pointed out by others, the government expenditure on research in proportion to the total budget, or to the gross national product, is lower in Canada than in other technically advanced nations. There is no reason to conclude that we have reached the point where there is serious need to confine research expenditure within rigid bounds. It is still possible to increase support of one research project without depriving another.

Support of Research
in Neglected Areas

The call for a science policy comes often from persons who feel that government spending on research has been haphazard with insufficient overall planning, and that consequently important areas have been relatively neglected and should be given more financial support. The criticism is unfair to organizations such as the National Research Council and to the members of its advisory committees which have conscientiously strived to make the best distribution of the funds available. If "planning" means the adoption of certain broad guiding principles for the allocation of funds, it has not been entirely absent in the decision making of granting agencies, and in the advice that they have given to government.

Their difficulty in making any such planning effective is that financial support alone is not sufficient to create research vitality in certain areas.

In any special field of science there are periods of high productivity and of relative inactivity that cannot be completely governed by money alone. Productive periods occur usually when an important new discovery or an important new development in research instrumentation opens up a great new field to be explored. One question leads to another and each must be tested by experiment, and so knowledge grows. Inactive periods occur in a science when it presents no new questions that arouse the curiosity of the scientists or that can be resolved by known research techniques.

When a science is in a period of high productivity it has glamour that attracts scientists and students, and it more easily obtains financial support. The dormant sciences excite less interest. This is not an objectionable discrimination which calls for a deliberate policy of resisting it. The glamourous areas should get more support because their use of it is likely to be more productive.

There is a similar advantage in supporting most strongly those research activities in which a country such as Canada has experience, skill, equipment and reputation. It is easier - which usually means that it is less costly - to continue to benefit from what we can do well than to acquire comparable competence and success in a science that we have neglected. Certainly there are neglected areas of research that should be

encouraged, but not at the expense of strong areas without good reason.

Priorities

It is necessary, of course, to discriminate between good ideas for research projects and bad ones. Discrimination in a particularly narrow field should be done by experts in that field, and it is on that basis that the grant selection committees are selected at present. They in turn report to a committee of wider background, preferably including persons who have experience in directing multi-disciplinary research activities. Such provision for decision on the distribution of grants seeks to judge the applications individually on the basis of the probable value or importance of the possible contribution to knowledge that might result. Even if it is decided for policy reasons based on other considerations to give more generous support in a particular field, the present practice of obtaining competent advice by other scientists on the merits of individual requests for research grants should nevertheless continue, although a corresponding relaxation of standards is required.

The practice of assigning priority to research projects according to the prospects that new knowledge may result is well established in the policy of the government agencies that distribute grants in aid of research. It is suggested by some that priority should depend more on recognition of foreseeable immediate applications of the knowledge or on the relative importance of the various objectives of national policy, such

as health, defence, education, commerce, etc., to which the research might be relevant. They would expect a government declaration of policy to specify the relative size of the investment in research to contribute to these various objectives.

However, merely to appropriate a large sum for research intended to promote an important objective of national policy will not insure that the research will be fruitful. There must also be ideas; they will be lacking unless the problem stirs the imagination. It takes time for ideas to grow and multiply. It also takes time to examine them critically, and to convince others of their merits. It takes effort and time to earn the confidence which the investment of large sums requires.

The physical scientists realize this. The applications for the Board's grants are supported by detailed explanations that require considerable time consuming work in preparation.

In applied research also examples can be found in Canada of programs growing from small beginnings to great importance. Some of the new programs initiated with the help of the National Research Council Industrial Research Assistance Program are considered to be very promising.

It also takes time to create a research competence in a manufacturing corporation that has little experience in it. The difficulties can only gradually be overcome as persons with relevant technical backgrounds advance to senior positions in management, and suitable research staffs are found and they become acquainted with the company's problems and the related

science and technology. These factors in turn limit the rate at which financial support can be advantageously increased.

It is unreasonable to expect that costly research programs should win immediate acceptance through vague references to national needs without explanation of how research can serve them. If they deserve the confidence of their proponents they are more likely to gain interest and gradually increasing financial support through diligent preparatory development and continuing demonstration of competence.

Some of the applied research centres in Canada well deserve to be called centres of excellence. There is a need for more. University engineering departments can help greatly in presenting the case for them by describing the useful research that they might do. Computerized studies are not needed to identify objectives unless we are insensible of the obvious.

Objectives

Such national purposes as the development of the Canadian north, accommodation to a difficult climate, an effective transportation system, reduction of pollution, etc., are not, in themselves, research projects, but research can serve them. Discussion of research priorities should take cognisance of the importance of such objectives. It is possible to assign relative weights to them, even arbitrarily. It is difficult, however, to go further in a general policy statement by attempting to deduce relative weights to be assigned to research related to these objectives, because the ways in which research can contribute to these various ends cannot be foreseen and expressed

as a widely applicable research policy. Wise expenditure on research depends on consideration of projects and programs individually in the light not only of the national objectives but also their intrinsic merit and the current state of the relevant science.

Dr. Richard R. Nelson, speaking to this committee, illustrated the point when he said "For most decisions involving science it is neither necessary nor helpful to have an overall science policy. Consider the question of spending on cancer research. It seems to me the most relevant question here involves health policy - not overall science policy. Cancer research programs can fruitfully be compared with the need for hospitals and a variety of other public health services other than research programs within the field of health and medicine."

There can be no easily applicable policy formula that would help government in deciding on the priorities that should be attached to different scientific activities and projects and the support which each should receive. Sound decision on such questions can only be reached after considering the best advice available from competent sources including its own advisory organizations such as the Science Council, Science Secretariat, and government agencies directly involved, and considering each important case individually. With the aid of that information, decisions must involve weighing the various incommensurable benefits, purposes, secondary effects and competing interests. A statement of national science policy should not fetter a government by making these decisions in advance.

A statement of national research policy, unless conceived with the gift of prophecy, can be no more than a reminder of some of the considerations to be borne in mind in making decisions of the support of research projects. It should, of course, recall the objectives of our whole national endeavour, not neglecting those whose benefits cannot be expressed in terms of commercial gain, so that we are alert to recognize opportunities for research that might aid them. It should not attempt to describe how the financial support of each objective should be divided between research and other activity. It should not regard the total federal spending on research as a single item to be distinguished from the rest of the budget, the size of which is to be decided before considering the part which research can play in serving each national objective. It should encourage research in those sciences that are in a period of great activity and productiveness, and projects which are more likely to bring new knowledge and have been carefully planned. It should not encourage support of a costly project or program if the application is not supported by well prepared description, that is convincing to competent referees, of the nature of the research, of the methods to be used, of the availability of equipment and the staff required, and of the cost of the undertaking. Such information, however, must be examined more tolerantly when endeavouring to encourage research and development in an industry that has little past experience of it. In drafting the policy, it should be remembered that important discovery cannot be guaranteed by contract, and that research is only a part of the process of successful innovation.

APPENDIX 3

MEMORANDUM SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

CANADIAN LIBRARY ASSOCIATION

28 February 1969

Dear Sir:

I have the honour to refer to the letter of 10 January 1969 in which the Honourable Maurice Lamontagne, writing to Professor Katharine L. Ball, President of the Canadian Library Association, invited the Association to submit a brief to the Special Committee on Science Policy of the Senate of Canada.

Senator Lamontagne's courteous invitation was reported to the Board of the Canadian Library Association at its meeting on 27 January 1969 and was received with pleasure. I was instructed to prepare a short memorandum within the framework of the conclusions and recommendations in a substantial and fully documented brief submitted by the Association in March 1968, to the Science Secretariat of the Privy Council.

The submission to which I was asked to refer is entitled *Science and Technology Resources and Services in Canadian Libraries: a Brief to the Science Secretariat*, and was compiled by a special committee of the Canadian Library Association under the chairmanship of Miss Eleanor Magee, Librarian of Mount Allison University. The terms of reference of the committee were to attempt "to show the present state of science holdings in each type of library and the present services provided by these libraries, and make recommendations for future science information services for Canadian libraries." It is the view of the Board of the Canadian Library Association that these very recent recommendations remain valid and they are submitted, with one supplementary recommendation, as substantive proposals upon which the Board, or a selected representative, would be prepared to testify orally before the Senate Committee.

A copy of the full text of the *Brief to the Science Secretariat* is attached. Further copies, if you wish, can be submitted at any hearing, to which the Association may be invited, as exhibits as defined in Part I, paragraph 5, of the Senate Committee's Guide for the Submission of Briefs. In summary, however, the *Brief to the Science Secretariat* discusses, in Chapter I, the present resources and services of Canadian libraries, classified as under:

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Chapter II deals with the present state of dissemination of scientific and technical information produced in Canada, thus:

Chapter III contains opinions expressed in questionnaires, surveys, briefs, etc.:

It is Chapter IV of the *Brief to the Science Secretariat* (pp. 66 and 67) that we wish, with the one supplementary recommendation

already noted, to set out as our substantive recommendations to the Senate Committee on Science Policy. The chapter is reproduced in its entirety below:

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

What emerges from this study of the present state of science information resources in Canada is the inadequacy of collections in all types of libraries and at all levels of information, and the limitations of access to existing research materials because of the demands on its collection by the clientele of an institution. The primary responsibility of the National Science Library to National Research Council staff, the responsibility of other government libraries for closed collections for their own research purposes, the increased enrollment in graduate schools, and the enlarged academic staff of the universities make for drastic limitations of service to the scientific community at large.

A further fact which emerges is the inadequacy of bibliographic controls, both of resources in libraries and of scientific information produced in Canada. The holdings of many libraries are not represented in the National Union Catalogue, the periodical literature of Canada is largely unindexed, and listings of other types of scientific information are relatively scarce, and, when in existence, are incomplete.

A third fact which emerges from the survey is that there is a need for two distinct levels of information - the level required by

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the research worker, and the level required by students in elementary and secondary schools and in technical institutes, and by users in business and industry.

The problem therefore presents three aspects for which solutions must be found:

1. The seeker after scientific information at any level must be able to discover what information relating to his problem exists.
2. He must be able to find where the publications containing the information he requires are located.
3. He must be able to obtain the original document or a copy of it.

Some criteria for standards of service must be met:

1. The retrieval of information must be comprehensive and fast.
2. The retrieval of information must be geared to provide service at two levels.

RECOMMENDATIONS

We therefore recommend:

1. That a controlling and co-ordinating body be established at the national level, to be responsible for all aspects of the dissemination of science information, including the responsibility for providing necessary Canadian bibliographic tools such as indexes, directories, bibliographies, lists of research in progress, and evaluative book lists.

2. That this national body be responsible for co-ordinating and developing at the national level all existing services, e.g. union catalogues, union lists of scientific serials, etc., which contribute to the retrieval of scientific and technolog-

ical information.

3. That a network of national and regional resource centres be established at two levels, the level required by research workers and the level required by other users.

4. That such a network utilize, where possible, existing strengths, but that the resource centres comprising it be separate from any existing institution where the needs of the institution's clientele would take precedence in the information retrieval process.

5. That the national resource centre act as the main resource centre for materials suitable for facsimile transmission, such as periodicals, technical reports and reprints, as well as for esoteric or costly materials whose relatively infrequent use does not justify their purchase at regional or local levels.

6. That the national resource centre be assigned the function of collecting tape services supplied by institutions and organizations such as the U.S. National Library of Medicine and Chemical Abstracts Service, and of disseminating information from such sources throughout the network.

7. That separate regional resource centres be established to serve the two groups of users, i.e. the research worker and the seeker after less advanced information; and that existing organizations such as research councils and provincial libraries be utilized as a basis, if possible.

8. That the responsibility for developing collections of books and other materials to support regional needs be delegated to the resource centres at the regional level.

9. That any science information retrieval services set up at any level take advantage of all the latest developments in communications technology in order to meet the needs of users rapidly and efficiently.

10. That any such information retrieval service take into account the need to provide access at each point in the network to all types of computer-produced records, and to develop techniques to overcome the problems of incompatibility between outputs from different sources.

11. That individuals be allowed to approach the system at any level, with the exception that all enquiries of a merely locational nature must be channelled to the national resource centre through the local outlets of the information network.

12. That until such time as the network envisaged becomes a reality, existing institutions be encouraged to share their resources by the introduction of franking privileges* for all material sent on interlibrary loan.

* granted by the Government of Canada

The Senate Committee will have noted the emphasis placed in the above recommendations on the validity and economy, in a country as large as Canada, of all means of co-operative exploitation of scientific

information. In particular, Recommendation 9 urges that advantage be taken of all the latest developments in communications technology. Following the Cabinet announcement, in November 1968, that the Federal Government plans to form a public-private corporation which will put a communications sattelite into orbit by 1972, the Canadian Library Association's request, as a corollary to Recommendation 9, that an adequate part of the capacity of the sattelite be reserved for the exchange, between libraries and research centres, of scientific and technological information.

This memorandum has been compiled by collaboration between the President of the Canadian Library Association, Professor Katharine L. Ball (Graduate School of Library Science, University of Toronto), the President-Elect, Mr Bruce B. Peel (Librarian to the University of Alberta, Edmonton) and Miss Eleanor Magee (Chief Librarian, Mount Allison University, Sackville, New Brunswick, Treasurer of CLA and Chairman of the CLA Committee appointed to prepare a brief to the Science Secretariat). I have asked them to submit to you *curricula vitae* as requested in Part I, paragraph 2 of the Guide, and I attach one for myself, as signatory.

Yours very truly,

Clifford Currie,
Executive Director.

CC:me
Encls

Secretary,
The Senate Special Committee on Science Policy,
Room 369-E,
Committees Branch,
The Senate,
Ottawa, Ontario.

APPENDIX 4

SUPPLEMENTARY BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

NOTRE DAME UNIVERSITY, NELSON, B. C.

Notre Dame University,
Nelson, B. C.
June 5, 1969.

To: The Honourable Chairman and members
of the Special Committee of the
Senate on Science Policy.

The discussions which took place during the Committee's so-called University Week and a perusal of the material made available on that occasion have led me to think that an attempt should be made to piece together, out of all the information brought together, as many useable details as possible. Such an attempt should aim at a coherent picture of all the results that appear practical at this point.

I make this attempt without elaborating here further a fairly well integrated set of basic background considerations which have been developed regarding the issues at hand, but I am keeping these in mind nonetheless. I might add that I make the comments which follow also on the basis of 15 years of varied university experience and an extensive background in such academic areas as philosophy, political science and public administration.

At this time it would appear that we are some distance removed yet from being able to formulate a definitive science policy, or set of policies. We are working towards this indeed, but it is not difficult to find oneself in full agreement with the view expressed by the Honourable Chairman of the Committee on this point, that there are a number of phases through which this project has yet to go. Two of these may indeed be considered only preliminary and it is with regard to them that I would like to make the following observations and suggestions.

1 - <u>The need remains for a more carefully worked out set of premises</u> upon which any policy conclusions will have to be based, including a number of coherently defined role identifications and relationships with reference to research activity, its objectives, and all persons and bodies engaged in it.
This point was raised in our earlier brief and the university week's proceedings served to bear out the validity of our observations in this regard.
This task necessitates an ongoing academic effort, as the need for a consistent elaboration of the premises continues.
Bearing in mind the realities of the total situation as well as the foregoing remarks, I would propose:

- An academic liaison structure in the form of a continuing committee. It could be advisory to the Science Council of Canada and would confine itself to a continuous and consistent elaboration and clarification of the basic premises, especially regarding roles and relationships.
- As it would be engaged in what is fairly well exclusively an academic exercise, this committee would be made up of academic people, one for each of the three or four academic areas distinguishable for this purpose (e.g. liberal arts and science, social science, applied science, engineering) on a four or five region basis (e.g. Atlantic, Ontario, Quebec, Western, B.C.) for a total membership of twelve to twenty members.
- Limited terms, allowing all universities to participate in turn, and a rotating chairmanship would help to insure its creativity and relevance as well as a completeness of viewpoints.

2 - Secondly, even at the earliest stages of the processes of policy formulation and execution, there is the major problem of coordination with regard to the correlation of research programs and with regard to a defensible, orderly and equitable approach to funding and grant giving.

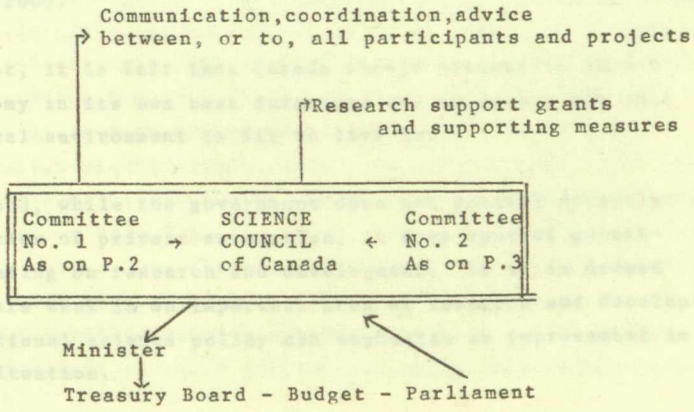
Again bearing in mind the realities of the total situation as well as the foregoing remarks, I would propose:

- A coordinating structure for the benefit of the respective participants and to advise a single Minister responsible to Treasury Board and Parliament.
- This would be a continuing committee, probably best attached to, or a part of, the Science Council. It would concern itself with the practical problems arising in connection with the coordination of research programs and research support. It should assume the actual granting functions now exercised by various agencies, councils and departments of government, allocating the parts of the total sum annually recommended by it to the Minister and passed by Treasury Board and Parliament.
- The membership of this committee would be drawn from existing bodies involved in research, such as government bodies at the federal and provincial level, professional bodies at the national level, industries operating on a national (or international) scale, university organizations at the national level such as the A.U.C.C. Such bodies at the national level would be understood to speak for and act

on behalf of their "constituents" at the provincial and local level.
An integral part of this proposal would be that, in the main, all research work done at the national level on a national scale, or in the national interest, would be left with the governmental, professional and industrial bodies (CMRC, NRC, etc.) to the extent that they are engaged in their respective and distinguishable research areas in their own right and on their own terms, on an incentive or pioneering basis, or on an agreed upon participatory basis, as the case may be. However, the granting functions presently exercised by the governmental bodies among them would be assumed by the Science Council's Special Committee mentioned above.

As indicated earlier, it is probably too early to advance much beyond these proposals at the present time, except to work out the details a little more.

We should be willing to be of further assistance, should the Committee desire it, to the extent of our responsibilities and abilities. We trust that the present contribution will be of some help to the Committee in the pursuit of its task to which it is applying itself so well.



J. F. POSTMA
Notre Dame University
Nelson, B. C.

APPENDIX 5

SUPPLEMENTARY BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

THE FACULTY OF SCIENCE, ST. MARY'S UNIVERSITY

HALIFAX, N. S.

ADDENDUM II

Science Policy of the Federal Government

A Brief Submitted to
The Special Committee on Science Policy
of the Senate of Canada

Further to the hearings held in Ottawa on May 24, 1969 and the invitation of Senator Lamontagne to submit second thoughts on the above subject, the Science Faculty of Saint Mary's University, Halifax, Nova Scotia is pleased to submit the following.

It has been recognized that those matters coming under the purview of a National Science Policy for Canada are continually changing with the result that a statement of policy must refer to a set of guidelines or principles which may be used to establish and reorder priorities as we proceed towards the Year 2000.

First, it is felt that Canada should attempt to direct its economy in its own best interests and in such a way that our natural environment is fit to live in.

Second, while the government does not control directly the policies of private enterprise, it does control government spending on research and development. If it is deemed that we are weak in an important area of research and development, national science policy can emphasize an improvement in such a situation.

Third, without defining in great detail basic research, applied research and development, it is the opinion of this Science Faculty that Canada is very weak in its effort to increase development and the skills required for development. Our industries tend to rely on imported technology. A national science policy should provide the necessary conditions to enable the science community to bring its research programs to the point where the nation can expect a more meaningful return from our efforts. Our technological knowledge should not be left to the exploitation of others.

The rate at which a new policy can be carried out will depend upon our ability to foster the required skills for this development stage of research. The change in emphasis should come about in a planned manner so that the proper numbers and types of disciplines are available for each appropriate phase of research. The people within the science community that have the ability and inclination to do applied research and development should be encouraged to do so. This could decrease or at least stabilize the demand for basic research dollars while at the same time increase the capability or numbers of people in Canada contributing to the development effort.

Our present universities are not the ivory towers they once were considered to be. They contain people who have a definite interest in applied research and development. Undergraduate universities provide larger numbers of graduates than graduate schools and can through their programs provide some of their students with the proper orientation re the problems of development. The undergraduate university (that with either a very small or no graduate program) deserves increased research

assistance if it is to develop properly the Bachelor level graduates whom industrialists say they require in larger numbers. In addition, the Bachelor level graduates are required to feed students to graduate schools. Undergraduates should be encouraged to participate in research activity. It is suggested that scholarships to third and fourth year students of high calibre should be allowed for.

It is assumed that the Senate Committee would like to have comment as to how the various stages of Research and Development should be funded; that is, how much should be allocated for basic research, for applied research, and for development. It is the opinion of this faculty that the separation of basic from applied research is not a distinct one. In fact, all levels of research must be maintained since one level tends to feed the other. In practice, the conception of an idea comes first. It may apply to any part of the sequence: basic research--applied research--development. It must be reduced to commercial practice by proceeding through this proper sequence, resulting in the final development which brings it to the point of being useful to mankind either commercially, socially, or culturally. Any attempt to allocate funds to each of these various stages which does not ensure that the previous steps in the sequence have been properly completed will tend to inefficient use of monies and manpower. It is true that it is sometimes possible to avoid certain steps in the sequence or carry out certain steps concurrently, but always with greater risk of failure.

It is well recognized that applied research and development are more costly ventures than basic research. An often mentioned ratio is that for every dollar for basic research, ten

are required for applied and one hundred for development. This does not represent the desirable split of funds since very few basic research projects reach the development stage. What the optimum split should be is a matter for a continuing study which could be established as a result of the Senate Committee's Report to Government. In the immediate future, the controlling factor will be available skills for development. In view of this, a suggested split for the next two years is 50% of research and development funds allocated by Government should go to basic research studies and 50% to applied research and development.

It is conceivable that universities, government, and industry can participate in all parts of the sequence--basic research--applied research--and development. The role of any one institution will depend on the skills, facilities, inclinations, and support it has.

Once again we stress the importance of research companies towards increasing the amount of applied research and development in this country. Every effort should be made to encourage the formation of this type of industry. They could eventually carry out a major part (30-50%) of all development in Canada.

Science Faculty
Saint Mary's University
August 18, 1969

APPENDIX 6

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

DR. W. E. RAZZELL

UNIVERSITY OF ALBERTA

EDMONTON, ALBERTA

Your recent review of Science Policy may perhaps lead you to miss a few of the grim realities concerning Science in Canada.

1. UNTIL ABOUT TEN YEARS AGO, NO WELL-TRAINED, AMBITIOUS, CAPABLE SCIENTIST WOULD COME TO WORK IN CANADA IF HE HAD SEEN HOW SCIENCE COULD FUNCTION IN THE UNITED STATES. In the area of fundamental Biology or Applied Biology, the great increase in funds available for research during the last decade has made an appreciable change in this situation. However, the effects of this increase in funding, especially in respect of the fundamental biological disciplines, have only begun to be felt, since many of the people who have come to this country in the interval are only now beginning to assume positions of responsibility and productivity. I believe it would be an absolute disaster for this area of science in Canada if support were not to continue to rise at an appreciable rate.

2. In particular, a multitude of competent investigators who have tried to cope in the penny-ante atmosphere of Canadian science during the last ten years have nevertheless been discouraged and left the country. I remind you of the recent Nobel Laureate in medicine, Dr. H.G. Khorana, who attempted to make a productive research group function in spite of the short-sighted policies of the Canadian sources of financial support in the period 1954-1960. He left for the United States - largely because the science support level in Canada was too low and because this had stunted the development of excellent research groups with which his own could associate. Further, Dr. Neil Bartlett also left this country a few years ago to accept a position of responsibility with excellent financial support, in spite of the award of the E.W.R. Steacie Award.

IT IS PRECISELY THE CONTRIBUTION OF SUCH INDIVIDUALS, TOGETHER WITH THEIR WORKING GROUPS, WHICH COULD HAVE CREATED A CLIMATE FOR ADVERTUROUS AND PRODUCTIVE RESEARCH - NOT ONLY IN THE FUNDAMENTAL BUT ALSO IN THE APPLIED AREAS - AND WHICH HAVE BEEN LOST TO THIS COUNTRY BECAUSE OF THE LACK OF A STRONG RESEARCH SUPPORT ATMOSPHERE.

3. Apart from such losses, which drain the Universities and associated research groups of their best talent, the policy of the Canadian agencies responsible for controlling and establishing regulations within which foreign companies should operate has contributed to the strangulation of productive science in this country. As an example, I refer to the recent decision by the Rayonier Canada Limited subsidiary of ATT to disband the wood research laboratory in Vancouver and move the facilities and personnel to Shelton, Washington, U.S.A. In future, therefore, this Canadian subsidiary will be importing its research and technological needs from the United States - a situation which is all too common, particularly in the pharmaceutical and refined chemicals industries. This particular company has the right since 1951 to tree-farm license number 6, which allows it to cut 42 million cubic feet of Canadian timber without any forced obligations to support the development of Canadian science. Such a situation is the result of stupid government policy and lack of understanding of both science and economics.

4. Foreign subsidiaries operating in Canada generally contribute most of their "research" component to quality control and other kinds of routine problem-solving, and I believe that it would be useful to deny any tax credit for "research" when it merely covers such simple and non-exploratory company services.

5. I believe that the fundamental research components of federal government laboratories should be greatly restricted, and that they should spend more of their time investigating ways, both scientific and legal, in which new industrial operations could be exploited. The consequent savings in research funds and increase in industrial base should be used to stimulate fundamental science in the Universities - where it properly belongs.

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6. Canadian Universities are peculiarly poorly provided with associated Research Institutes in various areas, particularly in Engineering and other applied developments, and this situation causes a distortion of the research character of the Universities which is bound to have a serious effect on the quality of graduate teaching in these institutions. Within this context, I would also include the applications of Biology to Medicine in which perhaps the best fundamental research endeavours can most easily be turned to applications. Even here, however, a reliance which is too directly made upon the applied nature of the work will stifle the operations of such groups and discourage participation by adventurous and capable investigators.

7. Finally, I believe that the most useful function of a government study of the kind which is now being made, would be to develop mechanisms for creating Crown Corporations to research, develop, manufacture and improve processes which are being neglected in Canada because the areas of study have been pre-empted by subsidiaries of foreign corporations. I refer specifically to the pharmaceutical industry, which could be as important to the Canadian economy as it is to the economy of Switzerland, but which is presently being frittered away by marginally capable sub-units of American and British corporations. None of these units is able or prepared to expand in a way which would develop a unique industry in Canada, and I am sure all of them would be jealous of any organization designed to do that. However, it is clearly a vacuum which can only be filled if a central agency were to contribute the funds for the first step.

W. E. Razzell, Ph.D.,
Professor and Chairman,
Department of Microbiology.

APPENDIX 7

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

J. L. WOLFSON, UNIVERSITY OF SASKATCHEWAN

REGINA, SASKATCHEWAN

I should like to comment on one aspect of the current debate over science policy. It appears that a consensus exists that research in the natural sciences in Canada should become mission-oriented. The aim in this view, is to utilize the natural sciences to increase the productivity of the country. To any government charged with the task of finding funds to finance an ever-growing social development program, the prospect of increasing production by the relatively simple means of directing scientific enquiry into "proper" channels must seem attractive indeed. However I believe that to push such a program too far would be most unwise.

It is clear that our society at present has a productive capacity much greater than that required to fulfill our essential needs. We find ourselves faced with the problems of how to apportion the excess wealth, and how to increase production still further. The latter problem is largely technological and therefore would appear simple to solve. However more and more people are becoming concerned as to the wisdom of striving to increase production without first making a committment as to its purpose.

Increased production can be directed to an increase in social development, to an increase in the availability of luxury goods, and to an increase in the opportunities for creative cultural and intellectual activities. Indeed the latter was surely one of the promises of affluence. Bearing in mind the increasing pressure for mission-oriented research, as opposed to <u>pure</u> scientific research, it would appear that affluence is accomplishing the reverse insofar as the natural sciences are concerned, and one shudders to think what the situation will be if we ever achieve opulence.

Before placing undue emphasis on mission-oriented programs, one sober fact should be borne in mind. Ours is a free pluralistic society, and no program can work

unless it is sufficiently attractive to young people. The prospect seems to be that young people entering the universities will, by and large, be repelled by careers in mission-oriented research. Indeed the natural sciences already appear to have lost much of their appeal for young people.

Most thinking people agree that our social development programs must grow. The question is really one of the relative apportionment of our excess wealth on luxury goods on the one hand, and on cultural and intellectual pursuits on the other. The problem is that our society has become very materialistic, and affluence is used to attempt to satisfy an appetite for a host of luxury items: snowmobiles, limitless varieties of cars, endless styles in clothing, holidays in the tropics, a multiplicity of spectator sports and games, very expensive TV programs - the list is endless. But such an appetite can never be satisfied. No matter how wealthy our society becomes it will always be able to invent new luxuries on which to squander its wealth, and in the midst of plenty, intellectual and cultural pursuits will be starved for funds. Unless we are vigilant even our social development programs will languish.

The solution to my mind is to develop a form of selective taxation which will discourage massive expenditures on luxury items, and thereby make it possible to direct substantial funds to the support of intellectual and cultural activities of all kinds. The justification is simply that intellectual and cultural activities are civilizing pursuits, and the fundamental human purpose, in one way or another, is to become ever more civilized.

Mission-oriented research need not be neglected, but it is surely important to keep it in perspective.

J. L. Wolfson,
Professor of Physics,
University of Saskatchewan,
Regina, Saskatchewan.

APPENDIX 8

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

J. D. PRENTICE

UNIVERSITY OF TORONTO

TORONTO, ONTARIO

The invitation of the Senate Committee to individuals to submit briefs on Canadian science policy is in itself a very encouraging sign of change in this country. The occasions on which working scientists are consulted about these matters are indeed rare and this lack of communications is one of the features of Canadian science policy which I believe needs to be improved.

As an individual physicist I would like to make some general remarks about the formulation of science policy and some comments about the mechanisms which now exist for this purpose. It seems generally agreed that Canada still lacks an overall policy for science and technology and that until recently it has also lacked adequate bodies for formulating such long range plans. The formation of the Science Council and Science Secretariat appears to be a useful step towards solving this problem. The Science Council has recently issued a report outlining an approach to an overall science policy[1]. The report makes some excellent recommendations and contains some novel and original ideas. I believe that the implementation of some of the research programmes outlined would be of immense benefit to Canada. In general then the report will be extremely valuable if carefully read by people who already understand science and its needs. However, I believe that certain sections of the report could easily be misunderstood and resulting actions might very seriously retard the scientific progress of this country. The report makes several references to basic science and the importance of a strong programme of fundamental research as a foundation for the applied research or mission oriented programmes which it suggests. It does not however make sufficiently clear the need for distinguishing between the

1 Towards a National Science Policy for Canada. Science Council of Canada Report Number 4.

appropriate policy making methods which apply on the one hand to basic research and on the other to mission oriented programmes. It is highly appropriate that in the latter field Canada should choose programmes that have a special relevance to our national problems. An applied science programme will not however flourish in a country which ignores fundamental research. In choosing the fields of basic science that should be strongly supported the same criteria of national interest cannot be successfully applied. If a deep desire to understand the ultimate structure of matter had not induced Lord Rutherford and his colleagues to probe the secrets of the atomic nucleus in the 1930's, at a time when Lord Rutherford himself was saying that one of the attractions of nuclear physics was that it could not possibly be of any use to anyone, then the immense benefits of nuclear power would not be available to our generation. Their successors today, who are engaged in this seemingly impractical quest of fundamental understanding, are the explorers of modern science.

Canada has been a country of explorers. When European explorers discovered this continent and were followed by settlers determined to exploit its potential wealth, two distinct types of people were needed. To develop the area already known, required those who would seek out and develop the sources of wealth. The fertile land, the trade, the minerals had to be exploited in the local region but the country would not have grown as it has if the early Canadians had not also found amongst them those who wished to explore, who stood on the hills and wondered what lay beyond, who were spurred by their wonder to go there and see for themselves. No one can say that the explorers have contributed more to the building of the nation than the prospectors, only that both have played their part. In the scientific and technological development that will take place in the remainder of this century, we need the explorers, the prospectors and the miners of modern science. The whole programme cannot succeed if any aspect is neglected. The Science Council Report has dealt imaginatively with the prospecting and developing stage of this programme. It even refers to the need for planned exploration to show the way for

the prospectors but it has little or nothing to say about those who wish to push back the frontier of the unknown. In several places the report mentions the need to continue to support basic science but there are two points on which it could easily mislead or be misunderstood. These concern the present state of basic science in Canada, and its cost. There appears to be an implication that all is well with fundamental research in Canada and furthermore it is linked in the first reference with "Little Science"[1]. It is also implied that little needs to be done about the basic science programme both because of its present health and its small future costs. There are, however, many newer fields of fundamental research in which Canada is quite backward.

A particular example of one field of physics which Canada has been slow to enter, is now discussed. I have chosen it chiefly because of my personal involvement but believe that it illustrates more generally the drawbacks of avoiding new areas of basic science. The study of fundamental particles and their interactions has clearly diverged from the study of nuclear structure from which it sprang. It might seem surprising that Canada, after such considerable contributions to nuclear physics, has lagged behind so many countries in particle physics. Our limited financial resources provide part of the explanation but several other more subtle factors have contributed. It is difficult to expand rapidly into new fields of science, as they develop, if the overall level of support is very low. The Science Council Report Number 4 emphasizes the fact that, according to one study, 22% of Canada's R and D funds were devoted to basic research in 1965-66 whereas the comparable figure for the U.S.A. was 12%. However, the U.S.A. spent over 4% of its larger per capita G.N.P. on R and D compared with Canada's 1.3%. The figure of 4%, it should be noted, is also not uncommon in European countries. Combining the percentages we find that the U.S.A. was spending almost twice as large a fraction of its G.N.P. on basic science as was Canada

[1] Science Council Report Number 4, page 4.

(U.S. 0.5% Canada 0.29%).

Other factors have, however, contributed in Canada to impede the development of new fields of physics. Our success in nuclear physics was founded on a clear decision in 1946 to enter the field with a strong programme. The success of the Chalk River Laboratories in fundamental nuclear physics and in nuclear power is one of the outstanding achievements of Canadian science. It is only more recently, however, that strong nuclear physics groups have grown up in several Canadian universities and it has been possible to find support for a major undertaking such as TRIUMF. In the early 1950's when U.S. and British universities were building accelerators of several hundred MeV energy to investigate in detail the properties of the new unstable particles which had been discovered in cosmic rays (such as pions and "strange particles") no Canadian group was well enough supported to acquire a comparable accelerator.

The shift of the emphasis of pure nuclear physics research from government labs to the Universities is undoubtedly healthy. Strong fundamental research is a necessity for a strong university. The students come to us from the high schools expecting to find a community of scholars dedicated not only to the transmission of knowledge but to its extension as well. We must not disappoint them if their education is to be successful and we must not fail the country in its expectations that the University will serve both these purposes. One way to estimate the state of our basic science research may be to compare our science departments with those of the best Universities in the U.S. To take the subject which I know best, I believe that few Canadian physicists would claim that any of our university physics departments is in the top ten on the continent. In fact, it might be difficult to find one which, judged overall, is clearly in the top twenty. Surely we must aim to improve this situation. Some groups in our universities indeed excell in particular fields of physics. In many cases however these are fields which are not as strongly pursued in other countries

simply because they are older and do not hold the promise of answering such fundamental questions as other newer ones which are pushing into more unknown areas. It has sometimes been argued that this is an appropriate choice for Canada but one can ask whether our country would have been discovered by explorers who spent all their time in the tributaries and never pushed up the main stream of our rivers. If Canadian physicists concentrate most of their efforts on fields in which we have already achieved competence and which are receiving less emphasis elsewhere there is no doubt that we will be able to make substantial and valuable contributions to the overall fund of scientific knowledge but in ignoring the new directions which science takes when it tries to answer more fundamental problems we will deprive Canadians of their share in one of the great adventures of our age. There will always be those amongst our youth who wish to pit their skills against the great challenges that reach furthest into the unknown. If those fields of physics in which they judge these challenges to lie are not pursued in Canada then some of our best young scientists will go elsewhere and not only will they be lost to their country but so will their influence on future students and their interactions with scientists in neighbouring fields.

Some of the newer fields of basic science are indeed expensive and cannot be classified, as seems to be implied by the Science Council Report, under the heading of "Little Science". Well established fields such as nuclear physics have also increased in cost and the need for several universities to cooperate in order to provide the most up to date experimental facilities is well exemplified by TRIUMF. This type of collaboration has had a long history of success in the United States where labs such as Brookhaven National Laboratory (BNL), Argonne National Laboratory (ANL) and Stanford Linear Accelerator Centre (SLAC) all serve particle physics groups from a number of universities. The existence of these laboratories and the generosity of American physicists has made possible the growth of small but thriving experimental particle physics groups in

a number of Canadian universities.

In Europe, it was realized as early as 1956 that many of the smaller countries would not even be able to afford a single accelerator for particle physics research. A number of countries therefore recognized the need for international collaboration and founded the European Organization for Nuclear Research which has constructed at CERN, Geneva one of the foremost particle physics laboratories in the world. The highest energy accelerator currently operating is in Russia but France is building a large bubble chamber for use with it. These trends towards international collaboration in particle physics will undoubtedly continue and there exists at present an opportunity for Canada to join in full partnership with the U.S.A. in the construction and operation of an accelerator laboratory to explore a completely new energy region above 70 GeV[1]. These questions are discussed more fully in a report recently submitted to the National Research Council[2].

There are undoubtedly other fields of basic science which require expensive facilities in which such international arrangements will prove very beneficial to Canada. One which comes immediately to mind is the proposed 200 inch telescope which could be installed in Chile by Canada and the U.S.A. It is perhaps amusing to note that these two examples represent two extremes of the frontiers of man's knowledge. As particles of higher energy become available it is possible to study the structure of matter at smaller and smaller distances. The many new particles which are observed have already significantly changed our understanding of the role of symmetries in nature. At the other end of the scale, the astronomers are extending our knowledge of the almost infinitely large and yet we find connections between these two subjects. The measurement of neutrino interactions with the 200 GeV Accelerator which is being constructed at Batavia, Illinois will extend the uses of neutrino astro-physics in probing the properties of stars.

[1] 1 GeV equals 10^9 electron volts.

[2] Report of the Canadian 200 GeV Study Group.

The discovery of anti-particles has led us to speculate that some distant galaxies may be completely composed of anti-matter. The impact of these ideas on the imagination of the public is well demonstrated by the large number of popular books and articles which have appeared on these topics. If Canada does not participate meaningfully in discoveries of this type we are not only depriving our young scientists of the opportunity to pursue such a career in Canada but we are also depriving all Canadians of the excitement of knowing that their country is contributing to these discoveries.

It was very appropriate that the first chapter of the Science Council Report Number 4 dealt with national goals for Canada. There is little doubt that the mission-oriented research recommended in that report would contribute significantly to the prosperity of the nation and to the quality of our life. It is equally true that participation in the most active fields of basic science will contribute to the education of our students and to cultural life of the nation. If Canada is to become a more civilized nation as well as a more wealthy one cultural goals must take their place beside economic ones. Research in basic science is no longer inexpensive. Its high costs however can be reasonably reduced by inter-university and international collaboration. But research in seemingly impractical fields of pure science does not only effect the intellectual life of the country; it also produces strong influences on applied research and technology. Much has been written about the electronics and scientific industries which have sprung up around Boston and Los Angeles. These are often attributed to the presence of a particularly strong engineering department at M.I.T. and Cal Tech. But their growth has been just as strongly stimulated by the excellent research in the basic sciences for which both M.I.T., Harvard, Cal Tech and the University of California are so justly famous. Strong engineering and applied science groups in our universities can undoubtedly help to stimulate technical industry in this country. But universities will not achieve their full potential unless they also cover a broad spectrum of pure science at

least part of which is quite disconnected from the mission oriented programmes. It is essential to the scientific health of the nation therefore that Canada should not ignore fields of basic science simply because they appear expensive or do not seem to be related very closely to the applied fields in which the country is specializing.

Finally I should like to examine some of the features which I believe contribute to the difficulties experienced in starting new fields of science in Canada. In doing so, I shall return to the previous example of particle physics as this is the one which I know best. The proximity of the United States and their aggressive pursuit of the most fundamental fields of research is undoubtedly one of the factors which has contributed to our slowness in entering particle physics. At a time when European physicists were urging their governments to set up an international laboratory and provide the best possible facilities at home it was all too easy for Canadians who wished to do particle physics to cross the border to a U.S. laboratory. For some time before the present particle physics groups became established, Canadians who were successfully working in this field in the U.S. or Europe expressed interest in forming such groups in Canada. They were however discouraged by the general lack of funds for expensive projects and by the generally conservative attitude towards the venture. Further difficulties arose when they tried to obtain information about what support might be available before definitely committing themselves to return to Canada. These three factors are I believe all somewhat subtly connected. In any country there will be some scientists who believe that financial support is inadequate but in Canada it has always been easier for them to emigrate than it has from most other countries. The result has been that a disproportionately large fraction of our most determined and ambitious scientists have left. The remainder have tended to be those who were more or less satisfied with the status quo. There is a quite natural tendency for scientific administrators to be appointed from the ranks of more senior scientists and it is a general experience

that such people tend to be more conservative than they were in their youth; however this conservatism is reinforced in Canada by the selection process described above. The National Research Council has in general done an excellent job of funding basic research in the universities. However more could have been done, and needs to be done, to convince the government of the need for increased support of not only the applied science but of basic research in Canada. Some years ago a committee of the Royal Society of Canada recommended that N.R.C. grants should immediately be doubled and then be increased by about 30% per year for a number of years. The initial expansion was not made but the 30% annual growth rate was achieved and was maintained for a number of years. The increases however barely kept pace with the growth of staff in the universities and it can be seen from the Rose Report[1] that the support per grantee was effectively constant over the period 1959-1967. Nevertheless the fact that the annual increase in the total was substantial during these years, was an encouraging sign which convinced many scientists who under previous circumstances might have emigrated to remain in Canada. This year, this rate of growth has been severely cut. Scientists are well aware of the fact that this is part of an overall economy programme introduced by the new government. However government officials may not be aware of the very serious effects which such fluctuations may have on the pure science programme of a country. It has been pointed out very forcefully by Dr. Weiskopf, one of the leading physicists of the United States that pure science should not be curtailed in times of social stress because of the long term damage which can be done[2]. It is equally true that an investment in pure science only pays dividends over a long period. Furthermore, it is clear that the economy made by cutting the National Research Council grant for this year is a minute saving in the overall budget of the country. Any government programme would be adversely affected by cuts in spending in any given year

1 Science Secretariat special study No. 2 "Physics In Canada Survey and Outlook", Table II, p. 40

2 Science Vol 157, p. 873. Relevance of Science during Times of Social Stress. V. Weisskopf.

but none is likely to feel the effects for such a long term as is the programme in basic science. For many scientists the previous situation was just good enough to convince them to remain in this country despite the much lower level of support which is available here compared to many western countries. One year of severe cuts can easily destroy their confidence and it is the best amongst them who can most easily and most probably will emigrate. I believe that the National Research Council and the Science Council have a responsibility to make these facts clear to the government.

Whether or not they are doing so is very difficult for a working scientist to determine. Although as mentioned above the N.R.C. programme of support for research in universities has generally been very successfull one of its worst features is the lack of communication between the granting body and the grantees. In many fields of modern physics it is almost impossible to plan successfully on a one year basis. While it is clearly understood that the government cannot definitely guarantee a given level of support over more than one year it can certainly give indications that a given level is likely. The lack of communication between N.R.C. and their grantees adversely effects not only the planning but the morale of junior scientists who cannot discover on what basis decisions are made. General statements are available that grants are based on an assessment of the scientific abilities of the grantee but without any two way discussion of the successes and failures of any particular research programme it is almost impossible to judge one's progress. This lack of communication between junior scientists and senior government advisors is well exemplified by part of the evidence given by the President ofthe National Research Council to your committee. Dr. Schneider appears confident that basic research in the older disciplines such as mathematics, physics and chemistry is in fairly good condition and that Canada should reach the forefront of these fields in the next ten years without any radical change in the present situation. He does admit that a number of branches of the main disciplines are still weak and need strengthening but

he does not appear to believe that any radical steps are necessary. I do not think that he could get anything like unanimous support for this opinion from the junior scientists of the country.

In summary then, it appears that Canada is lagging behind in many of the newer fields of basic scientific research. A case for increased support of applied science and technology has been ably and convincingly made by the Science Council's Report. It should also be made clear however that the newer fields of basic science will not develop rapidly unless there is a rapid increase in the funds available. The effect of one lean year in the funding of the programme may do damage which will be felt for the next twenty years. I therefore recommend that the government should immediately be advised that a separate supplementary grant to N.R.C. is necessary to prevent this damage being done this year. Canada should support basic research more strongly than at present and should stimulate a number of newer fields which have previously been neglected. The cost of such programmes is not prohibitive if imaginative use is made of international collaboration. The formulation of science policy and the morale of Canada's research scientists could both be substantially improved by more open discussions between the scientists involved and those responsible for given scientific advice to the government.

J. D. Prentice,
Department of Physics,
University of Toronto,
Toronto 5, Ontario.

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APPENDIX 9

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

THE NUTRITION SOCIETY OF CANADA

THE STATUS OF AND FUTURE REQUIREMENTS FOR NUTRITION RESEARCH IN CANADA

"Nutrition is the science of food, the nutrients and other substances therein, their action, interaction, and balance in relation to health and disease, and the processes by which the organism ingests, digests, absorbs, transports, utilizes and excretes food substances. In addition, nutrition must be concerned with certain social, economic, cultural and psychological implications of food and eating."

This is the working definition of Nutrition as used by the Council of Foods and Nutrition of the American Medical Association (J. Am. Med. Assoc. 183:955, 1963), and is given here to illustrate the breadth of involvement of this rapidly developing discipline.

For the purpose of this report, research is defined as "the achieving of new knowledge of a general nature through the testing of hypotheses by the use of scientific methods." Hence, research in Nutrition may be described as any investigation which contributes in this way to knowledge by dealing with any part, or combination of parts, of the basic definition of Nutrition.

PRESENT STATUS

In considering the topic "Nutrition Research in Canada", the first step was to determine the directions and emphases of relevant investigative work currently being undertaken in this country under a wide variety of administrative headings - i.e. Nutrition, Biochemistry, Animal Science, etc. This was accomplished by compiling a list of "Nutrition" projects undertaken in Canada during the period 1966-68, using as a basis information received from the Canada Department of Agriculture (Research Branch), National Research Council, Medical Research Council, Defence Research Board, Department of National Health and Welfare, Department of Veterans' Affairs, individual answer sheets submitted during the recent Study of Basic Biology in Canada, and from direct communication with

institutions or persons not covered in the former categories. While the pitfalls of assessing accurately the situation by this method are well recognized, it is suggested that the information gained is sufficient to provide for a general overview.

The orientation of some 350 Nutrition research projects carried out in Canada during the period 1966-68 is given in Table 1. First of all, it is of significance to note that about two thirds (67.6%) of the Nutrition projects applied, either specifically or non-specifically, to domestic animals (Categories C to J); only one third (32.4%) were related to the human (Categories A and B). This points to the fact that, due to the basic economic demands of the animal industry, the science of Nutrition has been well accepted and exploited within the field of Agriculture. The feeding problems of the human population, devoid of comparable direct economic demands, has suffered as a consequence in terms of research attention. In addition, the fact that it is often necessary to have an M.D. directing or overseeing Nutrition research directly applied to humans has been a major limiting factor.

A division of the total research projects within each category into basic and applied groupings provided interesting but not unexpected information (Basic research has been defined as that undertaken primarily for the advancement of scientific knowledge, without a specific practical application in view; applied research is the same, but with a specific practical aim in view). Of the total Nutrition projects, only 69 (or about 20%) were of a basic nature while the remainder (about 80%) were considered applied research. This is not surprising since Nutrition as a science is essentially the application of a variety of biological and social sciences to the solution of problems relating to food and feeding. Only in the case of the projects that were not specifically related to any species was there a high proportion of basically-oriented research (Category A). For the species-specific projects, including the human, the emphasis of the research was almost exclusively in the applied area.

The domestic animal-oriented Nutrition research projects were carried out primarily at Research Stations of the Canada Department of Agriculture and in University Departments of Animal and Poultry Science. Of these, 63 were non-specifically related to non-ruminant and ruminant species (Categories C and D). Of the species-specific projects, it is noteworthy that 63 (or about 18% of the grand total) were directed to avian species. This considerable attention to poultry nutrition has been noted in other countries, and is a reflection of the ease of working with avian species and the economic advantages of birds in experimentation. In terms of national

significance, the 8% of Nutrition projects applicable to beef cattle might be considered sub-optimal.

The origin of Nutrition research applicable to the human was more diverse than in the case of domestic animal projects. This information is presented in Table 2. It is apparent that the majority of Nutrition projects in Canada that can be related either indirectly or directly to the human are being carried out in the Universities. In the case of the projects categorized as animal, vertebrate, non-specific, 47 (or 70%) originated in Universities, and primarily in Faculties of Agriculture, Faculties of Medicine (including Departments of Anatomy, Biochemistry, Paediatrics, Pathology, Physiology and Surgery), Colleges or Schools of Home Economics and Departments of Nutrition. The remaining 30% were carried out mainly in hospitals and by various research branches in the Federal Government. Of the projects that were specifically related to the human, 36 (or 78%) originated in Universities, and primarily in Faculties of Medicine and Colleges or Schools of Home Economics. Hospitals were responsible for about 20% of the projects in this category.

Because those projects included in Category A in Table 1 may apply equally to domestic animals and to the human population, it should be noted that only 46 (or 13%) of the Nutrition research projects carried out in this country have a direct application to humans. The nature of these projects is illustrated in Table 3. The sum of the column "No. of Projects Involved" is greater than 46 because two or more areas may have been covered in one project title. For example, the project "Recognition of protein undernutrition in aged people" would be listed under both "Nutritional status" and "Nutrition of the aged" in Table 3.

The large number of projects involving interactions between Nutrition and disease is a consequence of the high proportion of this research being carried out in Faculties of Medicine and in hospitals. These projects involved relationships between various aspects of Nutrition and such conditions as chronic renal failure, metabolic bone disorders, ischemic heart disease, diabetes, gastrointestinal malabsorption etc. This is in direct contrast to the situation with domestic animals, where research involving the interrelationships between Nutrition and disease is minimal. Schools of Home Economics have tended to emphasize research on food habits, food acceptability, obesity, nutritional status, nutrition education, nutritional value of foods, therapeutic diets and dietary requirements.

FUTURE REQUIREMENTS - GENERAL

a) Animal Nutrition

On an overall basis, it might be said that the Nutrition research effort in Canada is comparable, on a per capita basis, to that in other developed countries insofar

as domestic animals are concerned. This should not imply that an optimum research level has been attained, since many problems remain to be resolved in animal nutrition. The continuing decrease in arable land available for the production of animal feeds in developed countries places pressure on the animal nutritionist to discover alternate feed supplies, and perhaps with an emphasis upon utilizing industrial waste products. The scarcity of studies on the interrelationships between nutrition and disease in domestic animals was pointed out earlier. The interrelationships between nutrition and other environmental factors (i.e. climate, housing, food availability, etc.) require further study. While the influence of genetic factors upon nutrient requirements must continue to be examined in animal production, the time has come when equal emphasis must be placed upon attempts to adjust environment (including nutrition) to existing genetic lines. Meaningful research in animal nutrition in the future will require people well trained in basic Nutrition working in conjunction with individuals trained in a number of other disciplines - i.e. biochemistry, physiology, veterinary medicine, genetics, economics, food technology etc.

b) Human Nutrition

When the human population is considered, the Nutrition research effort in Canada does not compare favourably with that of the U.S.A., for example. While Nutrition research at the clinical level might be considered adequate by some standards, many questions remain unanswered. Although correct diet has long been recognized as an integral part of the treatment of various metabolic diseases (i.e. diabetes, uremia, gout, etc.), the identification of the associated biochemical or physiological defects has not been complete in all cases. The development of diets satisfactory for the treatment of the ever increasing list of so-called "inborn errors of metabolism" has really only begun. Specific relationships between diet and such "high fatality" conditions as coronary heart disease and obesity must continue to be examined.

While the clinician's approach to Nutrition research must go forward, it is strongly recommended that more work be directed to the nutrition of the large number of normal, healthy individuals whose feeding problems may be, in many cases, primarily of social, cultural or economic origins. This research should deal with problems at both the community and metabolic levels. In the former, such aspects as surveys of nutritional status, patterns of food consumption as influenced by social, economic and psychological factors and the various nutritional problems associated with specific groups in society must be considered. At the metabolic level, such problems as the determination of optimum nutrient requirements of the body (with particular emphasis on the fetus, the adolescent and the aged), utilization of food nutrients by the body and metabolic interrelationships all deserve increased research attention. In addition

emphasis must be given to studies where the metabolic and the psychological aspects of nutrition are considered together. For example, studies are needed to determine the degree of correlation between a "sense of well-being" and various objective measures of nutritional status.

In the field of public health or community nutrition, research attention must be directed to the following problems - nutrition education planning, implementation and evaluation; methodology in regard to determining the reasons for existing food habits or preferences, and on the interpretation of information obtained in nutritional status surveys; epidemiological approaches to public health nutrition; effect of additives, drugs, etc., on nutritional status of the community; acceptance and value of synthetic and convenience foods.

The dearth of Canadian effort in these areas is due to the minimal availability of financial support for this type of research and to a scarcity of individuals trained to work in depth in the field of public health or community Nutrition.

c) The Training of Nutritionists

The training of personnel for research in Nutrition has many interesting implications. Those who proceed to graduate studies in Nutrition may have had undergraduate training in a wide variety of disciplines - i.e. Medicine, Biochemistry, Physiology, Home Economics, Animal Science etc. - and their eventual approach to Nutrition research may or may not reflect their original training. Although it is difficult to obtain general agreement on a specific definition for a Nutritionist, many are of the opinion that an individual who adapts and applies his or her original training primarily to the consideration of problems pertaining to the feeding of humans or animals should be classified as a Nutritionist.

Provision for training the Nutritionist for subsequent research at the metabolic level might be considered adequate in Canada, although this training obviously will not always be gained in a Department of Nutrition per se. On the other hand, advanced training in the area of community or public health nutrition is completely inadequate. Whereas such programs are available at a number of different centres in the United States, there is at this time only one institution in Canada that offers a graduate program in public health nutrition. This program, at the University of Toronto, leads to a Diploma in Nutrition. A professional Master's degree in Public Health Nutrition is not available. This glaring deficiency must be recognized by both government and university authorities if a complete approach to Nutrition research is to be established in this country.

At the Arden House Conference on the Role of State Health Departments in Nutrition Research, Dr. W. H. Sebrell, Jr., Director of the Institute of Nutrition Sciences

at Columbia University, made the following observation which is even more relevant to the situation in Canada. "Very few places provide the kind of training that gives a total grasp of the public health nutrition problem, starting with the basic cause of malnutrition which is in food production, land use, food habits and food technology, and including the biochemistry of nutrition, the recognition of the deficiency diseases, the nutritional values in foods, methods in health education and epidemiologic and social factors. All these subject areas are needed in the training of a person who is to be a team leader working for permanent improvement in nutrition."

d) Support for Nutrition Research

In the future, there must be a change in the method of funding by governmental agencies insofar as Nutrition research is concerned. There should be provision for the funding of larger-scale projects that have been integrated on an interdisciplinary basis at their origin. For example, a study of a specific problem relating to the nutrition of the aged person could conceivably involve separate but integrated contributions by nutritionists, clinicians and sociologists. If these individuals sought independent support for each phase of the study, the nutritionists might seek support from the Department of National Health and Welfare or NRC, the clinicians from MRC, and the sociologists from Canada Council. The chance of all receiving support simultaneously would be extremely remote, leaving specific unexplored areas in what otherwise could be a meaningful study of an acute problem.

The Killam Awards, announced by the Canada Council in 1968, might well provide an example of organizational format that should be considered by other fund-granting bodies. It must be clear that the recommendation implies that this type of grant should be in addition to the present system of grants to individual researchers. For either form of granting system, there would be merit in the establishment of review panels oriented towards Nutrition within each of the granting bodies - i.e. NRC, MRC, etc.

With the establishment of such panels, sufficient research funds must be made available to encourage 1) the expansion of research activities in a number of existing centres, and 2) the creation of new centres of excellence to deal with specific Nutrition problems.

FUTURE REQUIREMENTS - SPECIFIC

a) A National Nutrition Survey

It is proposed that a nation-wide survey be undertaken to evaluate the dietary patterns and food habits of the various segments of the Canadian population and

to assess their nutritional status by clinical examination and biochemical measurements. The data obtained from this survey would help evaluate the impact of the various sociological, psychological and economic forces on the nutrition status of a community. They would also serve as a basis for detailed metabolic studies in specific communities where evidence of malnutrition, undernutrition or overnutrition had been detected.

The sample to be covered by the National survey should be drawn at the rate of 1 per 1000 of the population, thus involving 21,000 Canadians grouped according to their socio-economic status as well as age, sex and physiological state. The population sample in this survey should be subjected to dietary studies, clinical examination and should provide blood and urine specimens for a variety of biochemical measurements.

It is suggested that a team of 2 physicians, 1 dentist, 6 nutritionists, 4 interviewers and 2 technicians would be able to survey 40 to 50 subjects a day. Thus the survey would require approximately 500 team-days. It is assumed that several teams might be operating in the field simultaneously in order to complete the survey within 12 months. The cost of the field operation is estimated at $2,200 per team per day or $1,100,000 for the survey. In addition, the cost of laboratory analysis (equipment, supplies and salaries of a manager and 10 technicians) would be $300,000, data processing and sampling ($50,000), training programs for field team members (salaries and travel for 4 training officers = $100,000) as well as the administration and co-ordination of the National survey (salaries and travel = $100,000). Thus the non-field operation cost will come to $550,000. The total cost of this survey is estimated at $1,650,000 (i.e. $1,100,000 + $550,000).

b) Research Institutes on Human Nutrition

It is recommended that three centres of excellence in nutritional research be established in Canada, each having responsibility for the achieving of new knowledge and the training of individuals in the area of human Nutrition.

It is proposed that one of these be known as the Research Institute on Community Nutrition. The main objective of this Institute would be to carry out research and train individuals in human Nutrition, dealing with the metabolic problems of both diseased and healthy individuals, as well as the social, psychological, cultural and economic aspects associated with public health or community Nutrition. The concept of such an Institute would have to be accepted by a Canadian University, with the understanding that the staff members would not be responsible for undergraduate teaching, but would have as a primary academic responsibility the training of students at the Masters and Doctoral levels.

In addition to the Director of such an Institute, the professional staff might include the following members:- biochemists, physiologists, dietitians, sociologists, psychologists and public health nutritionists, and at least one clinician, economist, epidemiologist and pharmacologist. It cannot be stressed too strongly that each professional staff member would have to be selected on the basis of his or her interest in Nutrition research and willingness to apply original training to the problems associated with the feeding of people.

The other two centres could be known as Nutrition Research Institutes, with a broad objective covering both basic and applied Nutrition, and covering all aspects from food production to human health. It is essential that such centres be located on university campuses where existing personnel and facilities make possible an efficient co-ordination of the Nutrition interests of various disciplines:- Biology, Agriculture, Food Science, Animal Science, Home Economics, Medical Sciences and Social Sciences. It is suggested that these two centres be developed through the expansion of personnel and facilities at institutions that are already interested and involved in the field of Nutrition.

A complement of fifteen professional researchers plus an appropriate supporting staff is suggested for each of these Institutes. If the MRC figure of $45,000 is used as the cost to set up one researcher in an equipped building, the capital cost involved would be - $45,000 x 15 = $675,000 for each Institute. For all three, the total capital cost would be $675,000 x 3 = $2,025,000.

Again using MRC figures, it has been estimated that the annual cost for the conduct of research is about $30,000 per researcher. This includes charges for graduate students, post-doctoral fellows, summer students, professional and technical assistants, secretarial help, pension contributions, materials and supplies, equipment and travel. Hence, this aspect of the operational cost would be - $30,000 x 15 = $450,000. If the average salary of the professional researcher is estimated at $18,000 per annum, an additional $270,000 ($18,000 x 15) would be required. The total annual operational cost would therefore be of the order of $450,000 + $270,000 = $720,000 for each Institute. The estimated annual cost for operating all three Institutes would be $2,180,000 (3 x $720,000).

c) Public Health Training Grants

The need for public health nutritionists in Canada is so well recognized that it does not require documentation in this report. Upon the establishment of centres of excellence to deal with this aspect of Nutrition training, consideration must be given to the encouragement of prospective students to avail themselves of the advanced studies thereby made available.

Hence, it is recommended that a number of Public Health Training Grants be made available by the appropriate governmental agency. These would be grants made to the individual, through the university at which the study was to be carried out, for support of graduate work in Public Health Nutrition. They should involve no post-graduation commitments to either any particular province or agency. In addition to the funding of the student, an additional grant should be made to the university at which the student is being trained for support of his or her research undertaking.

It is not difficult to visualize the eventual training of thirty candidates per year. If the graduate stipend was set at $3600 and the university allocation at $6000, the total annual cost would be -

Student stipend	- 30 x $3600 =	$108,000
University allocation	- 30 x $6000 =	180,000
		$288,000

It is of utmost importance that Canada make a very special effort to improve the nutritional status of her population. It cannot be overemphasized that expenditures on nutritional research will result in considerable savings in medical care.

Table 1 - Orientation of Nutrition Research Projects in Canada During the Period 1966-68

Category	Primary Orientation	Nutrition Projects			% of Grand Total
		Total	Basic	Applied	
A	Animal, vertebrate, non-specific	68	50	18	19.3
B	Human, specific	46	5	41	13.1
C	Non-ruminant animals, non-specific	23	8	15	6.5
D	Ruminant animals, non-specific	40	6	34	11.4
E	Dairy cattle, specific	28	0	28	7.9
F	Beef cattle, specific	28	0	28	7.9
G	Sheep, specific	14	0	14	4.0
H	Swine, specific	34	0	34	9.7
I	Fur-bearing animals, specific	8	0	8	2.3
J	Avian species, specific	63	0	63	17.9
	Grand Totals	352	69	283	100.0

Table 2 - Origin of Nutrition Research Projects Applicable to the Human

Origin	Animal, vertebrate - non-specific (Category A)	Human - specific (Category B)
Universities	47	36
Faculties of Agriculture	7	-
Faculties of Medicine	21	12
Colleges or Schools of Home Economics	8	20
Departments of Nutrition	9	4
" " Biology	1	-
" " Zoology	1	-
Hospitals	8	9
Government	12	1
Food and Drug Directorate	6	1
Department of National Health & Welfare	2	-
Canada Department of Agriculture	4	-
Research Institutes	1	-
Totals	68	46

Table 3 - Nature of Nutrition Research Projects in Canada
Having a Direct Application to Humans
(Category B - Table 1)

Area Studied	No. of Projects Involved
Nutrition x Disease Interaction	18
Mineral metabolism	7
Cholesterol metabolism	6
Food habits	5
Food acceptability	5
Obesity	5
Protein metabolism	5
Nutritional status	4
Nutrition x hormone interaction	3
Nutrition education	3
Nutritional value of foods	2
Therapeutic diets	2
Lipid metabolism	2
B-vitamins	2
Body composition	1
Dietary requirements	1
Energy metabolism	1
Carbohydrate metabolism	1
Nutrition of the aged	1
Nutrition in pregnancy	1

APPENDIX 10

BRIEF

TO THE

SPECIAL COMMITTEE

ON

SCIENCE POLICY

BY: Kshatriya, Amarnath R.,
Physics Department,
British Columbia Institute of Technology,
Burnaby, B.C.

February 19, 1969.

CURRICULUM VITAE

Kshatriya, Amarnath R., B.Sc.(Hons), M.Sc., University of Bombay; M.Sc., University of British Columbia; Born in 1932 in Bombay, India. Taught in Colleges affiliated with the University of Bombay as a demonstrator in Physics (from 1953 - 1957) and as a lecturer in physics (from 1957 - 1959). Teaching experience in Canada (from 1959 - present) includes one year at pre-secondary level. Landed Immigrant in Canada as of May 1965. At present: Master, Department of Physics, British Columbia Institute of Technology, Burnaby, B.C. Married to Savita and have three children. Home address: 4487 West 16th Avenue, Vancouver 8, B.C. Professional interest includes academic/pedagogical efforts to enhance an appreciation of the interaction of knowledge and nature.

INTRODUCTION

The thoughts presented here have the following basis:

(i) Involvement, participation and development of the human being is vital to an enduring human social structure and the feeling of satisfaction is considerably enhanced if the situations favour an optimisation of the participant's faculties.

(ii) the emphasis on "do it" is to be balanced with that on "learn it".

(iii) Science Education will play a major role in the industrialised society of the future not only because of its potential to generate technology but also because of it providing the background and 'tools' for a knowledgable interaction of the human being with his environment.

There is a need for a Science Policy in Canada and the responsibility to implement such a science policy will have to rest with the Federal Government of Canada. The presentation here is concerned with activities relating directly to two-three year post secondary institutions (e.g. technical institutes, Regional Colleges).

1. FORMATION OF A SCIENCE FOUNDATION

The teacher plays an important role in the process of dissemination and appreciation of available information from scientific activities and technological advancements. There is an urgent need to encourage an atmosphere in which a teacher has a chance to optimise his ability, update his knowledge and improvise his pedagogical activity. In order to create this type of an atmosphere throughout the country, the following is recommended:

The Special Committee investigate the possibility of establishing a Science Foundation with the following objectives in mind:

1. (a) To improve the subject matter competence of teachers in all sciences at the pre and post secondary levels.

1. (b) To provide some means of a continuous (e.g. once a year) assessment of effectiveness of regional school science programs

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and the suitability of text books (e.g. to encourage writing, revising and/or correcting information in school texts).

To meet the demands in 1(a) the Science Foundation should organize Summer Institutes, short courses and Research Participation programs for pre and post secondary teachers. These programs would be held during summers (for 6-8 weeks) and the activity will involve universities, technical institutes and participants from across the country. For details the attention of the committee at this stage will have to be directed to the operations of National Science Foundation in Washington, D.C.

To meet the demands in 1(b) regional committees of interested people be encouraged to produce the assessment. Such a committee may consist of teachers/administrators drawn from local teaching institutions and it can provide the vital need for a continuing communication and improvement.

2. PREPARATION OF TECHNICAL INSTITUTE GRADUATES

The student joining the institutes of technology generally carries a heavy load of work. It is hard for him to keep remunerative jobs outside of school hours. Besides, the school year extends to almost ten months leaving only two months for possible summer employment. In view of these observations the following is recommended:

The number of Loans and bursaries available to students at institutes of technology should be increased.

In order to increase the competence and versatility of the technical institute graduates, it is essential to explore the possibility of adding a year to the existing graduating time interval or increase the number of "contact" hours of training. It will be of value to establish, among institutes, mechanisms e.g. a Standard's Committee whose objective will be to make sure that a certain minimum level of competence, expected of technical institute graduates, is maintained in all institutes of technology across the country. The size of enrolment at institutes of

technology should be limited to a number such that all existing facilities e.g. space, equipment and teachers are used adequately. If the demand for enrolment exceeds the acceptable enrolment capacity of the institute then the institutes should be in a position to examine the possibility of operating an afternoon shift.

3. PROFESSIONAL DEVELOPMENT AND OPTIMUM USE OF EQUIPMENT

The institutes of technology have a teaching faculty with a variety of technical, industrial and academic preparation. Professional development, if it is to be effective, will have to be a continuous process. In order to 'stretch' the tax payer's dollars invested in form of building and equipment in institutes of technology the equipment and laboratory facilities should be used not only for the purposes of increasing the technical skill and understanding of the technologists but also for the purpose of small scale, short-term Engineering and Industrial projects conducted at institutes at faculties 'own time'. Such an activity will provide a Summer/Semester employment to the promising technologists and increase their versatility. In view of these reflections following recommendations are made:

The federal government in its science policy should create and tend channels to encourage the following:

3. (a) At each institute of technology a group of interested teachers (Project development group) may be formed. This group will examine the institutes' potention for short term Engineering/Industrial projects and maintain liason with potential organizations.

3. (b) Local industries/business and government organizations be persuaded (by giving some sort of tax exemption to the organizations incurring expenditure connected with the projects) to encourage expenditure on such projects conducted at regional institutes of technology.

3. (c) Defense Research Board of Canada and the National Research Council be persuaded to look to the institutes of technologies as a possible location for conducting modest Science of Materials type projects. These institutions should consider supporting suitable "applied" projects in much the same fashion as they do it at universities.

4. FINANCING

For 1(a) and 1(b) the money be "generated" by some taxing mechanism similar to the Social Development tax, and persuading the provinces to increase their share of contribution toward technical/vocational education.

For 3(b) generous incentives in form of tax exemptions to industries, and rights to develop the results of the project for commercial use, will, it is hoped, generate an increased amount of industry supported research activity.

APPENDIX 11

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

THE UNITED NATIONS ASSOCIATION, HALIFAX BRANCH

HALIFAX, N. S.

CANADA'S ROLE IN CHEMICAL AND BIOLOGICAL WARFARE RESEARCH

Canada's recent co-sponsorship of a resolution tabled at the United Nations Assembly calling upon U Thant to prepare a report on the dangers of chemical and biological weapons, is a notable step toward disarmament. The possibility of the use of chemical and biological weapons constitutes a serious threat to mankind, and the peoples of the world should be aware of the dangers of such use.

Yet Canada has placed herself in a false position in the eye of the world. Through secret research into chemical and biological warfare (CBW) in cooperation with the USA, Great Britain and Australia, Canada has helped to create the very dangers which, at the United Nations, she claims are so great.

In the face of such apparent inconsistency in Canadian policy - an inconsistency of the kind which is noticeable in some other aspects of Canadian policy, especially vis-a-vis internationalism and continentalism--it is appropriate to examine Canada's role in the world today. The problem of CBW research would seem to be peculiarly suited to analysis in this respect, illustrating as it does a number of areas which, at present, detract from Canada's standing in the world, but which, through changes in policy, might place this country in a very favourable light. Furthermore, at a time when the Canadian Government has expressed the desire to review many aspects of policy, an examination of such a sensitive area as CBW research is imperative.

Present Canadian Policy

1. Under an agreement between the United Kingdom, USA., and Australia, Canada collaborates in the Technical Cooperation Program (TTCP), which has been described as "our most important

international program" by the chairman of the Defence Research Board (DRB).[1] Research into the defensive aspects of biological, chemical and nuclear warfare is conducted in such a way as to improve the "combined efficiency of these four countries and (minimize) duplication of effort".[2] It is evidently "an area with many security restrictions",[3] and its importance is evident from the fact that, according to the 1966 DRB Annual Report, the expenditure for the two main establishments associated with TTCP accounted for about 16% of the total DRB budget of over $44 million.[4]

According to available information, the work is purely defensive. While this may be considered at first sight to be acceptable, and accepting the argument that at least some defensive measures can be taken against CBW (although the efficacy is open to question), it must be recognized that there is an extremely tenuous line existing between what is "defensive" and what is "offensive". The secret work carried out under TTCP is, in this context, of considerable concern for the following reasons:

a) One aspect of the activity of TTCP has been described as "a program of testing some type of agent...which has arisen as a result of UK or US development work. We provide some of the machinery whereby this agent may be evaluated."[5]

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1. R.J. Uffen: Proceedings of the Special Committee on Science Policy. The Senate of Canada, Oct. 24, 1968.
2.&3. Proceedings of the Special Committee on Science Policy, The Senate of Canada, Oct. 24, 1968.
4. Defence Research Board of Canada, Annual Report, 1966 pp 16-17
5. A.Penney, reported in "Our Pivotal Role in Germ Warfare Research John Morgan, Montrealer, 41, No.9.p6, 1967.

Canada, in fact, to the chagrin of Albertan farmers, provides an "open air laboratory",[5] taken out of over 1000 acres of prime farmland, and it is not surprising that both the British and the Americans "rely on Canada to provide.....scientific and technical knowhow to help them do the sampling and measuring"[5] of bacterial materials.

b) The extent to which the research program is defensive is questionable. Particularly significant is the statement from Porton in England (the Microbiological Research Establishment at which a worker recently died from plague) in relation to the British program, from which Canada "benefits", that "we are interested in both aspects, offensive and defensive."[6] The line between "defensive" and "offensive" already tenuous, becomes even less well-defined. And further, when the use of defoliants and tear-gases in the Vietnam war is openly admitted by the USA[7] which is allowed to use Canadian Research facilities, the line banished and Canada becomes party to the suffering in that strife-torn country. Canada's dependent position is mainly the result of her present role in CBW research.

2. The value of a defensive research program of this kind is itself open to doubt. Defensive measures are needed against chemical and biological agents which are colourless, odourless, tasteless and impalpable. Effective protection of the Armed Forces, with which the Defence Research Board program is mainly

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5. A. Penney, reported in "Our Pivotal Role in Germ Warfare Research John Morgan, Montrealer, 41, No.9.p6, 1967
6. Reported in CBC film on CBW, November 1968
7. For complete references see S.M.Hersh, CBW, Bobbs-Merrill, Indianapolis, 1968.

concerned, would be a herculean task; protection for the more vulnerable civilian population would be a problem of magnitude only appreciated by the Sorcerer's Apprentice. For practical purposes there is no real defence against CBW, and it is important that the public realize this. The taxpayer may well reach the conclusion that defensive research of such magnitude and cost is hard to justify unless there is a change in overall planning.

3. CBW research is essentially secret and it has been stated on the best authority that "Secrecy is clearly essential to preparations for chemical and biological warfare".[8] It is not surprising that in the USA., "the chemical and biological weapons program is one of the most secret of all US military efforts".[9] Canadian policy leads directly to the creation of international tension, and as responsible scientists have warned "Secrecy on the part of possible enemies is....productive of anxiety, suspicion and hostility, and may precipitate hostile reactions".[8] Secrecy breeds the germs of war; the secret deterrent does not deter but rather aggravates: "the best defence is knowledge".[9]

4. Canada's part in CBW research places her, in the eyes of the world" in particular, in a position which is closely aligned to that of the USA. Canada's involvement in this field, which itself is so erosive of ethical principles, prevents her from assuming a role which in the long term is of far greater import. It is a role which Canada could and should play if Canada is to make an effective international contribution in the next decade or quarter-century. Two aspects are particularly important: her

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8. Statement from Fifth Pugwash Conference on Science and World Affairs, Aug.24-29,1959,reported in Bull.Atom.Scs. pp337-9,Oct.1959 & History of Pugwash Confs., J.Rotblat, London, Dawsons, 1962.
9. Dr. Ursula Franklin in interview with Dr. R.J.Uffen, 1968.

relationship to underdeveloped countries in their vital needs for assistance in growth, and her stature as an impartial but sincere Peacekeeper wherever and whenever her services are required. Both of these roles are poorly played under present conditions. Quoting again the Pugwash group of scientists, "We believe that nations which build their national security on secrecy of scientific development sacrifice the interests of peace and of the progress of science, for temporary advantages....."[10]

A Possible Role for Canada

Such considerations speak very strongly in favour of a change in Canada's policy vis-a-vis CBW research. What then should Canadian policy be?

It is here that Canada could achieve greatness through a reversal of her present policy. It would require of Canada a measure of independence, because a much greater international perspective would be demanded. A key to the role Canada should play is a quotation from the Vienna Declaration issued by the Third Pugwash Conference in 1958:

> "As scientists, we are deeply aware of the great change in the condition of mankind which has been brought about by the modern development and application of science. Given peace, mankind stands at the beginning of a great scientific age. Science can provide mankind with an ever increasing understanding of the forces of nature and the means of harnessing them. This will bring about a great increase in the well-being, health and prosperity of all men".[10]

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10. Statement from Third Pugwash Conf. on Science and World Affairs reported in History of Pugwash Confs., J.Rotblat, Dawsons, London, 1962.

Peace is the ideal. It is worth working for. Canada can help.

1. The dangers of CBW must be emphasized by Canada. In this respect Canada's co-sponsorship of the resolution is a commendable step. Canada should, furthermore, press for some kind of United Nations Commission or Committee on Chemical and Biological Warfare, similar in type to the UN Scientific Committee on the Biological Effects of Radiation. Such a body would collate knowledge of CBW and would be the catalyst required to bring knowledge into the open.

2. Canada should consider encouraging the work of the Pugwash Conference on Science and World Affairs. It is significant that a study group, following the 13th Conference, recognized the potential importance of CBW; the group realized that it was still a relatively "insensitive" activity although closely connected with public health problems, and decided to test the feasibility of a voluntary system of inspection. Pilot studies were done, cooperation was remarkably good, and ideas for future control were collected. More recently the Stockholm Peace Research Institute, with support and advice of the Pugwash group sponsored teams of scientists from Eastern, Western and non-aligned countries to carry out specific research in the field of detection and identification of biological weapons, of a kind which otherwise might be carried out mainly under military auspices. This is a promising possibility which Canada should certainly encourage.

Canada, in fact, could seek to cooperate in international research work on the control of CBW, instead of conducting secret, nationalistic research work for her own dubious benefit. A potential loss of defensive capacity--already small in so large a country- would be more than offset by the gain in goodwill.

3. Canada might go further and offer its biological laboratories to a truly international and a political organization such as the World Health Organization. This has been proposed for the USA by Herriott, who felt that "this action would be a giving up of very little by any nation and would be a demonstration of good faith. It would reduce tensions somewhat and would permit Russia and the USA to work out administrative arrangements for inspection etc., on this model".[11] Such laboratories could become models of cooperative efforts, and eventually the need for secrecy and classified research might disappear. Ideally, the aim would be "to dispel the miasma of secrecy that fosters international suspicion and tension, and in its place to extend the benevolent application of microbiological and chemical knowledge for the benefit of all men".[8]

4. Canadian policy, if truly international, would have no need to participate in programs such as TTCP.. If a review of such organizations as NATO is in order, and even advocacy of withdrawal from NATO, so then should the DRB program be reviewed.

5. Canada should seriously question her priorities both at home and abroad. Important issues, of which CBW research is an example should be openly discussed in the public forum. The British policy of "opening" the Microbiological Research Establishment--almost essential following the case of plague--is one step in this direction, which Canada should follow. Parliamentary responsibility is considerable, but essentially it is the Canadian public which must learn to use democratic processes to their advantage. In a democracy the public is entitled to know the facts; for the protection of democracy

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11. R.M.Herriott in Problems of World Disarmament C.A. Baker, Boston, Houghton Mifflin, 1963.
8. Statement from Fifth Pugwash Conference on Science and World Affairs, Aug. 24-29,1959, reported in Bull.Atom.Scs. pp337-9,Oct.1959 & History of Pugwash Confs., J.Rotblat, London, Dawsons, 1962.

the public must know the facts. And so, the basic policy of Canada must in the end come from the informed citizen. Only then will Canadians, and all people understand with Einstein that "Science has brought forth this danger, but the real problem is in the minds and hearts of men".

D.A.E.Shephard, M.D.,
25 Shore Drive,
BEDFORD,
Nova Scotia.

APPENDIX 12

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

NORMAN S. GRACE, TORONTO, ONTARIO

1. Summary

"How best to organize for the support and use of science to help meet our objectives?" is the question. The main difficulties lie in the all-pervasive, international nature of science and its tremendous rate of growth. This is resulting in rapid and accelerating change throughout the world which is superimposed on and interacting with the fast development of Canada. It is important therefore that we learn "how best to manage change" and, in the national interests, do this quickly. We require a flexible, dynamic system to keep in touch and take advantage of the rapidly changing scene to help us maintain updated, realistic objectives and to develop and implement progressive plans for achieving them.

2. The unique nature of the Canadian situation requires truly Canadian solutions. Advantage, of course, can be taken of progress in other countries; however, it must be adapted before it is adopted.

3. The enviable record established by the Federal Government in efficiently managing change during the last war is noted. The question is asked "What can we learn from this and the experience of Canadian industry since the war?" Some organizational principles for managing change are suggested.

4. The problems before us are so complex and there are so many ways of tackling them that a basic approach aimed at establishing the fundamentals is recommended. This approach would attempt to develop "a basic blueprint for progress" to serve as a continuing guide.

5. How best to marshall, support and utilize our scientific and technological capability is a central issue. Improved communication and cooperation between government, educational institutions and industry is vital.

6. Extensive recent travel and participation in several international scientific conferences has shown that many of the less-developed countries have the greatest respect for Canada and, indeed, are looking to us for leadership. This is an unexpected opportunity - perhaps a responsibility.

7. The impression is also gained that most other countries would gladly change places with Canada at this time. This suggests that we have done a reasonable job in conducting our affairs and that perhaps we should not be too hasty in adopting drastic changes.

8. Fundamental Approach

Major advantages of reducing a problem to its simplest form, to its fundamentals, lie in improved comprehension and communication. This is all the more important where the concepts are complex and the participants geographically scattered and varied in training, occupation and interest - circumstances which apply in the present situation.

9. A basic approach aimed at establishing the fundamentals might start with simple statements of

(a) Our primary objectives - international, national and regional;

(b) How science can help us achieve them;

(c) Plans and procedures for efficiently effecting this

(d) An ideal organization to manage the exercise.

10. In this way, it should be possible to establish a "basic blueprint for progress" to serve as a continuing guide as one moves from the ideal and fundamental into the innumerable complexities of the real-life situation.

11. Cooperation to Cope with the Challenge of Change

The challenge of change is so great that each country must try as best it can to marshall its scientific and technical resources and, through cooperation, maximize their use. In Canada these resources are primarily found in government, educational institutions and industry. Too often there is lack of communication and understanding between those employed in one sector and those in the other two. It is important to overcome this difficulty; steps to this end might include:

(i) Emphasizing that each of the three main activities is a means to an end;

(ii) Implementation of the principle that business or industrial experience is a vital part of education:

(iii) The greater movement of people between the three sectors;

(iv) The greater use of task forces, part-time assignments, etc.

12. It is also important to improve coordination and understanding between the different levels of government, for many of our problem areas such as pollution cut across municipal, provincial and federal jurisdiction.

13. The Management of Change

(a) Examples:

There are many examples of the successful management of change; two are briefly referred to.

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14. Our Federal Government established an enviable record in efficiently managing change during the last world war. For example, the way in which the rubber emergency was handled provided the necessary rapid wartime solutions and resulted in a viable Canadian synthetic rubber industry for the post-war period.

15. The loss of the natural rubber plantations to Japan in late 1941 created one of the most serious emergencies during the whole war. Under Government leadership and with the close cooperation of many industries and the dedicated efforts of many individuals, and leaning heavily on the technology of our great neighbours to the south, the almost impossible problems were solved efficiently and in the shortest possible time.

16. This example is mentioned not only because of its importance, but also because of my first-hand involvement, on loan to the Department of Munitions and Supply, then to the crown company, Polymer Corporation, while at the same time carrying on a senior technical function with a leading rubber goods manufacturer. This type of dual assignment greatly aids coordination and progress, particularly during periods of very rapid change.

17. What can we learn from the experiences of Canadian industry since the war? In order to survive, they have had to learn how to operate in a rapidly changing scene; for example, changes in raw materials, product and market requirements, attitudes of labour and investors, national and international competition, etc.

18. (b) Some Basic Organizational Principles:

A study of the above cases suggests the following organizational principles for managing change:

(i) Well-defined organization;

(ii) Clear-cut responsibilities and related authority;

(iii) Coordination, dynamic rapport, short lines of communication with feed-back;

(iv) Flexibility of attitude and action;

(v) Mobility of personnel (regroup, not necessarily recruit).

19. Organizing for the Future - A Developing Science Policy:

There are many factors and uncertainties that make it difficult, but all the more essential, to organize for the future. For instance,

(i) The long time scale that characterizes the development and use of scientific knowledge.

(ii) Uncertainty as to the precise type and timing of future changes - the amazing developments of the past several decades, such as harnessing atomic energy, exploration of outer space, developments in computation, communication, transportation, new materials, wonder drugs, the pill, organ transplants and the understanding of the genetic code, are at best but a partial guide as to what the changes will be during the next few decades.

(iii) Many changes originate outside our borders and their initial impact on Canada may be largely outside our control.

20. How can we maintain early awareness of major changes so that we will have sufficient lead time to take maximum advantage of them and minimize the undesirable features that generally accompany change?

21. These are some of the reasons for believing that our science policy must be a developing one. It must evolve in the light of what we want to happen and what we expect to happen. Provision must therefore be made for frequent reappraisal of the situation with sufficient flexibility to permit rapid adjustment to it.

Norman S. Grace,
33 Rose Park Drive,
Toronto 7,
Ontario.

APPENDIX 13

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

G. W. C. TAIT,

R. R. 1, GIBSONS, B. C.

1. My reason for submitting a brief on Canada's science policy is my belief that I am in a position to present views on fundamental points of policy, which views will not appear in other briefs. In this presentation I would first show that much of present science policy is misleading as to objectives and often can only be regarded as a disasterous waste of potential scientific capacity. Following this will be a survey of principles upon which a sound policy can be built.

2. Specifically the major points to be made are:

   (a) The nature of Canada's scientific administrative establishment inevitably favours policies at variance with the needs of both scientists and the public.

   (b) In establishing a sound science policy a clear distinction must be made between applied science and basic science on the criterion of purpose. Applied science should be justified and budgeted on the basis of policy for the particular area of application. Basic science can be justified and supported by a science policy founded on sciences nature as an essential cornerstone of our civilization.

(c) By its nature basic science is most effectively organized as a multiplicity of small projects. Large comprehensive projects generally serve other purposes than the most effective advancement of basic science.

3. Most other briefs can be expected to be prepared by members of Canada's body of scientific administrative officers who effectively constitute an "establishment". Although many internal differences and conflicts are apparent in the functioning of this establishment, these are generally concerned with the ascendency and relative standing of individuals and groups. On points considered essential to the existance of this establishment there is a common position supported by severe disciplinary measures. Admittedly such a situation is not uncommon in other professional fields; but it is particularly significant in the field of scientific administration and policy making because of special circumstances which will be discussed. It is the contention of this brief that this situation is sufficiently serious to result in the generation of science policies for Canada that are neither in the interest of productive scientists nor the public but which are merely in the interest of the scientific administrators.

4. At this point it is helpful to review certain important aspects of the nature of science, scientists and administrators of science policy. In the broadest sense science may be considered the sum total of verifyable human knowledge organized in a systematic way to stress the interrelation of separate items with particular regard to fundamental principles. The application or practice of science is the activity of taking a step into the unknown with the purpose of adding to this knowledge. The scientific method is the fact of taking such a step rather than merely speculating as to what may be beyond, i.e. try and see (or experiment). Steps can be small or large; into fairly well charted areas of the unknown or into completely unknown areas. The superior scientist takes large steps. The purpose of the steps may be to provide answers to practical problems or it may be simply to add to the field of general knowledge (idle ? curiosity). The former constitute applied research and the latter basic research. It is apparent that in the case of applied research the likely answer to the study is nearly in view from the beginning so that in this case the length of the steps into the unknown are relatively short. For this reason basic research generally has greater appeal for the more gifted scientist since it involves greater

advances into the unknown and the possibility of shifting the line of study as new opportunities come into view.

5. It is apparent that the person who has an enthusiasm for taking large steps into the unknown is likely not only to have considerable ability but also an emotional bias to enjoy going in a direction different to that taken by those around him. The productive scientist is rarely a conformist and as a result is unlikely to be particularly skilled at developing a wide range of human relations. He is unlikely to prove a keen competitor for administrative positions nor is he likely to enjoy such work, especially if it is part of a highly organized bureaucratic machine.

6. Nevertheless one firm feature of Canadian science policy is the recruitment of scientific administrators from the scientific community. (The Canadian trait of relative tolerance of dissimilar cultures has as a by-product an enhanced respect for experts, even if their qualifications are chiefly self or mutually proclaimed). The general result is that the persons most likely to enter scientific administration are neither the most productive scientists nor versatile administrators from non-scientific fields but rather the least productive scientist; the person who entered

science by mistake; whose talents lie not in scientific capabilities but in human manipulation and self promotion. Further such a person is likely to be a very poor spokesman for the scientific community since he does not tempermentally form part of it. Rarely, a first class scientist will rise to the top of administration by strength of a unique personality but his efforts will be undermined and frustrated by the mass of conformist administrators around him. Unfortunately the prevalence of scientific jargon permits the bureaucrat and salesman in scientific clothing to conceal their inadaquacies and even their natures.

7. Clearly a scientific administration heavily loaded with seeming scientists whose true skills are promotional and concerned with the manipulation of people will assign priorities and possess motivations in connection with science policy different from those which would reflect the interest of the productive scientific community and of the general public. In particular their primary motivation whether self recognized or not must always be to show that existing scientific administrative organizations or proposed modifications into which they can comfortably fit, are essential for the satisfactory development of

science in Canada. Policies resulting from this situation will not necessarily be in the best interest of scientific progress.

8. Since the scientific administration establishment is essentially concerned with maintaining itself as the only channel of communication between working scientists and the representatives of the public it is concerned that such communication be limited to forms on which it can place its own imprint. In general the scientific administrative community finds it to its interest to confuse issues.

9. Support of the "big" project with "practical potential" is particularly favoured. It is much easier for the administrator to build up his position with a minimum need for any real scientific comprehension if he can promote projects involving large capital investments. These require a correspondingly large administrative machinery and are self-generating of tasks for scientific staff. Further, because of large capital investment public support can continue to be obtained long after the project has outlived its usefulness or even clearly been proven an error of judgement in inception that should have been scrapped at the first opportunity. Unfortunately unlike business institutions there is no simple auditing technique to reveal intellectual bankruptcy. Also

the administration is in a position to play off the working scientist and the representative of the public against each other. When the project has failed to live up to its original promotion, he can continue to ask the public for funds on the grounds that the project should be judged on its basic research potential and not on simple economic results. On the other hand funds can be transferred internally from basic research to development areas in the hope that something will turn up that can be promoted as a success. In turn the scientific staff are shifted to more and more routine duties to shore up the failing project. The result of "big" projects to the participating scientist is that in the projects period of decline he must work at tasks which he recognizes are of little merit (in contrast to the administrator who seeks to stretch out and disguise the decline of a big project as long as possible).

The occasional senior scientist without too serious family ties may manage to break away but too often because of our close knit administrative establishment, this involves leaving the country - often only with great reluctance. For others the only course is to remain and let their talents rot.

10. The scientific administrator without true scientific talent will support applied research against basic research since it is easier for him to comprehend applied research and its presentation to the public lies more comfortably within the scope of his abilities. Again the transfer of public influence from the productive scientist to the administrator is favoured.

11. In contrast, it is the view of this brief that a science policy in the best public interest can be built on quite different principles.

12. Reference should again be made to the difference between basic research and applied research, which has been defined in terms of purpose. Since applied research is carried out in connection with some practical purpose, policy with respect to applied research must by its nature be part of the area of policy concerned with the particular purpose. For example, applied research in agriculture should be covered by agricultural policy. It should be the mark of a progressive agricultural policy that scientific methods be pursued on every occasion that there is a favourable probability that they will lead to the solution of a particular problem in conformity with economic standards. The free use of scientific studies to seek out the key questions to be asked must also

be part of the policy of any progressive administration. It is true there are a few points in applied research where some consideration needs to be given to general basic science policy. The availability of scientific staff could be one such consideration. Another point concerns the rewards the scientist achieves in his work. A productive scientist is generally relatively content at present to work for something like $12,000; yet with his talents but with different motivation he should be able to earn twice that figure in business. That is, the nominal salary can only be viewed as half the recompence and the rest must be made up in other satisfactions. For the competent scientist the freedom to carry out basic research must be recognized as part of his terms of employment. To secure a first class scientist to carry out an applied research study, he should be given a compensating reward in lieu of high salary of up to 50% of his time free for research studies according to his own interest. (Some USA big businesses have considered it worth their while to employ top ranking scientists and give them 100% unrestricted time). Granting scientists on applied research projects time for basic research of their own choosing is preferable to high salaries alone since the latter course cannot materially increase the

output of applied research and in time will only reduce the quality of the output. (A scientist only has so many original ideas in any field in a year and longer hours will not increase this.)

13. The basis of a direct Canadian science policy is held to lie in the field of basic research. The justification for support of such activity is that basic research or science for its own sake is the basis of our whole society. There is abundant historical evidence that limiting search for knowledge to that of immediate utility creates a sterile society. Canada as a member of the community of advanced nations must support pure science in the same way that art, literature and other humanizing activities must be supported.

14. The degree of support for basic science is a proper subject of public concern. The government should decide what budgetary sum or fraction of the gross national product could be allocated to this purpose. This allocation should be absolutely distinguished from funds for the support of applied research and transfer between these within an institute should be blocked. The funds for applied research should come from those for the area of application and should be justified on normal economic grounds. The latter can in no way be considered to meet Canada's responsibility

for extending human knowledge as a member of the world community.

15. It is suggested that the following steps would improve the scientific output achieved for the budgetary allocation provided:

(a) Communication should be improved between the working scientist and representatives of the public by reforming the scientific administration. Inadequate staff should be replaced in part from the ranks of productive scientists by improving their working conditions as administrators (reduction of bureaucracy). Supplementing these scientists there should be a group of non-scientific but imaginative professional administrators. In general a policy of judging administrators of science policy on their qualities as administrators rather than as sacred scientific cows will not discourage scientists who enter administration, but rather, weed out the phonies. Scientific administration should be encouraged to develop to a form in which a few scientists of proven productivity are responsible for judging the general competence of scientists applying for grants or of staff scientists within a basic research institute.

Supporting the senior scientist administrators should be non-scientist professional administrators who would be concerned with all other administrative matters and who would work under a general directive to keep administrative activities to the minimum necessary for efficient operation.

(b) The responsible public authority should take a very conservative look at the credentials and competence of proposed scientific administrators before delagating power into their hands and in fact should favour forms of administration that limit the powers of the administrators. It is far easier and safer to judge that Drs. V., W., X., Y. and Z. are reasonably competent and imaginative scientists and that if they severally propose to carry out a variety of experimental studies, then supporting grants of say $30,000. each have a reasonable chance of adding something to human knowledge; than it is to judge that Professor A. has such outstanding talents that he can be trusted to manage a $3,000,000 project involving 100 supporting scientists. The scientific administrators common claim that he is essential to coordinate basic research is fallacious since there is no evidence that the

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"coordination" of basic research serves any function other than the concentration of power in the hands of administrative scientists.

(c) The responsible public authority should not surrender its right to surveilance of the expenditure of research funds to a scientific administrative bureaucracy whether in government research establishments or in universities. However the concern of the government is not the scientific "merit" of projects but rather the determination that funds for basic research are actually spent in that field and not diverted to building up the administrative bureaucracy or to shore up faltering projects in applied fields.

(d) A large diversity of small projects should be encouraged. The aim in allocating funds should be to engage the maximum number of scientists possible in basic research. Concern should lie with the general competence of the project leader and originality of concept, not with expected results. Experience shows that the judgement of even world leading scientists is of very limited value in assessing the merits of a

proposal for a basic research project. The history of science shows very little correlation between the expected results of a study and its ultimate worth; nor between cost and results.

(e) Very critical examination should be given to big projects. To be considered a big project should only be a framework for a diversity of individual projects of interest to a corresponding large group of scientists. The occasional large scale projects that are successful in promoting science are usually those least justified on the basis of foreseeable practical application.

(f) A relatively free and generous allocation of funds can be justified in support of basic research if the authorities are correspondingly firm in demanding that applied research projects meet sound economic standards of performance with regard to effort and reasonably projected results.

16. Further factual information in support of these views can be expected to be found by careful reading of the other briefs.

17. In my opinion some submissions as reported in the press show a failure to comprehend what is meant by science policy. In particular they would seem to overlook the definition as supplied by the "Guide": "...research is....work undertaken for the advancement of scientific knowledge" and that even for applied research, the "direction towards...practical application" is at most a qualification of the fundamental definition. Many persons especially in administration and finance appear quite unaware of the existance of science at all as a fundamental factor in our society and have confused scientific research with any attempt to apply the most modest intelligence to existing problems on anything more than a day by day basis. They have suddenly become aware of the need for some long term planning in government activities. Rather than find the necessary funds by sacrificing any of the routine or bureaucratic activities which they understand and with which they can cope, they hope to finance any planning or non-routine activities by calling them research and by (mis)appropriating any funds that may be available for true research.

APPENDIX 14

BRIEF SUBMITTED TO

THE SENATE COMMITTEE ON

SCIENCE POLICY

BY

THE COUNCIL FOR LABORATORY ANIMALS,

VANCOUVER, B.C.

IN THE MATTER OF FEDERAL SUPPORT AND DEVELOPMENT

IN THE PHYSICAL, LIFE, AND HUMAN SCIENCES

AND, IN PARTICULAR,

IN THE MATTER OF

MEDICAL RESEARCH USING ANIMALS

The Council for Laboratory Animals has, for the past six years, made a close study of the type of experimentation using animals in Canadian medical schools and research institutions, has studied present legislation and legislative developments in Britain and the United States, and has presented a Brief (in 1963) on the subject of parallel legislation at the Federal level for Canada, which has been supported by subsequent submissions to the Federal Government.

Our Council notes with appreciation the action of the Association of Canadian Universities and Colleges which, with the support of the Medical Research Body, has set up the Council on Animal Care. We also appreciate the appointment of Dr. H.C. Rowsell as Director of the said Council and his Survey and Report, in which Dr. Rowsell outlines the need for, and means of, improving the treatment of animals in all Canadian laboratories.

However, our Council hold that a number of basic changes in the policy of medical research and tests, are required and we hope that the direction will come from your Committee.

Further, we hold that Federal legislation is required to implement the regulations the Council on Animal Care envisages as purely voluntary measures.

1. CO-ORDINATION OF MEDICAL RESEARCH

A study of medical journals strongly suggests that there is much duplication of experiment both in Canada and internationally; much repetition, often with such slight variation as to cast doubt on its necessity; some frivolous experimentation, resulting in a waste of scientific time, skills and funds; examples of excessive numbers of animals being used in a single series of experiments; over the years insufficient evidence of use of modern statistical methods to reduce the numbers of animals used; little apparent study, development and use of alternatives (other than in vitro); and an apparent lack of coordination between institutions and/or granting bodies when projects were submitted and supported.

Our Council, therefore, submits that a National Co-ordination Centre be set up, or, if one is in operation, its works be extended, to correlate projects, to concentrate centain types of study to specific institutions, to judge projects by their possible painful effects on the animals to be used as well as the medical value, and to prevent needless experimentation. (It should be the work of the Co-Ordination centre to make available a central Reference Library, outlines of proposed experimental projects, and to further the study and use of alternative media and of humane techniques.

2. GRANTS FOR MEDICAL RESEARCH

A National Co-Ordination Centre will have on file details of both Federal and Provincial grants, and of philanthropic, private and foreign grants given or available to Canadian researchers. Arrangements should be made that such non-government grants require adherance to the Code as is required of Government awards.

3. AIMS OF MEDICAL RESEARCH

Although certain epidemic diseases have been eliminated and others largely controlled in the Western world, this has been accomplished chiefly through sanitary, isolation and public health measures.

The obverse is the increasing demand for hospitals, nursing homes and mental health centres, the general sub-standard physique of our youth; the steady increase of circulatory diseases and cancer; and the rising consumption of tobacco, liquor and drugs.

Our Council considers that over the past two or more decades too much emphasis has been placed on animal experimentation and too little on clinical studies; much pure research has little relation to current human health, and a study of grants would suggest that these go to a far greater extent to abstract research than to problems of public health such as air and water pollution, health education, eugenics, housing and family planning etc., where the cause is known but too little devoted to prevention of concommitant ills.

We would, therefore, urge that the Senate Committee encourage, through direct grants and facility grants, more clinical, as opposed to animal experimentation research.

4. DRUG TESTING

At present the Federal Food and Drugs Department's regulations require the following mandatory tests before drugs are released for use:-

a) Tests on at least two species of animals at a degree of toxicity by which 50% of the subjects must die (LD50),

b) Further prolonged tests of reduced toxicity until an acceptable non-toxic dosage is arrived at,

c) Long term tests of up to a year for possible adverse effects.

It must be borne in mind that the term "drug" covers not only medicaments but also food and drink additives, colourings, cosmetics, paints, synthetics of many types, pesticides, aerosols, etc.

The British "Littlewood" Report (1965) states that such tests consume nearly half of the total number of animals used in British laboratories, while in the United States some 60% of all experimental animals are used in drug tests.

Although Canada as yet is not a large manufacturer of drugs, pharmaceutical laboratories are on the increase and the enormous sum of animal suffering in this area must not go unchallenged when alternatives are available. Their use must be made legal and compulsory as evidence of their effectiveness is established.

Alternatives for living animals for drug testing are:- human tissues, human diploid cell cultures, elementary forms of life such as amoeba and protogoa, embryos, sea urchins' eggs, etc.

Dr. R. T. Perkins of the British Research Council points out the danger of lethal viruses in the kidneys of African green monkeys and he advocates the production of polio vaccine from human diploid cells strains instead. (Dr. L. Hayflick, of the Wistar Institute, is a pioneer in the development of diploid cell lines.)

An official of the British Research Council has listed a number of areas where non-sentient alternatives are already in use in Britain while a report on "The Pre-clinical Testing of Drug Safety", by the World Health Organization (1966) states, inter alia, "New techniques and new ideas should....have an impact on the way in which toxicity of a drug is tested. Thus histapathology will come to be supplemented by histo-chemistry, and many problems will be clarified by the wider use of electronmicroscopy".

Again and again we read in responsible scientific publications that "the phenomenon of species variation makes extra-polation of results from one species to another, and particularly to man, extremely difficult", and, "testing of drugs on animals is done for legal, and not scientific reasons".

Our Council urges that the Senate Committee recommend a study of this subject; the adoption of already accepted alternatives, and the allocation of grants to their further development, which will lead to a revision of the present imprecise, inhumane and dangerous animal test regulations, and which will reduce substantially the cost of drug testing.

5. PHYCHOLOGICAL EXPERIMENTATION

This is an area which has expanded enormously within the last two decades. Our Council notes that the Canadian Journal of Experimental Psychology deals largely with human volunteers in tests of direct educational or clinical import. However, certain Canadian psychologists have conducted extremely distressing experiments on animals which are not reported in Canadian but in foreign journals. For example, constantly repeated "acquisition and extinction of learning habits" with intensive or prolonged electric shock; the use of curare or similar paralysants in conjunction with electric shock, so that the animal cannot escape; prolonged and complete isolation (up to 6 months) of animals to prove

the obvious, - that environment plays a decisive part in development; and so on.

Our Council, therefore, urges that the Senate Committee recommend that all Departments of Psychology exclude painful, repetitive and frivolous experiments on animals and, further, that psychological projects involving animals be carefully scrutinized in this regard.

6. CERTAIN EXPERIMENTAL TECHNIQUES

Our Council has noted with great concern the use of certain pieces of equipment by Canadian researchers. Some of these are:-

a) Drumming devices in which unanaesthetized animals are battered as the drum revolves.

b) The stereotoxic apparatus, now standard equipment in Canadian institutions. Although complete immobilization may be necessary in certain procedures, this can only be tolerated in conjunction with complete anaesthesia. Canadian reports sometimes refer to its use with unanaesthetized animals,

c) Complete immobilization of conscious animals by "strapping down for prolonged periods (up to 17 hours) or until death" has been reported,

d) Swimming till death,

e) Prolonged enforced excerise in the "wheel" or "treadmill" sometimes with electric stimulation to prevent rest.

As such trauma and stress producing experiments have been recorded for many years, our Council holds that any medical knowledge to be gained thereby must already be on record and we strongly request that the Senate Committee recommend such experiments be disallowed.

IN SUMMARY: Our Council must accept the present use of animals in medical research but holds that the numbers used have at times been excessive, and that preventable suffering has been inflicted through the conduct of repetitive, unjustifiable, or poorly planned experiments, or through the use of animals where other media could be used.

WE RECOMMEND:-

1. That a National Co-Ordination Centre be established or enlarged,

2. That a comprehensive list of research grants, projects and recipients be made available to the public annually, (vide the U.S.A. Grants and Awards (Research) Annual Report),

3. That more clinical as opposed to research on animals be encouraged through the allocation of grants,

4. That special attention be given to substitution of non-sentient matter instead of animals in drug tests,

5. That close scrutiny be given to the increasing number of painful psychological experiments, and to the use of mechanical and other devices for restraining or causing trauma, shock or stress to animals.

APPENDIX 15

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

M. F. WIDEEN,

UNIVERSITY OF SASKATCHEWAN,

REGINA CAMPUS

Some comments regarding Science Education in Canada

Assuming that any science policy for Canada would include a section relating to the teaching of science in our schools, I would like to propose that the Special Committee on Science Policy of the Senate of Canada consider taking steps to assist the improvement of science education in two areas.

The Sponsorship of Projects for Curricular Improvement in Science Education

In the United States, the National Science Foundation in the past two decades has funded a number of projects sponsored by independent organizations involving the development of improved programs for the teaching of science at the elementary and high school levels. Typically, those have involved huge sums of money and have combined the talents of scholars, educators, psychologists and professional writers. The resulting programs have had a significant impact on the teaching of science having combined two streams of enlightment - a new view of the disciplines concerned and a fresh approach to methodology. At the high school levels these have centred around improved approaches to teaching biology (B.S.C.S.), physics (P.S.S.C.), chemistry (Chem.S. and CBA), earth science (E.S.C.D.) and physical science (I.P.S.); at the elementary level they have typically involved an integrated approach to the teaching of science (E.S.S., A.A.A.S.etc.).

To date, organizations or universities in Canada have not had the opportunity of developing programs of a similar nature because of a lack of financial support. The practice has been to import programs from the United States which has generally raised the quality of teaching in many of our schools. The fact remains, however, that if we are to assume that this country has a unique character and unique problems then the development of programs with a Canadian character should be considered.

Furthermore there are other areas to which expertise and attention should be directed in this country. Mention could be made of the development of a K-12 model of curricular design for our schools, or the development of programs for science education for Indian children. There are groups that would direct energies and attention to those problems and others, were the Government of Canada to establish a foundation to provide financial support for such endeavours.

The Provision of Funds for In-Service Teacher Education

Despite the large number of improved teaching models in science education that have been developed in the United States and Great Britain and the current wave of curriculum reform, teaching in most Canadian classrooms remains a rather sterile, traditional endeavour. In fact, it is being suggested in many areas that an entire generation of science teachers must change their philosophy of teaching in order to adapt to the present changes taking place. Hence the role of in-service education becomes an important area for concern.

Programs for in-service education in science teaching are presently being held back through a lack of financial assistance to those most interested. Here again, were the Government of Canada to pursue a policy similar to that in the United States where financial support was provided to Universities and private groups planning projects for this purpose, significant improvements could be made in this area in Canada.

M. F. Wideen,
Assistant Professor,
Elementary Education,
University of Saskatchewan,
Regina Campus.

APPENDIX 16

BRIEF SUBMITTED TO

THE SENATE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

THE NORTH AMERICAN LILY SOCIETY, INC.

21719—9

The North American Lily Society (NALS), which is the only organization representing mostly amateur lily growers in Canada and the U.S.A., has noted with great interest your broad-minded invitation to the general public to submit ideas and suggestions in regard to a Canadian Science Policy. We, as directors of the NALS, would therefore like to explain our views in regard to future research on lilies.

We fully realize that technical research on lilies can be carried out only within the framework of general horticultural research, and that some of our suggestions have probably been put forward by other organizations as well. However, we are somewhat worried about the fact that the genuine concern of amateurs in the field of horticulture may be increasingly overlooked by government departments, and that their legitimate interests may be sacrificed in the name of so-called "rational" approaches. We wholeheartedly support the idea of planning research, of putting it on an accountable basis. But we also feel that there will be an inherent danger that non-commercial interests will be completely neglected, because the pleasure derived by "back-yard" gardners from better plants can hardly be measured in dollars and cents. We do hope your committee will consider these aesthetic and social factors together with other considerations, and will deem them sufficiently important to include them as one of the criteria by which future research should be judged.

As far as lilies are directly concerned, Canada has had a proud tradition, based on the work by the Canadian Department of Agriculture, at Ottawa, by the Ontario Department of Agriculture, at Vineland, by the University of Saskatchewan, at Saskatoon, and by private breeders at Dropmore, Man., Parkside, Sask., Cobble Hill, B.C., and Wawanesa, Man. As far as we have been able to ascertain, most of this work has dwindled to nothing, and some of the material derived from these programs has been lost.

Looking toward the future, we hope that some of the work on lilies will be revived, and we would like to state our views as to the changing roles of the Government, the Nursery Industry and the Amateur.

Much of the lily breeding is at present being done by nurserymen and by interested amateurs, and we do not think that there is any need for government work in this field. Past experience in Canada and the U.S.A. has shown that private industry and amateurs are quite capable of developing this field without assistance. Their closeness to the market demands, and their sensitivity to changing trends will assure a continuing development in the future. However, there are certain limitations which are set by the complexity of modern plant research, and we find that even very large private nurseries are not capable of coping with them without going to expenses that are not commercially justifiable. These limiting factors are of a basic nature - if research can be divided into "basic" and "applied". The long-range development of lilies as a dependable ornamental (both commercially and for the amateur) depends upon their solution, even if such solutions do not guarantee immediate increased returns to anyone nursery. Although we do not in any way want to "tell the government what to do", we would like to say that we consider it to be absolutely necessary that some scientific effort should be made in these fields, if any long-range progress in the development of lilies is to be expected. We have informally canvassed the advanced amateurs within our society, as well as several nurserymen, and there was practically unanimous agreement as to the fields in which more research is needed. In order to explain our opinion more clearly, we would like to go into some detail regarding these fields:

Disease Resistance

It is known from empirical work that lilies vary in their resistance to the major diseases, Botrytis, Fusarium and viruses. However, practically nothing is known about the inheritance of these resistance factors, nor about the physiological basis of this resistance. Breeding, therefore, is a continuing hit-or-miss game, as far as diseases are concerned. Even such basic factors as the determinants of epidemics have not been studied sufficiently, and - in the case of viruses especially - much remains to be done in detailed identification. Most of the work needed is of such a nature that it will require the efforts of specifically-trained scientists.

21719—9½

Cytogenetics

In the past, results from cytogenetic investigations have been extremely valuable in determining the exact parentage of hybrids and have in some cases led to a revision of the scientific hypothesis regarding relationships between species. At present, apparently no work is being carried out. As increasing numbers of unusual hybrids are being created by amateurs (such as L. tigrinum x L. regale), the need for a reliable cytogenetic analysis becomes more urgent. If international classification, registration or patenting of lilies is to be meaningful, some expertise in this field will be necessary.

Germination Physiology

One of the factors holding back progress in lily breeding is the lack of information about the chemical mechanisms inhibiting germination. In many cases, healthy seeds develop from unusual crosses, but germination is impossible. Some preliminary research on these factors was carried out by the U.S.D.A. years ago, but nothing has been added in recent times. From the few facts which are known, it is obvious that this type of research, apart from its direct application to lily breeding, would be of considerable interest in regard to basic mechanisms of seed physiology.

Compatability and Sterility

Although sterility factors have been known for a long time in lilies, further research has been slow or non-existent. In recent years, American workers have investigated several different sterility mechanisms and have explained some of them. Others remain to be investigated, among them those affecting the Canadian Patterson hybrids, and those preventing crosses between L. longiflorum (Easter Lily) and other groups of lilies.

Field Population Studies

While the above-mentioned problems have direct and potentially economic implications, field studies are of a more theoretical nature. However, it is obvious that time is running out and that the few remaining areas where lilies occur in the wild (L. canadense, L. michiganense, L. philadelphicum) will soon be taken over by the increasing demand for agricultural and urban land. Even where the species are not threatened directly (L. columbianum), habitat changes are taking place at a rapid rate, and studies of

natural occurence, distribution, and species development will soon be impossible.

Collecting and Testing

While the collecting and testing of lily hybrids may not be a scientific function, in the strict sense, we do think that a future Science Policy should leave some room - and allot some funds - for such an endeavour. Canadian cultivars have formed the basis for several internationally recognized new hybrid groups; yet several of the original Canadian cultivars have been lost already, not because they were inferior, but because the market situation favoured imported material over the cultivars developed in Canada. Other cultivars have become so infected with virus diseases that they are worthless in their present state, and will need heat treatment before they can be evaluated. Lily testing is being done on a fair scale by amateurs and nurserymen alike, especially in regard to local adaptability. However, testing by independent agencies for such factors as disease resistance would be most welcome.

Physiology of Growth

Physiological factors which underlie the growth rythm of lilies have received some attention in several countries, but - as far as we know - no work in this direction has been carried out in Canada. Nurserymen and amateurs have empirically explored methods for pot culture, forcing, shading, propagation, etc., but serious research into the basic mechanisms has been lacking. A better understanding of these factors would undoubtedly increase the efficiency of the work carried out by nurserymen and amateurs.

We have written this brief especially with the amateur in mind, since our organization represents mostly amateurs, and since we expect that the nursery industry will make its own representation. However, we would like to point out that research in the fields mentioned in this brief would be of considerable importance to the nursery industry and would thus be of commercial as well as aesthetic value.

We will be more than happy to supply further information on any point in which you may be interested. We also wish to assure you that the NALS and its members will be ready at any time to support lily research to the best of their ability, through both information and donation of material.

Mr. Fred H. Hayes,
Canadian Vice-President,
North American Lily
Society, Inc.,
1222 Bellevue Avenue,
Burlington, Ontario.

APPENDIX 17

BRIEF

to the

SPECIAL COMMITTEE ON SCIENCE POLICY

of the

SENATE OF CANADA

submitted as a private citizen

by

MR. TAM DEACHMAN

1346 West 26th Avenue

Vancouver 9, B.C.

Summary of Main Conclusions

1. It is possible to establish the mechanism for the administration of a science policy immediately, but the establishment of a science policy itself should be preceded by an investigation or "diagnosis" of national problems, followed by a listing of goals and priorities.

2. The most common way of dealing with national problems to date has been to cope with them by Royal Commission or special task force once symptoms became so aggravated that the public demanded action.

3. The wave of the future suggests that we shall learn, as business does, to probe our problems and anticipate our needs in advance.

4. We should devote an entire year to a massive national diagnosis of problems by special committees or task forces. This should be followed immediately by a listing of priorities, and recommendations for action. The benefits are not only the direct results, but also in the therapeutic advantages of airing pent-up frustrations.

5. These "national diagnostic years" should be held every 10 years, so that we can up-date projects and use past diagnoses as benchmarks of progress.

6. Canadian science has made tremendous strides without an overall science policy. Any policy now drawn up must not accidentally constrict the type of progress we are making today.

7. In the solving of national problems we should develop a working rule-of-thumb for cooperation among the three levels of government. It is suggested that, generally, the federal government should define problems; the provincial governments should delineate their extent (and prepare them for action), and municipalities should be charged

with doing something to implement and police recommended solutions.

8. Industrial R&D should be stimulated by finding ways to provide further assistance to horizontal rather than vertical industrial groups. Groups of two or more companies sponsoring joint R&D should receive maximum encouragement.

9. Your Committee should recommend the creation of a Ministry of Science Policy, with two equal Deputy Ministers - one responsible for Natural Sciences and one responsible for Social Sciences.

Introduction

1. This submission is made with great hesitation and humility. I am an advertising executive, making a submission strictly as a private citizen. I have, as you will see, no axe to grind. Nor have I any special training or background in any of the sciences. As far as your Committee is concerned, I am a complete outsider looking in. The possibility that this brief may be considered a presumptuous imposition on your time looms large before me.

2. To try to compensate for intruding with a layman's opinion, I shall be fairly brief. In doing so I may sound dogmatic and arbitrary. Please be assured that this is not my intention. I have already read most of the first 2,000 pages of the transcript of your proceedings, and I have accumulated a profound respect for your Committee and for the high calibre of the witnesses who have been heard to date.

PART I - WHAT SCIENCE POLICY?

National Goals

3. My primary concern is that you may be trying to establish a science policy without arriving first at a hard-nosed list of widely accepted national goals. Certainly you can set up a mechanism to

administer a science policy immediately, and perhaps you regard that as your main task. But I seriously question how far you should attempt to go in setting the actual policies for the various sciences to follow. I am not at all convinced that you should be asking scientists - especially in the natural sciences - to advise you on the best direction to go to bring maximum benefit to the people of Canada. If you must ask scientists for such opinions, I think you will get better answers from those in the social sciences. But I think the best answers must come from the people themselves, and I will get back to that in a moment.

4. I think the members of your Committee themselves recognize that many of the answers to the question of both science policy and national goals lie in the areas that concern the social scientists.

5. On Page 257, Phase I, of your Proceedings, Sen. Kinnear said:

> "I become really concerned about the small amount of resources allocated to research and development in sectors that Galbraith pointed to, the non-defence public sector of housing, education, pollution and so on. That is the area I am really interested in..."

You may recall that Sen. Kinnear also asked Dr. Uffen, Chairman of the Defence Research Board, whether the Board did research in conflict resolution. His reply was somewhat vague.

6. On Page 289 of Volume 4 of your Proceedings, Sen. Thompson showed he was thinking along similar lines when he said:

> "Because of the mixture of our population we have an opportunity to establish a unique social laboratory...that could be carefully studied as an experiment for the world."

7. On Page 260, Phase I of your Proceedings, Sen. Yuzyk touched on the far-reaching nature of your quest, when he said:

> "I look upon our basic problem as being that of how to make the best use of science in the broad field for the good of the nation and of humanity. Science is involved in every aspect of human life. Governments have to give direction - at least many of the top scientists have told us that governments have to decide on priorities, and have to decide on what should be supported by subsidy - what is going to be a government project, what is going to be in the private sector - and what is going to be in the field of the universities and educational institutions."

8. On Page 997, Volume 8, Sen. MacKenzie raised the point with Dr. Solandt, Chairman of the Science Council of Canada, with a moving definition of the national need:

> "I was not thinking so much about the practical results of science as much as whether anything can be done to assist human beings to adjust themselves to what science has done and is doing to them and their environment. You may say this is something, perhaps, a social scientist or humanist should tackle and try to answer, but I think it is a common problem, and, as I say, I would hope that your council would continue to look at it from that broad point of view."

9. Finally, your Committee will recall that Dr. Solandt himself questioned the idea of natural scientists acting as arbiters of national goals. He noted that the Science Council had tried to fill the vaccuum resulting from the non-existence of what he good-humouredly called "the Goals of the Nation Department", but he added, on Page 945 of Volume 8 of your Proceedings:

> "I think that we may be criticized - I am surprised we have not been yet - for stating national goals, because many people say that scientists are not the best qualified people to state national goals, and I would completely agree with that, but somebody has to start, and I would hope that this statement on national goals might provoke some discussion and some refinement and improvement in the idea of having extensively defined national goals, because I think they are fundamental to developing national policy in almost any field."

10. As you can see from the above quotations, there is a general sensitivity and awareness that goals and priorities must be established, and that someone, somewhere, must take the responsibility for proclaiming them so that action on attaining them can be undertaken for the benefit of the general public.

How Do We Arrive at Goals and Priorities?

11. Before we try to answer the question of who should set the goals and priorities, let's ask ourselves how we start.

12. It seems logical to me that the first requirement is an examination of the problems that face Canada and Canadians. I don't think it is hard to find out what they are. There are easily a hundred

specific areas we could list, from alcoholism to housing, from biculturalism to pollution. The Science Council classed the entire mix of national goals into six tidy groups:

1. National prosperity;
2. Physical and mental health and high life expectancy;
3. A high and rising standard of education, readily available to all;
4. Personal freedom, justice and security for all in a united Canada;
5. Increasing availability of leisure and enhancement of the opportunities for personal development; and
6. World peace, based on a fair distribution of the world's existing and potential wealth.

13. As you can see, each one of these goals represents the highest degree of idealism on the one hand, and a veritable Pandora's box full of problems on the other. To date we've kept those problems sort of swept under the rug, applying the broom only if they slipped out and became unsightly. Bilingualism and biculturalism became a problem, so we appointed a Royal Commission to learn how to cope with it. We have had another recent Royal Commission on the Rights of Women, because this was an area which was seriously neglected. The housing problem slipped out from under the rug recently, so another enquiry was conducted. Science has grown to become a benign monster, so you are looking at it. And I think we can predict that pollution will soon require the services of still another major task force.

14. The increase in studies such as this are a good sign. But we are still far from the ideal, which is an overall diagnosis of our national problems to see (a) how big they are; (b) how urgent they are; (c) how solvable they are; and (d) what, specifically can be done about them.

15. There are two directions we can go: We can continue to wait until the infections within our social system come to a head, and deal with each with a Royal Commission poultice, or we can take the time to

make a general examination and diagnosis.

16. Obviously the latter is the approach we must eventually take. We do it for sick individuals. We do it for sick family units. We do it for sick corporations. We do it even for sick political parties! But the corporation is probably the best analogy, because a corporation seems to be able to recognize, quicker than a nation, when action must be taken if it is to survive. Corporations today produce marketing plans extending as much as five and even ten years into the future. They know precisely where they want to go in terms of every segment of their market. They set goals which are constantly being revised, updated and supplemented as time goes by. They predict the trouble spots in their development and work constantly to alleviate or eliminate them. The finest counsel in the world is retained to make sure they stay healthy. And if symptoms of trouble crop up, they are quickly attacked.

How do we make a National Diagnosis?

17. Suppose we set aside an entire year - 1970, for example - which would be devoted to a giant national self-examination by perhaps a dozen special committees, task forces or Royal Commissions...each taking on a small group of related problems.

18. They would figuratively put Canada on the psychiatric couch and through the clinic. Each would set a careful list of guidelines for submissions, somewhat like those your Committee uses, to try to bring forward evidence in an orderly fashion with built-in summaries for easy assimilation by all concerned. At the end of the hearings, each task force or committee would make recommendations on matters it has examined, and finally, possibly in the second year, a special committee composed of key members of each individual task force or Committee would work together in camera, to hammer out a long range set of national goals together with recommended priorities. It then becomes a matter for government action.

19. I see this not merely as a one-shot effort. I believe it should be built into our system like the decennial census, and, in fact, 10 years might be an ideal interval. The first one would be the hardest. After that we could use the preceding investigations as bench-marks to measure our progress toward the attainment of our ultimate national goals.

20. I must emphasize that there are peripheral advantages to be gained by the very act of conducting these "national diagnostic years". First, it is good for all of us to be exposed to these problems, to think about them, and become involved. This is participatory democracy at its best. Second, there are a tremendous number of frustrations, bordering on group neuroses, which are associated with all of these problem areas. Most arise in people who have a common bond because they are members of a minority, or are unfair victims of the economy, the educational system, their age, social status, or disease. Some are well enough organized to cry out in a loud voice, and achieve some measure of public assistance. But there are many others who need to be heard.

21. If we can spend a year listening, we will bring a lot of problems out into the open which are presently almost smothered. And the committees or task forces which hear these submissions will inevitably become instruments of catharsis by allowing some of these deep feelings of insecurity and anxiety to come to the surface under the glaring light of national publicity.

22. I can hear some of you saying to yourselves, "Boy! He <u>really</u> wants to open a can of worms, doesn't he?" To which I reply, yes; I think it could be the best thing that ever happened to Canada. Lie awake tonight and think about it, quietly. Surely there is no other direction to go. Surely the nations of the world cannot continue to operate forever by battening down the crises as they arise. We must learn to plan ahead. We can't plan until we <u>define</u> the <u>extent</u> of the problems we face. Your Committee has been told over and over again that science planning must be a long-term thing. I respectfully suggest that

the task that must precede a science policy is far too enormous to be tackled by your Committee, and I would urge you to report to the Government that the first requirement is for a national diagnosis of the state of the nation, followed immediately by a recommendation on priorities which can ultimately give direction to large segments of the scientific community.

PART II - ONE MAN'S OPINIONS

23. Part I dealt with my basic reason for this submission. Part II consists of a few short miscellaneous observations. They are "my 2-cents' worth".

The State of Science in Canada Today

24. As noted earlier, I have read most of the first 2,000 pages of your proceedings. I think Canada's science community, and the individuals that comprise it, and the succession of governments universities and industries that have supported them over the years, deserve three rousing cheers from the entire country! The work of the National Research Council, the Science Council, Atomic Energy of Canada, Canadian Patents and Development Limited, the Atomic Energy Control Board and various departmental scientific establishments has been positively astonishing.

25. We have done a few things wrong, but we have done an incredible number of things right, more or less by flying by the seat of our pants. Remember this when you come to lay down a mechanism for a science policy. Give it direction, yes. But for goodness' sake don't stifle it with a heavy over-layer of bureaucracy.

Inter-government responsibility

26. Eventually there will have to be a working rule-of-thumb developed for cooperation between the federal, provincial and municipal governments in coping with some of our national problems.

27. Take pollution as an example. We have talked and talked and talked about pollution, yet specific action has been miniscule in relation to the extent of the problems of pollution control.

28. I believe what must happen is this: The Federal government must define what constitutes pollution under various circumstances. It must set standards for maximum allowable pollution of air and water for various substances. It must say, "X grams of this substance per cubic mile of air (or water) constitutes the maximum pollution permissible for human health."

29. Next, the provincial governments must divide their areas into pollution control districts. Then they must delineate the extent of pollution they will accept in each district. The maximum set by the federal government will not always be the maximum allowable in a district. It may be lower, although never higher. For example, we will learn to expect that more water pollution might be tolerated in Lake Erie than in Lake Louise. And more air pollution might be permitted, at least for a while, in heavily industrialized city areas than in prairie towns. But I repeat, at no time must the federally established maximum be exceeded.

30. The provincial governments must then set up a calendar for the elimination or control of pollution hazards, and the municipalities, in urban areas at least, must take on the job of doing something about it all. (In suburban and rural areas the provinces will end up with this additional policing job).

31. The money will have to come as a result of consultation among the three levels of government. In some severely polluted areas the federal authority might have to contribute heavily. In other instances a simple edict from a municipal authority might end the problem.

32. I cite this merely as an example of the general direction problem-solving will someday take: Federal defines; provinces delineate; municipalities do. (You will notice that in Part I of this brief I suggest that the first step necessary in the proclama- of a science policy is to get the federal government to define the requirement).

Encouragement of Industrial Research and Development

33. One of the major problems your Committee will deal with is suggesting ways to encourage industrial research and development. I have only one small suggestion to make, and that is that consideration be given to adding further incentives to R&D undertaken on a joint basis by industry trade groups, associations or smaller groups of companies engaged in similar endeavours.

34. We know that the pulp and paper people, for example, do a tremendous amount of jointly supported R&D, and that competition is mainly confined to internal efficiency and the marketing area. I would like to see us do everything possible to encourage groups of two or more companies to get together to share R&D efforts.

35. This has the immediate advantage of largely eliminating the worry that public funds are being used to pay for individual product refinements rather than basic R&D. But it might also give incentive to a lot of small industries to engage in research with others in their own league.

36. In an ideal society I would like to see every industry with its central R&D laboratory, supported by industry members in proportion to their assets, from which knowledge would come which would be automatically available to all members. These might often develop into multi-million facilities which would, in effect, become departments of the humblest entrepreneurs, from which they could draw help on some very nominal fee basis.

37. Government support of that kind of research and development would eventually aid a far greater number of companies than are now being aided. It seems incredible to me that, in a period of 6 years and 5 months, the National Research Council was only able to give assistance grants to 132 companies or associations. (Table 1, Appendix F, Attachment 3/2, NRC Brief, Page 169 of Volume 3 of your Committee's Proceedings). There are, after all, over 13,000 manufacturing establishments in Canada employing 15 or more people. Surely you can find a way to reach more than one percent!

38. As an advertising man I can't help wondering whether the general lack of interest shown by industry in government-sponsored R&D assistance programs might, in part, be due to poor communication. I see a fair number of business publications in a year, and I am not conscious of any consistent program by NRC or others to tell industry of the availability of these programs. I'm sure something is being done, but perhaps it is not enough. A little bit of market research might give you some surprising answers. Your Committee might find it extremely revealing to get any good advertising agency to evaluate NRC's current communications' program, and tell you whether it is adequate, and if not, why not. Insist that such a study come from outside. I do not think NRC or any government body is capable of evaluating such a thing without professional assistance.

The Mechanism for the Administration of Science Policy

39. I believe your Committee is well aware of the fact that the role of the social sciences in a national science policy has received too little attention in your hearings up to March 1, 1969. It is to be hoped that they will be heard from in subsequent sessions. It seems apparent, however, that the social sciences are not organized as thoroughly as are the natural sciences. I respectfully suggest that it should become one of the duties of your Committee to put forward a strong recommendation for changing this situation.

40. On Page 981 of Volume 8 of your Proceedings, Dr. Solandt commented on this matter and gave three alternative solutions:

1. Add a few social scientists to the Science Council so that the Council's recommendations, while not covering the social sciences, were at least intelligent from the social science point of view;

2. Dissolve the Science Council and form a new science policy council that contains a proper balance of natural and social scientists;

3. Form a parallel council for the social sciences, and possibly put on top of the two of them an executive committee... that had representatives of both of them, and that might be chaired one year by the chairman of one, and the other year by the chairman of the other.

I would plump for No. 3 or an approximation of it.

41. There is no question in my mind but what you need a Minister of Science Policy. I would like to see the natural and social sciences separated and kept co-operatively competitive. I think that under the Minister there should be a Deputy Minister of Natural Sciences and a Deputy Minister of Social Sciences. As far as I can see, this is the only mechanism that will guarantee that each has an equal share of the Minister's attention, and therefore a fair hearing in Cabinet. I think your science policy is in trouble unless we see to it that there is such a guarantee.

-oOo-

Vancouver, B.C.
February 27, 1969.

Biographical note - Tam Deachman

Thomas Wilson ("Tam") Deachman was born in Calgary, Alberta, on May 23, 1918, and educated in Ottawa and Lennoxville, P.Q. He has spent 30 years of his business life in advertising or public relations...20 of them with Montreal or Toronto advertising agencies, usually as copy chief or creative director. Prior to moving from Montreal to Vancouver in 1965, he was for several years responsible for the Canadian information services of Foster Parents' Plan. In 1965 he also founded - and still directs - the Help-a-Stranger Idea, an organization devoted to the promotion of Christmas-time charity. Mr. Deachman is married, has 5 children, and is currently p.r.o. and director of consumer copy services for Gordon Rowntree & Co. Ltd., a Vancouver advertising agency.

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APPENDIX 18

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

RAPESEED ASSOCIATION OF CANADA

SUMMARY

This brief, submitted by the Rapeseed Association of Canada, is intended to underscore the importance of rapeseed in the diversification of Canadian agriculture; the development of a new industry in the Prairie Provinces resulting from increased production of rapeseed; and the need for the Federal Government to promote the viability of the industry by the funding of well-planned research efforts.

In a highly competitive market where edible oils are interchangeable in the food processing industry, it is essential that there be continuous research programs in the areas of plant breeding, oilseed crushing technology, and production of the highest possible quality of oil and protein meal. These are the tools with which markets can be expanded, and the Canadian farmer stands today in great need of market expansion for products of the farm.

Considerable research work is being done but it is not enough. Too often, Canada is in danger of losing highly competent and skilled scientists in the field of agriculture to other countries because funds are not available to keep them working at home. Frequently, too, the results of experiments and research work are delayed because of inadequate staff. These are matters of vital importance to Canada and Canadian agriculture. They demand the application of sufficient funds to maximise the research potential in the shortest possible time.

RAPESEED ASSOCIATION OF CANADA

1. The Rapeseed Association of Canada is a NATIONAL non-profit organization representing all sectors of the industry from the producer of rapeseed to the end user of the products. Farmers constitute a substantial proportion of the total membership of the Association and are well represented on the Board of Directors.

RAPESEED INDUSTRY

2. There are many facets of the rapeseed industry in Canada but the major elements might be listed as follows:

1. Rapeseed growers
2. Oilseed crushers
3. Edible Oil refiners
4. Feed manufacturers
5. Exporters
6. Handling and Transport

3. Despite the diversity and, in some instances, conflict of interests, it has been possible through the Rapeseed Association of Canada to develop common programs that have produced beneficial results for the industry as a whole.

4. This has been particularly the case in research programs in which crushers and processors have co-operated fully by making available to research teams in Universities and National laboratories full details of their crushing techniques and the products produced in their plants.

FATS AND OILS INDUSTRY IN CANADA

5. Oilseed crops produced in Canada and the new industries they have created are now very significant elements in the economic life of Canada. Rapeseed is only one of several oilseed crops grown in Canada, although in recent years it has become the largest. Like soybeans and sunflowerseed, the oil derived from rapeseed is an edible oil. All are interchangeable in the manufacture of such food items as margarine, shortening and salad oils and all must face the competition of other edible oils imported from abroad.

6. Up to the present time, rapeseed has been developed as a spring crop only in the prairie regions of Western Canada, but plant breeders and other researchers are seeking a variety of winter rapeseed that would be adaptable to areas in Ontario and possibly Quebec. Such a development would strengthen the crushing industry in Eastern Canada, which has experienced in recent years a sharp decline in the processing of flaxseed due to a declining demand for linseed oil in Canada.

MARKET FOR RAPESEED PRODUCTS

7. A bushel of rapeseed weighs 50 pounds and from this is derived about 20 pounds of edible oil and 30 pounds of protein meal. The oil content of the seed is about 42% and meal usually averages 36% in protein content.

8. During the calendar year 1968 the following domestic production of deodorized oils was reported by the Dominion Bureau of Statistics:

From Rapeseed	Pounds
Margarine oils	32,803,000
Shortening oil	46,023,000
Salad oil	37,867,000
Total	116,692,000

The above total represented about 28 per cent of all vegetable oils used in the production of these three food products in Canada.

Rapeseed Meal:

9. The protein meal, residual after the oil has been extracted from the seed, is used in Canada as an animal protein feed. It is consumed in varying amounts by livestock and poultry. Its use is steadily increasing as research work develops improved processing techniques and plant breeders endeavour to develop varities of rapeseed with improved characteristics in both the oil and the meal.

EXTERNAL TRADE

10. The external trade in rapeseed, rapeseed oil and rapeseed meal is largely confined to exports of the seed. Some rapeseed oil has been exported to Australia and Hong Kong and other markets are capable of development.

There has been no important export of rapeseed meal from Canada.

11. Asia has provided the largest outlets for Canadian rapeseed with Japan the leading buyer and Taiwan (Formosa), Italy and Morocco sizeable customers. Total exports have almost tripled since 1963-64.

12. Efforts to persuade feed manufacturers in Japan to include rapeseed meal in their feed formulations have resulted in research programs being initiated in Japan. There is promise that these efforts will prove successful, in which case demand for Canadian rapeseed in the Japanese market would increase. The Rapeseed Association of Canada sent a Mission to Japan in the summer of 1968 and this was followed by a visit of two scientists from Western Canada in March 1969, for an exchange of views with their counterparts in Japan and an evaluation of the research work being done in Japan, relative to the animal feed aspects of rapeseed meal.

IMPORTANCE OF OILSEED CROPS

13. Production of oilseed crops in Canada has not only led to the development of new industries but has brought to Western agriculture much needed diversification. The problems of surplus wheat production are being partly met by a switch to oilseed crops and particularly rapeseed. These crops are not only taking up some of the acreage being removed from wheat but they are providing a cash crop for the farmer.

14. The oilseed crushing industry in Western Canada is a comparatively new one but there is every prospect that this infant industry will expand as markets grow at home and abroad for the seed, the oil and the protein meal. Tremendous strides have been made in the improvement of processing techniques through research work undertaken by the Canada Department of Agriculture, The National Research Council of Canada, and various universities in all parts of Canada. This research work must continue if Canada is to maximise the potential of new crops and the new industry.

TECHNICAL COMPETENCE

15. It can be said that the technical competence and scientific leadership in all aspects of the rapeseed industry are rendering Canadian

rapeseed competitive domestically and in world markets. The Rapeseed Association of Canada is doing everything within its limited financial means to encourage and foster this leadership with a view to capturing an increasing share of the market not only within Canada but overseas.

AREAS OF RESEARCH

16. There are several important areas of research but the principal ones are the following:

1. Plant breeding and agronomy
2. Oilseed crushing technology
3. Rapeseed meal utilization in animal feeding
4. Oil utilization in edible and industrial products

17. In all of these areas work is proceeding. It is essential that this work be maintained and strengthened. The Canada Department of Agriculture and the National Research Council of Canada are playing a very important role in basic and applied research while the Department of Industry, Trade and Commerce, through the Rapeseed Utilization Assistance Program, developed by the Department of Industry is contributing greatly to the efforts to improve further the quality of Canadian rapeseed, rapeseed oil and rapeseed meal and thus enhance its competitive position in all markets. In this work, there is close collaboration with the Rapeseed Association of Canada and with the major universities across Canada.

18. Our total research effort in oilseed crops, however, falls far short of the efforts in competing countries and particularly the United States where research funds channelled into the soybean industry have produced enormous dividends in terms of higher quality soybeans, better yields and a tremendous expansion of markets at home and overseas.

19. Addressing the International Association of Seed Crushers at their Congress held in Washington, D.C., in September 1968, Mr. R.W. Judd, Managing Director, National Soybean Crop Improvement Council, spoke of the difficulties encountered initially in arousing concern about soybean research but added that Congress had eventually responded by financially

supporting much more research, with results already well known.

20. It was stated by Mr. Judd that Federal and State scientist man-years in soybean production research had risen from 38 in 1961 to 89 in 1966 and may reach 200 by 1972. The goal is 256 by 1977. This goal was established by a National committee composed of representatives from federal, state and private research organizations.

21. What the United States has done for soybeans is feasible for rapeseed in Canada. Our efforts should be bent in this direction. Funds for all aspects of research, including production, quality control and marketing, are needed and must be forthcoming if some of the problems of agriculture are to be solved.

APPENDIX 19

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

DR. R. A. CLEGHORN, M. D.

MONTREAL, QUEBEC

ON PSYCHIATRIC RESEARCH IN CANADA

by

R.A. Cleghorn, M.D., D.Sc., F.R.C.P.(C).

Professor and Chairman, Dept. of Psychiatry,
McGill University, Montreal.

Director, Allan Memorial Institute, Montreal.

Psychiatrist-in-Chief,
Royal Victoria Hospital, Montreal.

Psychiatric research in Canada was incidental and fragmentary before World War II. Since that time, Canadian Departments of Psychiatry associated with the universities have developed rapidly, in part associated with the emergence of Psychiatry from mental hospitals and the establishment of units in general hospitals. Teaching at the undergraduate level began to be organized in a modern fashion subsequent to World War II and post-graduate training courses were established. Research, which had pushed medicine into a new era, in the earlier decades of the century had affected Psychiatry very little. The emergence of the shock therapies in the thirties gave new hope and fresh therapeutic weapons, but little organized research was done until the establishment of the university departments in the forties and fifties. One of the early difficulties was the inadequate supply of trained investigators in the field. In order to correct this short-coming, two of the older centers brought in experienced research workers from basic disciplines to establish laboratory investigation with the anticipation of cultivating a climate of opinion in which clinical research could grow. A few clinicians, by virtue of their own inclinations and hard work, made themselves familiar with the methodology of research and undertook praiseworthy programs. In the past fifteen years, the pace of research in Psychiatry has accelerated, but it is quite obvious to those doing the survey of psychiatric research in Canada that the best work in the broad field of Psychiatry was being undertaken by those familiar with the most precise techniques of the mature disciplines of biochemistry and physiology. Most of these individuals did not have

an M.D. degree. Few psychiatrists have had the time, inclination or financial support sufficient to familiarize themselves with these specialized disciplines, many of which have only a very peripheral bearing on the major problems of Psychiatry.

The most urgent need in psychiatric research is the stimulus and opportunity for well trained clinicians to undertake clinical problems with a scientific scrutiny, applying critical techniques to the solutions of the problems involved. Many of these areas still are those of the so-called 'soft data', where methodology has to be worked out in order to tackle the problems in a critical, scientific manner. The lag in the development of research in Psychiatry is inherent in the discipline itself, rather than in the lack of the people involved. Psychiatry borders on a large number of the behavioural sciences, such as psychology, sociology and anthropology, and draws from them points of view and methods of approach which are of great importance, but in many respects lack the precision available in the basic sciences of bio-chemistry and physiology.

The training of clinical research workers in Psychiatry is still a very vexed problem. Nowhere has anyone come up with a system which will, without fail, produce a productive research scientist in this clinical field. A few young men have taken time off from either their clinical duties or after their clinical training has been completed to take specialized training in neuro-physiology or in bio-chemistry or even in psychology and then returned with these skills to the study of a specialized problem in, as a rule, limited areas of Psychiatry. The number who have done this is relatively small and for reasons which are fairly obvious. They will, by the time they have finished their clinical training, have reached the age of about thirty and frequently have families to support. Well paid opportunities are available in clinical Psychiatry itself and for these young men to turn their back on the good emolument and the personal satisfaction of dealing with appreciative patients in order to undergo the years of deprivation and small salary while they are getting further training, is more than they can face. Here is one area which might be tackled more vigourously, namely the provision of more adequate scholarships or bursaries for young trained psychiatrists to continue and take research training. As it is now, the medical research fellowships are rarely adequate to support young psychiatrists for the time necessary to gain the kind of experience to transform them into investigators. Another factor of major importance which should be clearly recognized is that the character structure of a young man doing research in Psychiatry is almost, of necessity, odd or exceptional. He must have a devotion to the solution of scientific problems in this field, denying at the same time the usual affiliation to any one of the several dogmas which plague Psychiatry. If it is necessary to emphasize an optimistic note at this point, it should be stated quite clearly that there are more young psychiatrists demonstrating an interest in research now than formerly and they are allying

themselves with inter-disciplinary workers from other fields, such as bio-chemists, sociologists and psychologists, and as they work acquire some of the expertise which is necessary to qualify them as independent investigators.

No attempt will be made to itemize the current status of psychiatric research in detail, as this has been done in the Medical Research Council report. It might be well to point out, however, that there is an inadequate amount of work being done in the field of alcohol and addiction, while that in bio-chemistry and psycho-pharmacology seems to be proceeding satisfactorily. One might add to this psycho-physiology. In the field of psychology, in which Canada has been rather prominent because of some of its leading investigators, there is insufficient pay and many such young investigators have been attracted to the United States by better remuneration. Money is also badly needed in the area of forensic Psychiatry, because this field has not yet, except I think at the University of Toronto, been properly incorporated into the university structure. It needs little emphasis on our present social problems to indicate the tremendous importance of this area.

In conclusion, one should say that psychiatric research in Canada needs financial support from both provincial and federal government sources. Most universities are not sufficiently well financed as far as research is concerned to give the support in this area which is needed. Support is more easily forthcoming for the established research areas in the basic sciences and in medicine, where the discreteness of the problems can easily be demonstrated. It should be pointed out, however, that the problems being attacked by Psychiatry are of much more immediate relevance to the health and social organization of Canadian citizens than are those of the basic sciences and even of medicine. It has to be recognized and taken into account that at the present time many of the methods which Psychiatry uses in its study have not got the degree of satisfactory clarity as have the others mentioned. We have to be prepared to spend money without an immediate return to support even some rather speculative studies, in order to a) train and b) examine the problems which face us in the social science and behavioural disciplines today.

APPENDIX 20

SUBMISSION TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

CANADIAN SOCIETY OF PLANT PHYSIOLOGISTS

Preface

This brief, with the accompanying appendix, outlines previous surveys on research in plant physiology in Canada and summarizes the main conclusions which have been reached. We feel that the Canadian Society of Plant Physiologists effectively fosters exchange of information in this branch of science but that there is also need for a more comprehensive society (e.g. a Canadian Academy of Sciences) to represent the views of all scientists in Canada on matters of common interest. A general government policy on science is needed but detailed planning of science is best left to the scientists who are going to do the work.

1. This brief has been prepared by the President of the Society, in consultation with the other officers. The officers for 1968-69 are as follows:

President:

A. C. NEISH, Atlantic Regional Laboratory, National Research Council of Canada, Halifax, N. S.

Past-President:

F. R. FORSYTH, Canada Department of Agriculture, Research Station, Kentville, N. S.

Vice-President:

B. G. CUMMING, Department of Botany, University of Western Ontario, London, Ont.

Secretary-Treasurer:

K. JOY, Department of Biology, Carleton University, Ottawa, Ont.

Eastern Director:

F. WIGHTMAN, Department of Biology, Carleton University, Ottawa, Ont.

Western Director:

E. A. COSSINS, Department of Botany, University of Alberta, Edmonton, Alta.

2. The Canadian Society of Plant Physiologists is a member of the Biological Council of Canada.

3. The object of the Society is to encourage research and education in the field of plant physiology and its application. The membership consists of persons having a scientific interest in plant physiology. The Society was founded in 1958 with 66 members. This number grew to 351 by 1967, but has shown little change since then. The membership is drawn from universities and government laboratories in about equal proportions.

4. Plant physiologists study the physical and chemical changes which occur in plants during their growth and development. We believe that along with other areas of plant science (e.g. plant breeding, plant pathology) research in plant physiology is of great importance to the Canadian economy. The cultivation of plants is the basis of human civilization. Most other aspects of our culture have developed after the cultivation of improved varieties of plants made stable community life possible. Plant science is particularly important in Canada because much of our economy is based on forests and on agricultural plants. Commercial development of aquatic plants in Canada presents an interesting challenge since so much of our area is under water due to numerous lakes, an extensive coastline and a relatively large share of the continental shelf.

5. Research in plant physiology in Canada is heavily dependent on the Federal Government for financial support. This research is about equally divided between government institutes and universities. In universities, research will be controlled to some extent by the direct grants from government agencies to research workers. However, two other factors have some control over output of scientific information, namely: 1) the time available for research after completing teaching and administrative duties; and 2) support for graduate students and postdoctorate associates, both of which factors will be controlled to some extent by the finance available to the university as a whole. The government should be aware that any decrease in support at university (and thus provincial) level may become reflected in a decrease in research output, even if direct government support for the individual scientist continues.

6. A major function of the Canadian Society of Plant Physiologists (La Société Canadienne de Physiologie Végétale) is the holding of annual meetings for the exchange of information. This exchange occurs by formal presentation of papers and less formally at social functions and impromptu gatherings. We do not finance research, nor have we operated as a pressure group. Our interests are purely scientific. We are financed by dues collected from the members and by registration fees at meetings. Grants have been obtained from the National Research Council of Canada to pay the travel expenses of invited speakers, who are usually distinguished plant physiologists from other countries. Members of our Society have also been instrumental in organizing international symposia in Canada, e.g. the Seventh International Conference on Plant Growth Substances, held at Carleton University in July, 1967. It can be said that we

have some impact at the international level, as well as playing a part in fostering indigenous science. A medal has been instituted by our Society for recognition of distinguished service to plant physiology in Canada.

7. Members of the Canadian Society of Plant Physiologists have been involved in recent surveys of the state of plant physiology in Canada, which have led to some recommendations for furtherance of this important field of research. These surveys are summarized in Appendix I.

8. We have reached the following conclusions concerning Canada's science policy.

8.1. There is no need for the government to set up any organization or controls to prevent duplication of effort with respect to research in plant physiology in Canada. The exchange of information which occurs between our members is adequate for this purpose.

8.2. Experiments can be planned most effectively by "working-level" scientists who are building their reputations on the results. These people are very sensitive to the opinions of other scientists and this provides a powerful stimulus for thorough planning. No outside agency or higher authority, however competent, can carry out detailed planning of research effectively.

8.3. There is need for a publicly-stated government science policy which will indicate how much money is likely to be available for research for the next five years and which general areas are likely to receive the most support. This will permit the laws of supply and demand to function, which will result in the proper numbers of plant physiologists being trained.

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8.4. The actual allotment of funds should be handled by granting mechanisms such as those now in existence. There may be room for some improvement in techniques but we feel the present system is basically sound. (See Appendix I for more detailed recommendations).

8.5. Consideration should be given to establishing in Canada a body such as a "National Academy of Sciences" that is not tied to any particular pressure group, which draws on all scientific areas of the community to reflect the needs, aspirations and opinions of scientists and communicates them within the scientific body and to the government and community at large. We feel the Royal Society of Canada is too restricted in its membership to perform this function, and that other scientific societies are too specialized. We hope that the Senate Special Committee on Science Policy would examine the feasibility of creating a Canadian Academy of Sciences.

APPENDIX 21

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

F. H. NORTHOVER, CARLETON UNIVERSITY, OTTAWA

I understand that your Committee is inviting submission of briefs by concerned scholars, for consideration during the third phase of its hearings. I have decided to respond to this invitation, and, if after you have read my brief, you wish to see me personally, I should be very happy to appear before the Committee.

As a mathematician, I shall confine my submission to mathematical, and applied mathematical research. In my opinion, the best way in which this can be promoted and encouraged is for the Government to continue to give its support to the Summer Research Institutes of the Canadian Mathematical Congress. During my period of office as Director last year I heard that the Government Departments responsible for approving such expenditures were taking a hard look at the same in order to determine whether or not they were worthwhile. Never having had any doubts on this point muself, I become somewhat concerned, and therefore put a few paragraphs about this into my Director's Report, which is incorporated into the general report of the Institutes' work for last year. I hope you have had a copy, but, in case you haven't, I will recapitulate part of my argument here.

Research in mathematics springs mainly from communication and interchange of ideas between the mathematicians themselves. In a vast country like Canada the institutions of learning are, on the whole, separated by enormous distances and this obviously constitutes a severe handicap to the free working of the process I have just mentioned. This is the main reason why the Summer Research Institutes were started - to off-set it. It is my experience that they are very effective in stimulating Canadian mathematical research activity, and during my period as Director of the Institute, I naturally did everything I could think of to encourage the above process of free interchange of ideas - by seeing that the mathematicians got to know one another.

The expenditures incurred in encouraging mathematical research are very moderate in comparison with other scientific disciplines. In the latter, not only are very large sums needed to purchase highly sophisticated equipment but provision has, in addition, to be made for maintaining such equipment - which includes also technicians and laboratory assistants' salaries!

Since none of this arises in any support of mathematical research, such support is likely to prove a good bargain - and, in my view, the most efficient way to do this, is to support the Canadian Mathematical Congress - particularly through its Summer Research Institutes.

I take it that it would be a reasonable assumption to suppose that your Committee does not want to see research and development in mathematics and applied mathematics lag behind that of other countries. Canadian mathematicians are, on the whole, doing their best to see that this does not happen, and would much appreciate any sensible, well-directed support - along the lines I have suggested - to further this aim.

F. H. Northover,
Professor of Mathematics,
Director, Summer Research Institute
of the Canadian Mathematical
Congress,
Member, Canadian Commission II,
U.R.S.I.
Member, I.R.E.
Consultant to Defence Research
Board of Canada,
Consultant to GM/AC Electronics Inc.

P. S. The Institute periods are fixed in the summer because this is when the Professors have the most time available to concentrate upon serious research, owing to teaching and administrative commitments.

APPENDIX 22

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

THE COMMITTEE OF CHALK RIVER NUCLEAR LABORATORIES

PROFESSIONAL EMPLOYEES

CANADIAN RESEARCH & DEVELOPMENT

"PRINCIPLES AND RECOMMENDATIONS"

This brief was prepared by a committee of AECL Professional Staff at CRNL (Appendix II). The committee is a cross-section of CRNL professionals who comprise a significant proportion of Canadian scientists and engineers engaged in R & D.

Many of the authors belong to other national or provincial organizations such as the Engineering Institute of Canada, The Association of Professional Engineers of Ontario, The Canadian Association of Physicists, the Life Sciences Societies, etc.

1. INTRODUCTION

We at CRNL, being personally involved in the Canadian R & D effort, are concerned about Canadian science policy. We have noted with interest Federal Government endeavours to establish national objectives and policies. Our decision to prepare a brief was triggered by a management suggestion that we participate if we considered our thoughts and opinions might be of value to the Senate Committee. The Brief has not been subjected to review or discussion with management.

Our object in preparing this brief was twofold: to stimulate discussion of the subject among CRNL staff, and to contribute to the national policy deliberations. The brief avoids statistics, tables, and graphs which attempt to compare R & D between Canada and other countries. No doubt the Senate Committee has been subjected to a great deal of this type of data, and is quite familiar with it. We concluded that direct comparison between Canada and other countries is not entirely valid (and would even be misleading) due to large differences in economic, political and other environmental conditions. Consequently, the considerations and recommendations are based mainly on reasoning related to specific Canadian conditions.

Numbers in brackets in the text refer to notes in Appendix I which give some of the sources used, and amplify some statements.

2. SUMMARY

In attacking this complex problem we define R & D and its purposes, identify factors influencing Canadian R & D effort, and suggest some principles for planning.

We conclude that Canada is deficient in R & D mainly because there has been little demand for or exploitation of its results. In the interest of national development, change is urgently needed. Government policies to promote this change are recommended.

3. R & D - DEFINITIONS & PURPOSES

Research and development embody activities differing vastly in purpose and character. For our present purpose the process is divided into:

- Exploration (basic research)
- Development (applied research)
- Exploitation (innovation)

as illustrated by Figure 1 and defined below [1].

3.1 Exploration

The purpose of Exploration is to understand the composition and behaviour of our environment. The product is knowledge leading to the ability to predict future response.

Support for Exploration as a worthy cultural activity demands a difficult value judgment since future benefits are not readily predictable, and the audience is small.

However, Exploration is necessary in Canada for additional purposes. These are:

(a) To develop and retain competent scientists.

Apart from expansion of knowledge they provide:

- the interpretation of fundamental discoveries elsewhere with a possible prediction of their potential and impact on the Canadian scene.
- the stimulation and inspiration for creation of new technology.

(b) To provide a store of knowledge available for exchange or barter on the national and international levels.

(c) To provide a foundation and support for Development and Exploitation.

3.2 Development

Development transforms knowledge and predictions derived from exploration into reality. In Canada or elsewhere, Development has one purpose: it is the necessary prelude to Exploitation.

3.3 Exploitation

Exploitation is the application within economic constraints of Exploration and Development to yield social or economic benefits.

It follows that the practical purpose of R & D is to generate social or economic benefits which result directly from Exploitation. Exploration and Development are the initial and intermediate steps toward Exploitation.

Therefore, in the absence of the will and means to exploit, it is difficult to justify Exploration or Development on an economic basis. This, we believe, is the key point in the Canadian R & D debate.

4. SIGNIFICANCE OF EXPLOITATION

4.1 We have concluded that the economic basis for Exploration and Development must be Exploitation. If Exploitation is weak the market for Exploration and Development will be small. They will continue to be done for educational and prestige reasons, but it will be politically difficult to justify large government expenditures if limited use is made of the results. Value, to the public, is usually associated with material, social or cultural benefits that affect people directly.

4.2 This is not an argument for diverting funds from Exploration and Development into Exploitation. In the absence of adequate Exploration and Development there would be few new products to exploit, and it is questionable whether we are doing enough now. Exploitation, however, is woefully inadequate[2].

4.3 It should be easier to justify expenditure on Exploitation than on Exploration and Development. Figure 1 illustrates that Exploitation is by far the most expensive part of the R & D process, and consequently provides more jobs. In addition, the results - good or bad - become apparent in a shorter time.

4.4 If the projects selected for support are wisely chosen a reasonable proportion will be successful. Visible results at the Exploitation end will lead to demand for employment of the less visible earlier operations. A strong and flexible capacity for Exploration and Development must be maintained to accept this challenge.

5. SIZE OF CANADIAN R & D

5.1 The Senate Committee is familiar with the argument that Canada devotes a smaller proportion of her Gross National Product to R & D than most developed countries. Available statistics show that in Canada there are seven "qualified engineers" per 10,000 population. In the USA there are 25[3]. It is debatable whether the situation in

the USA is optimal but they have been successful.

5.2 In Canada there are few large national projects, civil or defense, requiring a concentrated R & D effort. Realization of such projects stimulates the creation of new technology and products.

5.3 As one of the important commercial nations in the western world we might expect to see a large number of Canadian patents and many Canadian products on the international market. The Watkins Report points out that about 95% of patents granted in Canada in 1957-61 were issued to foreign applicants. The corresponding figures for the U.K., France and West Germany were 47%, 59% and 32%.

6. OBSTACLES TO CANADIAN R & D

6.1 General

From the beginning the Canadian economy has been based on natural resources - furs, lumber, then wheat, minerals and hydraulic power. We have lived on this endowment, using these capital resources to pay for our other needs.

The USA, on the other hand, has been almost from the start a manufacturing economy which complemented our own. The pattern is well established.

It has been necessary in the past for Government to alter the pattern in the interest of national development. Examples are the C.P.R. to promote east-west trade, and the tariff. The Government must exercise leadership again if Canadians are not to become a nation of tenants. The R & D dilemma is one reflection of this need, and cannot be considered independently.

6.2 The characteristic of our economic pattern that bears on R & D is the ready availability of technological goods and services from the USA and our ability to pay for them with natural wealth. We can have the products without doing the R & D, but only so long as we are willing to pay the indirect price in economic dependence and lower standard of living. The price is indirect, but real.

6.3 To break out of the pattern will require firm Government action, one aspect of which will be R & D policy. To alter a pattern requires numerous small shifts rather than a single major change. Some features of the pattern that inhibit Canadian initiative in the Exploitation of scientific research are:

(a) The transfer of funds out of Canada in the form of interest, dividends, management fees, R & D payments, etc. The transfers are a consequence of foreign ownership. They are part of the national economic surplus which is the normal source of funds for reinvestment and R & D[(4)].

(b) Canadian business Management is adapted to the economic pattern. Most of our industrial operations are either Branch Plant or imitative and depend on foreign organizations for leadership. The qualifications of Canadian Management, as noted by the Economic Council, are not impressive[(5)].

(c) Similar observations apply to our financial institutions which are also geared to the pattern. Hence the paradox of massive financial organizations and shortage of risk capital[(6)].

(d) The relatively small proportion of technically trained people in our population at large, as well as in management, is another feature.

(e) The enormous influence of the United States mass media has an immeasurable effect on our confidence in our abilities and our products. Most of this advertising spill-over into Canada is obtained at marginal cost to the US firm. Canadian exposure of the same intensity is much more costly to a Canadian firm[7].

(f) The tariff, whatever its virtues, weakens any incentive to improve efficiency by developing new methods[8].

(g) Exclusion of Canadian subsidiaries of foreign firms from markets outside Canada undercuts our growth potential.

(h) The smaller scale of Canadian enterprises limits their capacity to absorb the initial costs of developing a market for new products, or to support long-term R & D projects[9].

6.4 These are some elements of the Canadian pattern. We need only two things to re-shape it to our needs: the will to do so, and strong Government policies. In changing the pattern the object is not abolition of foreign ownership. Natural resources and foreign investment are equally desirable, provided that both are used primarily for our own benefit[10].

7. PRINCIPLES AND CONSIDERATIONS FOR CANADIAN R & D PLANNING

We have discussed the purposes of R & D and some of the specifically Canadian factors which influence the type

and quantity of effort. In this section we suggest some principles on which Canadian R & D planning should be based.

Our financial resources are limited. Most of our material needs can be met by imported goods or technology. However, the major R & D policy concern should be to foster economic growth and meet Canadian social requirements. A balance between economic and social considerations is necessary, but the economic base must provide the wealth for both. In the past the main incentives for R & D have been economic. However, the climate is changing and many of our most urgent problems are social, with no foreseeable short term economic gains. Serious social problems are visible in Canada and are becoming urgent. These problems will place increasing emphasis on National Goals directed and financed by Government.

Research and development programs will tend to become larger because technology and our society are becoming more complex. This will require government direction with increasing interaction in the R & D programs amongst industry, universities and government agencies.

In this frame of reference we consider the three general classes of R & D in turn, beginning with Exploitation - the essential end product.

7.1 Exploitation

Exploitation is the weakest of the three stages of R & D in Canada and, at the same time is the principal reason for doing R & D. A strong effort is needed and the impetus can come only from Government.

(a) A few major programs of national significance are essential to support a strong technology. These programs would be aimed at specific National Goals.

(b) Although National Goals are easy to propose they are extremely difficult to evaluate relative to one another. A National Goal would be characterized by expected economic or social benefits and suitability to the Canadian environment. It should also become a source of national pride. The selection of National Goals is based on social and economic considerations; their achievement depends on science. The selection process demands and deserves thorough multi-disciplinary study[11].

(c) Of equal importance in aggregate, are the many smaller Exploitation projects initiated by Industry, by Government departments, or as by-products by R & D establishments. Individual cases where Government assistance is required should be evaluated under the same principle as the major programs but with more flexibility.

(d) A key step in Exploitation is the transfer of information from developer to producer. Exploitation work should therefore be done as close to the "factory" as possible.

If the final result is to be an industrial product the final stages of development should ideally take place in industry.

(e) In principle, Industry should finance Exploitation aimed at industrial products. Government financing of Exploitation by industrial laboratories should occur only when the following conditions exist:

(I) the particular project is in the national interest,

(II) Industry is unable to underwrite the entire cost,

(III) the contribution by Industry is substantial rather than token,

(IV) the Management is competent in both business and technical terms,

(V) the eventual profits will be available for re-investment in Canada,

(VI) the industry concerned will not be excluded from foreign markets by any corporate restrictions,

(VII) the information and technology will not be exported for less than fair return.

Essential projects to which Industry is unable or unwilling to contribute funds should be financed and executed entirely by Government. Very long term projects and those having social improvements rather than economic gain as their objectives will be in this group. Past performance has demonstrated the effectiveness of Government R & D across the full spectrum.

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(f) When a Government establishment has been created to carry out Exploitation it should not be restrained by any reluctance to compete with Industry. If it is to do a job it should do it vigorously. In addition to its specific mission the Government establishment has a responsibility to press exploitation of any by-products that emerge.

Again a strong effort should be made to promote exploitation of these by-products by Industry. Failing this, any such products should be exploited by the appropriate Government establishment. The principle here is that an Exploitation establishment cannot avoid certain entrepreneurial responsibilities.

(g) Any Exploitation project is expected to lead to production or to a social benefit. It is vital that, once committed, the project have the funds and the Management required to carry it through to successful application. This involves the concept of "staying power", or the ability to absorb losses during market development. Thus, Government funding should not necessarily terminate with completion of R & D.

(h) The quality of Management, business and technical, must weigh heavily in decisions on location and funding of Exploitation projects.

7.2 Development

The general principle is that Development should be undertaken only if subsequent Exploitation is expected. The same rules therefore apply, but with much greater discretion because at this stage the information will be more speculative.

The proper location of Development work is not easy to generalize; each case will have special considerations. Some of these are: scale of effort, diversity of talents and equipment, time-scale, degree of uncertainty, and suitability of existing facilities.

In general, the size of the required establishment will be the dominant consideration, with the large scale facilities being Government operated. Not being tied to a particular industry, Government establishments can be more flexible, can adapt to different missions, and can include a broader fundamental research capacity.

A valuable attribute of large mission-oriented establishments is their ability to unite in a common effort representatives of many disciplines. Experience at the Chalk River Nuclear Laboratories has demonstrated the beneficial effects of the mutual support and stimulation provided. This atmosphere can be generated only in laboratories organized specifically to promote it and is not generally found in industry or universities as now established. Government should provide the enlightened insight to foster this kind of activity which is in the nature of a largely untapped natural resource.

The funding principles applied to Exploitation are valid here, with some changes in emphasis:

- Because of the greater risk and the more remote payoff, a larger proportion of Government funds is appropriate.

- Scientific competence in both management and workers, is a major factor to be considered in allocating funds.

7.3 Exploration

The interface between Exploration and Development is generally less clear than that between Development and Exploitation. The first two merge to such an extent that it is often essential to do both in the same establishment. In principle, Exploration and Development for a National Goal program should share the same establishment, each stimulating the other. As mentioned earlier, such a laboratory would provide for some amount of Exploration unrelated to the mission.

Basic research fields related to National Goals will provide the main pool of research competence for the country at large.

A second type of Exploration is inevitable and desirable - the non-mission research which occurs in Universities and even in mission-oriented establishments. This work is motivated by the scientific interest of a competent individual. It is completely unpredictable, and is an invaluable source of new things. The only principle here is that of natural selection.

Universities are, and should be, a major location for Exploratory work. Usually, this work is not mission-oriented but reflects the talents of outstanding individuals.

An outstanding individual can attract others of similar talents, resulting in a strong University Department. The Department might grow into a Research Institute with unique competence in a particular field. This is a desirable evolution.

A category of exploration known as Big Science is characterized by large, complex and costly facilities. A mission-oriented establishment such as Chalk River Nuclear Laboratories cannot be classified as a Big Science facility although it embraces certain Big Science features in areas related to its mission.

Big Science in the strict sense is purely Exploratory - for example, a large radio telescope or a high energy particle accelerator. Because the discoveries to be made are unpredictable and a discovery in any area will sooner or later produce benefits, the selection or rejection of a Big Science proposal requires a difficult decision. Each case must be judged on its merits and on the calibre of its proponents with the best scientific advice obtainable. An institute created for Big Science should not be under the control of a single University but should serve a group of Universities, or else it should be government-operated and be open to participation by all Universities.

8. POLICY RECOMMENDATIONS

The translation of the foregoing principles into practice requires certain policies on the part of the Government of Canada. These policies must be flexible so that they can adapt to changing circumstances, to new discoveries, and to the opportunities created by outstanding individuals. The following statements, which constitute our policy recommendations, are offered as guidelines rather than as rigid rules. Some of them are beyond the realm of R & D and might be described as matters of economic policy. We regard this as unavoidable because - and this is the essence of our Brief - the state of R & D is a reflection of the economic environment.

8.1 Our principal recommendation is that the Government maintain a strong R & D capability and, as a matter of urgency, promote Exploitation of the products of R & D by every means at its disposal.

8.2 Several major programs of national significance should be initiated, for their own value and to develop a pool of facilities and trained people, and also as a basis for national pride.

8.3 The selection of National Goals is a complex problem. The essential first step is to obtain and evaluate the information on which to base decisions. A multi-disciplinary body should be set up for this purpose.

8.4 The level and quality of Exploration (basic science) and Development (invention, applied science) have been reasonably satisfactory. These activities have been largely conducted in Government establishments, with some notable work in universities and elsewhere. This policy should continue, with expanding effort, chiefly in the form of new or expanded establishments to pursue National Goals.

8.5 Exploitation (innovation, new products and processes) has been weak in Canada and it should be Government policy to encourage vigorous effort by Industry and by Government establishments.

8.6 Exploitation requires funds, management skills, and technical competence. The lack of any one of these can lead to failure. It should therefore by Government policy to provide funding to Industry where management and technical competence exist. It should bring together the funds and the proper people. To ensure that the public interest is protected and to assist the recipient Companies, the Government should

participate in Management to an extent proportional to the funding provided.

8.7 The Government should consider the provision of Management and Technical Consulting services to Industry as a means of furthering its Exploitation policies. An appropriate agency should be formed for this purpose, with high quality staff and facilities.

8.8 The transfer of information is a vital link between R & D and production. For this reason, the establishment of Industrial Laboratories and Research Associations should be encouraged wherever the scale of operation and industry funding permit. Where Industry laboratories are not feasible, participation by Industry in Government R & D laboratories should be encouraged.

8.9 Exploitation programs funded by Government should be so constituted that the benefits, including those from eventual foreign marketing, accrue to Canada.

8.10 It should be the policy of Government laboratories to promote energetically the exploitation of all products of their R & D, even those that are not related to the specific mission of the establishment. These products should be exploited by Industry if possible, and otherwise by Government.

8.11 One major deterrent to Canadian Exploitation is competition by foreign products supported by advertising spill-over from the country of origin. The importance of

Brand Names, real and psychological, is recognized. To offset this influence, the Government should discuss with Canadian Industries the institution of a standard mark or symbol to be carried by products of Canadian R & D which meet certain standards of quality and performance.

8.12 Research management skills can be developed only in R & D establishments. Both Government and Industrial research establishments should be encouraged to identify and develop competent research directors by internal policies and formal training.

8.13 Large and costly equipment for scientific Exploration ("Big Science") should be funded and operated by the Government under particular circumstances. In this area as in all others the importance of recognizing and considering the views of outstanding individuals cannot be overemphasized.

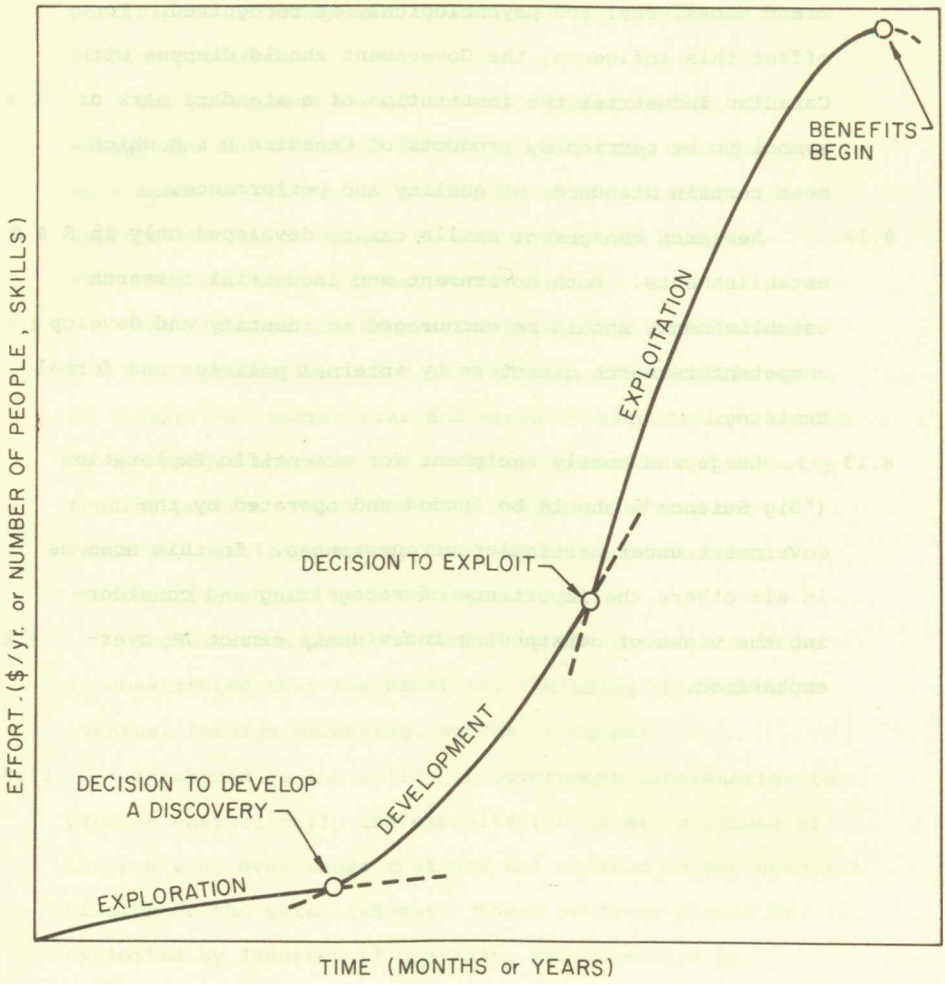

FIGURE I: THE R & D PROCESS

APPENDIX I

References and Supporting Data

1. Figure 1 is purely diagrammatic. Scale and proportion vary widely with the type of project. One breakdown of new product costs is provided by a 1967 study for the U.S. Secretary of Commerce, "Technological Innovations: Its Environment and Management", which assigns 5-10% of total cost to "research, advanced development, invention".

2. Primary evidence of our weakness in Exploitation is the evident scarcity of Canadian products and processes. In his book "Ideas in Exile", J.J. Brown documents our history in this area.

3. The figures are taken from "Foreign Ownership and the Structure of Canadian Industry" (The Watkins report).

4. Payments to Non-Residents in 1964 excluding Trade and Finance groups, were extracted from the "Annual Report, Corporations and Labour Unions Returns Act, 1964" (DBS 9802-503) as follows:

APPENDIX I (Continued)

TABLE	ITEM	TOTAL (10^6)
8 A	Dividends	480
B	Interest	130
C	Rent	40
D	Royalties	64
E	Franchise	28
F	Advertising	20
G	Research	20
H	Insurance	9
I	Management	59
J	Professional Services	47
		897

This is nearly 2% of GNP, which was $47,393 million. From the same source we attempted to discover what funds might be available for R & D from the profits of Corporations operating in Canada. Assuming that only companies having profits greater than $500,000 could do useful R & D, and assuming that they could spend 2% of sales on R & D, the total R & D expenditure would be $720 million.

Again, "General Review of the Manufacturing Industries of Canada, 1960" (DBS #31-201), Table 27 lists the 40 leading industries in terms of sales. At 2% of sales, the R & D fund would be $320 million.

DBS #13-527, "Industrial R & D Expenditures in Canada" reports that 825 firms of 3400 contacted in 1965

performed or financed R & D. Their total expenditure was $235 million, approximately 1% of sales.
The Charpie report for the U.S. Department of Commerce indicates Company-financed R & D to range from 0.6% to 4.5% of sales.

5. The Fifth Annual Review of the Economic Council of Canada comments extensively on this subject. Studies by the Organization for Economic Cooperation and Development (OECD) pointing to the "management gap" as a major factor in U.S. industrial supremacy have been widely quoted.
The attitude of Canadian management to R & D is documented by Herbert Byleveld in "Scientific Research in Canadian Industry" for the National Industrial Conference Board, 1963.

6. "The Vertical Mosaic" by John Porter deals extensively with the "Economic Elite".

7. This problem seldom comes to the surface, but the "Time" and "Reader's Digest" conflict with the Government of Canada indicated its potential.

8. The Watkins Report discusses this point at length.

9. The correlation between size and degree of foreign ownership of Corporations in Canada is borne out by the statistics which we studied. The very strong correlation between size and profit (as percent of sales) which is apparent in Section D of DBS 9802-503 was surprising and, we felt, significant.

10. The following remarks by Mr. V.O. Marquez of Northern Electric are quoted in "Problems and Policies in Canadian Manufacturing" published by the National Industrial Conference Board.

"I think there are very real hazards stemming from foreign ownership, but I am inclined to suspect that the root of these dangers probably lies within ourselves. Foreign ownership has tended to make Canada a technological colony. Because it has been so easy and apparently so economical - particularly in the short term - for Canada to obtain access to the fruits of foreign research and development, we have failed to perceive that as long as we are willing to let others do all our thinking for us we are not likely to gain experience in thinking for ourselves. We deny ourselves even the satisfaction of making our own mistakes".

11. We have not attempted to identify specific National Goals, nor do we comment on those proposed in Report Number 4 of the Science Council of Canada. We strongly support the recommendation of a "systems approach" to selection of programs. We are familiar with the sophisticated optimization techniques applied to the design of nuclear reactors for example; we would expect similar techniques to be applied to the more complex problem of National Goals.

APPENDIX II

COMMITTEE MEMBERS

Brief bibliography including profession, year of graduation (or equivalent) advanced degrees and experience.

Dr. G.A. Bartholomew	Physicist, 1943, Ph.D. 1948, 22 years Government Research.
E.C. Carlick	Engineer, 1948, 11 years Industrial Development, 10 years Design, CRNL.
H.H. Clayton	Physicist, 1935, M.Sc. 1937, 22 years Government Research.
R.K. Elliot	Engineer, 1952, 4 years Pulp & Paper Industry, 13 years Design and Development, CRNL.
Dr. C.A. Mawson	Chemist, 1929, Ph.D. 1933, 36 years Research with Industry, Hospitals and CRNL.
J.G. Melvin	Engineer, 1950, 4 years Industrial Service, 14 years Development AECL.
J.S. Nelles	Engineer, 1949, 4 years Industrial Design, 15 years Development CRNL.
D.T. Nishimura	Engineer, 1954, 15 years Development and Operations, CRNL.
A.W.L. Segel	Engineering Physicist, 1947, M.A. 1949, 10 years Manufacturing Industry, 9 years Development, CRNL.
Dr. K.J. Serdula	Physicist, 1959, Ph.D. 1963, 6 years Research, CRNL.
P.D. Stevens-Guille	Engineer, 1960, M.Sc. 1968, 3 years Industrial Development, 6 years Design & Development, CRNL.

SUPPLEMENTARY BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

CANADIAN CONSTRUCTION ASSOCIATION

21719—13½

15 October, 1969

INDEX

Item

CANADIAN CONSTRUCTION ASSOCIATION

CONSTRUCTION HOUSE, 151 O'CONNOR ST.,
OTTAWA 4, CANADA
AREA CODE 613/236-9455

October 15, 1969

Hon. Maurice Lamontagne, Chairman,
and Members of the Special Committee
on Science Policy of the Senate of Canada

Honourable Senators:

The Canadian Construction Association is very pleased to submit this Supplement to its Brief of April 15, 1969, as requested during the hearing on June 11th. This opportunity of augmenting our previous material and testimony is greatly appreciated.

Appended are memoranda dealing with the four questions on which amplification or comments were specified:

1. The nature of legislation that would be required for the proposed National Construction Industry Development Fund.

2. The adoption of a uniform set of building standards across Canada and the avoidance of the present conflicts.

3. The manner in which more outlays on applied research may best be spent with respect to the construction industry.

4. Whether or not (i) a single agency could co-ordinate the various aspects of the research programs for the construction industry and (ii) a Centre or Centres of Excellence should be established with respect to construction research activities.

Also appended is a copy of a reference paper on Technological and Economics Research prepared for the Construction Industry Associations Conference in May, 1965. Whereas this paper does not refer to the Canadian Inquiry on Construction Labour Relations and other developments that have taken place during the ensuing period, it constitutes a useful summary of the main factors and of areas of association activity in the Research field.

This Supplement should be considered in concert with the initial Brief submitted last April in that care has been taken to avoid repeating any of the material contained in the latter at this time. Cross References have been stated where applicable in the Supplement.

Respectfully submitted,

Mark Stein, Eng.
President

"THE NATURE OF LEGISLATION THAT WOULD BE REQUIRED FOR THE PROPOSED NATIONAL CONSTRUCTION INDUSTRY DEVELOPMENT FUND"

(Reference: Recommendation #12 and Paragraphs 54-60 in the Brief, particularly Paragraphs 54 and 58-59).

Summary: This Memorandum describes alternative vehicles for the collection of funds from the on-site sector of the construction industry to expedite needed research and development work of a general nature. Of these alternatives, strong preference is expressed for the use of construction employers' over-payments to the Canada Pension Plan. A 'working draft' of a Constitution for the Fund is also presented, together with an outline of Sample Projects and Budget requirements.

The proposed Fund is not designed to finance all Association programs at the national level. Rather it is intended to enable the Industry to finance research projects, educational programs and other activities that would facilitate its development and increase its ability to meet the demands for its services efficiently and economically.

Whereas manufacturers are already active in the area of research and development, individual construction companies do not have the resources to permit them to conduct any significant 'in house' research. By pooling their resources, however, they would be enabled to participate in a comprehensive and effective research and development program. Only through such a Fund, uniformly assessed on the construction operations of all contractors, including manufacturing contractors, can the Industry perform a significant R. & D. function. This in turn will afford relief to the Federal Treasury.

For these various reasons, it is believed that Federal Government co-operation or, if necessary, legislative action to facilitate the establishment of a National Construction Industry Development Fund in Canada would have very strong public appeal.

Vehicles for Collecting Funds

There are a number of alternatives that are available. The CCA recommends that existing funds or assessment schemes be used in order to avoid additional administrative costs.

The Canada Pension Plan affords the prime example. The construction industry, due to its extreme but essential labour force mobility, experiences considerable over-payments. The legislation provides for rebates to employees and a special provision was included in the personal Income Tax return forms whereby employees may apply for their over-payments to the Plan. The legislation, however, fails to allow refunds to be made of the matching over-payments by employers.

It is understood that the amount of over-payments made by construction employers annually is now upwards of $5 million. This money morally belongs to contractors. When the C.P.P. was established, it was expressly stated that contributions to it were not a tax. The Government has conceded that the fact that employers are not eligible for refunds for over-payments is inequitable and has had under study for some time possible means of processing rebates to them. Administrative difficulties, however, are held to be too serious and costly to overcome and the Minister of National Revenue recently stated that the Government had decided to retain the legislation in its present form.

During this lengthy study by the Department, the Association recommended to the Government in its annual interviews with the Federal Cabinet in 1967 and 1968 that money from construction employers' over-payments to the C.P.P. be transferred in bulk amounts for their collective use in the proposed National Construction Industry Development Fund. This proposal enjoyed widespread support throughout the industry, as evidenced by its endorsement by the C.C.A. National Council (on which are represented many member associations - Appendix "b" of the Brief) and by the National House Builders' Association.

As mentioned, the Government has decreed that contractors have no individual claim to their over-payments to the C.P.P. Indeed, they have no way of knowing the amount of their over-payments since they do not know how much employees coming to work for them during the year have already paid into the Canada Pension Plan. C.P.P. assessments are regarded as part of the labour cost "package".

The Government would no doubt rebate employers' over-payments to the C.P.P. if it were feasible to do so. The administrative difficulties that would be encountered in making rebates to individual contractors would be overcome by the transfer of monies from their over-payments to the proposed National Construction Industry Development Fund to finance badly-needed projects for the benefit of the industry in general.

Such action, as requested by the industry, would be administratively simple, morally just and strongly appealing to the public. Even the interest on construction employers' over-payments to the C.P.P. would cover the Fund's intial budget. Insofar as legislation is concerned, only a minor enabling amendment to the Act would be needed.

An alternative procedure would be to provide for a very slight increase in the assessments or contributions paid by all construction employers with respect to Unemployment Insurance or the Canada and Quebec Pension Plans and to have the proceeds transferred to the National Construction Industry Development Fund. Such an arrangement would be similar to that followed in France with respect to the assessments paid by construction employers into the National Government's vacation pay fund. Similarly, an extra nominal fee could be levied on construction companies in connection with their annual Companies Act return to the Federal Government.

Failing an arrangement whereby moneys for the proposed Fund are collected economically in this fashion in connection with existing collection schemes, it would be necessary for special legislation to be enacted in order that all construction employers contribute to the Fund. The latter would have to pay for all of the collection costs. This is the procedure that has been followed by the South African Government.

Finally, another alternative vehicle might be the application of a payroll assessment of, say, one cent an hour or some other very nominal assessment with respect to all Federal construction projects. No new legislation would be required. Whereas the cost of these projects would be slightly increased, such action could be justified on the grounds that (a) the taxpayers would benefit to a far greater extent from the greater efficiencies and economies with respect to construction projects generally resulting from the R. & D. work financed by the Fund and (b) the operation of the Construction Industry Development Fund would make the Industry less dependent on the Federal Treasury for outlays in this area.

In summary, the various alternatives, the use of Canada Pension Plan over-payments made by construction employers appears to the Association to be the most attractive. The funds are adequate. They morally belong to construction employers and would no doubt be refunded were it not for administrative problems. The desirability of the construction industry carrying out such R. & D. work is obvious. There could be no grounds for complaint. The proposal would be warmly welcomed by not only the construction industry but also by the general public.

CONSTITUTION

OF THE

NATIONAL DEVELOPMENT FUND FOR THE CONSTRUCTION INDUSTRY
(Inaugurated by the Canadian Construction Association)

1. NAME

The name of the Fund shall be "The National Development Fund for the Construction Industry".

2. INTERPRETATION OF TERMS

"Construction Industry" shall mean the enterprises employing labour, materials, components and equipment in the fabrication, installation, alteration, repair or maintenance of immobile physical improvements.

"Association" shall mean the Canadian Construction Association.

"Association Executive" shall mean the Executive Committee of the Association or any sub-committee delegated with power in terms of the Association's constitution to act for the Executive between meetings.

"Association Secretariat" shall mean the secretariat of the Canadian Construction Association.

"Fund" shall mean the National Development Fund for the Construction Industry.

"Industry" shall mean the Construction Industry.

3. OBJECTS

The objects of the Fund shall be -

(a) To encourage a practical interest in technical and scientific obstacles to maximum efficiency in the Construction Industry and, to this end, to promote and finance industrial research and testing whether undertaken by the Industry or by way of grants-in-aid to recognized research institutions, including educational establishments.

(b) To promote education within the Industry by providing improved facilities for academic, scientific and technical training by way of grants-in-aid to Universities and other approved educational institutions.

(c) To introduce, independently or in collaboration with the Provincial Departments of Education and approved educational institutions, training courses for management, foremen and other personnel.

(d) To keep the skilled labour force informed of changing construction methods and techniques in the Industry; to provide instruction and training by way of refresher courses to facilitate the adaption of skills to such changing requirements and, where necessary, to extend facilities within the framework of this object to other groups constituting the labour force.

(e) To safeguard the skilled labour force against the possible adverse effects of increased mechanisation and automation by means of facilities to qualify for alternative employment in the Industry and, where necessary, to extend facilities within the framework of this object to other groups constituting the labour force.

(f) To recognize meritorious effort in the form of apprenticeship awards, bursaries for further education, or by such other means as may be deemed to be suitable to promote maximum achievement in the interests of the Industry.

(g) To promote and finance efforts aimed at securing the interests of the Industry on a long-term basis by sponsoring detailed studies, enquiries or investigations in suitable directions in collaboration with interested bodies, institutions and organizations.

(h) To promote safety measures in the Industry and to collaborate with bodies already engaged in the promotion of accident prevention.

(i) To sponsor an Advisory Service for the Construction Industry aimed at promoting managerial and administrative efficiency; the improvement of human relations within the Industry, and at minimising the effect of technical and scientific problems encountered in the course of building construction.

(j) To receive and consider suggestions from interested bodies, institutions and organizations which are aimed at furthering the interests of the Construction Industry as a whole.

(k) To publicize vocational opportunities offered by the Industry in all fields.

(l) To sponsor study tours in justifiable circumstances.

(m) To secure the character and interests of the Construction Industry as an economic entity and, to that end -

(i) to promote collaboration between various interests, industrial sections and/or groups constituting the Industry or associated with the Industry in any way; and

(ii) to secure representation for the Industry on other bodies the functions and objectives of which fall either partially or fully within the scope of these objects.

(n) To study and develop good construction business practices.

(o) To promote studies designed to stabilize the growth rate of the construction program.

(p) To promote detailed studies of the development of statistics measuring construction volume, costs, employment, productivity, etc.

(q) To undertake continuing studies of Construction Labour Relations with a view to achieving more stable and mature conditions in this field and therefore increased productivity.

(r) To receive contributions, fees, donations and legacies for the purpose of furthering the objects detailed herein, and to spend such funds in accordance with these objects and the subsequent provisions of this constitution.

(s) To borrow, invest, lend money on the security of immovable property or otherwise subscribe or donate money in the discretion of the Management Committee/Finance Sub-Committee.

(t) To acquire by purchase, lease or otherwise any movable or immovable property and also to sell, let, mortgage, or otherwise deal with or dispose of movable or immovable property or other assets belonging to the Fund or use such property for such other purposes as may be approved in terms of this constitution.

(u) Generally to do all such things as may be considered necessary to promote the prestige and to secure the status of the Construction Industry in the broadest sense of the term, and assist in the development of the Industry and to improved productivity.

4. ADMINISTRATION OF THE FUND

The Fund shall be administered by a Management Committee.

5. MANAGEMENT COMMITTEE AND ADVISORY BODY

(a) The Management Committee shall be constituted of a Chairman, Vice-Chairman and twelve members broadly representative of Construction Industry employers.

(b) An Advisory Body shall be appointed consisting of persons co-opted with the approval of the Association Executive from the Design professions, Labour organizations, Research, Education and other non-construction employer groups with specialized knowledge in construction operations.

(c) Alternates may be provided for and shall be entitled to all the rights and privileges conferred by this Constitution when representing an absent member.

(d) The President of the Association for the time being shall be the Chairman of the Management Committee, subject to the right of the President to nominate, with the prior approval of the Association Executive, any other member to serve as Chairman.

(e) The election of Vice-Chairman shall be made from the membership of the Management Committee.

(f) The Management Committee shall be appointed annually in January or as soon as possible thereafter by the Association Executive in consultation with the CCA National Council (a body representing all sections of the industry and country). Serving members shall be eligible for reappointment.

(g) Any vacancies shall be filled by the Association Executive for the balance of the year. The fact that a vacancy may at any time exist will not invalidate the proceedings of the Committee.

(h) Members of the Management Committee and of the Advisory Body shall be eligible for appropriate travelling and subsistence expenses incurred in the execution of their duties.

6. FUNCTIONS OF THE MANAGEMENT COMMITTEE

(a) The functions of the Management Committee shall be -

(i) To deal with all matters coming within the scope of the objects of the Fund, and to examine and approve or reject projects proposed.

(ii) To vote funds for expenditure in connection with approved projects.

(iii) To invest the monies of the Fund; to delegate appropriate powers to a Finance Sub-Committee and to control expenditure on approved projects or in connection with the administration of the Fund.

(iv) To appoint Sub-Committees as may be required.

(v) To present an Annual Report on the operations of the Fund to the CCA National Council.

7. MEETINGS

(a) Meetings of the Management Committee and of sub-committees appointed by the Management Committee shall be held as required and shall be convened by the Secretary.

(b) The Chairman shall preside at meetings of the Fund, provided that in his absence the Chair shall be taken by the Vice-Chairman or, in the absence of both the Chairman and the Vice-Chairman, an Acting Chairman shall be elected from amongst members present at the meeting in question.

(c) Special meetings of the Management Committee may be requisitioned by the Chairman or any two members of the Committee.

(d) Minutes of the proceedings at all meetings shall be kept by the Secretary and shall be submitted for confirmation to the next succeeding meeting.

(e) Five members of the Management Committee shall constitute a quorum at meetings of that Committee.

(f) Members of the Advisory Body shall be invited to attend at least one Management Committee meeting a year.

8. COMPOSITION OF THE FUND

The Fund shall consist of -

(a) Monies received from

(i) Overpayments by Construction employers to the Canada Pension Plan. (The accumulated interest on the overpayments would be sufficient to get the Funds started.)

OR,

(ii) An increase in the assessment or contribution paid by all construction employers with respect to Unemployment Insurance or the Canada Pension Plan.

OR,

(iii) A nominal fee levied on Construction Companies in connection with their Annual Companies Act return to the Federal Government.

OR,

(iv) The enactment of special legislation requiring that all construction employers contribute to the fund on an equitable basis. (A very minor assessment would generate appreciable monies for the Fund.)

OR,

(v) The application of a nominal payroll assessment on all Federal construction projects.

(b) (i) Such earnings as may accrue from investment of proceeds or sale of publications.

(ii) Such fees for services rendered, donations, legacies as may accrue to the Fund.

9. SECRETARIAL AND ADMINISTRATIVE DUTIES

(a) Secretarial and administrative work arising out of the activities of the Management Committee and of sub-committees shall be entrusted to the Association Secretariat.

(b) The General Manager of the Association for the time being shall be the Secretary of the Fund and shall allocate members of the staff of the Association for the performance of the work of the Fund as required.

(c) In recognition of the additional work entailed, the Association shall be paid an administration fee based on a reasonable assessment of costs incurred, but such fee shall in any event be not less than 5% of the gross annual contributions to the Fund. The administration fee, calculated on the basic percentage of 5%, shall be paid to the Association quarterly and any adjustment to compensate for costs incurred over and above that figure shall be made annually before the close of each financial year. Such adjustment shall be subject to the approval of the Association Executive and of the Management Committee.

10. OFFICIAL RECORDS AND BOOKS OF ACCOUNT

The Secretary of the Fund shall be responsible for the keeping of official records, minutes and books of account.

11. ANNUAL AUDIT

The books of account shall be audited annually by a Chartered Accountant appointed by the Management Committee.

12. AMENDMENTS

Amendments to the provisions of this Constitution may be adopted at the instance of the Management Committee. No amendment to the provisions contained herein shall become effective until the approval of the Secretary of State of Canada has been obtained.

13. DISSOLUTION OF THE FUND

(a) In the event of the Fund being dissolved for any reason whatsoever, the Association Executive shall forthwith appoint a trustee or trustees to continue to administer the Fund until such time as available monies have been expended in accordance with the provisions of this Constitution, and in accordance with the objects of the Fund.

(b) Should the Association Executive approve, the appointed trustee or trustees may administer any unexpended balance of the Fund in collaboration with the Management Committee or with such members of the Management Committee as may remain available for the purpose.

(c) Any arrangements with the trustee or trustees as to the cost of administration and liquidation of the balance of the Fund shall be subject to the approval of the Minister of Consumer and Corporate Affairs.

.....

NATIONAL CONSTRUCTION INDUSTRY DEVELOPMENT FUND
-- PRELIMINARY PROJECTS AND BUDGET --

The areas of research and development contemplated with respect to the proposed Fund were outlined in Paragraphs 15 and 49-52 in the CCA's Submission. Some of the projects would take some time to prepare for before they could be launched. For example, in the case of the Canadian Inquiry on Construction Labour Relations, the preliminary work involved the appointment of a representative Steering Committee, the selection of the industry's main problem areas and the engagement of suitable professionals to conduct the research studies. (Such personnel may well be in short supply and unable to take on new assignments until their current projects have been completed). The major financial outlays did not take place until a year or two after the Inquiry was initiated.

Accordingly, it is suggested that a realistic preliminary budget for the first year of operations might be only $350,000. Subsequent annual budgets would draw on the Fund as required with respect to specific projects. The following draft budget for the first year's operations is submitted for illustration purposes of projects that could be launched without delay; actual outlays would be decided upon by the Fund's trustees.

	Item	Cost
1.	Research studies in the field of the economics of housing	$50,000
2.	Development of Training Course for Construction Superintendents (Ont. Dept. of Education estimate)	10,000
3.	Sponsorship of a Chair of Building Science at a Canadian University	35,000
4.	Fellowships for the new Institute of Systems Building at the University of Toronto	10,000
5.	Program of scholarships and post-graduate fellowships for construction technician courses at Technological Institutes and construction engineering courses at Canadian Universities	50,000
6.	Follow-up studies to the Canadian Inquiry on Construction Labour Relations	20,000
7.	Additional Work-Study Projects on different types of construction to supplement those financed by NRC, CCA, etc.	15,000
8.	Sponsorship of prototype projects using modular dimensioning (initial costs)	50,000
9.	Operation of Construction Management Seminars	25,000
10.	Economic studies on construction volume and employment instability in relation to monetary and fiscal policies and economic development	25,000
11.	Studies with a view to developing improved statistics measuring construction volume, costs, employment, productivity, etc.	25,000
12.	Preliminary study of the implications to the Construction Industry of the conversion to the Metric System of Measurement in Canada	5,000
		$320,000
	Administration, travelling expenses, etc.	30,000
		$350,000

THE ADOPTION OF A UNIFORM SET OF BUILDING STANDARDS ACROSS CANADA

(Reference: Recommendation #2 and Paragraph 23 in the Brief)

Building regulations are usually By-Laws passed by the Council of a Municipality under the authority of the appropriate Provincial Municipal Act. These Municipal Building Codes are originally drafted in widely diversified fashion and their differences are increased due to varying rates of expansion and revision. Local building regulations accordingly often differ widely between adjacent municipalities.

The objective of the National Building Code of Canada is to provide a uniform set of modern building standards for use throughout Canada. Variations in climatic conditions and earthquake factors are accommodated by a Supplement containing information for the various parts of the country. The appropriate figures for the municipality in question are inserted in the pertinent provisions of the National Building Code and, upon adoption, form part of the building by-law. This flexibility is such that the national code may readily be adopted by any Municipality across the country. A "Short Form" of the Code is available for smaller municipalities and another special version has been prepared for use in Northern Canada. All documents are available in both English and French. A new edition will be published in early 1970.

The number of municipalities that have adopted the National Building Code has increased substantially in recent years. The adoption of a standard building code has been made compulsory in Great Britain but to date governments in Canada, until the appointment of the Special Committee in Ontario, have not yet given this matter any consideration because of the complex Canadian division of legal responsibility.

It is felt that the Federal Government could encourage municipalities to adopt the National Building Code of Canada by making its adoption, without amendment, as a condition for loans or grants. For many years, for example, National House Act loans for houses have been conditional on their adherence to the National Building Code. There is considerable scope for additional application of this principle.

With regard to Provincial Governments, it has been contended that, inasmuch as they delegated to the Municipalities the right to adopt building regulations, this right could be reassumed. Then the Provincial Governments could adopt uniform building standards throughout their respective regions or require the Municipalities

to do so. In this regard a most significant study has been carried out by the Committee on Uniform Building Standards for Ontario, a body appointed by the Ontario Minister of Municipal Affairs. Its report is due to be released in the near future and it is expected to recommend the mandatory adoption of the National Building Code of Canada without change within a specified period. If so, it will likely have an important influence on other Provincial Governments.

A copy of the CCA's answers to a Questionnaire from the Ontario Committee follows inasmuch as they summarize most of the supporting factors regarding uniform building standards across Canada:

CANADIAN CONSTRUCTION ASSOCIATION

CONSTRUCTION HOUSE, 151 O'CONNOR ST.,
OTTAWA 4, CANADA
AREA CODE 613/236-9455

February 4, 1969.

Mr. C.D. Carruthers,
Chairman,
Committee on Uniform Building Standards
for Ontario,
Department of Municipal Affairs,
801 Bay Street,
Toronto 5, Ontario.

Dear Mr. Carruthers:

Thank you for your letter of January 3, 1969 inviting comments on a number of specific questions with reference to the Inquiry being conducted by your Committee. Whereas your questions were directed at me as an individual, the subject matter falls within a policy area of the Canadian Construction Association and my Board of Directors has authorized me to state that my attached comments also have their endorsement.

The Association has 47 member associations and 400 national member firms based in the Province of Ontario, representing prime and specialty contractors and manufacturers and suppliers of construction materials and equipment. The Ontario Federation of Construction Associations is affiliated with the CCA. It is understood that it and possibly other member associations in Ontario will also be submitting their views to your Committee in response to your invitation.

By way of a preface, the CCA has long advocated the adoption of uniform building standards throughout Canada. Its recommendations are summarized in the following policy statement again adopted on January 22, 1969 at the Association's recent 51st Annual General Meeting:

7. BUILDING CODES

The Association strongly urges the general adoption of the National Building Code of Canada and its supplements including Housing Standards to facilitate uniformity, safety, efficiency and economy in the construction industry. Action by the Provincial Governments in enacting legislation that facilitates the easy adoption of the National Building Code and in encouraging their Municipalities to use the Code as the local building by-law is also strongly recommended.

Yours sincerely,

S D Schutter

General Manager.

SDCC*MW
attachment

Questionnaire Return
to the
Committee on Uniform Building Standards for Ontario
by S.D.C. Chutter, Ottawa
General Manager, Canadian Construction Association

1. "Do you favour a uniform code for the Province?"

Yes, emphatically.

Indeed, relatively speaking, the need for and benefits of a uniform building code are greater in Ontario than in any other Province.

Roughly one-third of Canada's construction program is carried out in Ontario. The largest concentration of construction activity in the nation is in Southern Ontario. This area is marked by virtually a continuous flow of urban and industrial development from one municipality (and building code jurisdiction) to the next. Upwards of 15% of Canada's total construction program is executed in the Metropolitan Toronto area alone -- roughly equivalent to British Columbia's construction program and greater than that of any other Province with the exception of Quebec. Moreover, much of the Canadian production of construction materials and components is located in Ontario.

Accordingly, variations in building code requirements affect more construction activity in Ontario than in any other comparable area. Similarly, the problems encountered by contractors, manufacturers and others because of the present lack of uniformity are more numerous than elsewhere. Conversely, the benefits from the standardization of building codes and the resulting economies and greater efficiency would be the most marked in the aggregate sense in Ontario. In addition, the establishment of a uniform code in this Province would doubtless have a very direct influence on manufacturers, governments etc. in other Provinces and expedite the trend towards the attainment of a uniform building code across Canada.

2. "Would the National Building Code of Canada be satisfactory as a uniform code?"

Once again, Yes, emphatically.

There really is no practicable alternative. The National Building Code is already widely accepted. A very substantial up-dating and revision is due to be completed in mid-1969 and to be available in published form at the beginning of 1970. Mechanics exist whereby new developments etc. can be accommodated during the five-year periods between new editions by standing committees and the Code's secretariat. Its provisions take into account regional variations in climatic and soil conditions and earthquake factors. Whereas some in our industry may not agree with all of the contents of the National Building Code affecting their operations, there is widespread agreement that the benefits of uniformity would in itself make the Code all the more acceptable.

The development of a provincial uniform code differing from the National Building Code would not only be a retrogressive step but would also constitute a very considerable and unnecessary expense to the Government of Ontario.

3. "What would be the effect, if a uniform code were adopted, on (a) the cost of construction and (b) the reduction of both on-site and off-site problems?"

Assuming that the "uniform code" in the question refers to the National Building Code of Canada, the effect would be to reduce costs. Actually, the two parts of the question amount to the same thing inasmuch as the reduction of either on-site or off-site problems will result in at least decreased overhead costs.

It should be recognized that -- in those cases where lower (or no) standards prevail -- the introduction of a uniform code may well increase costs. However, in such instances the higher standards are deemed by the experts preparing the National Building Code to be desirable in terms of structural safety, health, fire protection etc.

The cost savings resulting from the adoption of a uniform building code throughout Ontario will also vary from municipality to municipality, depending upon their present building code provisions. The scope for savings is indicated by the following examples:

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Governments: Municipalities will no longer incur the very considerable expense of preparing, publishing and up-dating their own building codes. Provincial Government Departments, Commissions etc. can design in accordance with a single standard for their projects throughout the Province.

Manufacturers: Uniformity of building code provisions for such a large market would facilitate larger production runs, fewer models and lower inventory costs. Manufacturers would not have to petition individual municipalities for building by-law amendments to permit the use of new materials or components, once it had been established that the latter usage was in accordance with the uniform code.

Designers: Those designing buildings would need to be familiar with only one set of building code provisions and would be freed from spending many hours studying the building regulations of each municipality where a project is to be located -- or of redesigning projects to make them conform to local requirements. Also, designers would be able to use new materials and techniques permitted under the National Building Code and not be restricted by out-moded provisions of local building codes.

Contractors: Similarly, prime contractors and sub-contractors would not have to build under a maze of differing building codes, many of which have provisions that are either overly restrictive or inadequate. A uniform code would greatly reduce the present confusion, arguments and delays in obtaining decisions. Their employees would in like fashion not have to learn different procedures for different municipalities.

Building Officials: It is understood that the Ontario Association of Building Officials adopted a resolution last year recommending to the Ontario Government that the National Building Code of Canada be applied throughout the Province. Among the benefits of such a situation would be the ability to obtain interpretations of provisions in the National Building Code through the Code's secretariat.

Owners and Tenants: In addition to the above factors, those owning or occupying buildings would also benefit cost-wise from speedier completions and lower fees and permit costs. Those wishing to build standard units in different municipalities could, with a uniform building code, obtain the benefits of large-scale orders.

4. "What other Provincial Acts or Regulations should be studied and amended to make a uniform code most satisfactory?"

   It is understood that your Committee has had a list compiled of upwards of forty Ontario statutes which either contain provisions governing construction requirements or empower those responsible for their administration to issue regulations to this end. Obviously if a uniform building code is to be effective in Ontario, its contents must have precedence. No doubt a good many of these other statutes and regulations would be made redundant by the introduction of a uniform building code. A consolidation of the balance would be most useful.

5. "Do you consider that under certain conditions amendments and revisions to a uniform code might be allowed (a) by Municipal (b) Regional and/or (c) Provincial authorities?"

   No. Such exceptions would quickly dissipate the benefits of a uniform building code. The National Building Code already provides for regional variations in such factors as climatic conditions.

6. "Should a training course be initiated for municipal building officials and inspectors?"

   Yes. Such courses would be especially desirable prior to and during the stage when the uniform code is introduced.

7. "Should there be a Board set up by the Province to deal with (a) approval of new materials and methods and (b) interpretations of a uniform code?"

   This would be redundant if the National Building Code of Canada is adopted as the uniform code.

8. "Any other comments?"

The construction industry and the allied professions have already stated their support of the proposal that the Ontario Government have the National Building Code of Canada applied as the standard set of building regulations in the Province. Such action is all the more urgent in view of the substantially larger volumes of construction that have been predicted for the years ahead.

The introduction of such regulations on a province-wide basis would not be such a large step as may a first seem to be the case. There is already an Ontario Plumbing Code, provincial regulations in the electrical construction field, provincial statutes governing the installation of elevators, lifts, boilers etc. and others pertaining to the construction of projects in the institutional field and those where members of the public assemble or stay.

Moreover, as mentioned, many Ontario municipalities have already adopted the National Building Code in whole or in part. National Housing Act residential loans are granted on the condition that the National Building Code of Canada provisions are adhered to.

The publication of the next revised edition of the National Building Code of Canada makes the introduction of a uniform code throughout Ontario most propitious. It is hoped that your Committee will include in its Report to the Minister of Municipal Affairs a proposed schedule covering the adoption of the 1970 edition of the National Building Code and the consolidation of Ontario statutes, standards and regulations in the construction field.

The writer would of course be very pleased to expand upon any of the above material on request.

February 4, 1969

SDCC*MW

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THE MANNER IN WHICH OUTLAYS ON APPLIED RESEARCH MAY BEST BE SPENT IN RESPECT TO THE CONSTRUCTION INDUSTRY

In our Brief it was recommended that greater emphasis should be applied to "applied" research as compared to basic research and the Association was asked to give examples in the Supplement of how this could be achieved. As was revealed during the hearing, there are problems in definition. However, it is felt that the examples of research and development work contained in the Brief constitute good illustrations of "applied" research. Similarly, the proposed projects listed on page 9 of this Supplement are all "applied" in nature.

In general, it is believed that if additional funds become available for research they should be directed towards applied research activities. This is normally the area in which the industry -- either singly as companies or jointly as associations -- devotes its attention. Public research institutions should no doubt continue to conduct a mixture of basic and applied research activities, but it is our impression that in a country such as Canada, the emphasis should also be on the "applied" side.

Insofar as the Federal Government is concerned, it is strongly contended that the size of the construction program and the great importance the industry's operations have on economic development and living standards clearly justifies substantial increases in R. and D. programs related to the construction industry. A comparison of Federal research outlays with respect to the various industries would likely reveal a startling lack of relative proportion!

Generally speaking, it is felt that Federal Government R. and D. activities in the construction field have been "applied" in nature. So have their research incentives to industry (although as stated in our Brief, they often have not been too applicable to the construction industry). It is believed, however, that Federal research grants to the Universities should be applied to a greater extent to projects that are "practical problem-oriented".

An example of the applied research that could be undertaken would be to subsidize the construction of buildings incorporating new techniques such as modular coordination. This could make a meaningful contribution to the industry's progress. Changing techniques in the industry require considerable changes in job management and further requires education of the various trades involved. Projects of this nature carried out in conjunction with the Division of Building Research/NRC, who could be responsible for the work study analysis, would be most significant. Similarly, comprehensive study should be made of "systems" building.

"WHETHER OR NOT (i) A SINGLE AGENCY COULD COORDINATE THE VARIOUS ASPECTS OF THE RESEARCH PROGRAMS FOR THE CONSTRUCTION INDUSTRY AND (ii) A CENTRE OF EXCELLENCE SHOULD BE ESTABLISHED WITH RESPECT TO CONSTRUCTION RESEARCH ACTIVITIES"

The Association believes that the concept of a "Centre of Excellence" as being one university or body devoted to construction research would not meet the requirements of the industry due to the magnitude and scope of the industry's needs. The concept of a "Centre of Excellence" of the usual academic sort does not fit the Construction Industry. Most of the specifically construction research projects are either of such a magnitude or of such long duration that they are not suitable for the normal University research program - especially since so many must be carried out in the field, and not in the laboratory, to which the concept of a "Centre of Excellence" is usually applied. There are projects that can be done at Universities but they will always need to be correlated with other work and information, and they must be based on a sound knowledge of the relevant literature and of work already done in the field.

The country does need a Centre for stimulating, co-ordinating and servicing multiple building research efforts in the industry, the universities, etc. The N.R.C. Division of Building Research has performed such a function to an ever-increasing extent through the operation of the Building Research Centre, the provision of reference library service and general liaison with other organizations engaged in research activities in the construction field. The C.C.A. believes that the scope of its activities should be appreciably expanded.

The research needs of the industry will likely require various specialized centres or units to deal with construction industry segments or aspects of its operations. The Federal Department of Industry, Trade and Commerce's "B.E.A.M. Program", for example, is concerned with the area of achieving greater productivity and efficiency in the manufacture and assembly or use of construction materials, components and equipment and is also strongly supported by the C.C.A. Provincial Research Councils, the Universities, private organizations, etc., will no doubt contribute usefully more and more with respect to research projects or programs in selected fields.

In summary, the Association feels that no one agency could possibly co-ordinate all of the aspects of the various research programs for the Construction Industry. The "Centres of Excellence" concept has much merit, however, and the N.R.C. Division of Building Research would seem to constitute

the main research and co-ordinating body, with considerable scope left over for other "Centres " to specialize in selected fields. It should be noted that Canada has nothing like the Land Grant Colleges of the U.S.A. Any consideration given to developing "Centres of Excellence" at universities should include a study of the experiences of these U.S. universities and their very comprehensive industry-oriented faculties and research programs.

Memorandum No. 5

CONSTRUCTION INDUSTRY ASSOCIATIONS CONFERENCE

Ottawa, May, 1965

Reference Paper on Technological and Economics Research

Note: This Conference was sponsored by the C.C.A. with a view to setting Construction Industry Objectives in the light of rapidly changing construction techniques, programs and operations and predictions of substantially increased future demands for construction services. The Prime Minister of Canada opened the Conference and delivered the keynote address.

Whereas the following Reference Paper is now somewhat dated and incomplete, it does constitute a useful summary of the main factors involved in construction industry policy considerations related to the various sciences and of the main areas of association activity. It demonstrates that the contents of the Association's Submission and Supplement are not hastily conceived but are in accordance with a 'blueprint' approved by a very representative group at the Ottawa Conference in 1965 and used as a guide by the C.C.A. in subsequent years. As mentioned in its opening paragraph, references to research studies in the fields of labour relations, training, etc., were also contained in other Reference Papers. The Canadian Inquiry on Construction Labour Relations was the direct outcome of one of these references.

RESEARCH

"Research" can cover a variety of fields. For the purposes of this brief paper, references will be restricted to technological aspects of the practice of construction in Canada and to economic factors influencing the scheduling of construction operations. (References to research studies in the fields of labour relations, training etc. are contained in other Reference Papers).

The development of new materials, equipment and techniques is a continuous condition in the construction industry. Much of this has resulted from specific research activities; some from job-site "trial and error" experimentation; and a good deal from a combination of the two. In the past, prime attention has been devoted to research and development of materials and machinery. This will likely continue, but increased attention is now being paid to research into job management as a means of increasing productivity and reducing costs by better utilization of job-site manpower and equipment and scheduling of operations.

Moreover, the importance of "external" factors affecting construction efficiency cannot be over-stressed. Construction has had a reputation for being relatively unstable. Seasonal and cyclical swings have caused very serious unemployment problems for all engaged in the industry -- employees, contractors, manufacturers and suppliers alike. This reflects a fundamental problem to the industry affecting recruitment, equipment, investment and long-term planning generally. Much remains to be done but work by economists in the fields of investment, employment and so forth hold out the promise of reduced "boom or bust" characteristics in our industry in the future.

The reduction of seasonal swings in construction in Canada is basically the result of research in both areas. The development of new materials and techniques has greatly facilitated wintertime construction. Similarly, research into the nature of wintertime unemployment has led to the introduction of incentives that have served to level out very considerably the municipal services construction and housebuilding programs. Similarly, large-scale publicity programs have greatly influenced the transfer of repair and renovation work to the winter months.

So far as is known, no recent appraisal has been made of the overall technological research program for the construction industry in Canada being conducted by the NRC Division of Building Research; the Forest Products Laboratories and other Federal Government agencies; the universities; Provincial Research Councils, Departments and other bodies; individual manufacturers and contractors; trade associations; and other organizations. To any such list must be added the research work being carried out by other industries seeking to expand their markets by developing new construction materials.

All of this activity must add up to a very impressive total. And yet, when the outlay is compared to the total value of the construction program, the percentage being spent on technological research and development may well be below that of many other industries.

With regard to economists, some large manufacturers of construction materials have economists on their staff and others engage them from time to time for special studies. The construction industry as represented by contractors and associations does not have any staff economists. In Ottawa, economists with the Economic Council of Canada, the Bank of Canada, Central Mortgage & Housing Corporation, the Departments of Finance, Trade & Commerce, Labour etc. and the Dominion Bureau of Statistics are naturally concerned with matters related to construction operations but, subject to correction, there are no Economics Sections dealing with the overall construction industry, whereas "Industrial" Federal Departments such as Agriculture, Fisheries, Forestry, Mines and National Resources all have such groups of economists working full time on behalf of the industries which they serve. The Departments of Public Works and Transport have economists but they deal with departmental programs in the main. There is no "Construction Industry" section in either the Department of Trade & Commerce or the Department of Industry. A few university economists have special knowledge of construction operations and the field of investment policy has attracted a good deal of attention. Generally speaking, however, there does not appear to be much liaison between the industry and university economists.

Association research activities in the fields of technology and economics are quite varied. For example, the Portland Cement Association operates a large research laboratory; the National House Builders' Association is financing with CMHC the construction of experimental houses; the Canadian Institute of Steel Construction underwrites the expenses of a Research Fellow at the National Research Council; and the Road Builders' Associations in the Prairie Provinces contribute to the Beattie Ramsay Memorial Fund whose moneys are used to finance construction research projects carried out by the Schools of Engineering in their region.

The CCA encouraged the establishment of the NRC Division of Building Research; is honoured to include the Division among its members; is represented on the Division's Advisory Council; and refers most technical inquiries to it. In short, liaison is very close and no attempt has been made to provide any services available from DBR. The CCA advanced funds to help finance research on soil compaction and related studies in Western Canada and member firms provided accommodation for the field crews conducting this work. With regard to job-site productivity, the Association has carried out committee projects and has distributed material on "payment-by-results" and profit-sharing plans and has promoted "Work Study" methods. For example, a paper on the latter subject was presented at the 1963 CCA convention and the Association helped to finance and arrange interviews for Prof. Aird's study that was the basis for the NRC-DBR publication, "Manpower Utilization in the Canadian Construction Industry". Currently the CCA is promoting Work Study seminars for construction executives.

Insofar as construction economics is concerned, the CCA has devoted a major portion of its annual submission to the Federal Government to "Economic Expansion & Employment"; has submitted major briefs to the Royal Commissions on Taxation, Banking & Finance, Canada's Economic Prospects etc. and co-operated closely with the latter's separate study on the Canadian Construction Industry; has actively participated in the development of the ILO's very comprehensive material on "Practical Measures for the Regularization and Growth of Employment in the Construction Industry"; has promoted the improvement of government statistics concerning construction volume, employment etc.; and has made many representations concerning measures designed to expedite the development of Canada's resources and industrial growth.

In order to increase the amount of research works, associations in the construction industry might well:

a) assist in the development of more technical research personnel by providing universities with fellowships etc.
b) provide greater support to the NRC Division of Building Research and other organizations engaged in construction research work
c) budget for research projects, where appropriate, in various fields of industry activity
d) advocate the continuation of taxation incentives designed to encourage corporate research programs
e) establish closer liaison with public agencies, universities and other groups studying various aspects of the industry's operations in order to assist them in their work and to ensure that full recognition is given by them to the importance of the construction industry and to practical considerations
f) help in the publicizing of the results of research studies and of means towards the improvement of construction practice.

It is interesting to note that the construction industry in South Africa is developing a very comprehensive research program covering construction technology, labour relations, training, organization and management and that it is financed by contributions to an Industry Development Fund. This fund is administered by trustees representing various associations in the industry. A detailed study of the establishment in Canada of a similar Fund on a broad basis to finance and co-ordinate projects for the general welfare of the construction industry would appear to be very worthwhile. The very magnitude of the number of firms in the industry means that sizeable sums could be accumulated from very small assessments. The size and effectiveness of the programs already carried out in Canada in certain aspects of the industry by this type of assessment are frequently impressive. The possible extension of this procedure to large-scale projects of general interest beyond the normal capabilities of existing associations may in itself warrant "research".

APPENDIX 24

SUPPLEMENTARY BRIEF TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

THE DEPARTMENT OF EXTERNAL AFFAIRS

August 22, 1969

RESEARCH ACTIVITIES WITHIN THE
DEPARTMENT OF EXTERNAL AFFAIRS

Research within the Department of External Affairs has been carried out over the years largely on an ad hoc basis and generally has been closely related to the specific policy objectives of the Department and Government at any given point in time. The Department is well aware of the benefits which can be derived from the establishment of a capability for carrying out sustained research into many aspects of foreign policy and has recently taken steps toward the establishment of a unit within the Department to be concerned with policy research and analysis.

HISTORICAL RESEARCH

2. A large proportion of the time of Historical Division is, by the very nature of its responsibilities, devoted to historical research. The major effort is directed to the preparation for publication of successive volumes in the series Documents on Canadian External Relations. This work entails the search for original documents constituting Canada's "State Papers" and related documents from which a judicious selection must be made, followed by scholarly editing in preparation for publication. Searches are conducted in the Department's files, the records of the Office of the Governor General

and other collections in the Public Archives of Canada including groups such as the Borden Papers, the Meighen Papers, the King Papers, etc., as well as Sessional Papers. In fact, any source known or suspected of being able to provide leads to historical documents of this nature is used.

3. The staff devoted to the research described above consists partly of the permanent members of the Historical Division, assisted by a University Professor of History engaged under contract for specified periods, usually about one year, and students who are engaged during university vacation under the Government Plan for student employment.

4. In addition to the research described above, the Historical Division carries out research at the request of other divisions of the Department which may require background on developments on the earlier years of the Department's activities in order to assist them in dealing with current problems. Occasional studies into the earlier history of the Department are also undertaken on the initiative of the Historical Division where a requirement to provide background material of use to other divisions of the Department is foreseen. The Historical Division also occasionally conducts research in the course of preparing articles for the Department's monthly publication "External Affairs".

LEGAL RESEARCH

5. Research activities within the Legal Division of the Department of External Affairs are closely related to the responsibilities of the Department and deal with many

important questions arising out of Canadian participation in international organizations and Canadian external interests and policies. The Division works closely with the Department of Justice on matters relating to Canadian law and legal practice, and with the legal sections of other departments and agencies of governments in their specialized fields. It also provides other divisions within the Department with interpretations of international law as they affect their work. The Division acts as consultant in the drafting of treaties and similar formal exchanges with foreign governments.

6. During the past several years, a number of academics and students have been engaged under contract or under the summer employment programme to assist the Legal Division in a variety of research projects, including the following:

- A study of State Succession;
- A study of State Responsibility;
- A study on the Law of the Sea;
- A paper on "Possible Approaches to the Establishment of a Legal Regime to Regulate the Exploration and Exploitation of the Mineral Resources of the Seabed and Subsoil of the Oceans Beyond the Limits of National Jurisdiction";
- A draft interim "Convention on the Exploration and Exploitation of the Mineral Resources of the Seabed and Subsoil of Oceanic Basins;

- A paper on "Article 25 of the United Nations Charter (Obligations of United Nations Members to Carry Out Decisions of the Security Council)";
- A paper on "War Crimes and Crimes Against Humanity";
- A study of the steps needed and possibilities of action for Canadian ratification of various United Nations Human Rights Instruments;
- A summary of "Canadian Practice on Recognition of State and Governments";
- A preliminary card index reference on States and Governments recognized by Canada;
- An outline paper on State Succession;
- Studies on implementation problems in connection with Canadian ratification of the U.N. Convention on Racial Discrimination and the U.N. Convenant on Human Rights;
- A study of the Canadian attitude towards the Peaceful Settlement of Disputes.

7. To assist it in its work, the Legal Division maintains a library devoted mainly to works on international law and a Treaty Register where records of international agreements to which Canada is a party are maintained.

SEASONAL RESEARCH PROGRAMMES

10. The Department has found the services of senior students and professors engaged during the summer vacation period to be extremely helpful in enabling it to carry out specific research projects which it would have difficulty completing by other means. In addition to providing the Department with valuable assistance, students and professors are selected from groups whose areas of interest coincide with those of the Department. Students are thus able to obtain an "insider's" insight into the conduct of Foreign Affairs and to have an opportunity to determine through their association with the Department whether it presents the kind of career opportunities they would find desirable. Thus, the programme also serves as a valuable adjunct to the Department's recruitment programme.

11. The nature of the research carried out by students and professors may vary from year to year depending upon Departmental priorities. By way of example, the following are some of the projects undertaken during the 1968-69 "summer employment" programme:

Division	Subject
Latin American	Specialized studies on various Latin American countries
United Nations	Peaceful Settlement of International Disputes
Information	Teaching and Research at Canadian Universities in International Relations and Area Studies
Historical	Preparation for Publication of Documents on Canadian External Relations

Legal	Specialized Duties in Claims Section
Cultural Affairs	Canadian Art Exhibitions Abroad
Economic	Study of Possible Free Trade Between the Commonwealth, Caribbean and Canada

Additionally occasional research projects on specific subjects are carried out by specialists in certain fields under contract.

POLICY ANALYSIS GROUP

12. As a consequence of a recent study carried out at the direction of the Under-Secretary, a Policy Analysis Group is being set up in the Department, which will be concerned with "policy research" or "policy analysis" rather than the traditional forms of pure and applied research. Its principal task has been defined as "to develop and analyse major alternatives for Canadian foreign policy, with particular attention to long-range considerations".

13. The creation of the group is in keeping with the emphasis being given to "objective analysis" in the formulation of policies in government and in the private sector in the United States and other countries. It is also designed to enable the Department to work in co-operation with other government departments and agencies in Ottawa which now employ these techniques. The Policy Analysis Group will work closely with the Senior Committee of the Department.

14. In addition, the Group is expected to establish links with non-governmental research institutes and universities. The possibility of commissioning research in political science and related fields from such institutions which would assist the Department in the development and analysis of foreign policies will be studied.

ADMINISTRATIVE RESEARCH

15. In addition to the conduct of research into foreign policy and related matters, the Department several years ago created an Organization and Methods Division with responsibility to promote, on a continuing basis, improvements in Departmental management and operating procedures. In the main, this is achieved through formal and comprehensive surveys of major segments of the Department's operational areas, e.g., personnel management, records management, materiel management, property management, as well as through ad hoc studies of lesser importance on individual procedures or forms. All projects are carried out in four steps: fact finding, analysis, development of conclusions, and the making of recommendations.

16. Recommendations may range from basic changes in organizational structure to the elimination of an unnecessary copy of a simple form; from the use of a simple piece of office equipment such as a dictating machine, to an examination of large-scale computer application to the work of the Department. Various recognized techniques are used in the day-to-day work of the Division including: systems and procedures design, organization analysis, work measurement, forms design, etc.

17. Although the size of the Department and the nature of its activities do not justify the hiring of full-time specialists, the Department is able to call upon the resources available from other sources such as the Bureau of Management Consulting Services or from private consultants. The staff of the Organization and Methods Division keeps itself informed of the latest developments in the management improvement field in Canada and other countries both in and outside of Government.

18. As examples of the nature of the work undertaken by the Organization and Methods Division, it has recently concluded reviews in the following operational areas: Personnel Management; Records Management; Materiel Management; Printing and Distribution Services; and the Office of Economic Affairs. The Division also sponsored and took an active part in a survey of the organizational structure of the Department as a whole in conjunction with the Bureau of Management Consulting Services. It is now actively engaged in the implementation of proposals put forward by a firm of private management consultants for an improved financial management programme. Contributions have been made to the planning of the new Departmental headquarters building, e.g., evaluation studies of mechanical equipment suitable for transmitting papers throughout the proposed new headquarters building. Recommendations made in the area of Material Management include a computerized system of control which is now in the process of implementation. The Division has also actively participated in the development of a computerized control system for pay and allowances which is now in operation. A continuing programme of improvement of Departmental forms and associated procedures also has been implemented.

APPENDIX 25

SUBMISSION

TO THE

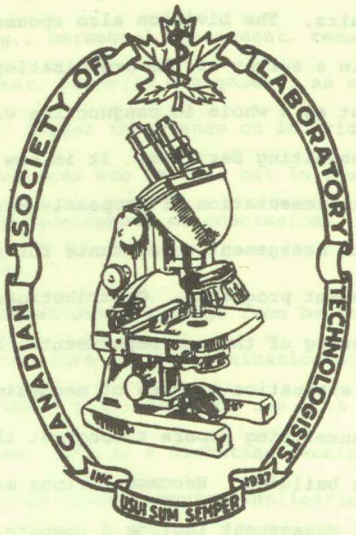
SPECIAL COMMITTEE

OF THE

SENATE OF CANADA

ON

SCIENCE POLICY



CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS
P.O. BOX 830 165 JACKSON ST. EAST
HAMILTON, CANADA

SUBMISSION

to the

SPECIAL COMMITTEE

of the

SENATE OF CANADA

on

SCIENCE POLICY

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This brief is submitted by the Canadian Society of Laboratory Technologists, 165 Jackson Street East, Hamilton, Ontario.

Mr. Peter Hills, President, and Mr. A.R. Shearer, Executive Director, will appear at the hearings.

This brief will be formally presented by Mr. A.R. Shearer, Executive Director of the Society.

April 12, 1969

21719—15½

SUMMARY OF RECOMMENDATIONS

1. It is recommended that, in the further development of a National Science Policy, appropriate recognition be given to the essential importance of qualified technological personnel in the total program (D.9).

2. It is recommended that research, development, and service should become more inter-related than at present by extension and maintenance of effective communications (D.10).

3. It is recommended that a study be initiated to determine the technological resources needed to support effective scientific development on a National scale, and that training programs be developed to provide qualified technologists to meet these needs (D.11).

4. It is recommended that at least a pilot training project be considered for technologists to serve academic research, and that such a program might offer a basic science curriculum with options in appropriate subjects, supplemented by a period of continued practical training in academic laboratories (D.13).

5. It is recommended that an ad hoc committee, representative of appropriate science and technologies, be created to study and report on the various recommendations of this submission.

A. OBJECTIVES OF THE C.S.L.T.

1. In the Charter of Incorporation of this Society granted by the Secretary of State for Canada in May, 1937, the original Aims and Objectives were well-defined, and they remain the basic principles of the Society today. These Aims and Objectives are:
   (a) to improve the qualifications and standing of medical laboratory technologists in Canada;
   (b) to promote research endeavour in all branches of medicine;
   (c) to promote a recognized and professional status for medical laboratory technologists;
   (d) to promote closer co-operation between the medical profession and the medical laboratory technologists; and
   (e) to aid more efficiently the physician in the diagnosis and treatment of disease.

2. In the development of its objectives, the history of the Society, as a National organization of professionally oriented personnel, has demonstrated that it has constantly maintained its activities towards the provision of well-qualified personnel in Medical Laboratory Technology for the benefit of medical laboratory services and the ultimate welfare of the patient. In its thirty-two years of service, the Society has certified 12,182 technologists to a National standard, and 54.8 per cent of these are currently active in the service of health science laboratories. Furthermore, the Society has maintained a co-operative liaison with the Canadian Medical Association and its laboratory affiliates, and it has established effective communication with other organizations within the health field through the appointment and function of its own Advisory Council. These broad and democratic external communications bring authoritative opinions on medical care to aid the Society in its general programs.

3. The Canadian Society of Laboratory Technologists defines medical technology as a career in medical laboratory science which requires specialized knowledge and intensive preparation, including instruction in skills and methods, as well as in the scientific, historical, or scholarly principles underlying such skills and methods. The certified

medical laboratory technologist is thus a person with a knowledge of, as well as the ability to perform, laboratory investigations required by medical laboratory services.

B. TRAINING AND CERTIFICATION

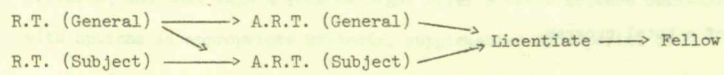
4. To assist in the fulfillment of our Aims and Objectives, programs for certification and registration of medical laboratory technologists were developed in the very early years of incorporation. Affiliation with the Canadian Medical Association was achieved in these early years, and a conjoint program of formal and regulated courses of instruction towards Certification with this Society was developed. Today the approval of Training Programs in Medical Laboratory Technology is a cooperative effort of the two Societies, with the assistance of other Laboratory Scientific Organizations, and uniform programs of training are being achieved in the interests of National Certification and Registration. In 1960, this Society organized its Certification Board to develop the current Certification Program in recognition of rapidly changing and developing requirements for Medical Laboratory Services. Essentially, this Program recognizes initial levels and advanced levels of Certification for Medical Laboratory Technologists.

5. Initial Certification. The initial levels of Certification are offered in two areas: the General area and the Subject area. The General Certificate, R.T., is conferred on an eligible candidate who has taken training in a Program approved by the Canadian Medical Association and the Canadian Society of Laboratory Technologists, and who has successfully completed the Certification examinations presented by this Society. The Subject Certificate, R.T.(Subject), is conferred on an eligible candidate who has completed a Training Program which has been approved by C.S.L.T. in one of the disciplines of Medical Laboratory Technology and who has subsequently passed the examinations for this Certification. At these initial levels of Certification, the medical technologist demonstrates the following characteristics associated with true professional status. (1) the professional worker contributes to the skill and knowledge of the profession. He develops new ideas, plans methods, and develops scientific accuracy and integrity and teaches by a scientific method; (2) the professional worker respects the confidence of others. The welfare of

those he serves requires that information concerning them remain confidential, and he never violates a confidence; and (3) the professional worker avoids rumour and hearsay. He secures information which is important to him directly from those authorized to release it.

6. Advanced Certification. Two levels of Advanced Certification are presently offered in the Society's Program; namely, Advanced Registered Technologist (A.R.T.), and Licentiate (L.C.S.L.T.). Progression from one Certification level to a higher level requires a minimum period of advanced training and experience of three years (normally 3-5 years), and defined eligibility credits must be accumulated during this period preceding examination. At the A.R.T. level, two types of Certification are offered: one in the General field, A.R.T.(General), and the other in one of the Medical Laboratory disciplines, A.R.T.(Subject). Licentiate Certification is the highest level of Certification obtained by examination in this Society, and there are two ways in which this Certification may be achieved. One of these emphasizes the administrative and organizational aspects of the individual's work, and the other emphasizes the highly specialized nature of his advanced qualifications in a special subject area. It may be noted that provision is made in the Certification Program for the granting of a Fellowship, but this will be conferred only by nomination of eligible candidates of outstanding abilities and knowledge.(see Appendix G to this submission).

The Certification levels and channels of progression which have been approved are shown as follows:



C. OTHER PROGRAMS OF THE C.S.L.T.

7. Recruitment of personnel into training and certification in medical laboratory technology is a continuing program of this Society. Recruitment is encouraged and supported at Provincial and local levels by members of the Society, who participate in career counselling by invitation from Secondary School authorities, and, in some areas, by the presentation of "Career Shows". The Society supports this activity by providing recruitment material in the form of the Career Pamphlet and films depicting medical laboratory technology as a career.

8. The publications services of the Society are maintained primarily as a membership service, but they function as media for continuing education. The Canadian Journal of Medical Technology, published bi-monthly, is devoted chiefly to the presentation of scientific papers, in English and French, on subjects of medical laboratory technology. The C.S.L.T. News Bulletin, published bi-monthly in French and English editions, carries items relating to Society news and programs, as well as technical notes and advice. Furthermore, a news-letter, produced by Science Sections, is published for distribution to members of the sections, and this publication serves the interests of specialized units within the Society, but in the ultimate interest of total Society programming.

D. A NATIONAL SCIENCE POLICY

9. The relevance of a technological Society's opinion to the profound questions which will be debated in any consideration of a National Science Policy may not, at first, be apparent, but it is respectfully suggested that the total resources required; that is, administrative personnel, research scientists, physical and equipment facilities, and qualified technological personnel, must be considered if economic and efficient utilization of research and development funds is to be realized. Traditional concepts that the availability of personnel with high academic training and capacity for profound thought, together with the hardware (equipment) to enable investigation of a concept assures the resolution of a project, should be broadened to admit that supportive resources in the team concept have an important and essential function in the development of a total program.

10. In our experience in a primarily service area, the exclusiveness which often exists between "research and development" on the one hand and "service" on the other is artificial and not always conducive to the best interests of each nor to the ultimate benefit of society. The problems encountered regularly by "service" groups can often provide a direction for "research and development", and such problems are capable of identification and communication by knowledgeable technologists, but there must be an inter-relation of research and service if effective communications and mutual assistance are to be realized.

11. The productivity of research and development must be dependent to some

degree on the ease with which projects can be brought into being, and we believe it is an economic waste of the research potential of a highly trained research scientist if he does not have strong and quickly applicable technological support. In academic research particularly, it is not uncommon to see a lack of initial productivity of variable duration simply because basic methodology has to be learned or developed by technical personnel. It is recommended therefore that a study be initiated to determine the technological resources needed to support effective scientific development on a National scale, and that training programs be developed to provide qualified technologists to meet these needs.

12. With reference to the foregoing statement, we suggest that the experience of this Society in developing a National program of training and certification in the technologies of hematology, histology, clinical chemistry, clinical microbiology, blood bank technology, and exfoliative cytology, might serve as a useful pattern for the development of technological training for research and development within a National Science Policy.

13. With the rapid and continuing advances of the technologies in most areas of investigation, dependence upon informal and outmoded apprenticeship training is inadequate and perpetuates an invidious system whereby personnel have restricted capabilities to adjust with changes in the new directions of science. It is recommended, therefore, that at least a pilot training project be considered for technologists to serve academic research, and that such a program might offer a basic science curriculum with options in appropriate subjects, supplemented by a period of continued practical training in academic laboratories.

14. The Canadian Society of Laboratory Technologists is prepared to make available its considerable experience, within the limits of its resources, to assist in the development of a recognized technological support in a National Science Program. In this regard, it is recommended that an ad hoc committee, representative of appropriate sciences and technologies, be created to study and report on the various recommendations of this submission.

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of

APPENDICES

APPENDIX A

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

BY-LAWS (ENGLISH)

CODE OF ETHICS

(Revised January 1963)

Introduction

Medical technology is a branch of medical science. The medical technologist, appreciative of the valuable work done by his colleagues in the medical and para-medical sciences, co-operates fully with them. The following Code of Ethics is the outgrowth of a desire to maintain the dignity and the high esteem of the profession of medical technology.

****

1. Medical technologists are dedicated to the service of humanity. They work in co-operation with all other members of the health team.

2. The motto "usui sum semper" shall remain paramount in the life of medical technologists.

3. Medical technologists shall uphold their scientific status on a suitably professional level by a distinctive demeanor in their dress and general conduct.

4. Medical technologists shall diligently apply their skill to maintain a reputation of honesty and reliability.

5. Medical technologists shall consider all medical information confidential.

6. Medical technologists shall be aware that the diagnosis of disease is the responsibility of the physician.

7. Medical technologists shall uphold and maintain the dignity and respect of their profession, considering reliability, courtesy, patience, tact, efficiency and personal integrity as fundamental attributes.

8. Medical technologists shall be loyal to their colleagues and shall recognize an obligation to support their professional organization by interest and active participation.

9. Medical technologists shall strive to improve their skill and knowledge and maintain an open mind to scientific advancement.

10. The medical technologist shall maintain a high professional level of teaching the method and theory of medical technology at all times.

CANADIAN SOCIETY OF LABORATORY
TECHNOLOGISTS

(Incorporated under Dominion Charter)

CHARTER
MAY 1937

NAME

The name of this Society shall be Canadian Society of Laboratory Technologists.

CHARTER

CANADA

By the Honourable Fernand Rinfret, Secretary of State of Canada.
To all to whom these presents shall come, or whom the same may in anywise concern,

GREETING:

WHEREAS, in and by Part II of the Companies Act, 1934, it is, amongst other things, in effect enacted that the Secretary of State of Canada may, by Letters Patent, under his Seal of Office, grant a Charter to any number of persons, not less than three, who having complied with the requirements of the Act, apply therefore, constituting such persons, and others who thereafter become members of the Corporation thereby created, a Body Corporate and Politic without share capital, for the purpose of carrying on in more than one province of Canada, without pecuniary gain to its members, objects of a national, patriotic, religious, philanthropic, charitable, scientific, artistic, social, professional or sporting character, or the like, upon the applicants therefore establishing to the satisfaction of the Secretary of State of Canada, due compliance with the several conditions and terms in and by the said Act set forth and thereby made conditions precedent to the granting of such Charter.

AND WHEREAS, FRANK JOSEPH ELLIOTT, Analytical Chemist, DENYS ROBERT LOCK, HELEN LEOTA SMITH, MARJORIE BEWS, and WILLIAM EDWARD DUNCAN, Technicians, JAMES KENNETH McGREGOR, Surgeon, HARRY PEACOCK, Physician, MIRIAM ROBINA HUTCHINSON, Secretary, and WILLIAM JAMES DEADMAN, Pathologist, all nine of the City of Hamilton, in the Province of Ontario, MARY MAIN and RUTH IRENE LAWRASON, both of Dundas, in the said Province of Ontario, Technicians, and MABEL EVELYN TUFFORD, of Walkerville, in the said Province of Ontario, Technician . . . . have made application for a Charter under the said Act, constituting them, and such others as may become members in the Corporation thereby created, a Body Corporate and Politic, under the name of Canadian Society of Laboratory Technologists for the purposes hereinafter mentioned, and have satisfactorily established the sufficiency of all proceedings required by the said Act to be taken and the truth and sufficiency of all facts required to be established previous to the granting of such Letters Patent, and have filed in the Department of the Secretary of State a duplicate of the Memorandum of Agreement executed by the said applicants in conformity with the provisions of the said Act.

NOW KNOW YE, that I, the said FERNAND RINFRET, . . . Secretary of State of Canada, under the authority of the hereinbefore in part, recited Act, by these Letters Patent, constitute the said FRANK JOSEPH ELLIOTT, DENYS ROBERT LOCK, HELEN LEOTA SMITH, MARJORIE BEWS, WILLIAM EDWARD DUNCAN, JAMES KENNETH McGREGOR,

HARRY PEACOCK, MIRIAM ROBINA HUTCHINSON, WILLIAM JAMES DEADMAN, MARY MAIN, RUTH IRENE LAWRASON and MABEL EVELYN TUFFORD, and all others who may become members in the said Corporation, a Body Corporate and Politic without share capital, by the name of Canadian Society of Laboratory Technologists with all the rights and powers given by the said Act and for the following purposes and objects, namely:

To improve the qualifications and standing of laboratory technicians in Canada; to promote research endeavour in all branches of laboratory work; to promote a recognized and professional status for technicians; to promote closer co-operation between the medical profession and the technician; to more efficiently aid in diagnosing and treating disease.

The operations of the Corporation to be carried on throughout the Dominion of Canada and elsewhere.

The head office of the said corporation will be situated at the City of Hamilton, in the Province of Ontario.

And it is - hereby - ordained and declared that, if authorized by by-law, duly passed by the directors and sanctioned by at least two-thirds of the votes cast at a special general meeting of the members, duly called for considering the by-law, the directors may from time to time:

(a) borrow money upon the credit of the corporation;

(b) limit or increase the amount to be borrowed;

(c) issue debentures or other securities of the corporation;

(d) pledge or sell such debentures or other securities for such sums and at such prices as may be deemed expedient;

(e) mortgage, hypothecate, charge or pledge all or any of the real and personal property, undertaking and rights of the corporation to secure any such debentures or other securities or any money borrowed or any other liability of the corporation.

Nothing in this clause contained shall limit or restrict the borrowing of money by the corporation on bills of exchange or promissory notes made, drawn, accepted or endorsed, by or on behalf of the Corporation.

And it is further ordained and declared that the business of the said Corporation shall be carried on without the purposes of gain for its members and that any profits or other accretions to the Corporation shall be used in promoting its objects.

That the said FRANK JOSEPH ELLIOTT, DENYS ROBERT LOCK, HELEN LEOTA SMITH, and WILLIAM JAMES DEADMAN, are to be the first directors of the said Corporation.

Given under my hand and Seal of Office, at Ottawa, this twentieth day of May, 1937.

Under Secretary of State

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

BY-LAWS

June, 1967

Article I.

Membership

The C.S.L.T. shall maintain a Registry of duly qualified members certified by the C.S.L.T. The membership shall be composed of members as defined hereinafter — CSLT Registry

Section 1. A Certified member shall be one who has attained a certain standard in the practice of medical laboratory technology as determined by the CSLT. — Certified member

Section 2. An Associate member shall be one who is currently engaged in medical laboratory technology but who is not a certified member. — Associate member

Section 3. An Affiliate member shall be one who holds a Doctorate degree in a related science or one who has attained a recognized status in health services. — Affiliate member

Section 4. Notwithstanding any of the above the CSLT may establish additional membership categories from time to time in recognition of developing programs.

Article II.

Terms of Membership

Section 1. Certified Members who are currently Registered and actively engaged in medical laboratory technology or who have been granted Honorary Membership shall be entitled to all the privileges and services of the CSLT, as defined by the General Council from time to time, including those of voting and holding elected office. — Privileges of Members (Active or Honorary)

Section 2. Certified Members who are currently enrolled but are <u>not</u> actively engaged in medical laboratory technology and who have <u>not</u> been granted Honorary Membership shall be entitled to all the privileges and services of the CSLT, as defined by the General Council from time to time, except for voting and holding elected office. — Privileges of Members (Inactive)

Section 3.	Associate Members shall be entitled to all the privileges and services of the CSLT, as defined by the General Council from time to time, except for voting or holding elected office at the National or Provincial level.	Privileges of Associate Members
Section 4.	Affiliate Members shall be entitled to all the privileges and services of the CSLT, as defined by the General Council from time to time, except for voting or holding elected office.	Privileges of Affiliate Members
Section 5.	The initial and annual membership fees for any and all classes of membership shall be as levied by an Annual General Meeting of the membership, upon the recommendation of the General Council.	Initial and Annual Fees
Section 6.	Any certified member of the CSLT shall be in good standing only so long as his annual membership fee has been paid in full and the completed Annual renewal form returned not later than March 1st (first) of each year.	Member in good standing
Section 7.	Only those members in good standing as defined in Section 6 above shall be entitled to have their names listed in the Annual Roster of the CSLT.	Annual Roster
Section 8.	Every member of the CSLT shall, by accepting membership, agree to abide by the Constitution and By-Laws of the CSLT, and such Rules and Regulations of the CSLT as may be made from time to time, including such Code of Ethics as the Directors may promulgate from time to time.	Responsibility of Member
Section 9.	Any member in good standing with the CSLT may submit his resignation by giving notice in writing to the Executive Director at least 30 (thirty) days prior to the effective date of such resignation, but without prejudice to his liability to the CSLT.	Resignation
Section 10.	When a member's financial obligations or commitments to the CSLT remain unpaid by April 1st (first) of any given year, his name shall be removed from the membership rolls, and his membership shall stand suspended without further action or notice.	Removal of name from the membership rolls
Section 11.	If his membership has been terminated by suspension, a member may, upon request and upon meeting the requirements for re-instatement, have his name restored to the membership rolls.	Privilege of Re-instatement of Suspended Members
Section 12.	Any member charged with conduct detrimental to the CSLT or to the profession of laboratory technology as set forth in the Code of Ethics referred to in Section 8 above, as promulgated by the Directors and approved at the Annual General Meeting of the membership and against whom such charges are sustained may be expelled from membership by a 2/3 (two-thirds) vote of the Board of Directors.	Expulsion

Section 13. Any such member so expelled, as specified in Section 12 above, shall have the prerogative of appealing his case to the members at the next Annual General Meeting, provided such notice for appeal has been submitted to the Executive Director at least 30 (thirty) days prior to the date of the Annual General Meeting. — Privilege of Appeal

Section 14. Every member shall agree to termination of membership as defined in Article II, Sections 9, 10 and 12 and thereby waives all rights, interests, privileges, services or claims as a member in the event of his membership being so terminated. — Waiver of Membership rights

Article III

Meetings

Section 1. The Annual General Meeting shall be a general meeting of the members of the CSLT, held at such time and place as may be determined by the Board of Directors of the CSLT, for the purpose of receiving the Annual Reports of the CSLT and for the transaction of such other business as may be properly brought before it. — Annual General Meeting

Section 2. Notice of the Annual General Meeting of the CSLT, together with the Agenda for the meeting shall be sent to the members at their last known address not less than 30 days prior to the meeting. — Notice of Annual General Meeting

Section 3. A special meeting shall be a general meeting of the members of the CSLT which may be called at any time by the President of the CSLT with the approval of the Board of Directors or its Executive Committee, or upon request by written notice signed by at least 5 per cent of the voting members of the CSLT, for the purpose of considering a specified and urgent matter of business which cannot be delayed for an Annual General Meeting lest it affect the interests and welfare of the CSLT. — Special Meeting

Section 4. Notice of a special meeting of the CSLT, together with the purpose for holding the meeting shall be sent to the members at their last known address not less than 15 days prior to the meeting. The specific date, time and place for the meeting shall be at the discretion of the Board of Directors. — Notice of Special Meeting

Section 5. The majority of voting members present for any meeting other than a General Meeting shall constitute the quorum for that meeting. — Quorum for meetings other than for General Meetings

Article IV

Voting

Section 1.	The eligibility of any member to vote at any General Meeting or by mail ballot shall be in accordance with Article II, Sections 1-4.	Voting Rights
Section 2.	Each voting member shall be entitled to one vote per question at any Meeting of the CSLT. and in the case of a mail ballot, he shall be entitled to one vote per question.	Voting
Section 3.	In the event of a tie vote at any Meeting, the Presiding Officer may cast the deciding vote.	Tie Votes
Section 4.	A majority vote of the members in attendance at any Meeting of the CSLT or by mail ballot shall prevail except as otherwise specified in these By-Laws.	Majority Vote

Article V

Enactment of By-Laws

Section 1.	The Constitution and By-Laws of the CSLT and any amendments thereto shall be enacted by the General Council of the CSLT after adoption by two-thirds (2/3) vote of the members present at the Annual General Meeting.	Amendments to the By-Laws
Section 2.	Any proposition to amend shall not be acted upon unless written notice thereof has been given to the Executive Director not less than 180 days prior to the date of the next Annual General Meeting.	Notice of Proposition to Amend
Section 3.	A copy of the proposed amendment shall be embodied in the Agenda for the next Annual General Meeting.	Notice to Members.
Section 4.	All By-Laws so made or amended, and for the time being in effect, shall be binding on the members of the CSLT and shall have full force accordingly as and when the approval of the Registrar General of Canada has been obtained.	Approval of Registrar General

Article VI

Officers and Officials

Section 1.	A Patron of the CSLT may be appointed by the members at an Annual General Meeting upon the recommendation of the General Council.	CSLT Patron
Section 2.	The elected officers of the CSLT shall be as follows and shall constitute the Board of Directors of the CSLT:- (a) The President (b) The Immediate Past President (c) The President-Elect (d) The Vice-President	Elected Officers

(e) Two (2) Directors - one of whom shall be bi-lingual in the English and French languages.
(f) Two (2) Senior Directors.

Section 3. The term of office for all elected officers shall be 1 (one) year and all such officers shall enter into their duties and responsibilities officially as of the 1st (first) day of January of each year following their election. **Term of Office.**

Section 4. All elected officers acting on behalf of the CSLT upon the direction of the Board of Directors shall be entitled to be reimbursed for authorized expenses incurred during their term of office. **Reimbursement for expenses incurred.**

Section 5. Any elected officer charged with failure to perform his duties as an officer or charged with conduct detrimental to the CSLT through his position as an officer, and against whom such charges are sustained after due and proper hearing before the Board of Directors or a Board of Enquiry appointed by the Board of Directors shall be suspended from office if approved by a 2/3 (two-thirds) vote of the Board of Directors of the CSLT. **Suspension from Office.**

Section 6. Any elected officer so suspended shall have the right to appeal his case before the members at the next Annual General Meeting provided such notice of appeal has been submitted to the Executive Director of the CSLT at least 90 (ninety) days prior to the date of the Annual General Meeting. **Right of Appeal.**

Section 7. The Appointed Officers of the CSLT shall include the following:- **Appointed Officers.**

(a) Chairmen of Appointed Boards.
(b) Chairmen of Standing Committees.
(c) Chairmen of Special Committees.
(d) Signing Officers of the CSLT.
(e) Such other appointed officers as may be deemed necessary by the Board of Directors of the CSLT for the efficient functioning of the CSLT.

Section 8. The appointment of Appointed Officers shall be made by the President of the CSLT with the approval of the Board of Directors. **Appointment of Appointed Officers.**

Section 9. The term of office for Appointed Officers shall be 1 (one) year and all such Appointed Officers shall enter into their duties and responsibilities officially as of the 1st (first) day of January following their appointment, except as otherwise specified in these By-Laws. **Term of Office.**

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Section 10. All Appointed Officers acting on behalf of the CSLT upon the direction of the Board of Directors shall be entitled to be reimbursed for authorized expenses incurred during their term of office. — Reimbursement of Expenses for Appointed Officers

Section 11. The Appointed Permanent Officials of the CSLT shall be full or part-time appointments and shall include the following: — Appointed Officials of the CSLT

(a) The Executive Director of the CSLT.
(b) Such other Appointed Permanent Officials as may be deemed necessary by the Board of Directors of the CSLT for the efficient functioning of the CSLT and its business office or offices.

Section 12. The Appointed Permanent Officials shall receive a salary and/or honorarium commensurate with their duties and responsibilities and in addition shall be reimbursed for any legitimate expenses which shall be incurred by them in the performance of their duties. — Reimbursement of Appointed Officials

Article VII

Election of Officers

Section 1. The Elected Officers of the CSLT shall be elected by mail ballot by the members of the CSLT who are eligible to vote as set forth in Article II, Sections 1 - 4. — Mail Ballot

Section 2. The ballot submitted by the Nominating Committee shall be forwarded by the Executive Director to each eligible voting member not less than 60 days prior to the date of the next Annual Meeting. — Ballot

Section 3. The ballots, completed by the voting member, shall be returned to the Executive Director within 15 days from the date of the mailing of the ballot and shall be counted by the auditor of the CSLT who shall report the results of the election to the Executive Director not less than 30 days prior to the date of the next Annual General Meeting. — Audit of Ballots

Section 4. In the event that any office is not filled as a result of the mail ballot, the Nominating Committee Chairman shall submit the name of at least one (1) nominee for the office not filled, for election at the Annual General Meeting. Notwithstanding the above, any voting member at the Annual General Meeting may also make nominations, for the office not filled, for election by the voting members at the Annual General Meeting. — Failure of mail ballot to elect an Officer

Section 5.	All elections held at an Annual General Meeting shall be by written ballot and the ballots counted by two (2) scrutineers appointed by the President at the Annual General Meeting, subject to the approval of the members at such meeting.	Elections at Annual General Meetings
Section 6.	In the event of a tie vote at any election at an Annual General Meeting, the President may cast the deciding vote.	Tie vote at Annual General Meetings
Section 7.	All nominations made, either on the nominating slate for the mail ballot or at any Annual General Meeting, must first have the written consent of the nominee.	Consent of Nominee required
Section 8.	All elections to office, either by mail ballot or at an Annual General Meeting, shall be by a plurality vote.	Plurality vote required for election

Article VIII

Duties and Responsibilities of Elected Officers

Section 1.	The President shall be the Chief Executive Officer of the CSLT, responsible to the membership of the CSLT for the efficient functioning of the CSLT and for the maintenance of proper procedures and protocol on the part of all Councils, Boards and Committees of the CSLT during his term of office and within the terms of these By-Laws.	Responsibility of the President
Section 2.	The President shall preside at all General Meetings of the CSLT, meetings of the Board of Directors and of the General Council and at all social or other official functions of the CSLT.	Duties of the President
Section 3.	The President shall be an Ex-Officio member of all other Councils, Boards and Committees of the CSLT except the Nominating Committee.	Privilege of the President
Section 4.	In the event of a vacancy occurring during the term of office of any elected Officer for any reason, the President shall have the authority to appoint a successor, with the approval of the Board of Directors of the CSLT, to fill the remainder of the term of office for such Officer.	Authority of the President
Section 5.	The Immediate Past President shall be the Chairman of the Nominating Committee, shall attend all meetings of the Board of Directors and assist in maintaining continuity in the progress of the CSLT and in the resolution of problems and projects.	Duties and Responsibilities of the Immediate Past President

Section 6. The President-Elect shall, whenever necessary, due to the absence or inability of the President to act, assume the duties and responsibilities of the President of the CSLT. — Duties of the President-Elect

Section 7. The President-Elect shall be the Chairman of the Legislation Committee and shall be a corresponding member of all other Standing Committees of the CSLT. — Privileges of the President-Elect

Section 8. The Vice-President shall, whenever necessary, due to the absence or inability of the President-Elect to act, assume the duties and responsibilities of the President-Elect. — Duties and Responsibilities of the Vice-President

Section 9. The Directors shall assist in the deliberations and activities of the Board of Directors. — Duties and Responsibilities of Directors

Section 10. The Senior Directors shall be members who have had previous Executive experience in the CSLT at the National level and shall act in an advisory capacity and assist in the deliberations and activities of the Board of Directors. — Duties and Responsibilities of Senior Directors.

Article IX

Board of Directors

Section 1. The Board of Directors shall consist of the Elected Officers of the CSLT as defined in Article VI, Section 2. — Constitition of Board of Directors

Section 2. Ex-Officio members of the Board of Directors without voting privileges may include Chairmen of such Boards and Committees as may be determined from time to time. — Ex-Officio members of the Board of Directors

Section 3. (a) The Board of Directors shall constitute the Executive body of the CSLT with power to incur obligations, disburse monies and perform all such acts of administration as may be necessary or expedient to the proper functioning of the C S L T subject to the provisions of these By-Laws and any amendments made thereto. — Authority of the Board of Directors

(b) The Board of Directors shall have the authority to:

(i) borrow money upon the credit of the corporation;

(ii) limit or increase the amount to be borrowed;

(iii) issue debentures or other securities of the corporation;

(iv) pledge or sell such debentures or other securities for such sums and at such prices as may be deemed expedient;

(v) mortgage, hypothecate, charge or pledge all or any of the real and personal property, undertaking and rights of the corporation to secure any such debentures or other securities or any money borrowed or any other liability of the corporation.

Section 4. Meetings of the Board of Directors shall be held at such time and place as may be determined by the Executive Director in consultation with the President of the CSLT. — Meetings of the Board of Directors

Section 5. The President with the approval of the Board of Directors of the CSLT may invite certain other Officers, Officials or other individuals to take part in the discussions on pertinent business at any meeting of the Board of Directors. — Privilege of the Board of Directors

Section 6. Between meetings of the Board of Directors, for action on problems requiring immediate attention, the authority and power to act rests with the President or his designate(s) from the Board of Directors in consultation with the Executive Director. — Delegated Authority

Article X

General Council

Section 1. The General Council of the CSLT shall consist of:
(a) The Board of Directors of the CSLT,
(b) The Directors from each Provincial Branch of the CSLT or Provincial Affiliated Society in Canada.
(c) Chairmen of Boards and Standing Committees. — Constitution of the General Council

Section 2. The General Council shall meet once a year at the time and place of the Annual General Meeting of the CSLT. — Meetings of the General Council

Section 3. Each member of the General Council shall be entitled to 1 (one) vote per question at any official meeting of the General Council of the CSLT. — Voting at General Council Meetings

Section 4. The President with the approval of the General Council of the CSLT may invite such other Officers, Officials or other individuals of the CSLT or its associated organizations as may be determined from time to time to attend any of its meetings. — Privilege of the General Council

Section 5. The General Council of the CSLT, as the policy approving body, shall receive the Annual Reports from the Board of Directors and shall refer any recommendations or other items of business as may be necessary, to the members at an Annual General Meeting for their approval. — Duties and Responsibilities of the General Council

Section 6. The General Council shall have the authority, by means of a 2/3 (two-thirds) majority vote, to request re-consideration of a decision made by the Board of Directors. — Authority of the General Council

Article XI

Advisory Council

Section 1. The Advisory Council of the CSLT shall consist of not more than nine members, appointed by the Board of Directors subject to the approval of the General Council at its Annual Meeting. — Constitution of the Advisory Council

Section 2. Ex-officio members of the Advisory Council shall include: — Ex-Officio Members
(a) The President of the CSLT or his designate,
(b) The Executive Director of the CSLT or his designate.

Section 3. The Advisory Council shall meet once each year, the time and place to be determined by the Executive Director with the approval of the Chairman of the Advisory Council. — Meetings

Section 4. A Chairman, elected annually by the members of Advisory Council, or his designate, shall be the Presiding Officer at any meeting of the Advisory Council. — Presiding Officer

Section 5. The term of office for each member of the Advisory Council shall be not more than 3 (three) consecutive years. — Term of Office for Members

Section 6. The duties and responsibilities of the Advisory Council shall be: — Duties and Responsibilities
(a) to act as liaison between the CSLT and other professional bodies.
(b) to act in an advisory capacity and make recommendations to the Board of Directors of the CSLT.

ARTICLE XII

Science Sections

Section 1.	Science Sections, as defined in the Rules and Regulations of the CSLT, may be established by authority of the Board of Directors.	Establishment of Science Sections.

ARTICLE XIII

Certification Board

Section 1.	The Certification Board shall consist of Registered members of the CSLT appointed by the Board of Directors from nominations submitted to the Board of Directors, as defined in the Rules and Regulations of the CSLT.	Constitution of the Certification Board
Section 2.	The Certification Board shall be responsible for all matters pertaining to the establishment and maintenance of standards of qualifications of members of the CSLT.	Duties and Responsibilities.
Section 3.	The term of office for each member shall be not more than 3 (three) consecutive years.	Term of office for members.
Section 4.	The Certification Board shall hold one of its meetings at the time and place of the Annual General Meeting of the CSLT. Other meetings of the Certification Board may be held at such time and place as may be determined by the Executive Director with the approval of the Chairman of the Certification Board.	Meetings

ARTICLE XIV

Publications Board

Section 1.	The Publications Board shall consist of Registered members of the CSLT appointed by the Board of Directors.	Constitution of the Publications Board
Section 2.	The Advertising and Business Manager of the Canadian Journal of Medical Technology shall be an Ex-Officio member of the Publications Board.	Ex-Officio member
Section 3.	The Publications Board of the CSLT shall be responsible for the publication of the Canadian Journal of Medical Technology and such other publications as may be issued from time to time by the CSLT.	Duties and Responsibilities.

Article XV

Nominating Committee

Section 1.	The Nominating Committee of the CSLT shall be a Statutory Committee.	Nominating Committee a Statutory Committee.
Section 2.	The Nominating Committee shall consist of the Chairman, who shall be the Immediate Past President of the CSLT, and the Provincial Directors of the General Council of the CSLT.	Constitution
Section 3.	The Nominating Committee shall be responsible for the preparation of the ballot for the election of Officers of the CSLT.	Duties and Responsibilities.
Section 4.	Nominations may be submitted over the signature of ten Registered members, one of whom shall act as the proposer and another as the seconder, and must be accompanied by the written consent of the nominee. Such nominations must reach the Chairman of the Nominating Committee at least 120 days before the Annual Meeting.	Nominations from members at large.

Article XVI

Standing and Special Committees

Section 1.	The Standing Committees of the CSLT shall be those Committees whose duties and responsibilities may involve a continuing study of the problems and projects as defined under the terms of reference assigned to them by the Board of Directors.	Standing Committees
Section 2.	The Special Committees of the CSLT shall be those Committees whose duties and responsibilities may involve only a short term study of any specific assignment given to them under the terms of reference as defined by the Board of Directors.	Special Committees

Article XVII

Signing Officers

Section 1.	The appointment of five (5) Registered members of the CSLT with authority of Signing Officers shall be made annually by the Board of Directors.	Appointment of Signing Officers
Section 2.	The Signing Officers or any two of the Signing Officers shall be authorized to sign on behalf of the CSLT any or all legal or financial documents of the CSLT during their term of office.	Authority of Signing Officers

Section 3. (a) The Signing Officers or any two of the Signing Officers, subject to approval of the Board of Directors, may transfer any and all shares of stock, bonds or other securities from time to time standing in the name of the Corporation in its individual or any other capacity or as trustee or otherwise and may accept in the name and on behalf of the Corporation transfers or shares of stock, bonds or other securities from time to time transferred to the Corporation, and the Executive Director shall affix the seal of the Corporation to any such transfers or acceptances of transfer, and may make, execute and deliver under the Corporate Seal any and all instruments in writing necessary or proper for such purposes, including the appointment of an attorney or attorneys to make or accept transfers of shares of stock, bonds, or other securities on the books of any Company or Corporation. Execution of Documents

(b) Notwithstanding any provisions to the contrary contained in the By-Laws of the Corporation, the Board of Directors may at any time by resolution direct the manner in which, and the person or persons by whom, any particular instrument, contract or obligations of the Corporation may or shall be executed.

(c) Deeds, transfers, licenses, contracts and engagements shall be executed on behalf of the Corporation by the Signing Officers or any two of the Signing Officers and the Executive Director shall affix the seal of the Corporation to such instruments as require the same.

(d) Contracts in the ordinary course of the Corporation's operations may be entered into on behalf of the Corporation by the Signing Officers or by any two of the Signing Officers as may be authorized by the Board of Directors.

Section 4. No Council, Board, Committee, or representative Provincial body shall expend any monies or incur any indebtedness or obligation on behalf of the CSLT without the sanction of the Board of Directors. Authorization of Expenses

Article XVIII

Executive Director

Section 1. The Executive Director shall be an Appointed permanent Official of the CSLT, responsible to the Board of Directors for the administration and management of the Head Office of the CSLT. Definition

Section 2. (a) The Executive Director shall be responsible for the maintenance and efficient operation of the business office of the CSLT. Duties and Responsibilities.

Section 2. (b) The Executive Director shall be an Ex-Officio member of all Councils, Boards and Committees of the CSLT and shall act as Secretary as instructed by the Board of Directors.

(c) The Executive Director shall perform such other duties as may be required of him by the Board of Directors, including that of a Public Relations Officer of the C.S.L.T.

(d) The Executive Director shall be responsible for maintaining the membership rolls and Registry of the CSLT and of such other documents as may be necessary.

(e) The Executive Director shall have custody of the Corporate Seal of the CSLT and shall certify all documents requiring certification by attaching the Corporate Seal of the CSLT.

(f) The Executive Director shall be responsible for keeping the books and records of the CSLT in such form as shall be acceptable to the Board of Directors.

ARTICLE XIX

Audit

Audit of Books and Fiscal Year of the CSLT.

Section 1. The books and records of the Society shall be audited by a chartered accountant who is authorized to practice under the laws of the Province in which the audit is conducted. The Board of Directors shall recommend to the General Council for referral to the Annual General Meeting for appointment, an auditor who shall audit the accounts of the Society annually or more often if desired, the audit commencing from the first of the fiscal year which shall be the 1st day of January of each year. If at any time the auditor so appointed is unable or unwilling to act, the Board of Directors shall appoint an auditor to act until the next Annual General Meeting.

ARTICLE XX

Official Crest of the CSLT

Official Crest

Section 1. The official crest of the CSLT, registered with the Canadian Registrar of Trade Marks, can only be used in whole or in part by any member of the CSLT with the written approval of the Executive Director of the CSLT.

ARTICLE XXI

Local Academies

Section 1.	Registered members of any district or area within a Province or territory may, upon application signed by at least five (5) such members, request approval and recognition of the organization of a Local Academy within the district or area. Such application shall be directed to the CSLT representative body in the Province (Provincial Branch or Provincial Affiliated Society, if such exists), or otherwise directly to the CSLT.	Approval to organize a Recognized Local Academy.
Section 2.	To retain approval to organise and operate a Local Academy, the Executive Officers and Officials of the Local Academy shall agree to operate and conduct the business of the Local Academy in co-operation with their Provincial Representative Organization and with the CSLT in conformity with the Constitution, By-Laws and Rules and Regulations of the CSLT and the Provincial Affiliated Society if applicable, insofar as there may be no conflict with the duties and powers of the Officers and Officials of the CSLT and its representative body in the Province.	Local Academy Agreement.
Section 3.	A Local Academy of the CSLT may only continue to operate and function as a Local Academy of the CSLT as long as there are at least five (5) Registered members in good standing with the CSLT enrolled annually as members of the Local Academy.	Minimum number of members required.
Section 4.	All enrolled members of a Local Academy shall be members in good standing with the CSLT.	Eligibility for membership in a Local Academy.
Section 5.	Eligibility to hold Local Academy office or official appointments shall be in conformity with the CSLT Constitution and By-Laws under Article II, Sections 1-4.	Eligibility to hold office.
Section 6.	Subject to the approval of the members of the Local Academy at a General Meeting, the Local Academy Executive may establish an annual fee, provided that no such fee shall become due and payable until approval of the Executive of the representative body of the CSLT at the Provincial level has been obtained, or from the CSLT in the absence of a Provincial representative body which includes any Provincial Branch of the CSLT or any Provincial Affiliated Society.	Local Academy membership fee.
Section 7.	The annual membership fee for any Local Academy shall at no time exceed the annual membership fee for the representative body of the CSLT at the Provincial level or of that at the National level.	Limitation of Local Academy fees.

Section 8. The Secretary of the representative body of the CSLT at the Provincial level shall automatically be placed on the mailing lists of all Local Academies to receive all Minutes of meetings and Reports by Local Academy officers and officials as well as any other publications issued by a Local Academy.

Minutes and Publications of Local Academy.

ARTICLE XXII

Provincial Branches of the CSLT

Section 1. Registered members of the CSLT resident in any one Province or Territory of Canada, where no Provincial Branch or Affiliated Society of the CSLT exists, upon application signed by at least ten (10) such members in the Province, may petition the Board of Directors of the CSLT for approval to organize an officially recognized Provincial Branch of the CSLT in their particular Province or Territory.

Application to organize a Recognized Provincial Branch.

Section 2. All enrolled members of a Provincial Branch shall be members in good standing with the CSLT.

Eligibility for membership in a Provincial Branch.

Section 3. Eligibility to hold Branch Executive offices or official appointments shall be in conformity with the CSLT Constitution and By-Laws, Art.II, Sections 1 - 4.

Eligibility to hold office in a Provincial Branch.

Section 4. To retain approval to organize and operate an official Provincial Branch of the CSLT, the Executive Officers and Officials of the Provincial Branch shall operate and conduct the business of the Provincial Branch in co-operation with the CSLT and in conformity with the Constitution and By-Laws and Rules and Regulations of the CSLT, insofar as there may be no conflict with the duties and powers of the Officers and Officials of the CSLT.

Provincial Branch Agreement.

Section 5. No Provincial Branch may continue to operate as an Official Branch of the CSLT unless there are at least ten (10) Registered members in the Province enrolled annually as members of the Provincial Branch.

Right to continue as a Provincial Branch of the CSLT.

Section 6. The CSLT reserves the right to revoke its approval and recognition of any Provincial Branch if, in the opinion of the Board of Directors of the CSLT, the said Branch fails to fulfil its obligations and responsibilities as defined in the Constitution, By-Laws and Rules and Regulations of the CSLT or if it operates in a manner considered by the Board of Directors as prejudicial or detrimental to the Aims and Objectives of the CSLT and its members within the Province or conflicting with the duties and powers of the Officers and Officials of the CSLT.

Right of CSLT to revoke Approval

Section 7. Subject to the approval of the CSLT members within the Province at an Annual General Meeting of the Provincial Branch, the Provincial Branch Executive may establish an annual Provincial Branch membership fee, provided, however, that no such fee shall become due and payable until the approval of the Board of Directors of the CSLT has been obtained.

Prov. Br. membership fee

Section 8. The annual membership fees for any Provincial Branch of the CSLT shall at no time exceed the annual membership fees for the CSLT.

Limitation of Prov.Br. Membership fee

Section 9. A Provincial Branch of the CSLT acting in that capacity may not enter into any formal agreement with any Government Department, Academic Institution, other Societies, or any other outside agency unless and until formal approval has been obtained from the Board of Directors of the CSLT.

Limitation of Prov. Branch Authority

Section 10. The Provincial Branch Executive shall recommend for the approval of their members at an Annual General Meeting, the names of at least 3 nominees and subsequently not more than 5 names shall be submitted through the Provincial Director to the Chairman of the CSLT Committee on Nominations for inclusion on the ballot for election by the voting members within that Province, to the office of Provincial Branch Director on the General Council of the CSLT.

Provincial Branch Representative on the General Council

Section 11. In the event a Provincial Branch of the CSLT ceases to function as a Provincial Branch for any reason whatever, the assets, financial and otherwise, of the Provincial Branch, together with all formal or legal documents of the Provincial Branch shall be put in trust immediately with the Executive Director of the CSLT. Such assets shall be held in trust by the Executive Director of the CSLT for a period of 2 years pending re-organization of the Provincial Branch. At that time, upon approval by the Board of Directors of the CSLT of the application for the re-organization of the Provincial Branch, the Executive Director will transfer the assets to the new Executive of the Provincial Branch. Failure of a Provincial Branch to re-organize within this period shall mean forfeiture of the assets which shall then be absorbed into the National assets of the CSLT.

Dissolution of a Provincial Branch.

Article XXIII

Provincial Affiliated Societies

Section 1. A Provincial Affiliated Society shall be one which assumes the functions and responsibilities of and replaces the Provincial Branch of the CSLT within a Province and which operates under an agreement with the CSLT but which holds its own Provincial Charter for the Provincial Society within that Province and operates under its own By-Laws which have been approved by the Board of Directors of the CSLT and the Provincial Secretary of the Province. — Definition

Section 2. Upon a 2/3 (two thirds) majority vote by mail ballot sent to all CSLT members within a Province, a Provincial Branch of the CSLT may, upon application, petition the Board of Directors of the CSLT for approval to re-organize the Provincial Branch as an Official Provincial Affiliated Society of the CSLT in their particular Province. — Approval for Organization of a Recognized Provincial Affiliated Society.

Section 3. The CSLT shall continue to recognize a Provincial Affiliated Society in agreement with the CSLT as long as the Executive Officers and Officials of the Provincial Affiliated Society adhere to the terms of the agreement. — Provincial Society Agreement.

Section 4. The CSLT reserves the right to suspend or revoke its approval and recognition of its agreement with a Provincial Affiliated Society if for any reason it is determined that a Provincial Affiliated Society is operating its business in opposition to the Aims and Objectives of the CSLT or in such other manner as to be detrimental to the welfare of the members of the CSLT within the Province or to the policies and operations of the CSLT as defined in the Constitution and By-Laws, and such Rules and Regulations of the CSLT as may be approved from time to time by the members at any Annual Meeting. — Right of CSLT to revoke or suspend approval.

Section 5. Should such a Provincial Affiliated Society have its approval and recognition by CSLT withdrawn at any time, the CSLT shall reserve the right to authorize the CSLT members within the Province to re-organize as a Provincial Branch of the CSLT and such Branch shall be recognized as the CSLT's representative body in the Province. — Further Right of CSLT.

Section 6. The Provincial Society may elect or select from its own Executive a person either without any specific office on that Executive or who will resign from such office if held, who will be recommended to CSLT Board of Directors as Provincial Society representative. If the nominee is acceptable to CSLT Board of Directors, his or her term of office will be two years. He or she will have full voting rights on CSLT General Council and will be eligible to serve on Committees. — Prov.Affil. Society Representative on CSLT General Council.

APPENDIX B

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

RULES AND REGULATIONS
GOVERNING SOCIETY ACTIVITY

21719—17

CANADIAN SOCIETY OF LABORATORY
TECHNOLOGISTS

RULES AND REGULATIONS GOVERNING SOCIETY ACTIVITY

(Revised - June 1968)

The Rules and Regulations of the C.S.L.T. shall include such policies, procedures and directives as may be established from time to time for the guidance of members, Officers and Officials of the C.S.L.T.

Rules and Regulations I

Membership and Current Enrollment

Item 1. Membership shall be as laid down in the By-Laws, Article I and Article II, Sections 1-7.

Item 2. Associate members shall not have their names included in the Annual Roster.

Certified Members

Item 1. There shall be four types of certified members,

(a) Certified member (active)
(b) Certified member (inactive)
(c) Certified member (Honorary)
(d) Certified member (Retired)

Item 2. Such members shall be entitled to use the designated initials indicating the level of certification held with the C.S.L.T.

Item 3. Certified member (Honorary) shall be a certified member (active, inactive or retired) who has been recommended for Honorary Membership by the Board of Directors to the General Council for referral to the members at an Annual General Meeting for approval. Such a member shall be exempt from payment of annual membership fees.

Associate Members

Item 1. There shall be two types of Associate members,

(a) Associate member (Trainee)
(b) Associate member (Non-Certified)

Item 2. Associate member (Trainee) shall be a member who is enrolled with the C.S.L.T. as a student in training in an approved training program as recognized by the C.S.L.T. and has paid the required membership fee. A member shall be enrolled as such throughout the duration of the required training period and the interim period (if any) pending the results of the certification examinations providing such examinations are taken at the next session following the completion of the training period.

Item 3. Associate member (Non-Certified) shall be a member who is currently employed in the field of Medical Laboratory Technology, who has paid the required membership fee, but who has not as yet completed the requirements for certification. Such a member shall be enrolled only as long as he is currently employed in the field and has paid the required annual membership fee. Such a

R.R. 6.68 (Rev.).

member shall be entitled to have his qualifications assessed on an individual basis by the Certification Board to determine equivalence with the requirements for and eligibility to certification.

Affiliate Members

Item 1. There shall be two types of Affiliate members,

(a) Affiliate member
(b) Honorary Affiliate member

Item 2. A non-member of the C.S.L.T. who meets the requirements as specified in Article I, Section 3 of the By-Laws may make application for Affiliate Membership, to the Executive Director for approval by the Board of Directors. Such a member shall be required to complete the annual renewal form and pay the required annual membership fee.

Item 3. Honorary Affiliate Membership shall be by recommendation from the Board of Directors to the General Council for referral to the members at an Annual General Meeting for approval. Such membership shall be awarded to a non-member of the C.S.L.T. in recognition of services on behalf of the C.S.L.T. in advancing the aims and objectives of the C.S.L.T.

Certified Members (Retired)

Item 1. Certified members of the C.S.L.T. who have maintained a minimum of 20 years registration with the C.S.L.T. may be eligible for this type of membership upon reaching retirement age as stipulated by the employing Institution, or who retires from active employment before retirement age for reasons acceptable to the Board of Directors.

Item 2. The Executive Director of the C.S.L.T. shall have the authority of approving such membership upon request, by the individual member, by a Provincial Branch, Provincial Affiliated Society of the C.S.L.T. or by his employer.

Minimum Standards for Certification - R.T.

Item 1. Minimum Age: 18 years at the time of application for examination.

Item 2. Academic Requirements: "Senior Matriculation level" with credits in the C.S.L.T. compulsory subjects of Chemistry, Mathematics and a second Science or a comparable academic level as may be determined and approved by the Certification Board on individual assessment.

Item 3. Training: A defined period of training in an approved training program recognized by the C.S.L.T. or a comparable level of training and/or experience as may be determined and approved by the Certification Board on individual assessment.

Item 4. Associate Membership: Enrollment as an Associate Member (Trainee or Non-Certified) for a minimum period of 3 months prior to the application for examination.

Item 5. Application: Submission of the required application form and fee for examination.

Item 6. Certification Qualification: Successful completion of the required examination(s), or by exemption from the regularly required examination(s) as may be determined and approved by the Certification Board on individual assessment or on equivalent qualifications previously determined by the Certification Board.

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Minimum Standards for Certification - A.R.T.

Item 1. Current registration as an R.T. or a Bachelor's degree in Biological Sciences or a comparable level as may be determined and approved by the Certification Board on individual assessment.

Item 2. Eligibility credits to a minimum of 30 credits as may be determined by the Certification Board from time to time.

Item 3. Submission of the required application form and fee for examination.

Item 4. Certification Qualification: Successful completion of the required examination(s) or by exemption from part or all of the regularly required examination(s) as may be determined and approved by the Certification Board on individual assessment or on equivalent qualifications previously determined by the Certification Board.

Minimum Standards for Certification - L.C.S.L.T.

Item 1. Current registration as an A.R.T. or a comparable level as may be determined and approved by the Certification Board on individual assessment.

Item 2. Eligibility credits to a minimum of 30 credits as may be determined by the Certification Board from time to time.

Item 3. Submission of the required application form and fee for examination.

Item 4. Certification Qualification: Successful completion of the required examination(s).

Minimum Standards for Certification - F.C.S.L.T.

Item 1. Current registration as a L.C.S.L.T.

Item 2. Applications shall be considered in accordance with the terms of reference as set forth for this level of certification.

Rules and Regulations II

Privileges of Membership - Eligibility and Restrictions

Except as stated otherwise in the Rules and Regulations, members shall have the right to:

Item 1. Receive all official publications of the C.S.L.T. as may be issued from time to time.

Item 2. Submit articles for publication in the C.J.M.T. subject to the approval of the Editor of the C.J.M.T.

Item 3. Submit Book Reviews, Abstracts of current scientific literature, technical notes, or such other items as may be acceptable to the Editor, for publication in the C.S.L.T. News Bulletin.

Item 4. Present papers, exhibits and other related items at the C.S.L.T. Conventions or Scientific Meetings as may be acceptable to the C.S.L.T. Convention Committee.

Item 5. Nominate eligible members for such Awards as may be available under the Policies and Procedures established for such Awards. (Restricted to Certified Members, active or Honorary).

Item 6. Use the designated initials identifying the member's current status and level of certification with the C.S.L.T. (Only certified members eligible).

Item 7. Purchase C.S.L.T. Insignia or Emblems for legitimate use, as may be available from time to time. (Restricted to certified members).

Item 8. Borrow with or without charge such films or other audio-visual aids as may be available from the C.S.L.T., in accordance with the Policies and Procedures established for such material.

Item 9. Nominate eligible members for elected office under the Rules and Regulations established for such nominations. (Restricted to certified members, active or Honorary).

Item 10. Hold elected office or official appointments at all levels of Society Activity. (Restricted to certified members, active or Honorary). Eligibility of members for these offices or appointments at the Provincial or local level shall be further restricted to certified members, active or Honorary, at the Provincial and/or local level as the case may be).

Item 11. Hold membership in a Science Section of the C.S.L.T.

Item 12. Be eligible for grants offered through the Founders' Fund of the C.S.L.T. under the Policies and Procedures established for such grants. (Restricted to certified active members).

Item 13. Submit Scientific Papers for the Scientific Award Contests under the Policies and Procedures established for such Awards. (Restricted to certified active members).

Item 14. Eligibility for such Awards as may be available through or from the C.S.L.T. under the Policies and Procedures established for eligibility and granting of such Awards.

Item 15. Eligibility for any C.S.L.T. sponsored Insurance Programs. (Eligibility and/or restrictions in accordance with the terms of the Insurance Program).

Item 16. Utilize the services of the Placement Bureau of the International, C.S.L.T., or Provincial Bodies. (Associate members and certified members (retired) excluded).

Item 17. Receive Certificates from the C.S.L.T. denoting the holder's qualifications, and/or status with the C.S.L.T. (Associate members not eligible).

Item 18. Receive an annual identification card bearing the member's status with the C.S.L.T. (Associate members, trainee, not eligible for annual renewal of such cards unless the enforced waiting period for examination shall warrant such renewal).

Item 19. Participate in educational and/or scientific programs offered at any level of Society activity under the conditions which may be established for eligibility.

Terms of Membership

Fees

Item 1. Application for certification or membership shall be as follows:

Certification:	by examination	$50.00
	by assessment and appraisal	35.00

Membership:	Affiliate	$10.00
	Associate (Trainee)	10.00
	Associate (Non-Certified)	8.00

Item 2. Annual Membership fees:

Certified Members (Active)	12.00
Certified Members (Inactive)	5.00
Affiliate Members	10.00
Associate Members (Non-Certified)	5.00

Item 3. Annual registration and/or enrollment shall be made by completion of the Annual Renewal Form and payment of the required annual membership fee.

Item 4. Notwithstanding Art. II, Section 10 of the By-Laws, a suspended member who pays his current annual membership fee during the period April 1st through December 31st in the year of suspension shall automatically be returned to his former status but his name shall not be included in the current Annual Roster.

Item 5. Provincial Branches and Provincial Affiliated Societies shall automatically receive a list of currently enrolled members.

Membership Reinstatement

Item 1. Members suspended for non-payment of membership fees may be reinstated to their former status upon completion of the current Annual Renewal Form and payment of the required fees in accordance with the Rules and Regulations.

Item 2. Those who have continued to be actively engaged in laboratory work but who have failed to maintain registration by yearly renewal are required to pay all back fees or a reinstatement fee of $25.00 whichever is the lesser, exclusive of the current fee, and must submit a statement outlining the details of their experience in the laboratory field during the period of non-registration.

Item 3. For those who have not been actively engaged in laboratory work but who have retained Inactive Membership, reinstatement to full registration may be obtained by payment of the current fee plus the submission of a statement verifying absence from the field of laboratory work.

Item 4. For those who have not been actively engaged in medical laboratory work and who have not retained Inactive Membership, a reinstatement fee of $5.00 is required exclusive of the current fee plus the submission of a statement verifying absence from the field of laboratory work.

Item 5. Those who have been inactive for 3 years or more when applying for reinstatement, will have their qualifications re-appraised and may be required to undertake a refresher course or obtain additional experience. They may be required to submit to an oral or written examination.

Item 6. Reinstatement of an Associate Member (Non-Certified) shall be by re-application and payment of the current annual membership fee.

Item 7. Reinstatement of a former Associate Member (Trainee) who has not completed his certification requirements shall be by application for Associate Member (Trainee or Non-Certified as appropriate) and payment of the membership fee. ($10.00 and $5.00).

Resignation of Members

Item 1 Should an individual wish to again become associated with the C.S.L.T., the procedure required shall be the same as that required of any other new applicant for membership in the Society, and he may be required to meet such requirements as may be determined by the Certification Board.

Rules and Regulations III

Meetings

Procedures and Conduct

Item 1. In general, the Agenda for meetings shall be in a form as follows:
- (a) Minutes of the last meeting
- (b) Business arising from the Minutes
- (c) Reports
- (d) New Business
- (e) Further Business
- (f) Adjournment

Item 2. Specific items for information or consideration shall be indicated under the applicable subject heading on the Agenda. When available, appendices shall be attached for the members' further information and consideration.

Item 3. It shall be the Presiding Officer's responsibility to maintain order, propriety and protocol during the course of the meeting.

Item 4. Meetings shall be conducted in accordance with Robert's Rules of Order.

Item 5. Upon approval of the Minutes of the last meeting, the Minutes shall be signed by the Presiding Officer.

Annual General Meeting

Item 1. The Annual General Meeting of the C.S.L.T. shall be held in conjunction with the Annual Convention of the C.S.L.T. unless determined otherwise by the Board of Directors.

Item 2. All reports for presentation to the Annual General Meeting shall be submitted in typewritten form to the Executive Director not less than 90 days prior to the Annual General Meeting.

Item 3. Only members holding a current C.S.L.T. membership card shall be admitted to the Annual General Meeting of the C.S.L.T. and only those members as defined under Membership Privileges of these Rules and Regulations shall be eligible to vote.

Item 4. The President, with the approval of the General Council, shall have the prerogative of inviting non-members of the C.S.L.T. to attend in order to assist or advise the meeting in their deliberations on any specific item on the Agenda.

Item 5. A Parliamentarian, appointed by the Board of Directors, shall be in attendance to assist the Presiding Officer and the members in maintaining the Procedures and Conduct of the meeting in accordance with Parliamentary Procedures and the Rules and Regulations of the C.S.L.T.

Item 6. The Minutes of the Annual General Meeting shall subsequently be forwarded to all members of the Society.

Rules and Regulations IV

Voting

Item 1. Any vote for election of an Officer at an Annual General Meeting shall be by written ballot and such ballots shall be counted by scrutineers appointed by the Presiding Officer.

Item 2. The Presiding Officer shall have the prerogative of calling for identification of those members eligible to vote at the commencement of the Meeting and if deemed advisable, request a segregation of the non-voting members from the voting members.

Rules and Regulations V

Officers and Officials

Patron

Item 1. The Patron of the C.S.L.T. shall be a person whose career and repute shall be so widely recognized and esteemed that his acceptance of the Honorary position as Patron of the C.S.L.T. will enhance and sustain the status of the C.S.L.T.

Item 2. Such a person shall be recommended by the Board of Directors to the General Council for referral to the members at an Annual General Meeting for appointment.

Item 3. The Patron of the C.S.L.T. shall be an Honorary appointment and he shall be entitled to all the privileges of the C.S.L.T. except that of voting or holding elected office.

Reimbursement of Expenses

Item 1. Allowances for expenses shall be in accordance with the recommendations of the Finance Committee and approved by the Board of Directors.

Item 2. Expenses expected to be incurred by any Council, Board, Committee or Officer, should either be so specified in terms of reference or submitted as a budget item not later than October 1st for consideration by the Finance Committee at their Annual Budget Meeting.

Item 3. The Executive Director shall have the authority to appoint C.S.L.T. representatives on the C.M.A. Committee's Inspection Teams and such representatives shall be eligible for reimbursement of expenses incurred in the performance of their duties.

Item 4. All expense accounts shall be submitted on the approved form and accompanied, whenever possible, by receipts.

Progression of Office

Item 1. The offices of the President-Elect, President and Immediate Past-President shall be automatic progressions at one year intervals in the order given, following the Vice-Presidency.

Rules and Regulations VI

Board of Directors

Item 1. Notwithstanding the terms of Article IX, Section 2, By-Laws, the Ex-Officio Officers of the Board of Directors, without voting power, shall include such Officers or Officials as may be appointed by the Board of Directors from time to time.

Rules and Regulations VII

General Council

Item 1. The Annual Meeting of the General Council shall precede the Annual General Meeting of the C.S.L.T.

Item 2. The General Council shall have the authority to:

(a) make recommendations to the Board of Directors for study and such further action as may be necessary.

(b) request reconsideration of actions by the Board of Directors as defined under Article X, Section 6 of the By-Laws.

(c) consider for approval recommendations of the Board of Directors for presentation to the members at an Annual Meeting for approval.

Item 3. Each member of the General Council shall receive a copy of the Minutes of the Board of Directors' Meetings.

Item 4. At the discretion of the President, in consultation with the Board of Directors, the President may call additional meetings of the General Council at such time(s) as may be necessary.

Item 5. In the event that a Provincial Director is unable to attend a meeting of General Council, the Provincial Branch or Affiliated Society shall have the authority to appoint an alternate to act on his behalf for the meeting(s).

Rules and Regulations VIII

Advisory Council

Item 1. The Advisory Council will function with the duties and responsibilities as stated in the By-Laws, Article XI.

Item 2. Appointments to the Advisory Council shall be made from members of Affiliated or closely allied institutions or organizations who have indicated interest in advancing the Aims and Objectives of the C.S.L.T. or who may be considered able and willing to contribute to the advancement of Medical Laboratory Technology.

Rules and Regulations IX

Science Sections

Item 1. A Science Section shall be established by the Board of Directors with a minimum of 10 members in the specific discipline who have requested, over their signatures, their desire for such a Science Section and their intention to actively participate in educational and scientific programs in the discipline.

Item 2. A request shall be forwarded to the Co-ordinator of Science Sections who shall refer it to the Certification Board for their consideration and recommendation to the Board of Directors for approval.

Item 3. A Science Section shall continue to act as such provided 10 members actively participate in the work of the Section.

Item 4. Each Science Section, through the Chairman for the Section, shall make an annual report on the year's activity to the Co-ordinator of Science Sections who shall in turn incorporate these reports in his annual report to the Executive Director.

Item 5. Each Science Section may hold an Annual General Meeting of the Section at the time of the Annual General Meeting of the C.S.L.T., for the purpose of electing a Chairman for the following year, and such other business as may be brought before it by the Chairman.

Item 6. Following the Annual Meeting, the Chairman of each Section shall forward a copy of the Minutes, together with such reports as were presented to the Meeting, to the Co-ordinator of Science Sections and the Executive Director of the C.S.L.T.

Item 7. Each Science Section shall be responsible to the Certification Board, through the Co-ordinator of Science Sections for the work which they do, but their right to function as a Science Section shall be vested in the Board of Directors.

Item 8. Each Science Section shall have the prerogative of nominating not more than 3 of their members for consideration for appointment to the Certification Board. Such nominations shall be made at their Annual Meeting and the Chairman of the Section shall, within one month of the Meeting, formally advise the Co-ordinator of such nominations accompanied by the written agreement of the nominee to stand for such appointment to the Certification Board. A copy of such nominations shall be forwarded by the Co-ordinator to the Executive Director for referral to the Board of Directors.

Item 9. The Co-ordinator of Science Sections shall be appointed annually by the Board of Directors and shall be eligible for re-appointment.

Item 10. Membership in a Science Section shall be by application and such application shall be forwarded to the Executive Director of the C.S.L.T. Membership qualifications for Science Sections shall include R.T.'s with three years' post-graduation experience.

Item 11. Science Sections shall be responsible to the Certification Board in the following areas of Society Activity:

(a) continuing educational and scientific programs for the advancement of C.S.L.T. members at all levels of certification.
(b) in co-operation with Convention Committees, to prepare and conduct seminars or workshops and other related items as may be included in the Convention Programs at the discretion of the Convention Committee.
(c) providing consultative services to any member of C.S.L.T. on questions involving medical laboratory science.
(d) recommending amendments or changes for future revision of the C.S.L.T. Syllabus of Studies for consideration by the Certification Board.
(e) developing acceptable questions for examination purposes for inclusion in the C.S.L.T. pool of examination questions.
(f) developing of such other programs or projects in the scientific and educational field as may be acceptable to the Certification Board.

Item 12. Recommendations arising out of Science Sections shall be forwarded to the Co-ordinator who shall bring them before the Certification Board for consideration, and if acceptable, the Chairman of the Certification Board shall recommend them to the Board of Directors.

Item 13. The Co-ordinator shall submit such recommendations from Science Sections in writing to the Executive Director, not less than 60 days prior to a meeting of the Certification Board for inclusion on the Agenda.

Item 14. The Co-ordinator shall submit an Annual Report on the activities of Science Sections during the previous year, not later than February 1st of each year to the Executive Director.

Item 15. Science Sections shall act in an advisory capacity and shall assist and co-operate with the Certification Board in the performance of their duties when requested.

Rules and Regulations X

Certification Board

Item 1. The Certification Board shall consist of 9 Active Certified Members of the C.S.L.T. appointed by the Board of Directors.

Item 2. The term of office for each member shall be for three years and members shall not be eligible to serve for consecutive terms of office.

Item 3. Three members to the Board shall be appointed annually to replace the retiring members of the Board.

Item 4. At least two members to the Board shall be recommended by the current Certification Board members from nominations submitted from Science Sections in accordance with Rules and Regulations IX, Section 8.

Item 5. The Certification Board shall recommend to the Board of Directors the appointment of the third member to the Board.

Item 6. The Certification Board shall recommend to the Board of Directors one of their members with more than one year's experience on the Board to act as Chairman in the following year, and such appointment shall be for a term of one year, but shall be open for re-appointment for a consecutive term if within the normal term of office of the member on the Board.

Item 7. The Co-ordinator of Science Sections shall be an Ex-Officio member of the Certification Board without voting privileges. He shall not be eligible for appointment as a member of the Certification Board during his tenure of that office.

Item 8. The Certification Board shall be responsible for study and recommendations to the Board of Directors in the following areas of Society Activity:

(a) appointment of Provincial representatives to report to the Board annually on the Senior Matriculation levels in the Provinces, proposed changes by the Department of Education therein, and continuing study of their application to the academic pre-requisites for entry into approved training programs.

(b) requirements for various levels of certification as may be established by the Society.

(c) standards of certification examinations and appointment of members to act on the examination teams in the various disciplines in which written examinations are offered; such appointments to be reviewed annually.

(d) extension of certification disciplines.

(e) Scientific education at all levels of certification with the co-operation of Science Sections.

(f) the Syllabus of Studies for any amendments which may be necessary and for proposed revision with co-operation of Science Sections.
(g) the assessment of qualifications of Non-Certified Associate Members for eligibility to certification.
(h) the assessment of advanced training programs for credit assignments.
(i) recommendations from Science Sections presented by the Co-ordinator of Science Sections.

Item 9. The Chairman of the Certification Board shall report to the Board of Directors on the activities of the Certification Board as and when required, and shall present to the Board of Directors such recommendations as may be referred from the Certification Board.

Item 10. The Chairman of the Certification Board shall present such recommendations in writing to the Executive Director, not less than 60 days prior to a meeting of the Board of Directors for inclusion on the Agenda.

Item 11. The Chairman of the Certification Board shall submit an Annual Report on the activities of the Board during the preceding year to the Executive Director not later than February 1st of each year.

Item 12. The Certification Board shall be directly responsible to the Board of Directors and act in an advisory capacity to the Board of Directors in the areas of Society activity as defined above.

Item 13. The Certification Board shall have the authority to appoint Committees of the Board to study specific items of business and such Committees shall be responsible to the Certification Board.

Rules and Regulations XI

Publications Board

Item 1. The editor(s) of C.S.L.T. publications shall be an Ex-Officio member of the Publications Board.

Item 2. The time and place of Publications Board meetings shall be as determined by the Executive Director in consultation with the Chairman of the Publications Board.

Item 3. An Executive Office appointee of the C.S.L.T. shall be the Advertising and Business Manager of Publications, and shall be responsible to the Executive Director for the performance of his duties.

Item 4. The Publications Board shall be responsible for study and recommendations to the Board of Directors of C.S.L.T. publications.

Item 5. The Publications Board shall have the authority to appoint Committees of the Board to study specific items of business and such Committees shall be responsible to the Publications Board.

Rules and Regulations XII

Nominating Committee

Item 1. The Executive Director shall determine the deadline dates for the Nominationg Commitee in order to produce the final slate of nominees in time for sending out the ballots to the membership, in accordance with Article VII, Sections 2 and 3 of the By-Laws.

Rules and Regulations XIII

Committees (General)

General Considerations

Item 1. The Board of Directors shall have the power to establish Standing or Special Committees, to vary their number from time to time and to discontinue their activities.

Item 2. All Chairmen of Committees shall be certified active members of the C.S.L.T. and all members of the Committee shall be currently enrolled members of the C.S.L.T. unless specified otherwise by the Board of Directors in their Terms of Reference.

Item 3. Chairmen and members of Committees may be re-appointed for additional terms of office except as stated otherwise in the Rules and Regulations.

Item 4. The Chairman of a Committee shall be responsible for the functioning of his Committee and shall be the one responsible for submitting reports and recommendations to the Board of Directors.

Item 5. Interim reports and recommendations from a Committee to the Board of Directors shall be presented in the following approved format:
(a) Page 1 - Statement of project or problem assigned to the Committee.
(b) Page 2,3, etc. as required - Resumé of studies made and the results of the studies.
(c) Last page - Listed recommendations arising out of the Committee studies. The report shall be signed by the Chairman and shall be submitted to the Executive Director.

Item 6. Chairmen of Committees, unless specified otherwise, who are not members of the Board of Directors may, upon invitation or request, attend a Board of Directors' meeting or Executive Committee meeting for the purpose of presenting their reports.

Item 7. The Chairman of a Committee, if he is not a member of the Board of Directors, may receive a copy of that part of the Board or Executive Committee Minutes which pertains to his Committee and such referral of the Minutes shall be considered as his notice of direction for proceeding with the work of his Committee or as may be indicated otherwise.

Item 8. The "Terms of Reference" provided to a Committee by the appointing body shall be explicit in the following points:
(a) The scope of work or study to be done and direction, if considered necessary.
(b) The limitation of authority in conducting the work.
(c) Time allotment for submission of progress reports or the completion of work to be done.

Standing Committees

A. Honorary Awards Committee

Item 1. The duties and responsibilities shall be to select the individual(s) who are to be honoured by any Award(s) provided by the C.S.L.T.

Item 2. The Committee shall have the prerogative of not approving an Award in any specific year if, in their opinion, none of the nominees presented qualify.

Item 3. The selection of members for any Awards shall be made from nominations and citations received not later than December 31st of any year.

Item 4. If a member has been selected to receive an Award, the Award shall be presented by the President of the C.S.L.T. or his designate at an Annual Dinner held during the Annual Convention.

Item 5. The Awards currently available for which the Committee shall be responsible are:

(i) Gold Medal Award
(ii) Honorary Membership
(iii) Honorary Affiliate Membership.

Item 6. All nominations submitted must be made on the approved nomination form and accompanied by a Citation which shall outline the qualifications of the nominee for such an Award.

B. Committee on Finance

Item 1. The Committee on Finance shall be a Standing Committee of the C.S.L.T. with terms of reference as stipulated in By-Laws.

C. Committee on Employment Relations and Welfare

Item 1. The Committee on Employment Relations and Welfare shall be a Standing Committee of the C.S.L.T., membership as stipulated in Committee Structure.

Item 2. The Committee shall hold at least one meeting annually at the time of the Annual General Meeting of the C.S.L.T. and at other times as may be considered necessary by the Board of Directors.

Item 3. The Committee shall be responsible to the Board of Directors for their terms of reference, in general to include the following:

(a) Studies, reports and recommendations on amendments or revisions for the C.S.L.T. Recommended Personnel Policies.
(b) Studies, reports and recommendations on Group Programs as may be in effect for the members of the C.S.L.T. under the sponsorship of the C.S.L.T. or for such additional Group Programs as may be under consideration and referred to them for such studies by the Board of Directors.
(c) Studies and review of any briefs and contracts related to employment relations and welfare under consideration or in effect in any of the Provinces. The members of the Committee in co-operation with Provincial Committees on employment relations shall present the results of such studies to the Board of Directors.

Item 4. Each member of the Committee shall keep the Chairman advised of any progress or action in his Province regarding employment relations and welfare of membership within his Province. Reports shall be submitted regarding relevant activity to the Chairman.

D. Committee on Legislation

Item 1. The Committee on Legislation shall be a Standing Committee of the C.S.L.T., as stipulated in By-Laws.

Item 2. The Chairman and his Committee members shall familiarize themselves with the By-Laws, Rules and Regulations, Code of Ethics and such other policies and procedures of the C.S.L.T.

Item 3. Its duties and responsibilities shall be to consider, study, report and make recommendations on any action of a legislative nature which concerns the C.S.L.T.

Item 4. Specific other duties which may be assigned to this Committee shall be as follows:

(a) To consider any proposal to amend the By-Laws, Rules and Regulations, Code of Ethics, and recommend other policies which may determine the future welfare of the C.S.L.T.

(b) During the Annual General Meeting of the, C.S.L.T., it shall be the duty of the Chairman to review each motion and determine -

i) if it fulfills the intent of the meeting and covers adequately the situation for which it was passed.

ii) whether or not ambiguity may exist.

iii) whether or not further clarification may be required to achieve an adequate interpretation of the motion.

iv) if any motion passed may be contrary to the By-Laws, Rules and Regulations of the C.S.L.T. or whether an amendment may be required if the motion is to take effect.

(c) To study and report to the Board of Directors and to submit any recommendations which may arise as a result of their studies, on any legislation proposed by other organizations or authoritative bodies and which may have effect on the C.S.L.T.

(d) To review, study and recommend to the Board of Directors on any formal contracts or agreements, etc. which may be referred to them for study.

(e) To review, study and report on any By-Laws proposed for adoption by a Provincial Branch or Provincial Affiliated Society in formal agreement with the C.S.L.T. and further to recommend for resolution of any conflict of interest which may arise between such organized membership of the C.S.L.T.

E. Committee on Public Relations and Membership

Item 1. The Committee on Public Relations and Membership shall be a Standing Committee of the C.S.L.T. as stipulated in By-Laws.

Item 2. The Committee shall hold meetings as may be required.

Item 3. The duties and responsibilities of this Committee shall include:

(a) To work in close co-operation with the C.S.L.T.'s Convention Committee's Sub-Committee on Public Relations and as such shall collate any publicity items or pictures and submit these together with a report on Convention activities and news, to the Executive Director within 30 days following the Convention for use and referral of such items for release to other publications.

(b) To encourage and develop ways and means of presenting Recruitment Programs.

(c) To encourage and develop ways and means of bringing non-members into the C.S.L.T.

(d) to consider, study and make recommendations to the Board of Directors on membership services.

(e) To collate, with the co-operation of each Provincial Branch Director or Chairmen of Provincial Committees on Public Relations, such news items or other material relating to medical laboratory technology or medical laboratory technologists. Such material to be forwarded to the Executive Office at the end of each year to be filed in the Archives of the C.S.L.T.

Special Committees

A. Founders' Fund Committee

Item 1. The Committee shall hold meetings as may be required.

Item 2. The duties and responsibilities shall include:

(a) In co-operation with the Committee on Finance to recommend arrangements as may be necessary to maintain and administer the resources of the Founders' Fund.

(b) To consider and study ways and means of administering the Grants from the Founders' Fund.

(c) To consider and study the Criteria for Qualifications by which the funds shall be made available to members of the C.S.L.T.

(d) To consider and study ways and means of increasing the assets of the Fund through donations or other means.

Item 3. The Founders' Fund shall be kept in a separate account by the C.S.L.T. and such funds shall be held in trust for the sole purpose of administering the Founders' Fund Grants.

Item 4. The distribution of Founders' Fund Grants shall be in accordance with the policies and procedures which shall be established for the administration of the Fund.

B. Convention Committee

Item 1. The Convention Committee of the C.S.L.T. shall be a Special Committee of the C.S.L.T. The appointment of the Chairman and members shall be made each year from the members of that Province in which the Convention ie being held.

Item 2. The duties and responsibilities shall be to administer and prepare for the Annual Convention of the C.S.L.T. in accordance with the approved instructions.

Item 3. The Chairman shall be responsible for the co-ordination of the activities of all Sub-Committees and shall maintain adequate liaison and communication with the Executive Director of the C.S.L.T. and in accordance with the approved instructions.

Item 4. Since Science Sections of the C.S.L.T. usually take an active part in the development of the Scientific Program, adequate liaison and communication must be maintained with the Co-ordinator of Science Sections.

Item 5. Any deviation from the approved instructions must first have the approval of the Executive Director, the Finance Committee, the Executive Committee of the Board of Directors, whichever may be applicable under the particular circumstances.

Item 6. The Convention Committee shall be responsible to the Board of Directors and make their reports and recommendations through the Executive Director, and by invitation, the Convention Chairman may be requested to report personally to the Board of Directors or its Executive Committee.

Authorization of Expenses

Item 1. All requests for payment of expenses shall be made on the Approved Expense Account Form of the C.S.L.T. in accordance with the Policies and Procedures established for the payment of such accounts and shall be accompanied, whenever possible, by receipts covering the expenses.

Item 2. Notwithstanding the above, the Committee on Finance shall have the authority of recommending the "maximum" for such additional expenses as may be approved by the Board of Directors for payment to any Council, Board, Committee or other organizational unit of the C.S.L.T.

Rules and Regulations XIV

Executive Director

Item 1. The Executive Director shall be responsible for such duties as are specified in the By-Laws, Rules and Regulations of the C.S.L.T., and derive his authority for these duties from the Board of Directors.

Item 2. The Executive Director or his designate shall act as the liaison and Public Relations Officer of the C.S.L.T. with any or all outside agencies directly or indirectly associated or affiliated with C.S.L.T. activities, and shall have the authority to speak on behalf of the C.S.L.T. The Executive Director shall have the authority to appoint C.S.L.T. representatives for any study in this regard.

Rules and Regulations XV

C.S.L.T. Audit

Item 1. A Financial Statement shall be circulated in the Annual Report for the general information of the membership.

Rules and Regulations XVI

Official Crest of the C.S.L.T.

Item 1. The Official Crest of the C.S.L.T. was registered in 1957 and bears the patent Registration No. 107,555. Any unauthorized use of the C.S.L.T. Crest by groups or individuals shall be deemed illegal according to the laws of patent.

Item 2. Approved Training Centres, Local Academies, Provincial Branches, Provincial Affiliated Societies or other closely associated or Affiliated Organizations who may wish to use the Crest on publications must first obtain permission in writing for this specific usage from the Executive Director of the C.S.L.T. Such publications shall be for the purpose of or so designed as to promote the advancement of the Purposes and Objects of the C.S.L.T. as defined in the Charter. A sample copy of the proposed publication must be submitted at the time of the request for permission to use the Crest.

Item 3. The Executive Director in granting such permission shall forward to the individual requesting its use, a copy of the cut of the Official Crest. This individual shall be held responsible for the safe keeping of the Crest, for its legitimate use as requested, and for the safe return of the Crest to the Executive Director immediately upon completion of its use for the purpose requested.

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Rules and Regulations XVII

Local Academies

Item 1. A local Academy shall function as laid down in the By-Laws Article XXI.

Item 2. The general and basic areas of activity and responsibility of local Academies shall be considered to include the following:

(a) to offer scientific, educational and social programs to C.S.L.T. members residing within the area of the local Academy.
(b) periodically to invite and host the Annual Meeting and Convention of the Provincial organization or, in co-operation with the Provincial organization, that of the C.S.L.T.
(c) to publicize the contribution of the Science of Medical Laboratory Technology to the general public, news media, etc.
(d) to interest and encourage non-members in the area to become officially associated with the C.S.L.T.
(e) to interest, encourage and take part in career counselling and recruitment programs in the field of Medical Laboratory Technology within the area of their local Academy.
(f) to provide speakers to academic or other institutions in the local area, who wish to present information on Medical Laboratory Technology to students or the general public.
(g) to refer to the Provincial organization, or to C.S.L.T., as the case may be, all matters or items of business which may come to their attention which require more than a local decision.
(h) to work in co-operation with each organizational unit of the C.S.L.T. at all levels.

Rules and Regulations XVIII

Provincial Branches

Item 1. A Provincial Branch shall function as laid down in the By-Laws Article XXII.

Item 2. The general and basic areas of activity and responsibilities of Provincial Branches shall be considered to include the following:

(a) to offer scientific, educational and social programs to C.S.L.T. members residing in the Province.
(b) to periodically invite and host the C.S.L.T. Annual Meeting and Convention with assistance from local Academies.
(c) to encourage and take part in recruitment programs and career counselling in Medical Laboratory Technology within the Province, with the assistance of local Academies.
(d) to publicize the contribution of the Science of Medical Laboratory Technology to the general public, news media, etc.
(e) to interest and encourage non-members to become officially associated with C.S.L.T.
(f) to provide speakers to academic and other institutions with co-operation and assistance of local Academies who wish to present information on Medical Laboratory Technology to students or the general public.
(g) to refer to the C.S.L.T. all matters or items of business which may come to their attention and which require more than a Provincial decision.
(h) to work in co-operation with each organizational unit of C.S.L.T at all levels of activity.

Item 3. The operation of the affairs of a Provincial Branch and the policies and procedures for the conduct of meetings, duties and responsibilities of Officers and Officials shall be in accordance with the By-Laws, Rules and Regulations and the Policies and Procedures established by the C.S.L.T. insofar as these are applicable at the Provincial level of Society activity.

Item 4. Responsibilities of Provincial Branches for liaison between various levels of Society activity shall be maintained at all times as follows:

(a) copies of all publications, Executive, Annual and General Meeting Minutes, together with reports submitted, shall be forwarded to the Executive Director of the C.S.L.T. Such submissions shall include a copy of all publications, Minutes and Reports submitted to them from the recognized local Academies in the Province.

(b) Provincial Branch Executives shall allow representation from each recognized local Academy on the Provincial Branch Executive. Representatives shall receive Minutes of Meetings and act as Liaison Officers between the Provincial Branch and the local Academies.

Item 5. The intent of Section 9, Article XXII of the By-Laws shall allow a Branch, having notified the Executive Director of anticipated action, to enter into Personnel Policies Agreements with such outside agencies as may be necessary. Such agreements having been made must be submitted to the Executive Director.

Item 6. Recommendations from a Provincial Branch intended for C.S.L.T. consideration shall be submitted without delay in the approved form to the Executive Director for appropriate approval.

Rules and Regulations XIX

Provincial Affiliated Societies

Item 1. A Provincial Branch wishing to become incorporated as a Provincial Society under the relevant Act of the Province shall first seek approval from the C.S.L.T. and shall be required to sign a mutual agreement with the C.S.L.T.

Item 2. Under the terms of the Agreement, such a Society shall continue to function within the same terms of reference as a Provincial Branch and shall agree to abide by the By-Laws, Rules and Regulations and Policies and Procedures as may be established from time to time.

Provincial Directors

Item 1. The membership of the General Council of the C.S.L.T. shall provide for one Director from each Province who shall serve for a term of two years and who shall be eligible to serve for consecutive terms of office.

Item 2. A Provincial Director shall be a member of the General Council whose responsibility shall be to act as a Liaison Officer between the C.S.L.T. and Provincial Bodies.

Item 3. The Provincial Director shall serve on the Provincial Executive as a full or Ex-Officio member and he shall be given the authority to speak on behalf of the Provincial Executive at General Council meetings.

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Item 4. As members of the General Council, they shall receive a copy of the Minutes of Board of Directors' meetings. In their capacity as C.S.L.T. Officers, they shall recognize and respect the confidential nature of such Minutes and that they are sent to them for their personal information as members of the General Council. They may, however, in keeping with their responsibilities as Liaison Officers extract such information in the form of a report to the Provincial Executive as may pertain to the interests and business of the Provincial Executive or such local Academies as may be established in the Province, or of items of general interest, providing such information is authorized for release and that a correct interpretation is provided to the members.

Item 5. They shall keep their Provincial Executive advised concerning C.S.L.T. developments, new or amended policies, Rules and Regulations which have been approved for adoption.

Item 6. If a Provincial Director requires further clarification or interpretation of Minutes in relation to his duties and responsibilities as a Liaison Officer, he shall consult or communicate with the Executive Director before taking action.

Item 7. They shall keep the General Council advised of activities at the Provincial level by means of an Annual Report, and at any other time as may be considered necessary. Such Reports shall be submitted without delay to the Executive Director for referral to the General Council.

Item 8. They shall ensure that adequate communications are maintained in accordance with the Rules and Regulations.

Item 9. Notwithstanding the methods of their election on a Provincial basis, the Provincial Director shall in practice serve on the General Council of the C.S.L.T. in the National interest of the members of the C.S.L.T. They shall be responsible to their respective Provincial Branches or respective Provincial Affiliated Societies and to the C.S.L.T. to insure that no conflict of interest arises with regard to the exclusive areas of Society activity retained by all C.S.L.T. members in the Province.

COMMITTEE STRUCTURE WITHIN BOARD OF DIRECTORS AND GENERAL COUNCIL

A. 1. Annual Meeting - President as Chairman

2. Nominating Committee: (a) Past-President as Chairman
(b) Provincial Directors as members.

3. General Council: (a) President as Chairman
(b) Past-President
President-Elect
Vice-President
Two Directors
Two Senior Directors
Provincial Directors

4. Board of Directors: (a) President as Chairman
(b) Past-President
President-Elect
Vice-President
Two Directors
Two Senior Directors

5. Executive Committee: (a) President as Chairman
(b) Plus his Appointees

B. Standing Committees

1. Finance - Board of Directors - President as Chairman

2. Honorary Awards - Board of Directors - Vice-President as Chairman

3. Legislation - Executive Committee - President-Elect as Chairman

4. Public Relations and Membership-Executive Committee-Vice-President as Chairman

5. Employment Relations and Welfare-Provincial Directors-Past-President as Chairman

C. Special Committees

1. Founders' Fund-Executive Committee - President as Chairman

D. Certification Board-Chairman and members recommended for appointment by current Certification Board, as vacancies arise.

E. Publications Board-Board of Directors-President-Elect as Chairman

F. Signing Officers - President plus 4 members of Board of Directors

G. Advisory Council - Chairman and members recommended for appointment by Board of Directors.

APPENDIX C

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

GENERAL INFORMATION

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

General Information

1. Name and mailing address of Society.

Canadian Society of Laboratory Technologists,
P.O. Box 830, 165 Jackson Street East,
Hamilton 20, Ontario, Canada.

2. When was the Society founded and by what authority.

The Society was incorporated under Dominion Charter on May 20th,1937, on the authority of the Secretary of State for Canada in compliance with the appropriate Companies' Act.

3. What is the purpose of the Society.

The purposes and objectives of the Society are as follows:

(a) to improve the qualifications and standing of laboratory technologists in Canada;
(b) to promote research endeavour in all branches of laboratory work;
(c) to promote a recognized and professional status for technologists;
(d) to promote closer co-operation between the medical profession and the technologist;
(e) to aid more efficiently in diagnosing and treating disease.

4. Briefly describe: (a) the administrative structure of the Society; (b) the composition of the Board of Directors or Governors; (c) the powers of the Board; (d) how members of the Board are elected or appointed and for what term.

(a) The administrative structure of the Society is based upon the following unit of Executive organization (supported by full-time Executive Office staff to be described later): the General Council, which is the policy approving body of the Society, responsible to the membership; the Board of Directors, which is the Executive body of the Society; the Certification Board, which is responsible to the Board of Directors and deals with all matters pertaining to standards of training and certification; the Publications Board, which is responsible to the Board of Directors and deals with all matters pertaining to the publications of the Society; the Standing and Special Committees which are responsible to the Board of Directors for defined functions; and the Provincial Branches (with their Academies), which are considered as organizational units of the Society and are responsible to the General Council. The Nominating Committee is a statutory committee, which reports directly to the membership.

(A schematic diagram of this Executive organization is attached as an appendix to this item).

(b) The composition of the General Council is as follows: President, Immediate Past President, President-Elect, Vice-President, Directors, one of whom shall be bi-lingual in the two official languages (French and English) of the Society. Two Senior

Directors, ten Provincial Directors.

(The Committee structure of the Society within the Board of Directors and General Council is attached as an appendix to this item).

(c) The powers of the General Council include the following: the General Council, which is the policy approving body of the Society, shall receive the Annual Report from the Board of Directors and shall refer any recommendations or other items of business as may be necessary to the members at an Annual General Meeting for their approval. The General Council shall have the authority by means of a 2/3 (two-thirds) written majority vote, to request re-consideration of a decision made by the Board of Directors.

The powers of the Board of Directors include the following: the Board of Directors shall constitute the Executive body of the Society with power to incur obligations, disburse monies and perform all such acts of administration as may be necessary or expedient to the proper functioning of the Society subject to the provision of the By-Laws. The Board of Directors shall have the authority to authorize the payment of expenses incurred by any officer of the Society in the performance of Society business or by such members as may be appointed from time to time by the Board of Directors to render service to the Society.

The Board of Directors shall have charge of the publication of the official Journal of the Society. This publication shall be called, The Canadian Journal of Medical Technology. Between meetings of the Board of Directors, for action on problems requiring immediate attention, the authority and power to act rests with the President or his designate(s) from the Board of Directors in consultation with the Executive Director of the Society. The Board of Directors shall be responsible for all negotiations with outside agencies.

(d) The election of officers is conducted by mail ballot of the voting members of the Society annually, in accordance with the By-Laws and Regulations governing the function of the Nominating Committee. All officers of the Board of Directors are elected for a one-year term. The Provincial Directors are elected for a two-year term, five being elected in one year and five in the succeeding year. The Chairmanship of a Board, Committee or Council is assumed in accordance with the Committee structure of the Society.

5. What is the procedure for nominating persons for elected positions. (e.g. Nominating Committee and how it is appointed, Branch nomination, etc.)

The Nominating Committee of the Society is a statutory committee consisting of the Chairman, who shall be the Immediate Past-President of the Society, and the members, who shall be the ten Provincial Directors (one Director from each Province).

The Nominating procedure is as follows: The Nominating Committee shall submit to the Executive Director nominations for offices open for election, at least ten weeks prior to the Annual Meeting, for circulation of the mail ballot to the membership. The Nominating Committee shall provide at least one nominee for each office. Additional nominations may be submitted over the signatures of ten registered members, one of whom shall act as the proposer and another as the seconder, and must be accompanied by the consent of the nominee. Such nominations must reach

the Chairman of the nominating Committee at least 120 days before the Annual Meeting.

6. What is the election procedure followed and who administers the elections.

The procedure for election of officers is outlined in the following excerpts from the current By-Laws of the Society: "Article VII, Election of Officers, Section 1, The Elected Officers of the CSLT shall be elected by mail ballot by the members of the CSLT who are eligible to vote as set forth in Article II, Sections 1 - 4.
Section 2. The ballot submitted by the Nominating Committee shall be forwarded by the Executive Director to each eligible voting member not less than 60 days prior to the date of the next Annual Meeting.
Section 3. The ballots, completed by the voting member, shall be returned to the Executive Director within 15 days from the date of the mailing of the ballot and shall be counted by the auditor of the CSLT who shall report the results of the election to the Executive Director not less than 30 days prior to the date of the next Annual General Meeting.
Section 4. In the event that any office is not filled as a result of the mail ballot, the Nominating Committee Chairman shall submit the name of at least one (1) nominee for the office not filled, for election at the Annual General Meeting. Notwithstanding the above any voting member at the Annual General Meeting may also make nominations, for the office not filled, for election by the voting members at the Annual General Meeting.
Section 5. All elections held at an Annual General Meeting shall be by written ballot and the ballots counted by two (2) scrutineers appointed by the President at the Annual General Meeting, subject to the approval of the members at such meeting.
Section 6. In the event of a tie vote at any election at an Annual General Meeting, the President may cast the deciding vote.
Section 7. All nominations made, either on the nominating slate for the mail ballot or at any Annual General Meeting, must first have the written consent of the nominee.
Section 8. All elections to office, either by mail ballot or at an Annual General Meeting, shall be by a plurality vote".

The routine administration of the elections is conducted by the office of the Executive Director of the Society.

7. Who are the senior administrative officers of the Society, and how are these officers appointed or elected and for what term. Is there an organization chart.

The senior administrative officers of the Society are the following, and they constitute the Board of Directors of the Society: the President, Immediate past-President, President-Elect, the Vice-President, two Directors (one of which must be bi-lingual in the English and French languages), two Senior Directors.

Officers to each of the above-noted positions are elected for one-year terms, but the Vice-President automatically succeeds to the position of President-Elect and then President. The procedure for nomination and election of these officers is outlined in items 4,5 and 6 above. An organization chart of the Executive levels of the Society has already been attached as an appendix to item 4 (a) above.

8. Are there any Branch organizations within the Society. If so, what is the number of such organizations, bases of location, means of establishment, powers, and relationship to the Society.

In eight Provinces; British Columbia, Alberta, Saskatchewan, Manitoba, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland, there are Provincial Branches of the Canadian Society of Laboratory Technologists operating as organizational units of this Society. The policies of this Society are used as the basis for Provincial operation, but the activities of the Provincial Branches and their Local Academies are governed largely by local problems and interests. In the two remaining Provinces of Canada; namely, Ontario and Quebec, Provincial Branches of this Society existed as such until recent years, but in each of these Provinces there is now an incorporated provincial organization operating in the manner of a Branch of this Society and in agreement with this Society that such a relationship exists. In all cases, whether Provincial Branches or Provincial Incorporated Affiliated Societies, the standard for training and certification of medical laboratory technologists is that established and maintained by the Canadian Society of Laboratory Technologists.

9. What is the committee structure within the Society. What are the activities of such committees and how are the members appointed or elected.

The Executive structure of the Society was outlined in item 4 above, with particular reference to the General Council, Board of Directors, Certification Board, and Publications Board, but with no detailed information concerning the Committees of the Executive. The General Council, Board of Directors and the Nominating Committee constitute the statutory committees of the Society. There are, however, Standing Committees and Special Committees,which are Committees of the Board of Directors, and report directly to the Board of Directors. The Standing Committees include the following: Legislation Committee, Finance Committee, Public Relations and Membership Committee, Honorary Awards Committee, and Executive Committee. The Employment Relations and Welfare Committee is comprised of the ten Provincial Directors and reports directly to the General Council. The Special Committees, which may vary from time to time, include at this date the Founders' Fund Committee, and the Convention Committee. The Chairmanship and membership of these Committees is assumed within the Committee structure of the Society. The Chairmanship of the Convention Committee is decided by the members in the Province and City in which the Convention is to be held. The Chairman of the Convention Committee appoints the members to the Committee.

The Executive Committee has the authority to carry on urgent matters of Executive business between regular meetings of the Board of Directors and General Council, and in practice, acts in an executive and advisory capacity to the Executive Director of the Society on matters relating to policy. The Finance Committee is responsible for management control of all matters relating to the finances of the Society, and considers for approval the estimates and statements presented regularly by the Executive Director's office. The Legislation Committee is required to investigate all matters pertaining to the legal requirements of Society operations, and this relates primarily to By-Laws or their amendments, and Rules and Regulations pertaining to policy. The Employment Relations and Welfare Committee studies and reports on all matters pertaining to the Personnel Policies and Recommended Employment Policies affecting the membership

of the Society. The Public Relations and Membership Committee continually studies ways and means of promoting and maintaining external and internal public relations in the interests of a progressive Society sensitive to the wishes of the membership as well as our relationship with other organizations and the general public. The Honorary Awards Committee is responsible for the election of candidates to receive awards granted by the Society, and at the present time these awards include Gold Medal Award and Honorary Membership. The Founders' Fund Committee is charged with the responsibility for stimulating donations to the Fund, as well as ways and means of offering benefits from the earnings of the Fund. The Convention Committee is responsible for the local organization of our Annual National Convention under the direction of the Board of Directors and in co-operation with the Executive Director's office.

10. Is the Society a National Association and, if so, are there any affiliated groups in the various Provinces. What are the affiliations, and what are the financial arrangements with the affiliated groups.

The Canadian Society of Laboratory Technologists is a National organization, and as noted above, has a formal affiliation and agreement with the Ontario Society of Medical Technologists and the Quebec Corporation of Medical Technologists (which were formerly the Ontario Branch and the Quebec Branch of this Society respectively). All Branches and Affiliated Societies receive grants from the Canadian Society of Laboratory Technologists in recognition of the membership within the respective Provinces and dependent upon the degree of activity within the Province. In general, this grant has been made on the basis of a 10% return of the membership fees paid by members in the respective Provinces to the Canadian Society of Laboratory Technologists, but this basis for making the grant is not mandatory.

11. How is the profession represented by the Society defined.

The following excerpts from the Personnel Policies of the Canadian Society of Laboratory Technologists illustrates the definition of the profession as follows: "The Canadian Society of Laboratory Technologists defines Medical Technology as a career in Medical Laboratory Science which requires specialized knowledge and intensive preparation, including instruction in skills and methods, as well as in the scientific, historical, or scholarly principles underlying such skills and methods. The medical laboratory technologist is thus a person with a knowledge of, as well as the ability to perform, laboratory procedures required by Medical Laboratory Services".

12. What is the number of staff employed by the Society, distinguishing between full-time and part-time employees under the headings of: (a) administrative, (b) clerical, (c) research, (other please specify).

At this date, the number of full-time staff employed by this Society is 14 and a schematic diagram of their functions is attached as an appendix to this item. The administrative staff personnel are appointive officers of the Society, being confirmed in appointment by the Board of Directors. There are four appointive officers: Executive Director, Business Administrator, Registrar and an Executive Assistant.

There are 10 clerical members of the staff employed under the administrative authority of the Executive Director, and with some delineation these personnel function in the total area of Society activities. With reference to the attached organization chart of the Executive Office; there is one Office Supervisor, there are three clerks (general); one bookkeeper, one clerk (administration); three clerks (typists); and one clerk (certification). The general functions of each of these personnel are shown on the attached organization chart. At this date, there is no member of the staff primarily engaged in research, but the Executive Director is constantly involved in initiating studies related to progressive programming and most members of the staff assist in this regard. Furthermore, data collection, collation, and statistical presentation is a part-time function of several members of the staff. Although there are no part-time employees of the Society at the present time, the Editor of the Journal "Canadian Journal of Medical Technology" is paid an honorarium for editorial services in the production of this bi-monthly publication.

13. What were the membership figures of the Society in 1968, 1960, 1950 and 1940. If there is more than one category of membership, what is the number of members in each category for each of the years listed.

The Canadian membership figures for the applicable years are as follows:

	1940	1950	1960	1968
Registered Members:	255	(-	1765	5566
Associate Members:	-	(1254	-	-
Inactive:	25	(-	340	1114
Non-Certified:	-	-	184	991
Trainee:	-	174	754	1384
Total Membership	280	1428	3043	9055

14. What are the qualifications for membership in the Society. Could the qualifications be described under the following headings:
- Educational requirements for attaining such membership
- Examination requirements for membership and body conducting such examinations
- General requirements for membership (e.g. age, sex, nationality, period of residence in Province, moral character and any other general requirements).

Since the qualifications for membership in the various categories vary with the category, each group will be listed separately.

Registered Members are members who have been certified, are actively engaged in the practice of Medical Laboratory Technology, and are currently registered with the Society. This category of member requires an educational qualification of Senior Matriculation level (Canada), and subsequent training in a program approved by the Canadian Medical Association and this Society. At the completion of training, such personnel are required to take the examinations offered by this Society across Canada (twice a year) for certification and eligibility to registration. Candidates applying for certification examinations shall be at least 18 years of age, but there is no restriction regarding sex, nationality, or period of residence in a Province. However, candidates from outside of Canada are required to undertake a period of orientation in an employing institution in Canada before being considered eligible to take the

certification examinations, and this period is defined to allow the candidate to become adjusted to the Canadian scene and to be assimilated into Canadian service organizations before facing the Canadian certification examinations. This Society does not try to define or regulate what should be a required moral character, but this characteristic is largely controlled by on-the-spot interviews at the time of recruitment into Training Programs.

Associate Members (Trainee) are required to have the Senior Matriculation level of education and be enrolled in a Training Program approved by the Canadian Medical Association and this Society. Such members will, of course, on successful completion of Training Programs be eligible to take the examinations for certification and registration.

Associate Members (Inactive) are members who have been certified and registered, but who are not actively engaged in Medical Laboratory Technology at any given date, and are therefore retained as inactive members if they wish to maintain association with the Society.

Associate Members (Non-certified) are a group of personnel who have been admitted to membership in the Society, but who may or may not have the qualifications for certification and registration. If these individuals do not have the qualifications, either academic or training, they can retain this category of membership, but each one of them is assessed by a Committee of our Certification Board to determine if he may be considered eligible to take the examinations for certification and registration. This category of membership is therefore a group in some state of flux at any point in time, because some will be moving to other categories of membership.

15. Were there any amendments to qualifications for membership during the period 1937 to 1968.

In the 30 odd years since incorporation of this Society, there has been no change in the academic requirements for training towards certification and registration; Senior Matriculation level has been required from the outset. However, it must be recognized that academic curricula and programs in the various Provinces have changed considerably in this period of time, and the Senior Matriculation level of 1968 is quite different in content and approach from that of 1937; but the same level is still required. The greatest change has probably taken place in the type of Training Programs during these 30 years and these changes, for the most part, have taken place in recognition of the constantly increasing demands for a more complex technology in Medical Laboratory Services. In the early years of the Society's program for certification, an on-the-job exposure to the major disciplines of a Clinical Laboratory in an Approved Hospital, was the pattern of training. This on-the-job type of training was the predominant pattern for many years, although the period of in-service training gradually extended to 20 and 24 months, but within the last 5 years there has been a definite trend to the more formal approach in training for Medical Laboratory Technology. The rapidly developing programs of the last 5 years have assumed a two-phase approach to training, wherein the first phase is given in an academic atmosphere with lectures and laboratory demonstrations and exercises, and the second phase has been a period of approximately one year in the Laboratory

of an Approved Training Hospital, with emphasis on the practical applications of the fundamental sciences taught in the first year. At the present time, the majority of trainees in Canada are being trained in the formal two-phase type of program.

16. Is membership in the Society mandatory for the practice of the profession.

Membership or registration in the Society is not mandatory for the practice of the profession. However, the majority of employers will favour a registered technologist if one is available.

17. Is membership in the Society mandatory for any specific types or areas of employment within the profession. If so, what types or areas of employment. (e.g. for supervisory positions; for positions in an accredited Hospital,etc.)

Membership or registration in the Society is not mandatory for any specific types or areas of employment within the profession, but preference is usually given to members who are certified and registered at advanced levels of certification within the Society.

18. Does membership in the Society bestow any financial advantages on members.

Although membership in the Society, per se, does not bestow any financial advantages on the members, registered members usually receive a differential in salary in recognition of their qualifications.

19. What is the percentage of those practising the profession who are members of the Society.

There is no reliable information or source of information which could allow an absolute figure to be given for the relationship between members of this Society and the total numbers of personnel engaged in laboratory work in Canada. However, reasonably reliable information from informal sources would indicate that a "guesstimate" of 60% would be a reasonable figure.

20. Is a Provincial licence or certificate required for the practice of the profession represented by the Society.

A Provincial license or certificate is not required for the practice of the profession represented by the Society.

21. Does the Society confer any titles or degrees on its members. What are:
- the educational requirements for obtaining such a title or degree
- the examination requirements for such title or degree and the body conducting such examinations
- the other requirements for such a title or degree (e.g. age, sex, nationality, period of residence in Canada, moral character, etc.)

This Society grants certificates of qualification for registration at various levels as follows:

(a) Initial Certification - trainees with Senior Matriculation level of education, who have successfully completed a course of training in Medical Laboratory Technology in an Approved Training Program, may take the examinations offered semi-annually by the Society across Canada for certification at initial levels and eligibility for registration as Registered Technologists.

(b) Advanced Certification - there are two levels of Advanced Certification, which, in general, require certification previously at the initial level (as noted above) and a subsequent period of advanced training and experience varying from a minimum period of 3 years to 5 years, depending upon the rate of achievement of advanced credits eligibility. The first level of advanced certification qualifies successful candidates for registration as an Advanced Registered Technologist, and the next higher level of advanced certification qualifies a successful candidate for registration as a Licentiate, with the same qualifying criteria applying from each level to the next. At these advanced levels, eligible candidates are required to present a thesis and to attend subsequently an oral examination convened and conducted by this Society.

(c) Fellowship - The Certification Program of this Society does admit eligible candidates to nomination for Fellowship. At this date, there are no Fellows in the Society, and the procedure is for nomination only of highly qualified technologists, who may be subsequently elected to Fellowship in recognition of outstanding achievement in the service of Medical Laboratory Technology.

22. Does the Society itself operate an educational institution or institutions.

This Society does not operate an educational institution.

23. Does the Society have the authority to change or alter the curriculum of institutions providing education for future members of the Society.

Although this Society does not have the authority to change or alter the curriculum of institutions providing education for future members of the Society, for the last 28 years it has produced a Syllabus of Studies which sets the pattern for development of curricula in Approved Training Programs. This Syllabus of Studies has been revised at regular intervals (usually every 5 years) in recognition of changing requirements and developments in this area of Medical Laboratory Services, and it has been used in general as a guide by all Training Programs across Canada.

24. Does the Society act in an advisory capacity to other organizations or institutions providing education for future members of the profession.

As noted in the previous item, this Society has produced regularly over the last 28 years, a Syllabus of Studies for training and certification in Medical Laboratory Technology, which has been used as a point of reference by all Approved Training Programs in Medical Laboratory Technology across Canada. This Syllabus of Studies is provided to each training institution, which is approved for the training in Medical Laboratory Technology by the conjoint Committees of the Canadian Medical Association and this Society. In addition, the Executive Director of the Society maintains a constant liaison with training institutions on matters relating to training and certification, and he usually maintains direct personal contact with personnel across Canada at the time of his annual visits to each of the Provinces, and the main training institutions in each Province. Furthermore, the Executive Director of this Society is an ex-officio member of

the Canadian Medical Association's Committee on Approval of Training Programs in Medical Laboratory Technology and in this regard he maintains a constant liaison with the Canadian Medical Association and its Committee members.

25. What are the requirements and activities of the Society regarding the continuing education of its members.

The encouragement of continuing education among the members of this Society is made in several ways, and is a continuous objective of our various programs. In the area of communication by publications, this Society publishes a Journal, The Canadian Journal of Medical Technology, bi-monthly, and a News Bulletin bi-monthly in alternate months from the Journal. The Journal is primarily devoted to the publication of scientific papers in the various areas of Medical Laboratory Technology, and the News Bulletin is devoted to technical services such as reviews of current books, listings of important Journal articles, information pertaining to training aids and their availability, regulations and notices pertaining to training, certification, and membership, and general information items for the membership. In addition, the requirements for eligibility to Advanced Certification are such that Advanced Training Programs are encouraged, and since the institution of this requirement about 7 years ago, there has been an evolution of Advanced Training Programs in major centers across Canada. Furthermore, at this date the Certification Board of the Society is actively studying ways and means of providing Advanced Training Programs for the benefit of all members of the Society (whether they are employed in metropolitan areas or rural areas), and it is likely that part of this program will be the introduction of some form of correspondence courses.

26. Does the Society issue Rules and Regulations or guidelines covering the practice of the profession for the members of the Society. If so, by what authority is it empowered to do so.

In 1949, a Code of Ethics was developed by this Society as a guideline for the practice of Medical Laboratory Technology by members of this Society and it is a moral obligation of members of the Society to work within this Code. Furthermore, in 1954, the Society approved a Pledge, which is made available to graduating technologists and is used by a large number of Approved Training Programs at graduating ceremonies. (A copy of the Code of Ethics and the Pledge is attached as an appendix to this item).

27. Does the Society discipline members who do not abide by such Rules and Regulations and/or revoke their membership in the Society? If so, by what authority is it empowered to do so. What are the procedures by which such powers are invoked and implemented.

There is provision in the By-Laws of the Society for the disciplinary termination of membership as follows: "Any member charged with conduct detrimental to the C.S.L.T. or to the profession of Laboratory Technology as set forth in the Code of Ethics referred to in Article II, Section 8, (By-Laws) above, as promulgated by the Directors and approved at the Annual General Meeting of the membership and against whom such charges are sustained may be expelled from membership by a 2/3 (two-thirds) vote of the Board of Directors.

Any such member so expelled, as specified in Article II, Section 12,

(By-Laws) above, shall have the prerogative of appealing his case to the members at the next Annual General Meeting provided such notice for appeal has been submitted to the Executive Director at least 30 (thirty) days prior to the date of the Annual General Meeting".

28. When such Rules or Regulations affect persons or institutions who are not members of the Society, can the Society impose sanctions against such persons or institutions when they do not observe these Rules or Regulations.

It is not within the authority of this Society to impose sanctions against persons who are not members of the Society.

29. What are the measures, if any, taken by the Society to ensure the continued competence of a member of the profession to practice the profession.

The continued competence of members of the profession is encouraged by constant communication through publications of the Society, by the continued program of various sections of the Society in various disciplines to encourage and promote seminars, panel discussions, and regular meetings at all local levels, and the Society presents a scientific program of approximately four days' duration at each Annual Convention. As noted previously, members who wish to achieve advanced levels of certification are required to show by various means their competence for these advanced levels, and programs of refresher and advanced training on a wider basis are being studied at the present time.

30. What other activities or powers of the Society in the field of regulation or education may be of interest.

Executive Officers, Provincial Directors, members of the Certification Board, and members of Science Sections are frequently asked to act in a consultative or advisory capacity to Training Programs in various areas across Canada, and the Executive Director maintains a close liaison with many other organizations in the interests of medical laboratory technologists and Medical Laboratory Technology within the total framework of Medical Laboratory Services.

31. What activities is the Society engaged in to promote the socio-economic welfare of its members.

For many years, the Society has maintained Standing Committees on Employment Relations and Welfare, and has, from time to time, produced Personnel Policies (appended) and recommendations concerning the socio-economic welfare of medical laboratory technologists. The most recent publication in this regard is attached as an appendix to this item.

32. What are the activities of the Society to ensure that there will be an adequate supply of persons practising the profession or occupation.

This Society has constantly engaged in a program of recruitment of personnel for training in Medical Laboratory Technology, and its members regularly give career talks to High School students to encourage their entry into training. The Society supports this type of local action by publishing and making available a recruitment pamphlet (attached as an appendix to this item) for individual distribution to interested students.

Furthermore, the Society makes available for recruitment purposes a film strip on Medical Laboratory Technology, produced by the National Film Board, and a 16 mm. recruitment film, (colour, sound narrated, of approximately 20 mins. duration) entitled "Career - Medical Technology" produced by the American Society of Clinical Pathologists and made available to this Society through the courtesy of the Canadian Cancer Society. In addition, the Society has produced a Canadian recruitment film, 16 mm. colour, sound narrated of approximately 15 mins., and copies of this film have been distributed to each Provincial Branch and Provincial Affiliated Society to serve recruitment purposes in all Provinces of Canada.

33. What is the relationship (formal or informal) of the Society with other professional regulatory or education bodies in the Health Sciences.

The Society maintains a wide association with other organizations in the Health Sciences, both on an informal and formal basis. The Canadian Society of Laboratory Technologists has a formal affiliation with the Canadian Medical Association, and the Executive Director of this Society is an ex-officio member of the Canadian Medical Association's Committee on Approval of Training Programs in Medical Laboratory Technology. A constant liaison is maintained with the offices of the General Secretary of the Canadian Medical Association and the Executive Director of this Society. The Executive Director (CSLT) maintains a constant relationship with the Officers of the Canadian Association of Pathologists (a section of the Canadian Medical Association). This Society has a formal affiliation with the Canadian Hospital Association, and liaison is maintained on behalf of this Society through its Executive Director. The Society maintains an informal relationship with representatives of the Canadian Society for Clinical Chemists and the Canadian Association of Medical Bacteriologists, and the Executive Director (CSLT) meets whenever possible with representatives of educational bodies and governmental agencies in discussions concerning Medical Laboratory Technology and Medical Laboratory Services. In order that this Society shall be advised on a wide basis concerning Medical Laboratory Services, approximately 7 years ago it appointed an Advisory Council, which meets annually for two days for discussions on matters relating to Medical Laboratory Services and the programs of the Society. The Advisory Council has 9 members, appointed by the Society for terms of 3 years each, with 3 members retiring each year. Members of this Council have been appointed from many professional areas in the Health Sciences: Educators in Medical Science, Laboratory Directors, Directors of Medical Training Programs, Administrators in Hospital Services, Scientists in the various disciplines of Laboratory Services, and representatives of Government Laboratory Services. The consultation and advice provided by these members of the Advisory Council have been of inestimable value to the programs of this Society and has encouraged a wide appreciation of the complexities and scope of services to be offered by all professional personnel in the provision of better health care.

34. What are the methods by which the staff and Executive can communicate with the membership of the Society.

As indicated in previous items of this questionnaire reply, the Society maintains regular monthly communication with its membership through the publications of the Society (Canadian Journal of Medical Technology and C.S.L.T. News Bulletin). Furthermore, it is one of the recognized functions of the Executive Director to develop and maintain a Public Relations Program with the membership through the means of his annual trips to all Provinces in Canada.

The Annual Meeting of the Society is held during the course of an Annual Convention which lasts approximately 4-5 days and at this time members attending the Convention have the opportunity to meet with all elected officers of the Society as well as to attend regular scientific sessions. These Annual Conventions are held on an alternating geographical basis, and they are therefore held in various centres across Canada. For example, the hosts for 1966 were the British Columbia Branch (Vancouver), for 1967 the Quebec Society (Quebec City), for 1968 the Alberta Branch (Edmonton).

35. Does the Society produce an annual or periodic report.

The Annual Report of the Society, which is included in the May issue of the News Bulletin each year, is circulated to all members of the Society, and is discussed at the Annual Meeting of the Society.

36. Is there an initiation fee for membership in the Society.

The enrollment fee for Associate Members (Trainee) is $10.00 which covers the period of the Training Program, and includes the evaluation of academic credits, and a copy of the Syllabus of Studies, and a subscription to the Canadian Journal of Medical Technology, the News Bulletin and other information which may be circularized to the general membership.

The enrollment fee for Associate Members (Non-Certified) is $8.00 which includes assessment of academic and training qualifications and individual assessment by a Committee of the Certification Board, and provides regular publications' services of the Society.

Examination fee for eligible candidates seeking certification is $50.00, and this includes membership or registration fee for the current year.

37. Is there an annual or other periodic membership fee for the Society.

For Certified Members, the annual registration fee is $12.00. Certified Members, who are currently inactive (i.e. not actively engaged in the practice of Medical Laboratory Technology) may maintain membership in the Society upon payment of an annual fee of $5.00. The annual membership fee for Associate Members (Non-Certified) is $5.00.

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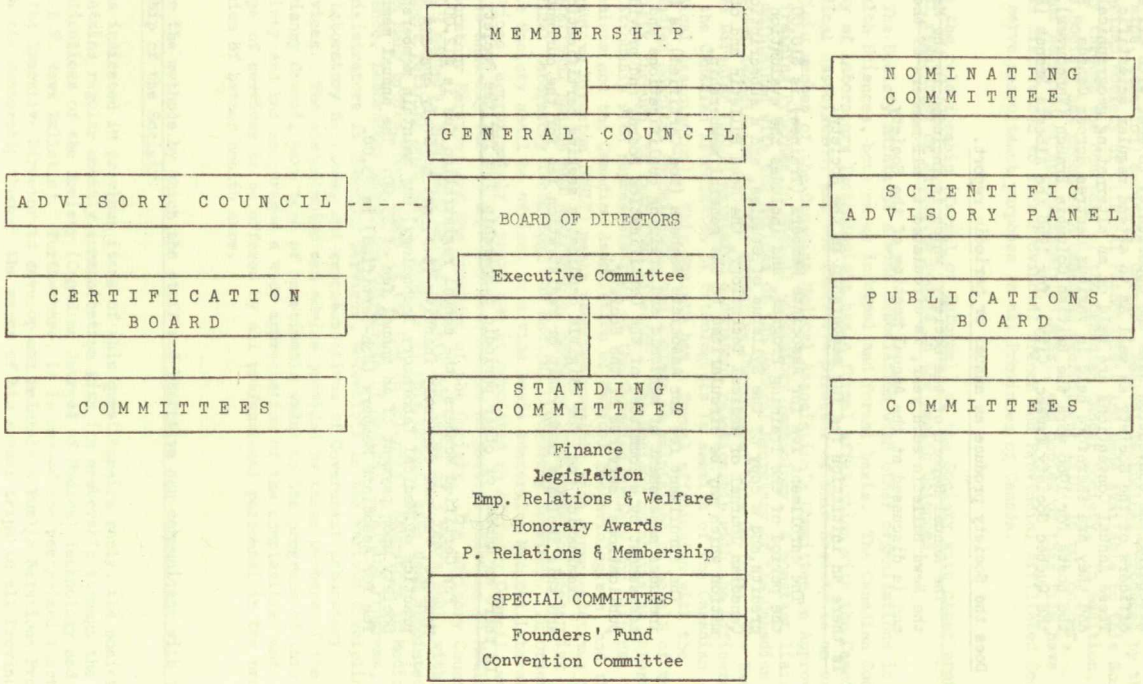
EXECUTIVE ORGANIZATION CHART



COMMITTEE STRUCTURE WITHIN BOARD OF DIRECTORS AND GENERAL COUNCIL

A. 1. Annual Meeting - President as Chairman

2. Nominating Committee: (a) Past-President as Chairman
(b) Provincial Directors as members.

3. General Council: (a) President as Chairman
(b) Past-President
President-Elect
Vice-President
Two Directors
Two Senior Directors
Provincial Directors

4. Board of Directors: (a) President as Chairman
(b) Past-President
President-Elect
Vice-President
Two Directors
Two Senior Directors

5. Executive Committee: (a) President as Chairman
(b) Plus his Appointees

B. Standing Committees

1. Finance - Board of Directors - President as Chairman

2. Honorary Awards - Board of Directors - Vice-President as Chairman

3. Legislation - Executive Committee - President-Elect as Chairman

4. Public Relations and Membership-Executive Committee-Vice-President as Chairman

5. Employment Relations and Welfare-Provincial Directors-Past-President as Chairman

C. Special Committees

1. Founders' Fund-Executive Committee - President as Chairman

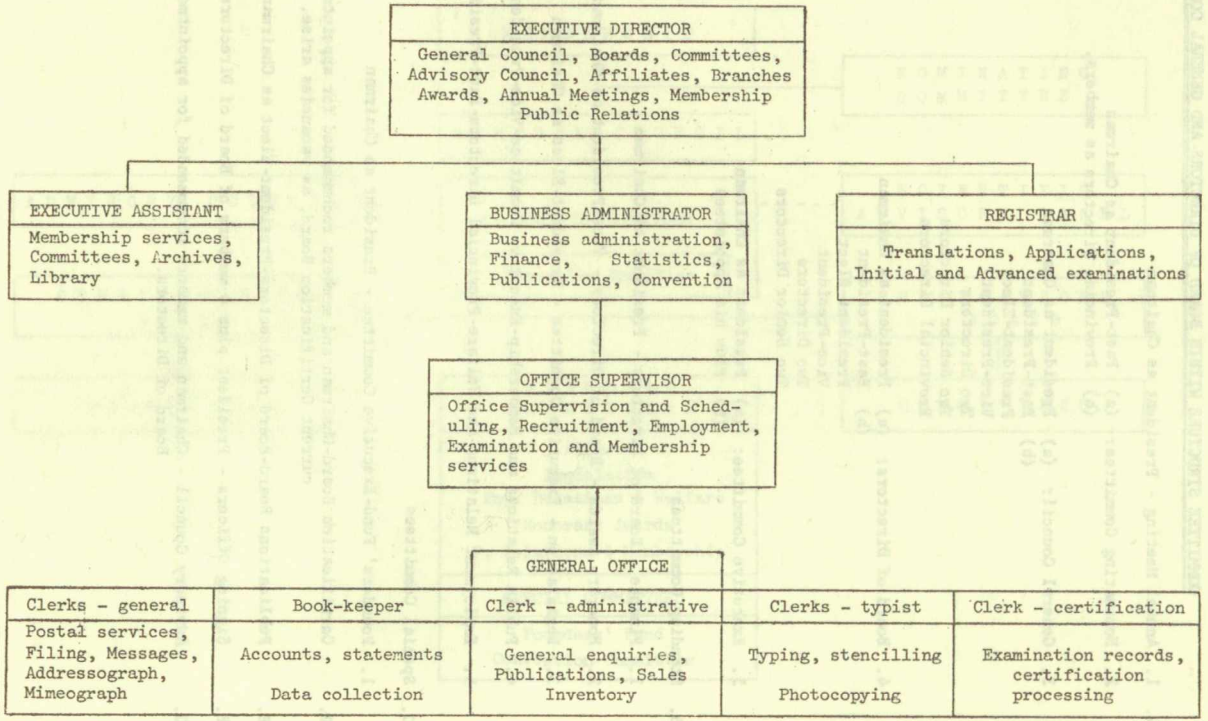
D. Certification Board-Chairman and members recommended for appointment by current Certification Board, as vacancies arise.

E. Publications Board-Board of Directors-President-Elect as Chairman

F. Signing Officers - President plus 4 members of Board of Directors

G. Advisory Council - Chairman and members recommended for appointment by Board of Directors.

ORGANIZATION - EXECUTIVE OFFICE



APPENDIX D

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

PERSONNEL POLICIES (ENGLISH)

C.S.L.T. PERSONNEL POLICIES

Introduction

Personnel Policies and Recommended Salary Schedules, as part of the National policy of the Canadian Society of Laboratory Technologists, are guide-posts for attainment by individual members, academies, and provincial organizations of the Society, as well as for employing authorities, each of whom should realize the importance of defined qualifications and professional attitude of the medical laboratory technologist.

The history of the Society, as a National organization of professionally orientated personnel, indicates that it has constantly maintained its activities towards the development of well-qualified personnel in Medical Laboratory Technology for the benefit of medical laboratory services and the ultimate welfare of the patient. The Society has developed an effective liaison with the Canadian Medical Association and its laboratory affiliates; and it has established effective communication with other organizations within the health field through the appointment and function of its own Advisory Council. These broad and democratic communications can bring authoritative opinions in medical care to aid its general programs. The Society's major interest has been in initial and advanced training and certification, in accordance with rapidly developing requirements of medical science, and it has facilitated the supply of qualified technologists to medical services at an ever increasing rate. The high attrition rate of young women from the service is a cause of major concern in the development of a stable medical laboratory service. Therefore, this Society feels that every effort should be made to create a career prospect in Medical Laboratory Technology which would encourage stability in the service, and an acceptable economic return for services rendered. The following policies are presented in accordance with the Society's programs and objectives, and they define laboratory service classifications which should be readily applicable across Canada.

Aims and Objectives

Medical Technology and the Medical Technologist

The Canadian Society of Laboratory Technologists defines Medical Technology as a career in medical laboratory science which requires specialized knowledge and intensive preparation, including instruction in skills and methods, as well as in the scientific, historical, or scholarly principles underlying such skills and methods. The practitioners of Medical Laboratory Technology are certified by the Canadian Society of Laboratory Technologists, which Society operates to develop and enforce professional standards for the certification of its members. In addition to the requirements of specialized training and high standards of performance, the medical technologist is governed by a Code of Ethics. The medical laboratory technologist is thus a person with a knowledge of, as well as the ability to perform, laboratory procedures required by medical laboratory services.

The Professional Approach

Parmenter (1) states that "Two types of profession exist, - one group which requires strictly formal education in well organized areas of knowledge such as the physician, lawyer, or engineer: - the second group, no less important, may not

demand as much in the way of specialized, theoretical knowledge, but does demand considerable background knowledge and/or creative ability, plus other skills, acquired through general education, appropriate experiences and progressive training". Furthermore, he adds that "professions require, for entry and success, graduation from prescribed university courses OR from prescribed education in some setting plus experience of such a nature as to provide a comparable total background of training. For some professions, licensing authorities determine the minimum qualifications for practice; in other professions, a Standards body determines the criteria for certification in a specialized field". These quotations illustrate the basic philosophy of this Society in the furtherance of its Aims and Objectives and reflect the main purpose of the certification program of the Society.

In the Charter of Incorporation of this Society granted by the Secretary of State for Canada in May, 1937, the original Aims and Objectives were well-defined, and they remain the basic principles of the Society today. These Aims and Objectives are to improve the qualifications and standing of medical laboratory technologists in Canada; to promote research endeavour in all branches of medicine; to promote a recognized and professional status for medical laboratory technologists; to promote closer co-operation between the medical profession and the medical laboratory technologists; and to aid more efficiently the physician in the diagnosis and treatment of disease.

In the early years of development of the Canadian Society of Laboratory Technologists, a Code of Ethics, which is a recognized prime characteristic of any professional organization, was produced for the guidance of its membership.

CODE OF ETHICS

1. Medical technologists are dedicated to the service of humanity. They work in co-operation with all other members of the health team.

2. The motto "usui sum semper" shall remain paramount in the life of medical technologists.

3. Medical technologists shall uphold their scientific status on a suitably professional level by a distinctive demeanor in their dress and general conduct.

4. Medical technologists shall diligently apply their skill to maintain a reputation of honesty and reliability.

5. Medical technologists shall consider all medical information confidential.

6. Medical technologists shall be aware that the diagnosis of disease is the responsibility of the physician.

7. Medical technologists shall uphold and maintain the dignity and respect of their profession, considering reliability, courtesy, patience, tact, efficiency and personal integrity as fundamental attributes.

8. Medical technologists shall be loyal to their colleagues and shall recognize an obligation to support their professional organization by interest and active participation.

9. Medical technologists shall strive to improve their skill and knowledge and maintain an open mind to scientific advancement.

10. The medical technologist shall maintain a high professional level of teaching the method and theory of medical technology at all times.

That this Code of Ethics has had an impact on employment relations of medical laboratory technologists has been demonstrated by the fact that it was used as supporting evidence and recognized in the final judgment (3) which was handed down by a Court of Law to medical laboratory technologists at Hamilton, Ontario, granting exclusion from a labour union.

In order that new graduates in Medical Laboratory Technology should recognize early in their careers the ethical and moral standards declared by the Society, a "pledge" for medical technologists was approved and has been in use at graduation ceremonies for many years.

A PLEDGE FOR MEDICAL TECHNOLOGISTS

I solemnly promise before God:

To carry out the duties assigned to me faithfully, and to the best of my ability.

To remember that a patient's life may depend upon the accuracy and reliability of my work.

To respect human life, and to be sympathetic towards all patients.

To hold inviolate the confidence placed in me by both patient and doctor.

To work harmoniously with my fellow technologists, and others who care for the sick.

To uphold the ethics and dignity of my profession.

To maintain an open mind for new ideas, and new truth.

So help me God.

C.S.L.T. CERTIFICATION

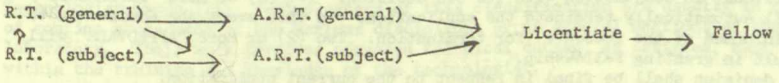
To paraphrase Leighbody's (2) description of what makes a professional worker professional: the medical technologist's chief desire is to render a service - to improve man's welfare or that of the community, is the end toward which the medical laboratory technologist devotes his career. To assist in the fulfillment of these desirable objectives has been one of the guiding principles of this Society since its inception in 1937, and programs for certification and registration of medical laboratory technologists were developed in the very early years of incorporation.

Affiliation with the Canadian Medical Association was achieved in these early years, and a conjoint program of formal and regulated courses of instruction towards Certification with this Society was developed. Today the approval of Training Programs in Medical Laboratory Technology is a cooperative effort of the two Societies, with the assistance of other Laboratory Scientific Organizations, and uniform programs of training are being achieved in the interests of National Certification and Registration. In 1960, this Society organized its Certification Board to develop the current Certification Program in recognition of rapidly changing and developing requirements for Medical Laboratory Services. Essentially, this Program recognizes initial levels and advanced levels of Certification for Medical Laboratory Technologists.

Initial Certification. The initial levels of Certification are offered in two areas: the General area and the Subject area. The General Certificate, R.T., is conferred on an eligible candidate who has taken training in a Program approved by the Canadian Medical Association and the Canadian Society of Laboratory Technologists, and who has successfully completed the Certification examinations presented by this Society. The Subject Certificate, R.T.(Subject), is conferred on an eligible candidate who has completed a Training Program which has been approved by C.S.L.T. in one of the disciplines of Medical Laboratory Technology and who has subsequently passed the examinations for this Certification. At these initial levels of Certification, the medical technologist demonstrates the following characteristics associated with true professional status. (1) the professional worker contributes to the skill and knowledge of the profession. He developes new ideas, plans methods, and developes scientific accuracy and integrity and teaches by a scientific method; (2) the professional worker respects the confidence of others. The welfare of those he serves requires that information concerning them remain confidential, and he never violates a confidence; and (3) the professional worker avoids rumour and hearsay. He secures information which is important to him directly from those authorized to release it. (1)

Advanced Certification. Two levels of Advanced Certification are presently offered in the Society's Program; namely, Advanced Registered Technologist (A.R.T.), and Licentiate (L.C.S.L.T.). Progression from one Certification level to a higher level requires a minimum period of advanced training and experience of three years (normally 3-5 years), and defined eligibility credits must be accumulated during this period preceding examination. At the A.R.T. level, two types of Certification are offered: one in the General field, A.R.T.(General), and the other in one of the Medical Laboratory disciplines, A.R.T.(Subject). Licentiate Certification is the highest level of Certification obtained by examination in this Society, and there are two ways in which this Certification may be achieved. One of these emphasizes the administrative and organizational aspects of the individual's work, and the other emphasizes the highly specialized nature of his advanced qualifications in a special subject area. It may be noted that provision is made in the Certification Program for the granting of a Fellowship, but this will be conferred only by nomination of eligible candidates of outstanding abilities and knowledge (according to the procedure outlined on page 5).

The Certification levels and channels of progression which have been approved are shown as follows:



FELLOWSHIP (C.S.L.T.)

Fellowship in the C.S.L.T. shall be by ELECTION.

This shall be an application by NOMINATION by three (3) Sponsors, two (2) of whom shall hold Advanced Certification in the Society, the third shall be a Pathologist and/or Laboratory Director.

REQUIREMENTS

1. A Nominee must be a member in good standing of the Society.

2. The Nominee's current certification shall be at the Licentiate (L.C.S.L.T.) level.

3. The Nominee must have a minimum of five (5) years continuous post-L.C.S.L.T. certification experience in General Laboratory Technology or any Discipline thereof.

4. A Nominee must submit "A" - a full Dossier and "B" - References.

   "A" The Dossier shall be a complete chronological history of the nominee's employment in Medical Technology from date of initial certification to the present time, and shall include:-

   (a) All centres of employment with names of Institutions, dates involved, name of Director and position(s) held.

   (b) Copies of all original manuscripts or reprints of all publications in which the applicant was a participant as author or co-author.

   (c) Complete information relative to any and all Post-Graduate studies. e.g. - Centre, extent, subject, Director, panel or demonstrator; duration, whether or not examination and if examined a transcript of the marks attained.

   "B" References must originate from at least three (3) sources additional to the sponsors and shall demonstrate a continued upgrading of knowledge and experience on the part of the nominee in the present field of endeavour or specific discipline.

PROCEDURE Election shall be by the following procedure and shall initiate with -

1. The Certification Board to whom would be submitted the Dossier and References. These shall be exhaustively checked and will result in referral with recommendation (APPROVAL OR DEFERMENT) to -

2. The Board of Directors. Decision at this level will result in referral with recommendation (APPROVAL OR DEFERMENT) to -

3. The General Council. Action at this third level shall be governed by the prior decisions, in conjunction with its own decision. Two (2) or more "DEFERMENTS" shall automatically terminate the application. In this event the Nominee is to be informed of the reason(s) for termination. Two (2) or more "APPROVALS" will result in granting Fellowship.
   The decision shall be final in respect to the current application.

LABORATORY SERVICE CLASSIFICATIONS

General Classifications. The Society recognizes that any classification of laboratory personnel, if it is to be applicable and effective on a wide basis, must consider the requirements of Laboratory Service as well as qualifications of personnel. It has been decided, therefore, that a numerical classification shall be introduced which will attempt to encompass the majority of Medical Laboratory Service requirements in Canada. The decision to develop a numerical classification in these Policies was made in recognition of the limitations and misuse of the terms: Junior, Intermediate, Senior, Charge, and Chief, and in acknowledgement of the fact that such designations are the prerogative of the employing authority. At this date (1966) it is recognized that the proposed classifications do not encompass all aspects of personnel requirements in Medical Laboratory Services, that there is a need for a classification having qualifications lower than those listed here for certification. Furthermore, it is recognized that there are personnel who have educational qualifications, abilities, and knowledge, well beyond that required for certification as listed herein. These aspects are at present under study, but the Society supports and encourages that personnel of outstanding qualifications be given appropriate recognition in the employment situation beyond the scheme proposed.

Technological classifications.

Technologist Grade I: Technologists of this classification require general or specialized knowledge of medical laboratory procedures, gained through completion of an approved course of training and certified by the C.S.L.T. at the R.T. level.

Technologists at this level, having completed two or more years of experience, may be required to allot specific work assignments to recent graduates, provide advice and assistance to trainees in complex technical situations, and periodically inspect routine work in a laboratory.

The technologist at this level may be expected to participate in emergency, week-end and/or night coverage programs, perform tests in various laboratory disciplines under the requirements of the Syllabus, and prepare written reports of the tests performed within his responsibility.

Technologist Grade II: Technologists of this classification perform the type of work and duties similar to that of Grade I, but have a position of seniority due to greater experience and training, and have become familiar with more specialized laboratory procedures.

These technologists may be responsible for some supervision and practical teaching in certain areas, to the Grade I technologist and trainee. They may also be expected to participate in programs of emergency, week-end and/or night coverage, if necessary.

Technologists at this level should be qualified as follows:

(a) certified and currently registered as R.T.(General) by the C.S.L.T., with at least two years of acceptable laboratory experience;

or (b) certified and currently registered as R.T.(Subject) by the C.S.L.T., with at least three years of acceptable experience;

or (c) recent University graduate in science;

or (d) a combination of training and experience equivalent to the above.

Technologist Grade III: Technologists of this classification are usually in charge of routine procedures of the various disciplines or of special sections of the laboratory. Their work involves advanced technical duties, as assigned, that come within the training and knowledge of the technologist.

These technical personnel may be engaged in supervision, in assisting with the training of student technologists, and in the methodology and practical aspects of medical laboratory technology. They keep records, prepare activity reports, and may determine supply and material needs. They may also participate in programs for emergency work coverage.

At this level, technologists should be qualified as follows:

(a) certified and currently registered as an R.T. by the C.S.L.T., with at least four years of acceptable experience;

or (b) certified and currently registered as an Advanced Registered Technologist (A.R.T.) by the C.S.L.T.;

or (c) graduate from a University in science, with two years of acceptable experience;

or (d) a combination of training and experience equivalent to the above.

Technologist Grade IV: Technologists of this classification should be required to supervise other technical personnel, and should be responsible for the efficient functioning of all technical aspects of the laboratory section or, in a smaller hospital should be responsible for the functioning of all technical aspects of the laboratory. Where applicable, such technologists should be responsible for the training of technologists and student technologists in the laboratory, or laboratory section. They may be expected to order equipment and supplies to maintain adequate stock; to introduce new techniques and provide instruction in their performance; and to be responsible for records, tests, maintenance of equipment and preparation of activity and monthly reports:

Technologists at this level should be qualified as follows:

(a) certified and currently registered as an R.T. by the C.S.L.T., with at least six years of acceptable experience in a laboratory discipline for which there is not as yet a higher certification;

or (b) certified and currently registered as an A.R.T. by the C.S.L.T., with three years of acceptable experience;

or (c) certified and currently registered as an A.R.T. by the C.S.L.T., and have served notice of intention to proceed to Licentiate certification.

or (d) graduate from a University in science, with three years of acceptable experience;

or (e) a combination of training and experience equivalent to the above.

Technologist Grade V: Technologists of this classification may be engaged in the co-ordination of technical staff function, and responsible to the Director of Laboratories for delegated administrative duties. Such technologists co-operate in a liaison capacity with other units of the hospital in promotion of a high standard of patient care. They may integrate the activities of the hospital laboratory training program with that of an established school of medical technology (where two-phased programs exist).

This is an administrative technologist position, wherever organization warrants its establishment. Technologists fulfilling such a function should have Licentiate certification (L.C.S.L.T.) by the C.S.L.T., with training in the principles of teaching, organization and management.

OR

Technologists of this classification may be technical co-ordinators, whose responsibilities will include the efficient functioning of all technical aspects of the laboratory, or of a laboratory section in a large hospital. They should be responsible for ordering, maintenance, and repair, of all equipment within the laboratory or section. They should be responsible for technologist training programs, as well as the supervision and instruction of technical staff in all technical procedures. They should be competent to introduce new, complex techniques, and instruct other technologists in

their performance. They should have a knowledge and awareness of the inter-relationships of various laboratory disciplines. They should be expected to attend group conferences and scientific programs related to their professional activities.

These technologists should be qualified as follows:

(a) certified and currently registered as a Licentiate (L.C.S.L.T.) by the C.S.L.T.

or (b) University graduate in science and C.S.L.T. certification at least at the A.R.T. level.

Technologist Grade VI: Technologists of this classification should be responsible for all studies and procedures conducted by the hospital laboratory technologists; the maintenance of adequate standards and quality control; staff supervision; and the supervision of the teaching of student technologists.

Such technologists shall have maintained certification and registration within the C.S.L.T. The Society recognizes that there are personnel with qualifications, abilities and knowledge beyond the grades outlined above, and it supports and encourages recognition to these people of outstanding qualifications.

Technologists at this level should be qualified as follows:

(a) certified and currently registered as a Licentiate (L.C.S.L.T.) by the C.S.L.T., with at least 10 years of demonstrated ability and experience;

or (b) University graduate, and A.R.T. certification or higher by the C.S.L.T., with at least 10 years demonstrated ability and experience.

Technologists in this classification should have indicated that their qualifications include a continuing education in the laboratory discipline or disciplines within the area of responsibility.

* * *

It is further emphasized that the Society recognizes that there are personnel with qualifications, abilities and knowledge well beyond the scheme outlined above. These individuals have maintained certification and registration within the Society. The Society therefore supports and encourages recognition to these people of outstanding qualifications. Furthermore, the Society recommends an economic return at least equivalent to that obtained in comparative professions in order to encourage continuing advancement and research in the medical science field.

* * *

References:

1. Parmenter, Morgan D.: Exploring Occupations, 1964-67 edition, The Guidance Centre, Ontario College of Education, University of Toronto, Toronto, Ontario.
2. Leighbody, G.B.: Quoted in Exploring Occupations (vide supra), from Tech Training, March, 1952.
3. Certificate: The Ontario Labour Relations Board, between the Hamilton Municipal Employees' Association, Local Union 167 of the National Union of the Public Employees and St. Joseph's Hospital, Hamilton, Sept.18,1959.
4. Certification Report, C.S.L.T. 1962.

RECOMMENDED EMPLOYMENT POLICIES

Although the Society recognizes that employment conditions may vary from region to region, or Province to Province, the following recommendations are presented as a national guide and should be applicable across Canada.

GENERAL

1. Registration with the Society shall be a condition of eligibility of employment as a Registered Technologist.

2. A written contract should be established stipulating the general conditions and the particular responsibilities of the position.
Two copies shall be signed by the two parties, and one copy be given to the Technologists.

3. Between the date the examinations are written and a certificate is obtained from the Society, the candidate may be remunerated by 15% less than the basic salary of a registered technologist. However, when the certificate has been obtained, the salary should be readjusted,retroactive to the date of employment or certification, whichever is applicable.

GENERAL CONDITIONS OF LABORATORY EMPLOYMENT

Normal Service

1. Salaries are based upon the minimum week as laid down by legislacion within the Province of employment.

2. All work outside of the normal working day or a normal week, will be considered as supplementary time and paid at one and one-half times the hourly rate.

3. Time to be remitted, whether for a holiday or vacation, is not recommended by the Society, because this tends to disorganize the routine daily service.

"Call Duty"

4. Call duty is that performed over the regular hours spent in the laboratory. The service should be performed by Registered Technologists as long as the number of qualified personnel is sufficient to cover the service.

5. Remuneration for this service should be as follows:

   (a) Evening and night duty: Technologists who are responsible for a service whether evening or night should receive an additional pro rata fee per period of duty.
   (b) Call duty: Technologists who are on call duty should receive:

      (i) an additional fee for stand-by duty;
      (ii) pro rata fee for eath call;
      (iii) transportation allowance.

Uniforms

6. Laboratory coats and/or uniforms, and the laundering of such, should be provided.

Retirement

7. An employee-employer retirement plan should be provided.

8. Severance pay, in recognition of valuable service and good employee practices, is recommended on termination of employment.

Laboratory Safety

9. A safety code should be enforced in all laboratories, assuring the technologist of adequate protection from infection and laboratory accident.

VACATIONS AND LEAVE

Statutory Holidays

1. Statutory Holidays shall be as declared in the Province of employment.

2. On the occasion of a Statutory holiday, a day must be given either on the day itself or within a given period of time (either 28 days before or after the holiday).

Sick Leave

3. No benefits without having completed three months of service.

4. One and one half days per month after 3 months service with the possibility of accumulating up to one hundred and twenty days or twenty four working weeks.

5. Technologists leaving employment, if working elsewhere within a Province under the same hospital authority, should be eligible to transfer accumulated sick leave.

Compassionate Leave

6. Adequate compassionate leave with pay should be granted to technologists on the occasion of the death of a close relative.

Special Leave (Training)

7. Leave of absence with pay should be given to technologists wishing to extend their knowledge by attending Seminars, courses, or scientific meetings:

   (a) On the recommendation of the Laboratory Director.
   (b) Without losing seniority.
   (c) By means of a regular salary or scholarship fund.
   (d) The expense of the course to be reimbursed fully, on successful completion of the course.

8. A minimum of 15 days paid vacation based on a five day week should be given after 1 year of continuous service, and 20 days after 5 years.

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9. A proportional compensation in vacation should be given if an employee leaves after 6 months of service.

10. Vacation relief should be provided wherever possible.

* * * * *

RECOMMENDED SALARY SCHEDULE

The salary schedule reproduced hereafter is recommended in accordance with the Technological Classifications defined in the foregoing Personnel Policies. Consideration has been given to the training and qualifications, experience and abilities, and responsibilities required of certified and registered technologists in the provision of medical laboratory services.

It is recognized as a principle that an individual with demonstrated qualifications and abilities may be promoted from one grade to another on the basis of these characteristics in less than the prescribed time indicated in the annual increment schedule.

RECOMMENDED SALARY SCHEDULE

Technological Classification	Initial Salary	Salary at Anniversary Service				
		1 year	2 years	3 years	4 years	5 years
Technologist Grade I	$ 5832 p.a. $ 486 mo.	$ 6048 p.a. $ 504 mo.	$ 6264 p.a. $ 522 mo.	$ 6480 p.a. $ 540 mo.	$ 6696 p.a. $ 558 mo.	
Technologist Grade II	$ 6408 p.a. $ 534 mo.	$ 6696 p.a. $ 558 mo.	$ 6984 p.a. $ 582 mo.	$ 7272 p.a. $ 606 mo.	$ 7560 p.a. $ 630 mo.	
Technologist Grade III	$ 7272 p.a. $ 606 mo.	$ 7632 p.a. $ 636 mo.	$ 7992 p.a. $ 666 mo.	$ 8352 p.a. $ 696 mo.	$ 8712 p.a. $ 726 mo.	$ 9072 p.a. $ 756 mo.
Technologist Grade IV	$ 9288 p.a. $ 774 mo.	$ 9720 p.a. $ 810 mo.	$10,152 p.a. $ 846 mo.	$10,584 p.a. $ 882 mo.		
Technologist Grade V	$10,728 p.a. $ 894 mo.	$11,232 p.a. $ 936 mo.	$11,736 p.a. $ 978 mo.	$12,240 p.a. $ 1,020 mo.	$12,744 p.a. $ 1,062 mo.	
Technologist Grade VI	$12,168 p.a. $ 1,014 mo.	$12,744 p.a. $ 1,062 mo.	$13,320 p.a. $ 1,110 mo.	$13,896 p.a. $ 1,158 mo.	$14,472 p.a. $ 1,206 mo.	$15,048 p.a. $ 1,254 mo.

1968

APPENDIX E

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

SUBMISSION TO
COMMITTEE ON THE HEALING ARTS
PROVINCE OF ONTARIO

SUBMISSION
to
COMMITTEE ON THE HEALING ARTS

by
CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

TABLE OF CONTENTS

A. OBJECTIVES OF THE C.S.L.T.

1. The objectives, for which the Canadian Society of Laboratory Technologists was incorporated in 1937, are as follows:

   (a) to improve the qualifications and standing of medical laboratory technologists in Canada;

   (b) to promote research endeavour in all branches of medicine;

   (c) to promote a recognized and professional status for medical laboratory technologists;

   (d) to promote closer co-operation between the medical profession and the medical laboratory technologist; and

   (e) to aid more efficiently the physician in the diagnosis and treatment of disease.

   After 30 years of voluntary effort by members of the Society toward the fulfilment of these aims and objectives, considerable progress has been achieved, and these original aims and objectives remain the basic principles of the Society today.

2. In the pursuit of these purposes, it must be emphasized that the Society has operated to stimulate, to guide, and to influence, in all appropriate areas of medical services, to produce acceptable standards of performance in the provision of good health services. It is important to recognize that, by the voluntary effort of well-motivated personnel devoted to ethical standards of their profession, a high standard of qualification has been developed, maintained, and generally accepted.

3. At the same time, however, satisfactions gained by achievement of high ideals do not always fulfil the total needs of a profession; and correlative objectives must be recognized, not the least of which is the socio-economic welfare of the members of the profession. In this regard,

the Society has developed Personnel Policies, outlining the professional approach of medical laboratory technologists in the service of the healing arts, and Recommended Employment Policies for practical attainment (attached as Appendix to item 3).

B. PROGRAMS OF THE C.S.L.T.

4. The programs of this Society, developed during thirty years, have been devoted to the development of high standards of performance in medical laboratory services, not only in the interests of the welfare and status of the membership, but also in the general interests of supportive health services to the ultimate benefit of all Canadians. The Certification Program, re-defined in 1960 in recognition of the rapidly expanding technology in laboratory services, has encouraged our members to seek higher qualifications through continuing and advanced education. Although the various levels of certification have gained informal recognition and acceptance, it is recommended that official recognition should be given to add further encouragement to laboratory personnel to seek these defined levels of certification. In this regard, it is emphasized that a strong laboratory service is largely dependent upon a stable technological staff of qualified and experienced personnel, and instability, or lack of such personnel strength, is one of the major problems of laboratory services. (Certification Program attached as Appendix to item 4).

5. Recruitment of personnel into training and certification in medical laboratory technology is a continuing program of this Society. Recruitment is encouraged and supported at Provincial and local levels by members of the Society, who participate in career counselling by invitation from Secondary School authorities, and, in some areas, by the presentation of "Career Shows". The Society supports this activity by providing recruitment

material in the form of the Career Pamphlet and films depicting medical laboratory technology as a career.

6. The publications services of the Society are maintained primarily as a membership service, but they function as media for continuing education. The Canadian Journal of Medical Technology, published bi-monthly, is devoted chiefly to the presentation of scientific papers, in English and French, on subjects of medical laboratory technology. The C.S.L.T. News Bulletin, published bi-monthly in French and English editions, carries items relating to Society news and programs, as well as technical notes and advice. Furthermore, a news-letter, produced by Science Sections, is published for distribution to members of the sections, and this publication serves the interests of specialized units within the Society, but in the ultimate interest of total Society programming.

C. PROBLEMS OF PROGRAMMING.

7. With the constantly developing and expanding service disciplines involved in the healing arts, together with the increasing involvement of administrative agencies interested in health services, problems of effective communications assume a major significance. The inter-relationships of medical, para-medical, and administrative agencies, must be more than superficially recognized if the dangers of conflict of interests and duplication of effort are to be circumvented. The excellent work, in development and maintenance of standards of service, produced by voluntary agencies, often suffers from a lack of clearly defined channels for communication of ideas and recommendations for action to administrative and legislative authorities.

D. NEEDS FOR MORE EFFECTIVE PROGRAMMING.

8. Since there is now a "Council on Health" established to advise the

Government of Ontario, presumably through the Department of Health, it is hoped that this Council may be encouraged to co-ordinate programming in all areas of health services and act as a "clearing-house" for information to and from the Government. In order to facilitate the studies and work of the Council, it is recommended that a Laboratory Advisory Committee be created to assist the Council, and that this Committee be representative of the various laboratory service organizations.

E. CONTROLS: VOLUNTARY OR COMPULSORY.

9. This Society, and its membership within the Ontario Society of Medical Technologists, have developed generally accepted standards of qualification and performance for medical laboratory technologists, and have continually urged that creation of adequate career prospects would produce a stability in the service. Although licensing of qualified personnel might be a desirable objective for regulatory purposes, it is recommended that stability within the service, by encouragement of personnel with a career outlook, should take priority in planning. Standards for qualification have been developed through the voluntary efforts of our professional Societies; a Code of Ethics has been formulated as a moral responsibility for qualified technologists; a program for advanced certification has been developed; and a classification schedule for grading technologists in employment situations has been presented: recognition of these voluntary efforts of a professionally orientated group could do more to establish an economically sound professional service than legislative control at this point in time.

F. CONTROL PROCEDURES.

10. If the established standards of qualification and recommendations for

technological classification (C.S.L.T. Personnel Policies) are officially recognized in the career - Medical Technology, then personnel would be required to demonstrate knowledge and ability in order to advance within the service, and the processes of democratic competition could be effective by voluntary control. On the other hand, compulsory control by legislation would require a cadre of qualified regulatory personnel, which, in itself, would present a demand on an already numerically weak supervisory group; and the maintenance of a regulatory force could be costly without providing assurance of quality control. Therefore, it is recommended that ways and means be studied to support and strengthen voluntary controls within the profession, rather than to invoke a compulsory mechanism which may prove impractical.

G. MERIT OF SERVICES.

11. The merit of medical laboratory service in total health care, and particularly in diagnostic services, has long been recognized by health authorities, and its importance has been stressed by the emphasis given to it in Federal and Provincial health care programs. The efficiency of a laboratory diagnostic service can have a profound effect on the economics of health care, by providing the physician with authoritative scientific information to assist him in dealing quickly and effectively with a diagnostic or therapeutic problem: the possible effects on hospitalization costs are obvious.

12. It is recognized that the merit of a service depends largely on its efficiency, and a quality control program could assist materially in any evaluation of merit of service. Therefore, it is recommended that consideration be given to the development of a Government supported

quality control program for medical laboratory services, and that such a program be guided in its development and presentation by a committee including representatives of the professional organizations concerned.

H. CONTINUING STUDY

13. The provision of total health care is a dynamic industry in a state of flux, constantly adjusting to medical and technological developments; and, as such, it requires continuing study by all practitioners of the Healing Arts. It is recommended that a Laboratory Advisory Committee be created to advise the Council on Health, that it be constituted as a standing committee to carry on continuing studies relating to laboratory services, and that it fulfil a role of liaison between the service organizations and the Government through the Council on Health.

I. RECOMMENDATIONS.

14. It is recommended that official recognition should be given to the certification levels established by the C.S.L.T. to encourage laboratory personnel to seek these defined levels of certification (B.4).

15. It is recommended that a Laboratory Advisory Committtee be created to assist the Council on Health, and that this committee be representative of the various laboratory service organizations (D.8).

16. It is recommended that, by encouragement of laboratory personnel with a career outlook, attempts should be made to create a staff stability with qualified career technologists, and this should take priority (over licensing) in planning (E.9).

17. It is recommended that ways and means be studied to support and strengthen voluntary controls within the profession, rather than to invoke a compulsory mechanism which may prove impractical (F.10).

18. It is recommended that consideration be given to the development of a Government supported quality control program for medical laboratory services, and that such a service be guided in its development and presentation by a committee including representatives of the professional organizations concerned.

APPENDIX F

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

RULES AND REGULATIONS

Initial Certification

(English)

TRAINING AND CERTIFICATION

1. CERTIFICATION AT THE LEVEL OF R.T.

A. Training Requirements:

(1) Age: minimum age of candidates for examination for certification is 18 years.

(2) Education:

"Senior Matriculation level" with compulsory standing in chemistry, a second science, and mathematics at that level.

B. Trainee Enrollment: (R.T.(General) and R.T.(Subject)).

(1) Students in attendance at an approved course of training are eligible for enrollment as Associate Members (Trainee). Application forms are available from the Director of Training or from the C.S.L.T. office, 165 Jackson Street East, (P.O.Box 830), Hamilton, Ontario, Canada.

(2) In order to avoid unnecessary delays and disappointments in having final application for the qualifying examinations approved, students are requested to enroll as Associate Members (Trainee) at the commencement of their course of training.

(3) Applications for enrollment as Associate Members (Trainee) must be accompanied by an official transcript of academic credits and the fee of $10.00 (see Section E.(1)). This fee includes evaluation of transcripts and the Syllabus of Studies. Application cannot be approved until both academic credits and fee have been received.

(4) In the case of Sisters, please insert on application form the maiden name following religious name.

(5) In order to assist the student in completing application, please note that it must include the following:

(a) Completed application form.

(b) Fee of $10.00 (see Section E.(1)).

(c) Official transcript of academic credits.

Since application for associate membership (trainee) cannot be approved until it is complete, please avoid delays by ensuring that the foregoing are all included when sending in your application.

(6) All students are required to enroll as Associate Members (Trainee) before their applications for examination can be approved. Membership fee includes subscription to the Canadian Journal of Medical Technology the official publication of the Society, and other periodicals and general information circularized to the general membership, evaluation of academic credits and a copy of the Syllabus of Studies.

(7) Students are reminded here that it is also necessary to complete application forms to write the examination by the deadlines as outlined in Section C.(2). Applications received after these dates cannot be considered until the next examination. Forms for this purpose may be obtained either from the director of your course or directly from this office.

(8) The Syllabus of Studies is recommended for students in training and in preparing for examination in order that they may acquaint themselves with the scope of work required. The bibliography contained therein has been carefully selected in order to assist students in their studies. One copy of the Syllabus of Studies is automatically sent to enrolled trainees. Additional copies of the Syllabus are available from the executive office as follows:

R.T.(General) Syllabus $1.00 each
R.T.(Subject) Syllabus $1.50 "

Orders must be accompanied by cheque or money order.

C. Application for R.T.(General) Certificate:

(1) Applicant must have completed a course of training in an approved program encompassing the following subjects:

General Knowledge
Clinical Microbiology
Clinical Chemistry
Hematology
Histology
Blood Bank Technology

(2) Applications for the Spring examination for R.T.(General) Certificate must be in the executive office not later than February 1st for enrolled trainees, and January 1st for all other applicants who have not enrolled prior to January 1st. Applications for the Fall examination must be in the executive office not later than August 1st for enrolled trainees, and July 1st for all other applicants who have not enrolled prior to July 1st.

The application form for supplementary examination must be returned to the C.S.L.T. office by January 15th for the Spring examination and by August 18th for the Fall examination, and must be accompanied by the required fee.

(3) Applications for examination received after the above dates cannot be considered until the next examination.

(4) Application forms for the initial examination are available from either your Director of Training or the C.S.L.T.office, 165 Jackson Street East, (P.O.Box 830) Hamilton, Ontario, Canada.

(5) In the case of Sisters, please insert on application form the maiden name following religious name.

(6) Applications must include the following:

(a) Application form completed in all details.

(b) Fee of $50.00 (see E. (2)).

(c) Official transcript of academic credits if not previously submitted.

(d) Enrollment fee of $10.00 for Associate Membership (Trainee) if not previously enrolled.

Since application for certification cannot be approved until it is complete, please avoid delays by ensuring that all the above are included when sending in application.

D. Application for R.T.(Subject) Certificate:

(1) Application for certification in a subject must be made on an individual basis and will be subject to approval by the Certification Board. Such application must be submitted before the commencement of a training program.

(2) Applicant must have completed six months' formal training in general laboratory technology and twelve months' further training in the subject.

(3) Examinations will be held annually in the Spring of each year, and will consist of a written paper on the subject and general laboratory knowledge, as well as a practical and/or oral examination on the subject.

(4) Application for the examination for Subject Certificate must be in the Executive Office not later than February 1st, and applicants must have enrolled as Associate Members previously.

The application form for supplementary examination must be returned to the C.S.L.T. Office by January 15th and be accompanied by the required supplementary fee.

(5) Applications for examination received after the above dates cannot be considered until the next examination.

(6) Application forms are available from the C.S.L.T. Office, 165 Jackson Street East, (P.O.Box 830), Hamilton, Ontario, Canada.

(7) Applications must include the following:

(a) Application form completed in all details.

(b) Fee of $50.00 (see E.(2)).

(c) Official transcript of academic credits if not previously submitted.

(d) Enrollment fee for Associate Membership, if not previously enrolled.

E. Fees:

(1) Associate Members (Trainee):

Enrollment fee is $10.00, which covers the period of the training program. This includes evaluation of academic credits, a copy of the Syllabus of Studies and subscription to the Canadian Journal of Medical Technology, the official publication of the Society, the News Bulletin and other information which may be circularized to the general membership. Fee paid for any previous evaluation is not deductible.

(2) Initial certification:

This fee is $50.00 and covers initial certification and registration.

(3) Supplementary examinations:

$5.00 per peper written.

(4) Re-Read:

$3.00 for each paper (papers with a mark below 45 are not re-read).

(5) Deferred examinations:

Any application which is postponed from one examination to another will require an additional fee of $10.00, unless notification of postponement has been received at least six weeks prior to date of examination.

NOTE: Depositing of cheque or money order does not necessarily mean approval of application. If remitting by cheque, please include the necessary exchange.

(6) Refunds:

(a) 70% of fee paid, if application is not approved.
(b) 70% of fee paid, if application is cancelled prior to examination.

F. Examinations:

(1) Notices regarding the exact time and place of writing will be sent to the candidate at least two weeks prior to the examination. It is important, therefore, that the C.S.L.T. be kept informed of any change in the candidate's address which might affect the candidate's assignment to the examination centre.

(2) R.T.(General) Certificate Examinations:

Examinations are held twice yearly. Unless unforeseen circumstances occur, these examinations will be held as follows:

Spring examination - middle part of June.
Fall examination - latter part of October or first part of November.

Initial examination will consist of written examinations in each of the following subjects:

General Knowledge	1 hour
Histology	1 hour
Blood Bank Technology	1 hour
Clinical Microbiology	2 hours
Clinical Chemistry	2 hours
Hematology	2 hours

(a) In the revised Syllabus (March 1962) Serology is included in Clinical Microbiology (previously Bacteriology and Immunology) and Hematology, with material pertaining to Immunology in the Bacteriology section and material pertaining to Blood Bank in the Hematology section.

(b) In the examination on Clinical Microbiology (previously Bacteriology and Immunology), questions on Mycology, Parasitology and Immunology will be included.

(3) R.T.(Subject) Certificate Examinations:

The examination will consist of:

(a) A three-hour written paper.
(b) A practical and/or oral examination.

Pertinent basic knowledge questions may be asked in either of the above examinations.

(4) Pass Mark:

A mark of 50% is required to obtain a pass in each section of the examinations.

(5) Supplementary Examinations:

(a) Failure in either written or practical portion of any subject shall necessitate that the candidate rewrite both written and practical parts of that subject, as applicable.

(b) The candidate who fails in more than three subjects on the R.T.(General) Certificate examination shall be required to repeat all subjects. At the discretion of the candidate, supplemental examinations need not all be written at the same examination session.

(c) Candidates may rewrite the examination(s) on the original application no more than twice either in whole or in part. Those candidates failing three times will be required to make new application for a fourth examination, and to furnish proof of additional training in each subject failed. This training must be commensurate with initial training in that subject and be taken in an approved training laboratory before application to sit again can be approved. More detailed information concerning this will be available upon request.

(d) Requests for re-read must be post-marked not later than August 18th after the Spring examination, and not later than January 15th after the Fall examination, and be accompanied by the required fee.

June 1968

APPENDIX G

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

RULES AND REGULATIONS

Advanced Certification

(English)

21719—21½

1. ADVANCED CERTIFICATION:

The levels of advanced certification which have been approved are Advanced Registered Technologist, (A.R.T.); Licentiate, (L.C.S.L.T.); and Fellow (F.C.S.L.T.). Advancement from the R.T. level to A.R.T., and from A.R.T. to Licentiate will be by qualification through the "credit system" and examination. Fellowship will be by election only on application or nomination. Fellows may be elected from the following:

From among members with superior qualification and long experience in positions of responsibility. They must have made outstanding contribution to the field of medical technology. Members to be eligible for election must hold their Licentiate.

2. Requirements for Advanced Certification.

(a) The requirements for advanced certification will be by eligibility qualification and examination.

(b) Qualifying criteria: for eligibility to examination.

The requirement to determine eligibility for advanced certification; that is, from R.T. to A.R.T. and from A.R.T. to Licentiate, will be 30 "credits" (C.S.L.T.) which may be achieved as follows:

(i)	Assessed laboratory experience assuming 2000 hours work/year and approximately 10 per cent of the time given to further training and development.	6 credits/year
(ii)	Academic course of one academic year in a related subject, with qualification by examination and certificate.	6 credits
(iii)	Academic course of one academic year in a related subject, without examination but proof of satisfactory attendance.	3 credits
(iv)	Short course in closely allied subject, of variable duration.	1 - 3 credits
(v)	Reading course on subject approved by C.S.L.T. and presented in form of a critical evaluation of the current literature may be submitted for a maximum of 3 reading assignments.	1 - 3 credits

of which not less than 18 credits and not more than 27 credits be achieved from (i) above, and at least one credit from (v) above. All credits to be assessed and approved by the C.S.L.T.

A person holding an approved University Degree in related Sciences, who can satisfy section (i) in the credit system may be considered eligible for examination at the A.R.T. level.

3. Enrollment.

Technologists wishing to proceed to advanced levels of certification should write to the national office of the C.S.L.T. for a "Notice of Intention" form.

4. Examinations.

Examinations for A.R.T. and Licentiate will be as follows:

(a) A thesis and oral examination will be predominant features of examination for each level, and

(i) the thesis shall be presented before December 31st of the year preceding the examination so that it can be assessed for eligibility to oral examination and used as a basis for part of the oral examination; and

(ii) the oral examination shall be conducted by an examination panel appointed from the local area, and include the Executive Director of the C.S.L.T. or his designate.

(b) Oral examinations: of approximately 1-2 hours on requirements covered by the Syllabus of Studies, and on the subject matter covered by the candidate's thesis. Candidates will be advised as early as possible concerning their appointments for the oral examination held in the Spring of each year, usually April or May.

(c) Pass mark:

(i) Thesis - the thesis will be graded by the examiners for eligibility to proceed to completion of the examination.

(ii) Oral - the oral examination will be based on the thesis and advanced knowledge of the subject. The results of the oral examination will determine the candidate's acceptability to advanced certification.

(d) Examinations for A.R.T.(General): candidates applying for A.R.T.(General) certification may be exempted from submitting a thesis by having successfully completed the examinations in three R.T.(Subjects). The three Subjects chosen must be disciplines included in the General Certificate (Initial level). The examinations shall be based on the Syllabus of Studies for the R.T.(Subjects) which the candidate is writing. All three Subject examinations must be taken at the same examination session, which is held in the Spring of the year.

5. Fees:

The fee for advanced certification is $50.00. This fee includes examination and certification at the level for which application is made, and registration for the current year. Fee must be submitted with the application form for advanced certification and annual renewal form duly completed but without fee.

ADVANCED CERTIFICATION

REQUIREMENTS FOR LICENTIATE CERTIFICATION

I. Minimum prerequisites for eligibility to examination:-

(a) At least an A.R.T. certificate (or equivalent)

and

(b) The required number of credits as laid down by the Certification Board.

II. Material for which candidates are responsible:-

(a) It must first be understood that even at this level, candidates must be grouped and examined in two distinct categories. These are namely: (A) Those who are devoting all their training and experience in one of the disciplines, and (B) Those who, although they may hold an A.R.T. certificate in a "subject", are now spending considerable time in a laboratory administrative capacity.

It then follows that candidates (A) shall be examined largely on "subject" material, whereas the (B) candidates shall be examined in the "general" area, and in laboratory organization and administration.

(b) In view of the continual and rapid changes taking place in medical technology, it is quite impractical to maintain an up-to-date, itemized Syllabus of Studies at this level. Therefore, candidates at this level shall be fully aware of all the latest developments as they are being evolved, and integrated into laboratory operations.

Based on this reasoning, then, candidates must demonstrate by examination the adequacy of their knowledge and proficiency, in that they be required to:-

CANDIDATES "A"

1. Have a reasonable knowledge of the literature published in various journals, reference books, etc., which is pertinent to that particular "subject".

2. Have the ability to evaluate new methods and equipment, and be fully qualified to put these into effect when and where possible.

3. Have a thorough and detailed knowledge of the techniques, principles, sources of error, normal values and calculations, as related to the subject of examination.

4. Have a reasonable knowledge of the interpretations of normal or abnormal results.

5. Be fully capable of managing the department.

6. Be completely competent to instruct in any phase of the work in that discipline.

CANDIDATES "B"

1. Have a reasonable knowledge of the literature published in various journals, reference books, etc., which is pertinent to laboratory technology in general.

2. Have demonstrated a continual search for new techniques and equipment to be introduced into the laboratory.

3. Have a reasonable knowledge of their techniques, principles, and interpretation of results.

4. Be completely competent to assist in the instructicn in any of the disciplines.

5. Be fully acquainted with the organization and management of a large laboratory in aspects such as:

   (a) Departmental organization of the laboratory.

   (b) Organization of methods and procedures.

   (c) Control of methods and procedures.

   (d) Training of Personnel.

   (e) Laboratory office procedures.

   (f) Purchasing and supply.

   (g) Personnel regulations and control.

   (h) Hospital or institutional organization -

      (i) Departmental organization of hospital or institution.

      (ii) Liaison between the laboratory and administration, and all other departments.

FELLOWSHIP (C.S.L.T.)

Fellowship in the C.S.L.T. shall be by ELECTION.

This shall be an application by NOMINATION by three (3) Sponsors, two (2) of whom shall hold Advanced Certification in the Society, the third shall be a Pathologist and/or Laboratory Director.

REQUIREMENTS

1. A Nominee must be a member in good standing of the Society.

2. The Nominee's current certification shall be at the Licentiate (L.C.S.L.T.) level.

3. The Nominee must have a minimum of five (5) years continuous post-L.C.S.L.T. certification experience in General Laboratory Technology or any Discipline thereof.

4. A Nominee must submit "A" - a full Dossier and "B" - References.

   "A" The Dossier shall be a complete chronological history of the nominee's employment in Medical Technology from date of initial certification to the present time, and shall include:-

   (a) All centres of employment with names of Institutions, dates involved, name of Director and position(s) held.

   (b) Copies of all original manuscripts or reprints of all publications in which the applicant was a participant as author or co-author.

   (c) Complete information relative to any and all Post-Graduate studies. e.g. - Centre, extent, subject, Director, panel or demonstrator; duration, whether or not examination and if examined a transcript of the marks attained.

   "B" References must originate from at least three (3) sources additional to the sponsors and shall demonstrate a continued upgrading of knowledge and experience on the part of the nominee in the present field of endeavour or specific discipline.

PROCEDURE Election shall be by the following procedure and shall initiate with -

1. The Certification Board to whom would be submitted the Dossier and References. These shall be exhaustively checked and will result in referral with recommendation (APPROVAL OR DEFERMENT) to -

2. The Board of Directors. Decision at this level will result in referral with recommendation (APPROVAL OR DEFERMENT) to -

3. The General Council. Action at this third level shall be governed by the prior decisions, in conjunction with its own decision. Two (2) or more "DEFERMENTS" shall automatically terminate the application. In this event the Nominee is to be informed of the reason(s) for termination. Two (2) or more "APPROVALS" will result in granting Fellowship.
   The decision shall be final in respect to the current application.

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

Reading Course Requirements for Advanced Certification

1. Please note that the Reading Course assignment is not the Thesis. The Thesis is part of the examination for A.R.T. or L.C.S.L.T. Certification. The Reading Course assignment is a means whereby the applicant receives from 1-3 credits towards the 30 credits required before the candidate is eligible to apply for A.R.T. or L.C.S.L.T. Certification.

2. The Reading Course is a program of reading, on an advanced level, from current scientific literature on some particular phase of medical laboratory technology in the subject for which the member intends to apply for A.R.T. or L.C.S.L.T. Certification.

3. The subject for the Reading Course must be chosen by the member and the title subsequently approved by submitting a "Notice of Intention" form in duplicate to the Registrar of the C.S.L.T.

4. The report on the Reading Course assignment must be presented as a critical review of the literature cited.

5. The report must be submitted at least six months (July 1st) in advance of the application form for advanced certification since it must be evaluated for the required credits for eligibility to apply for A.R.T. or L.C.S.L.T. Certification.

6. The evaluation of the Reading Course assignment will be based on the following criteria:-

   (a) adequate range of sources in the scientific literature for the subject chosen.

   (b) applicability of sources to the subject.

   (c) detailed discussion of the subject as reviewed in the literature.

   (d) the member's own assessment of the material reviewed, the comparisons made and the member's own general conclusions.

   (e) the presentation of the report, summarization, neatness, grammar, etc.

7. Following assessment of the report, the member will be advised of the credits assigned by return of the duplicate "Notice of Intention" form duly completed by the C.S.L.T. office.

8. "Notice of Intention" forms may be obtained upon request by writing to the

   C.S.L.T.,
   P.O. Box 830,
   165 Jackson Street East,
   Hamilton, Ontario.

CANADIAN SOCIETY OF LABORATORY TECHNOLOGISTS

Thesis Requirements for Advanced Certification

1. The thesis must encompass laboratory work actually performed by the candidate and relate to the work in the subject for which the candidate is applying for Certification. Candidates should, wherever possible, submit original experimental data.

2. The thesis must be prepared specifically as partial fulfillment of the examination for Advanced or Licentiate Certification. Material prepared for other purposes will not be admissible (See Appendix I).

3. Unless previously, and otherwise indicated by the candidate, the thesis will automatically be eligible for publication in the Canadian Journal of Medical Technology, if proven acceptable to the Editorial Board of the Journal. The thesis is also eligible for entry in the Scientific Paper Awards Contest, provided that the candidate fulfills all the requirements of the Rules and Regulations that govern the Contest.

4. The thesis submitted becomes the property of the Canadian Society of Laboratory Technologists and may not be reproduced or released for other purposes without permission of the Registrar of the Canadian Society of Laboratory Technologists and the Editorial Board of the Canadian Journal of Medical Technology.

5. The thesis must be submitted no later than December 31st of the year preceding examination. It will then be graded by the examiners as being "accepted" or "not accepted" for eligibility to proceed to completion of the examination. The thesis, as presented, will be used as a basis for part of the oral examination.

6. Three copies of the thesis must be submitted, the original and two carbon copies. It is recommended that a fourth copy be retained by the candidate.

7. The pages of the thesis must be enclosed in a suitable cover which must be firm and of sufficient weight to withstand considerable handling.

8. The manuscript of the thesis must be on white bond paper, 8½ x 11 inches in size and of reasonable weight.

9. Use one side of the paper only with one inch margins on all sides. Typing should be double spaced with clean, neat copy and no erasures. Use of a clean typewriter with fresh ribbon is recommended.

10. The title of the thesis should be as short as possible but at the same time be clear and definitive.

11. Acknowledgements of assistance, guidance or permission should be on a separate page following the "Title Page" and also be included as a separate item following the "Conclusion" of the thesis.

12. The length of the thesis should be commensurate with an adequate presentation of the subject. This would be considered to be not less than 2500 words.

13. Exclusive of the first page of the manuscript, pages should be numbered consecutively at top center.

14. Abbreviations should be kept to a minimum, but when used should be only acceptable and readily recognized terms. Otherwise, if abbreviations must be used, their meaning should be clearly indicated when they are first introduced.

15. The use of Greek letters or other unusual symbols must be clearly and adequately inscribed.

16. Numbers of one digit should be spelled out. Numbers of more than one digit may be given in figures.

17. Words required to be printed in italics must be underlined.

18. Specific names of micro-organisms are underlined to indicate italics and should be spelled out fully when first introduced. Subsequently, the generic name may be abbreviated. The generic name is capitalized and precedes the species name which is not capitalized.

19. Names of chemicals should conform to accepted chemical nomenclature. Proprietary names should be followed by the generic name in brackets, if known. Whenever possible, preference should be given to the generic name.

20. Footnotes should be avoided except to indicate the source of a commercial product.

21. Materials quoted directly from other sources, must be in quotation marks in the thesis and the reference given.

22. Grammar and punctuation should be carefully checked throughout the thesis.

23. Photographs must be glossy prints, at least 4 x 5 inches in size, attached in their appropriate place in the thesis by an adhesive cement.

24. Diagrams, figures, graphs and charts, or other drawings must be in India ink on heavy white paper and placed as near as possible to the reference in the text.

25. Each photograph, drawing, chart, etc. must be adequately labelled where necessary and include a short, explicit legend for explanation. Each should be numbered consecutively in order of reference in the thesis.

26. The thesis should be presented under the following four divisions:-
(1) Introduction, (2) Procedure, (3) Discussion and (4) Conclusions.

27. The "Introduction" should include a brief statement of the problem or study to be undertaken, the manner in which it is to be studied and the results to be expected. References to authoritative literature should be included where applicable.

28. "Procedure" should describe in detail the methods, equipment, reagents and other material that were used. Clear and concise descriptions should be given but in sufficient detail to enable the work to be duplicated.

29. "Discussion" should include an interpretation of the results obtained and their relationship to previous knowledge or work, in the subject

30. Under "Conclusions" should be a brief outline of what has been accomplished and the conclusions or opinions reached upon completion of the study.

31. References to journal articles, text books or personal communications, used in the development of the thesis, must be listed in alphabetical order according to author's name at the end of the thesis under "References". Each reference should be numbered consecutively and the corresponding number inserted in the appropriate place in the thesis, (see Appendix II for examples of listing references).

32. Authors' names must be listed as given in the original article.

33. The number of the volume of any journal or text book and the titles of text books listed under references must be underlined.

34. As a further guide to the development of the thesis and listing references, the candidate should study the style used by other authors of scientific literature.

Appendix I

Sample of Title Page:-

- - - - - - - - - - - Title - - - - - - - - - - -

- -

Submitted as a thesis in partial

fulfillment of the examination for

A.R.T.
or ..... Certification
L.C.S.L.T. Subject

.....
Candidate's Name

.....
Name of Institution

.....
City and Province

.....
Date

Appendix II

In listing references use the following examples as a guide:

Journals - author, title of paper, name of journal (follow standard abbreviations as used in current scientific literature), volume number, page number, and year.

i.e. - Rath, C.E. and Finch, C.S.: Sternal marrow hemosiderin. J.Lab. & Clin. Med. 33:81, 1948

Text books - author, title of book, edition, and year, publisher, city of publication.

i.e. - Wintrobe, M.M.: Clinical Hematology, ed. 3, 1961, Lea & Febiger, Philadelphia.

Personal communication - Smith, W.J.: (Must have permission to use).

Second Hand References - Walker, J.T., Shearer, A.P. and Graves, Arthur: Quoted by Hirsch, J.E. Arch.Int.Med.16:500, 1963.

APPENDIX 26

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

MRS. AMARET B. REYNOLDS

WHITEWOOD, SASKATCHEWAN

From - Mrs. Amaret B. Reynolds, P.O. Box 666, Whitewood, Saskatchewan.
Occupation - Retired Seed Analyst.

Employed by the Plant Products Division,

Production & Marketing Branch,

Canada Department of Agriculture,

at the following points: Saskatoon, 1939- 1958

Calgary, 1956 - 1958

Edmonton, 1958 - 1968

Supervising Seed Analyst in Germination, 1956 - 1968.

This brief is submitted in a desire to improve conditions for all Seed Analysts employed by the Federal Government, Department of Agriculture.

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1. FIELD OF SCIENTIFIC ACTIVITY

    1. Testing and standardization.
    2. Scientific information.

2. SEVEN CANADIAN LABORATORIES

    Located at: Vancouver, B.C. Winnipeg, Man.
    Edmonton, Alta. Toronto, Ont.
    Saskatoon, Sask. Ottawa, Ont.
    Montreal, P.Q.

3. PURPOSE OF LABORATORIES

    To conduct seed analyses in purity and germination in order to enforce the Canada Seeds Act Seeds Regulations and thus maintain high standards of seed quality.

4. WORK CONDUCTED IN LABORATORIES

    Routine seed analysis in purity and germination.

    Seed identification.

    Identification or analysis of materials when required to assist in cases of law enforcement.

    Training school for seed analysts. (There is no other rec-

ognized training school or course in Canada.)

Acts as an advisory group for many individuals who may be in commerce or technical groups.

5. DISTRIBUTION OF ACTIVITIES

Some contacts are maintained with related University departments - i.e. Forage Crops, Plant Pathology, Forestry, also Provincial Government Departments.

Agricultural schools look to Plant Products Division for advice and guidance.

Commercial firms send staff to training schools conducted by Plant Products Division staff.

Internationally, some laboratories are authorized and designated to conduct seed analyses which are recognized by all members of the International Seed Testing Association.

6. PERSONNEL (limitations)

Hiring suitable trainees is made more difficult by the fact that there is little scope for many advanced workers in seed analysis. Advertisements for Seed Analyst trainees state that University training is desirable, but seed analysis is such a limited field that University graduates tend to become frustrated. (RECOMMENDATION) - That those who show high potential in research or in the distribution of scientific information be given recognition and encouragement for initiative shown.

8. LACK OF RECOGNITION AS A PROFESSION

The role of Seed Analysts is being continually down-graded. The administrative worker in the same department is given increasingly more recognition both in a monetary way and in decision-making. Supervising Seed Analysts and Seed Analysts were asked in December, 1966, to answer detailed questionnaires to provide a basis for assigning these positions to the Engineering & Scientific Support Group in the Technical Category. Notification was received dated May 24, 1967, that this assignment had been made. A further letter dated September 26, 1968 states that Seed Analysts positions are scheduled to be converted to this group but that position levels and pay rates were not finalized at that date.

(At this date of presentation, no further information has been received.)

Meanwhile, clerical staff (Office Managers) in the Plant Products Division office have for some time been receiving higher salaries and assuming greater authority in matters relating to the laboratory.

9. DEPARTMENT HEADS

i.e., District Seed Analysts in charge of laboratories, are given too little authority in decision making. They must now refer most matters to their Supervisor who does not necessarily have the extensive scientific and technical knowledge that is required in a District Seed Analyst. This makes for delay and frustration. The wage scale has been altered drastically in past years with the result that the salaries of District Analysts are now lower than comparable positions on the Inspection Staff.

10. CHANGES IN ADMINISTRATION

Positions have been abolished or territories enlarged in such a way that real hardships are experienced by senior personnel, who bear the brunt of increased responsibilities. e.g. District Analyst position in Edmonton now revised to include supervision of the Vancouver Laboratory. This means that neither laboratory has full-time assistance and supervision. This causes a heavy load on the two Supervising Analysts as well as lessening the continuity and efficiency of work in both laboratories. This policy of abolishing positions is being felt in other laboratories as well.

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COMMENTS

Due to vast changes in technology, analysts must be much better informed. At present Seed Analysts are limited by the lack of a standardized curriculum of studies. Canadian-published material on seed analysis is out-dated and almost nil and little encouragement is given now for analysts to make further contributions.

Seed-testing courses are held in some American centres. Similar courses should be established in Canada.

The abilities of experienced analysts with teaching talent

should be utilized in a way to benefit analysts in all laboratories. Travelling expenses should be paid to make this possible. Seed Analysts are a small group but they must be recognized as the effect of their important work is widespread. In order to keep in step with technological advances, the field of seed analysis must be revised and up-dated so that Seed Analysts are not handicapped by lack of recognition which will tend to filter out the more promising persons in this profession.

February 21, 1969.

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OVERALL ORGANIZATION

MINISTER

DEPUTY MINISTER

ASSISTANT DEPUTY MINISTER

ORGANIZATION OF PLANT PRODUCTS DIVISION

DIRECTOR OF DIVISION

- CHIEF, FEEDS, FERTILIZERS AND PESTICIDES SECTION
  - SUPERVISOR, FEED AND FERTILIZER UNIT
  - SUPERVISOR, PESTICIDE UNIT
- CHIEF, SEED SECTION
  - SUPERVISOR, SEED PROJECTS UNIT
  - SUPERVISOR, SEED STANDARDS UNIT
- CHIEF, ANALYTICAL SERVICES SECTION
  - O/C SCIENTIFIC SERVICES LABORATORY
    - HEAD, SEED BIOLOGY UNIT
    - HEAD, ANALYTICAL CHEMISTRY UNIT
  - HEAD, ANALYTICAL CONTROL LABORATORY, OTTAWA
  - HEAD, ANALYTICAL CONTROL LABORATORY, CALGARY
  - O/C PESTICIDE TESTING LABORATORY
  - DISTRICT SEED LABORATORIES
    - DISTRICT SEED ANALYST
    - 1 or 2 SUPERVISING ANALYSTS
    - WORKING STAFF CONSISTING OF:
      - SEED ANALYSTS # 2
      - SEED ANALYSTS # 1 (trainees)
- SPECIAL ASSISTANT TO DIRECTOR
- HEAD, ADMINISTRATION SECTION
- DISTRICT SUPERVISOR: MARITIMES DISTRICT
  - SACKVILLE, N.B.
  - CHARLOTTETOWN, P.E.I.
  - SEED LABORATORY, OTTAWA
- DISTRICT SUPERVISOR: QUEBEC DISTRICT
  - CO-ORDINATOR, REGULATED COMMODITIES
  - HEAD, DISTRICT SEED LABORATORY
  - MONTREAL SUBDISTRICT
    - SHERBROOKE
  - QUEBEC SUBDISTRICT
    - RIMOUSKI
- DISTRICT SUPERVISOR: ONTARIO DISTRICT
  - CO-ORDINATOR, REGULATED COMMODITIES
  - CO-ORDINATOR, SEED
  - HEAD, DISTRICT SEED LABORATORY
  - TORONTO SUBDISTRICT
    - PETERBOROUGH
  - CHATHAM SUBDISTRICT
  - GUELPH SUBDISTRICT
  - LONDON SUBDISTRICT
  - OTTAWA SUBDISTRICT
    - NEW LISKEARD
    - OTTAWA SEED LABORATORY

- DIRECTOR OF DIVISION
  - DISTRICT SUPERVISOR: MANITOBA DISTRICT
    - CO-ORDINATOR, SEED
    - HEAD, DISTRICT SEED LABORATORY
    - MANITOBA EAST SUBDISTRICT
      - MORDEN
    - MANITOBA WEST SUBDISTRICT
      - BRANDON
  - DISTRICT SUPERVISOR: SASKATCHEWAN DISTRICT
    - CO-ORDINATOR, SEED
    - HEAD, DISTRICT SEED LABORATORY
    - SASKATOON SUBDISTRICT
      - PRINCE ALBERT
      - NIPAWIN
    - REGINA SUBDISTRICT
      - YORKTON
  - DISTRICT SUPERVISOR: ALBERTA - B.C. DISTRICT
    - CO-ORDINATOR, SEED
    - HEAD, DISTRICT SEED LABORATORY
    - EDMONTON SUBDISTRICT
      - GRANDE PRAIRIE
    - CALGARY SUBDISTRICT
      - RED DEER
      - LETHBRIDGE
    - VANCOUVER SUBDISTRICT
      - ABBOTSFORD
      - KELOWNA
      - VANCOUVER SEED LABORATORY

APPENDIX 27

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

ROBERT E. C. WEGNER,

FACULTY OF ADMINISTRATION

UNIVERSITY OF SASKATCHEWAN

REGINA, SASKATCHEWAN

FROM: Robert E. C. Wagner, February 25, 1969
Faculty of Administration

TO: Dr. A. B. Van Cleave

RE: Faculty of Administration Submission to the Special Committee on Science Policy of the Senate of Canada

In this discussion, the general framework indicated by Senator Lamontagne in his letter of December 20, 1968 to Principal Riddell will be followed:

A. Recant trends in research and development expenditures in Canada as compared with those in other industrialized countries.

The simple but startling facts are that whereas the United States spends approximately $112 per capita on research and development, Canada's outlay is only $37 per capita. These figures are for the latest year available (1967) with total expanditures amounting to $22.3 billion for the U.S.and $770 million for Canada.

"A recent study shows Canada ninth of nine leading western industrial nations in percentage of R & D performed by industry about 45% compared with 70% in the U.S. Moreover, Canada ranks eighth in percentage of GNP allotted to R & D. . ."[2] Canada allocates 1.19% of GNP to R & D whereas in the U.S. it is 3%.[3]

This gap, unless Canada makes a remarkable turnabout, is likely to get worse instead of better. All indications are that the new Nixon Administration is going to increase emphasis on R & D[4,5] Les DuBridge, Nixon's science advisor, says that every possible measure

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[1] "Canada asks industry into the lab", Business Week, December 28, 1968, pp.84-85.

[2] Ibid, p. 85.

[3] Ibid

[4],"Plugging the gap in R & D grants to universities", Business Week, February 15, 1969, p. 63.

[5],"Science agency gets more funds", The New York Times,February 6, 1969, p. 27.

is being taken to restore the cuts made by President Johnson last year[6].

It is instructive to note that many in the Canadian science community feel that the situation with regard to federal funding of R & D is getting worse not better.[7,8]

B. Research and development activities carried out by the Federal government in the fields of physical, life, and human sciences.

The Canadian government supports R & D in the amount of $255 million whereas the U.S. government spends $14.93 billion - once again the U.S. is proportionately ahead of Canada on this account by a ratio of almost 6:1.[9]

It is worthy of note that the Canadian government does approximately 35% of the R & D whereas the U.S. government does only about 14% of the total R & D engaged in. Questions as to policy and organizational efficiency are obviously involved - the U.S. thinks that industry and the universities are better suited for the actual R & D than the government.[10]

"The support given to research in the social sciences in Canada has been totally inadequate. It represents only a small fraction of the support for natural sciences; it is smaller in relation to population and total income in Canada than in the United States.

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[6] "Dubridge to Seek Closer Ties of Government with Scientists", The New York Times, December 17, 1968, p. 30.

[7] "The gloomy picture painted by Canada's scientists", The Globe and Mail, September 28, 1968.

[8] "Canada has no science policy", The Leader Post (Regina), February 7, 1969, p. 18.

[9] Business Week, December 28, 1968, op cit. This proportionate ratio, like all others in this paper, is determined by using a 10:1 adjustment for the population difference between the two countries; i.e., with regard to this example, the absolute ratio is close to 50:1 whereas the ratio adjusted for the population difference is 6:1.

[10] Ibid.

and various other modern societies."[11,12] Since Clark Kerr says that only about 10% of government support to academic institutions for research goes to the social sciences[13] (and the government supports academic research with about $1.5 billion) by extrapolation this means that less than $15 million must be available for such research in Canada.

C. Federal assistance to research and development activities carried out by individuals, univertieis, industry and other groups.

The following figure should prove enlightening. In 1965, the Canadian government supported research in the universities in the amount of $57 million.[14] In the United States, the federal government for the current fiscal year has allocated $1.519 billion to academic research.[15] Taking into account the population differences, this still results in a ratio of federal support to academic research favoring the U.S.condition by almost 3:1. In this connection it is worthy of note that the total amount spent on academic research (in the United States) from all sources for the year ending December 31, 1967 exceeded $3.0 billion dollars.[16]

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[11] Fifth Annual Review of the Economic Council of Canada: The Challenge of Growth and Change September,1968, Queen's Printer, Ottawa, p.53.

[12] See also The Social Sciences in Canada by the Social Science Research Council, May 1968, Ottawa.

[13] Clark Kerr, "New Challenge to the College and University" in Kermit Gordon (ed.) Agenda for the Nation. The Brookings Institutions,Washington, D.C., 1968, pp.237-276.

[14] Fifth Annual Review, op cit.

[15] "Federal Budget", The New York Times,January 16, 1969, p. 24.

[16] Business Week, December 28, 1968, op cit.

Federal support for university research in the United States has been growing at a 15% rate compounded since 1953.[17] Although it is unrealistic to think that this rate can be maintained indefinitely, such scholars as Clark Kerr[18] Donald Horning[19] (Johnson's science advisor), and Harvey Brooks[20] (Dean, Division of Engineering and Applied Physics, Harvard University), think it should be the goal of the government for the foreseeable future. Dr. DuBridge is not sure whether the 15% rate of increase can be maintained but is certain that the increase will not fall below 10%.[21] A 15% rate of increase would double current R & D in less than five years.

What is Canada doing to match this level of increase?

D. The broad principles, the long-term financial requirements, and the structural organization of a dynamic and efficient science policy for Canada.

The import of the parts A,B and C appears quite obvious to the Faculty of Administration. More money must be generated in the area of R & D in general and in academic research in particular. To quote again from the Fifth Annual Review of the Economic Council of Canada, "in our view no task may be more important to improving Canada's innovative performance than to strengthen the capabilities of Canadian management to understand and manage technological change and its innovative process. There are many routes to this end. One of the most rewarding is likely to be improvement in management education and training. . . Along with this there should be an expansion of university based business research, as well as greater attention to improved systems of management

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[17] "Scientists on campus flunk in federal aid", Business Week, January 4,1969, pp.86-89.

[18] Clark Kerr, op cit.

[19] Business Week, January 4, 1969, op cit.

[20] Harvey Brooks, "The Future Geowth of Academic Research: Criteria and Needs" in Harold Orlans (ed.) Science Policy and the University The Brookings Institution, Washington, D.C., 1968, pp.53-87.

[21] The New York Times, December 17, 1968, op cit.

Canadian corporations, governments, and institutions."[22, 23]

Several of our faculty have been thwarted and frustrated in their attempts to secure funds for study in the areas of public,business, and health administration. The sparse amounts of money available from either internal or private research funds limits these as truly meaningful sources of assistance for long-range research projexts.[24]

It is meaningful to note that the one institution in Canada which has gained a national reputation for innovative research in the area of administration and the development of graduate programs in fields other than business is York University . . . whose main financing has come through a grant of $500,000 from the Ford Foundation in New York City !!! [25]Interesting . . .

As far as management education is concerned, the latest figures available (for 1967-68 academic year) indicate that there were 16,354 MBA (or equivalent) degrees and 490 Ph.D. degrees granted from universities in the United States as compared to 341 MBA degrees and only one Ph.D. degree in Canada.[25] The ratio again favors the U.S.by 5:1 for MBA's with the Ph.D. comparison meaningless.

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[22]Fifth Annual Review, op cit., pp.54

[23]See also The Professional School and World Affairs. The University of New Mexico Press,1968. This study emphasizes the need for education in the professions and indicates that we have been woefully neglectful in this area -- particularly as it relates to world affairs.

[24]The Principal's Research Fund on the University of Saskatchewan,Regina Campus amounts to $10,000 per year; the Banff School of Advanced Management Research Fund amounts to -nly $10,000 in tota; The Bronfman Research Fund also only had $10,000 available and The Institute of Public Administration of Canada's Research Fund amounts to $20,000.

[25]"The closed loop", The MBA, January, 1969, p.25

[26]The MBA, January, op cit.

One of our faculty members whose area of research is in manpower, labor and industrial relations indicates that he feels that Canada is at least two decades behind the U.S. in both the quantity and quality of research undertaken.

The goals of a science policy have been discussed and deliberated at great length on both sides of the border. Some excellent books are available summarizing these discussions.[27] As both the Economic Council Report and the Scoail Science Report indicate, one of the major problems of Canadian effort in this area is lack of coordination and communication as to what has, is or might happen. As a result of this, it is highly recommended that the conclusions and recommendations of both these reports be studied carefully,[28, 29, 30] The rediscovery of the same problems and potential solutions by various sectors in our society, due to inefficient or non-existent communication, is one of the most deplorable wastes of manpower imaginable.

Those who fear the advance of science and technology because of its effect on the human quality of mankind should be reasured by the preliminary results just released of a study by a group of Harvard University scholars. According to this group, modern technology, rather than dehumanizing the populace, has made western civilized man the most genuinely individual in all history.[31]

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[27] See Agenda for the Nation: Science Policy and the University referred to above. The following books are also useful in this regard: Applied Science and Technological Progress: A report to the Committee on Science and Astronautics by the National Academy of Sciences, Government Printing Office, Washington, D.C., 1967; William R.Nelson: The Politics of Science, Oxford University Press, 1968; L. V. Bernner, The Scientific Age, Yale University Press, 1964; Van Tessel and Hall (eds.): Science and Society in the U.S., The Dorsey Press, 1966; Frederick Seitz: Science, Government and the Universities, University of Washington Press, 1966; Boyd R.Keenan (ed.) Science and the University, Columbia University Press, 1966.

[28] Fifth Annual Review, op cit, pp.29-61.

[29] The Social Sciences in Canada, op cit.

[30] Also see Applied Science and Technological Progress above

[31] "Study terms technology a boon to individualism", The New York Times, January 18, 1969, p. 1 F.

APPENDIX 28

ASSOCIATION OF CANADIAN MEDICAL COLLEGES

A SUPPLEMENTARY BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON SCIENCE POLICY

OF

THE SENATE OF CANADA

OTTAWA

1969

TABLE OF CONTENTS

I. HISTORY OF ACMC

The Association of Canadian Medical Colleges was founded as a voluntary association in April, 1943, when the deans of the twelve existing medical schools met for the first time in Ottawa, at the request of the Minister of Health, to consider the accelerated training of physicians to meet war-time needs and a proposed Health Insurance Act. At a meeting in August of that year, a constitution was drawn and the tradition of regular annual meetings was begun.

In the years between 1943 and 1963, ACMC worked closely with Departments of the federal government in the growth and development of medical education and research in Canada.

As early as 1957, the business transacted by ACMC had become so voluminous that a full-time Secretariat was considered. In 1960, representatives of ACMC, the Royal College of Physicians and Surgeons of Canada, and the Canadian Medical Association met and agreed that a Canadian Medical Education Secretariat should be established.

In 1961, incorporation was undertaken, and financial support for a Secretariat was sought under the charter of the Canadian Universities Foundation (now the Association of Universities and Colleges of Canada).

In July 1963, the Secretariat was established in Ottawa, with Dr. J. Wendell Macleod as Executive Secretary (now Executive Director). (Dr. Macleod had been Dean of Medicine at the University of Saskatchewan during the previous ten years.) ACMC became and remains an Associate Member of the Association of Universities and Colleges of Canada.

In 1967, the four developing medical schools (Calgary, McMaster, Memorial and Sherbrooke) were admitted to provisional membership, bringing the total Institutional Membership to 16.

II. FUNCTIONS OF ACMC

A. SERVICES TO MEMBER INSTITUTIONS

1. Accreditation

ACMC acts in the accreditation of Canadian medical schools in cooperation with the Liaison Committee on Medical Education of the Association of American Medical Colleges and the Council on Medical Education of the American Medical Association.

Canadian participation in this process has increased rapidly in recent years, to the point where, of five survey-team members, three are Canadian, including the Chairman or the Secretary.

Through a Committee on Coordination of Surveys of Programs in Medical Education, ACMC is collaborating with the Canadian Medical Association, the Royal College of Physicians and Surgeons of Canada, and other organizations to develop a method of accrediting medical education as a continuum - undergraduate, and postgraduate education, and the continuing education essential for practising physicians. This should obviate the current duplication of effort, and the burden on medical schools and hospitals of multiple surveys. It should also help to foster a clearer perception of medical education as a continuing process.

2. Annual Meetings

The annual meetings of ACMC (held in conjunction with those of the Association of Canadian Teaching Hospitals) are of increasing importance to member institutions and to other individuals and groups concerned in medical education. Each year, the scientific sessions concentrate on matters of current concern.

3. Newsletter

The ACMC NEWSLETTER is published six times a year, with a circulation of about 1000. This contains news of ACMC activities, medical school developments, and international events.

4. Advisory Functions

The ACMC Executive Committee and the staff of the Secretariat have been called upon to advise on questions of curriculum, course organization, departmental establishment, the search for faculty, the financial support of medical students (Canadian and non-Canadian), government support of medical research, the uses of hospital staff association funds, and many others.

B. RELATIONSHIPS WITH GOVERNMENTS

1. Federal Government

a) ACMC's closest association has been with the Department of National Health and Welfare, dating back to the first ACMC meeting in 1943. Apart from the presence of representatives of the Department at meetings of the Association, the most formal link has been through the contract agreement described in section IV p. 19 - 20.

ACMC has collaborated with the Department of National Health and Welfare in other ways as well. At the request of officers of the Department members of ACMC staff have reviewed applications for research grants from time to time. Again, to assist various divisions of the Department in their programs, ACMC has asked its members faculties to consider matters of special concern to the Department; e.g. the teaching of mass casualty care, the

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teaching of rehabilitation and mental health, the problem of non-narcotic addicting drugs, and the reporting of adverse drug reactions. ACMC was consulted during the preparation of legislation for the Health Resources Fund; developed a definition of Clinical Teaching Units properly eligible for grants from this Fund; and from time to time was brought into consultation by its chief administrator. ACMC has close liaison with the International Health Branch of National Health and Welfare, concerning student and faculty aspects of Canada's External Aid Program and it works at a variety of levels with the Canadian International Development Agency. ACMC is represented on the Advisory Committee on International Health

b) With the aid of a grant from the Department of Manpower and Immigration, and with the cooperation of the Department of National Health and Welfare, ACMC conducts Operation Retrieval as it relates to the graduates of Canadian medical schools. (This program is discussed more fully under Section II p. 5.)

c) ACMC has had close association with the Medical Research Council since its founding, with the National Science Library of the National Research Council, and on occasion with the Science Secretariat and other departments and agencies of government.

2. Provincial Governments

a) Newfoundland. The Province of Newfoundland, through Memorial University, utilized the Executive Director and three other members of the ACMC Executive Council as surveyors and consultants in connection with the establishment of its new medical school and the search for its dean.

b) The Executive Director of ACMC was a member of New Brunswick's three-man Commission to assess the need of a medical school in the province.

c) One province has approached the ACMC for assistance in a study of certain aspects of its health legislation.

C. PUBLIC INFORMATION

1. ACMC receives hundreds of inquiries annually, both directly and referred by government agencies, from students in Canada and abroad, concerning medical schools, graduate education and financial support.

2. ACMC answers inquiries from abroad concerning openings in medical teaching and research in Canada. If the curriculum vitae of a correspondent is promising, it is circulated to appropriate department heads. Inquiries about medical practice and certification in the specialties are directed to the provincial licensing authorities or to the Royal College of Physicians and Surgeons of Canada.

3. ACMC answers general inquiries from overseas institutions or agencies concerning Canadian medical education, research and practice. When indicated, questions are referred to the appropriate authorities.

4. In connection with Operation Retrieval, ACMC issues two publications. The "ACMC BULLETIN" is sent twice a year to graduates of Canadian medical schools who are interns and residents in the United States. This publication keeps the graduates up to date with Canadian developments, and provides information useful to them in returning to Canada. This effort is supplemented by annual team visits to selected U.S. centres of concentration of Canadian

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graduates in teaching hospitals. The second publication is "Operation Retrieval: A list of physicians and biomedical scientists training or working abroad and available for employment in Canada". This is published annually and sent to faculties of medicine, dentistry and pharmacy, university and medical libraries, teaching hospitals, federal and provincial government departments, Canadian medical associations, societies and clinics, and Canadian pharmaceutical manufacturers.

Through the Operation Retrieval program, it is possible for Canadian medical graduates training outside Canada to be considered for Canadian positions in the same way as if they were training in Canada.

D. COLLABORATION WITH PROFESSIONAL BODIES

1. Medical Associations

ACMC maintains close ties with the Royal College of Physicians and Surgeons of Canada, the Canadian Medical Association, the Medical Research Council, the College of Family Physicians of Canada, l'Association des médecins de langue française du Canada, the Canadian Association of Medical Students and Interns, the Medical Council of Canada, the Association of Canadian Teaching Hospitals, and the Federation of Provincial Licensing Authorities of Canada, as well as a wide variety of Association representing specific medical disciplines, e.g. The Canadian Association of Professors of Psychiatry. ACMC has undertaken collaborative efforts with many of these groups, and has acted in an advisory capacity to them in their concerns with medical education.

2. Health Sciences Associations

Under the sponsorship of the Association of Universities and Colleges of Canada, ACMC has joined with bodies representing the university faculties and schools of dentistry, nursing, pharmacy, optometry, rehabilitation and social work, to discuss ways in which education in the health-related professions may effectively be coordinated, to provide economies in education, and to foster optimal cooperation and utilization of members of the health team on the completion of their formal education.

These discussions have been among the factors leading to the Conference on Health Manpower and Educational Planning to be held October 7 - 10, 1969, under the joint sponsorship of the Department of National Health and Welfare and the Association of Universities and Colleges of Canada.

E. INTERNATIONAL RELATIONSHIPS

1. Canadian medical schools maintain a vital contact with American medical education through their affiliate membership in the Association of American Medical Colleges and by reciprocal attendance at meetings. The contribution made to medical education in Canada by the institutions of the U.S.A. with their research and policy resources, has been invaluable. Only now may Canada be able to reciprocate by making available the benefits of our pioneering experience with total population coverage by hospital and medical care insurance. Two or three times yearly one of the executive officers of ACMC attends meetings of the Executive Council of AAMC.

2. ACMC is a founding member of the Pan American Federation of Association of Medical Schools. Dr. J.J. Lussier, Dean of Medicine at the University of Ottawa, and ACMC Past-President, represents both Canadian and American faculties on the Administrative Board. A strong delegation from Canada attended the first meeting of the Assembly in Bogota, August, 1966.

3. ACMC holds institutional membership in the Association for the Study of Medical Education in Britain. Many ASME reports of studies or conferences are of interest to Canadian faculties of medicine. ACMC has helped to make these reports better known in Canada.

4. The Executive Secretary, ACMC, served on the Headquarters Executive Committee responsible for the planning and execution of the Third World Conference on Medical Education, New Delhi, November, 1966. Twenty Canadians were present, representing seven universities and The Canadian Medical Association. ACMC's Director of Research was nominated by American social scientists to be one of the group representing that field in the seminar discussions. He is Chairman of a Working Group of the International Sociological Association concerned with international studies of the training of health manpower.

F. SPECIAL STUDIES

1. ACMC officers and staff were involved in studies in medical education for the Royal Commission on Health Services from late 1961 through 1964.

2. ACMC sponsored, with the medical college librarians, a survey of medical libraries that led to the Simon Report,* and the Firstbrook Report.** These activities culminated in the establishment of a National Library Resources Centre for the Health Sciences in the National Science Library in Ottawa. It is expected that ACMC will be represented on an advisory board for the new centre.

3. Studies have been conducted on the cost of construction of research facilities in medical schools and teaching hospitals. These estimates were taken into account when National Health and Welfare established the Health Resources Fund in 1966.

4. ACMC staff assisted in the surveys of manpower resources in medical research conducted by the Medical Research Council.***

G. RESEARCH

a) The collection of data on Canadian medical students was begun in 1962, and elaborated in 1965 and 1966 with the completion of the first stage of an on-going registry of medical students. This component of an over-all Canadian medical manpower tabulation will permit projective studies of the process of physician training, as well as predictions of the manpower potential in general practice and in the specialties.

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* Library Support of Medical Education and Research in Canada, Beatrice V. Simon, ACMC, 1964.

** A National Library Resources Centre for the Health Sciences in Canada, J.B. Firstbrook, et al., 1966.

*** Survey of Research Personnel in the Medical Sciences in Canada, Medical Research Council. Report No. 1, 1966.

b) A long-term assessment of the supply of medical students was begun in a pilot study of applicants to the medical schools of Ontario in 1964, and has been continued on an annual basis in all of Canada since 1965/66. This has permitted an accurate and on-going assessment of the applicant pool and of the capacity of Canada's medical schools to admit qualified applicants. It has also opened the door to a fresh scrutiny of admission standards and policies.

c) A study of holders of Canadian higher degrees in the biomedical sciences who graduated between 1946 and 1963, and a survey of 140 Canadian-trained Ph.D.'s in the U.S.A., were undertaken in 1965-67. This was part of a larger examination of requirements and supply of faculty in the health sciences. Data now under analysis will shed light on some of the factors that influence scholars in these fields to migrate.

d) A survey of residents in hospitals approved for advanced training in specialties, and a pilot study of opinions of 60 residents, were conducted for the Royal College of Physicians and Surgeons of Canada in 1965. The findings played some part in bringing about needed changes in the examination for specialist certification.

e) Cost studies have included the following investigations:

i) Program costs in medical schools

ii) Program costs in teaching hospitals

iii) Econometric study of teaching hospital costs

iv) Private rates of return on education investment

v) The economic relations between intern and residency training programs and costs of physician's service.

These studies have provided an important national fund of information for the use of the medical schools, the federal government, provincial governments and international agencies (e.g. World Health Organization). In more than one instance, statistical information supplied by ACMC has been a deciding factor in the question of whether or not to establish a new medical school. As the ACMC registry of medical students continues through the years, biographical and professional information on an increasing proportion of Canada's physicians will be available for research on educational and manpower problems.

Support of Research. Most of ACMC's project research has been supported by the Public Health Research Grant of the National Health Grants, with applications being made through the Ontario Department of Health. This arrangement has posed certain difficulties for ACMC, and very likely also for the province of Ontario. Despite the goodwill of all concerned a system designed to support research in Public Health is not a reliable medium for the support of educational studies even when these are essential to national health manpower planning.

Two examples illustrate the unreliability of the arrangement. In November 1966 an application was made for $44,465. to support the third year of effort in the study of Canadian medical school applicants and students. In March 1967, only a matter of days before the new fiscal year began, the Association was informed of the outright rejection of the application. An appeal was made with the resulting allocation of $20,000 in July. Meanwhile the research officer concerned had moved to a more stable post in a university and it was too late in the academic year to find a

successor. In fact, the post was not filled until March 1968. The project was kept alive, however, with the expenditure of only $14,000; but no expansion could take place and the study quite clearly lost some of its momentum in the schools.

The second example concerned the much needed faculty registry. In October 1967 ACMC applied for a Public Health Research Grant, after obtaining encouragement informally from officers of the federal department and of the Medical Research Council, for both of which the data produced by the study would be useful. Seven months later the application was still held up at the provincial level and notice of an adverse decision was received from National Health and Welfare in early October 1968, one year from the filing of the application. Two weeks later it was re-directed by ACMC to the Medical Research Council. Now, over eight months later a decision is still awaited.

Fortunately, the new National Health Grant announced in May 1969 promises a much more satisfactory avenue for support of this type of research which has been bedevilled by its precarious connection with education but is so important to health manpower planning. Its purpose is broadly stated; grants will normally be for a three-year period, with annual review; application is made directly to the federal government, not through a provincial department; and finally, some of the overhead administrative costs including supervision by the principal investigator may be charged to the grant.

Further support for ACMC operational research is derived from a grant from the W.K. Kellogg Foundation of Battle Creek, Michigan, which terminates in December 1970. Renewal is possible but still problematical.

III. THE FUTURE ROLE OF ACMC

We are in an era of increasing emphasis on provincial concerns and of increasing provincial initiative in the study of needs and in systematic planning. Inevitably, certain provinces will be in a position to collect and analyse data and gain administrative experience that may be unique for the country as a whole. ACMC believes that it must more than ever act as a cohesive national force in medical education. It must continue its current functions, adapting rapidly to changing circumstances, and must expand its activities in the following ways.

A. SERVICES TO MEMBER INSTITUTIONS

1. Accreditation

While the involvement of the Association of American Medical Colleges and the American Medical Association in accreditation is still important to Canadian medical schools, ACMC is preparing for eventual total Canadian responsibility for accreditation. This role is of particular importance in maintaining national standards in education, so that mobility of health personnel between provinces will not be jeopardized. This does not entail a crippling uniformity. In fact, a diversity of methods is encouraged.

2. Communication

At a time of rapid change and development, ACMC sees a vital rôle in conveying information between medical schools, and between the schools and those agencies and associations concerned in medical education. In

the areas of curriculum change, experiments in teaching and evaluation and research on the delivery of health care, a great deal of duplication of effort can be avoided through rapid and thorough communication. To this end, it is hoped that the ACMC NEWSLETTER can be expanded in scope and in circulation, that ACMC staff can be made available for more frequent visits to medical schools, and that ACMC initiation of and participation in meetings and conferences can be increased.

B. RELATIONSHIPS WITH GOVERNMENTS

1. Federal Government

Along with other professional bodies, ACMC must be ready to work with departments of government, particularly the Department of National Health and Welfare, in providing information on the requirement and supply of health manpower, the financial support required for medical research and education, the development of appropriate methods of health care delivery, and other areas wherein the Department may request information or advice.

ACMC must also be prepared to respond to requests for advice on policy questions involving medical education or any of its facets.

2. Provincial Governments

As ACMC's registry of medical students grows to include an increasing proportion of Canada's physicians, the ACMC Secretariat will be increasingly capable of providing information on the origin, qualifications and distribution of the various kinds of physician in each province. From its applicant studies, one measure of the need for new medical education faculties is available.

G. PUBLIC INFORMATION

ACMC's role in public information is growing rapidly, as more and more agencies and individuals become aware of its functions and potential. In addition to answering requests for information, ACMC will be responsible for communicating with an increasingly health-concious public through a variety of channels, to ensure an appropriate response by the schools to the needs of the Canadian population.

D. COLLABORATION WITH PROFESSIONAL BODIES

1. Medical Associations

Among academic disciplines, medicine has an unusually wide and complicated network of ties with extra-university licensing and regulating bodies, professional associations, and such major institutions as teaching hospitals. The growing necessity for the life-long or continuing education of physicians is drawing the medical schools into ever closer contact with medical associations, and close and constant communication with them at the national level has become, and will remain, vital.

2. Health Sciences Associations

The current trend in the delivery of health care is toward increasing dependence on collaborating teams of health professionals, rather than on a succession of more or less independent individuals. To ensure effective collaboration in the delivery of care, and to increase efficiency, more coordinated education in the health professions must be effected. ACMC must continue and increase its efforts in collaboration with groups representing other health disciplines.

E. INTERNATIONAL RELATIONSHIPS

There is a growing desire in all faculties to increase the Canadian contribution to medical education in the new and developing nations. Moreover, Canadians often gain new insight into their problems at home when forced to focus on those of a setting in which needs are staggering and resources are scanty. ACMC urges that the objectives of further participation should be sharply defined and should bear a realistic relation to the resources of the Canadian faculties.

Canada's past association with other national organizations, and with international organizations such as the Pan American Federation of Associations of Medical Schools have been invaluable to Canada and, we believe, useful to the countries with which we have been associated. It is our conviction that these relationships must be maintained, and enhanced in any way possible, not only for the contribution that Canada may make to other countries, but for the broadened perspective that Canadians can gain.

The ACMC Secretariat would see much advantage to Canada if it had membership in the Pan American Health Organization. As a national Canadian body, and as a member of the Pan American Federation of Associations of Medical Schools, ACMC has been invited to send official representatives to important hemispheric meetings. With no invitation going to the Canadian government, this has created occasional embarrassment.

F. SPECIAL STUDIES

ACMC hopes that it will continue to be in a position to undertake or initiate special studies that fall within its area of expertise.

G. RESEARCH

ACMC hopes to be able to continue its registries of medical applicants and students and its studies of the costs of medical education. When financial support becomes available, ACMC plans to add a registry of medical school faculty to aid in the prediction of university manpower requirements, and to monitor the changing career patterns among teachers and research workers.

The ACMC hopes to see an expansion of its research efforts in two major ways:

1. In the area of manpower research ACMC sees a broader rôle as a national voluntary body in collaborating with government and the health professions to determine and predict the health needs of the population, and the ways in which medical personnel may be produced to fill these needs.

In conjunction with the Health Resources Directorate of National Health and Welfare, ACMC should undertake research to provide the information necessary to universities and the provinces for planning both the numbers and kinds of physicians and other medical scientists to be trained.

In cooperation with other national bodies, ACMC and AUCC have initiated discussions of the ways in which the university education of a variety of health personnel may be coordinated, in view of the trend toward the use of the "team" in the delivery of health care.

2. A logical concommitant of manpower research is research into methods for the delivery of health care. For some time, it has been clear that not even the industrialized nations can fill the demand for physicians. The new challenge is to fill the demand for health care by devising new methods

for its delivery, and more efficient and effective rôles for the members of the health team. This kind of research is best carried out at the level of the university health sciences centre, but ACMC must play a part in stimulating and coordinating such research, and in disseminating its results by publications and conferences.

Support of Research

For the reasons outlined on pages 10 and 11, the National Health Grants as administered by the provinces have not been an ideal source of support for ACMC's national research. The new National Health Grant, for the support of projects of national interest will, we hope, prove to be more readily applicable to the new and continuing studies of ACMC. Its coverage of legitimate overhead costs is extremely important. However, since the maximum duration of a grant will normally be three years it remains to be seen whether continuity of support of ongoing studies of long term interest will be secure.

IV. FINANCIAL SUPPORT OF THE SECRETARIAT

The support of ACMC core staff and facilities as distinct from staff and facilities acquired for research projects, has been difficult at best, and usually precarious. For some years the Executive and staff have been concerned by the high proportion of "soft" money in the budget of the secretariat. Attention has been drawn to the critical dependence upon American sources of support, and the American foundations in turn have expressed reluctance to give grants in the absence of a more substantial Canadian contribution. Since the founding of the Secretariat,

an average of 66 per cent of its core support has come from American sources.

Core staff and facilities have been supported from four sources: The W.K. Kellogg Foundation, the Commonwealth Fund of New York, the institutional membership of ACMC, and the Department of National Health and Welfare.

The ACMC Secretariat was established in 1962 with the aid of a five-year grant of $170,000 from the W.K. Kellogg Foundation of Battle Creek, Michigan. A new Kellogg grant for basic operational studies (three years at $45,000 per year, terminating November 30, 1970) was awarded only when the Foundation was assured that ACMC's member universities would increase their support substantially.

Fees from the institutional members were increased in 1968 from $1,000 per school to $2,000 per school plus $7.50 per undergraduate medical student. This yielded $65,915 for support of Secretariat activities in the 1968/69 fiscal year, an increase of 310% from the previous year. The continuation of institutional support of ACMC at this level is by no means assured, however, since other faculty associations are pressing for similar facilities and support.

In 1965, ACMC entered into an agreement with the Department of National Health and Welfare under the following terms:

i. to provide studies concerning integration of the work of physicians with that of allied health professions.

ii. to evaluate the performance of Canadian medical graduates.

iii. to develop methods for accreditation of medical schools by a Canadian accreditation body.

iv. to undertake such studies and activities that are consistent with the aims and purposes of the Association as may be requested by the Department.

In consideration of these activities ACMC has received consultation fees of $25,000 annually since 1965/66, with renewal of the contract each spring. Although the Department has requested ACMC to give attention to three additional topics in 1969/70 it has not been possible to increase the consultation fee. Nor is there any assurance that this source of payment for services rendered will be continued in the future, especially after inauguration of the new National Health Grant.

Recognizing the dilemma created by steadily increasing demands for service and consultation in the face of shrinking rather than expanding revenue, the officers of ACMC decided four years ago to gamble. They sought further "soft" money to support a second senior medical person for the core staff. The result was a grant of $80,000 made by the Commonwealth Fund of New York to cope with a deficit one year and to give three years of support to the new officer who joined in September, 1968. This grant terminates in March, 1971 with an effect on the Association's financial picture as revealed in Table 1.

Table 1

Comparison of ACMC's Financial Requirement and Revenue in 1970/71 and 1971/72

	1970/71	1971/72
A. Requirement	$175,000	$185,000
B. Revenue		
Membership fees and assessment	69,000	70,000
Commonwealth Fund, New York	44,000	-
W.K. Kellogg Foundation (if grant renewed in Dec. 1970)	45,000	45,000
National Health and Welfare consultation fees (if continued at present level)	25,000	25,000
	183,000	140,000
Balance	8,000 (surplus)	45,000 (deficit)

The table reveals an estimated net deficit for the two years 1970/71 and 1971/72, of $37,000. Deficits exceeding $50,000 would occur in succeeding years unless further revenue can be found. Moreover, as mentioned already, no one of the sources of support shown in the table is secure. Should one of these fail in 1971/72 the reduction of staff and services required to balance the budget would spell disaster.

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Although the valuable freedom of action permitted by certain of the American grants is appreciated, we believe that the Canadian component of ACMC secretariat core support must be increased substantially. Assurance of relatively stable, long-term support is necessary if experienced professional and administrative staff are to be recruited and maintained.

It is the view of ACMC that this substantial, continuing, Canadian support would most appropriately come from the Government of Canada, specifically, from the Department of National Health and Welfare.

V. GOVERNMENT SCIENCE POLICY AS IT RELATES TO VOLUNTARY ORGANIZATIONS

We believe that the preceding pages have demonstrated the national importance of ACMC to the medical schools, to the Government of Canada, and ultimately to the cause of excellence in health care for Canadians.

ACMC is, however, by no means unique as a voluntary body functioning in a scientific field at the national level. Government depends on a wide variety of organizations to collect and disseminate information, to help develop policy, and to act in the implementation of policy.

We believe therefore that it is important for the federal government to have a clear policy with respect to the support of such organizations.

It has been a Canadian tradition for governments to turn to outside agencies or facilities for available services or supplies, rather than to develop a duplicate capability at the expense of the public treasury. We believe that this has been a sound policy, and should be continued.

However, voluntary agencies in many parts of the world are straining or collapsing under financial burdens. Their services to government either diminish or disappear, and governments are faced with the difficult and expensive task of replacing a previously well-established service.

In this connection, we respectfully draw to your attention the attached paper, "The Nongovernmental Organization at Bay", by Alan Pifer, the 1966 Acting President of the Carnegie Corporation of New York, now President. While his dissertation applies to the situation in the United States, we believe that the principles stated are equally relevant to the situation in Canada. We hope that it will be valuable to you in your formulation of science policy in respect to voluntary agencies.

THE NONGOVERNMENTAL ORGANIZATION AT BAY

Reprinted from the 1966 Annual Report

CARNEGIE CORPORATION OF NEW YORK

589 Fifth Avenue, New York 10017

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Carnegie Corporation of New York is a philanthropic foundation created by Andrew Carnegie in 1911 for the advancement and diffusion of knowledge and understanding. It has a basic endowment of $135 million and its present assets, at market value, are approximately $289 million. Seven and four-tenths per cent of the income may be used in certain Commonwealth areas; all other income must be spent in the United States.

The Corporation is primarily interested in education and in certain aspects of public and international affairs. Grants for specific programs are made to colleges and universities, professional associations, and other educational organizations.

John W. Gardner, president of Carnegie Corporation of New York, was granted leave from the Corporation on August 18, 1965, to serve as Secretary of Health, Education, and Welfare. Alan Pifer is acting president of the Corporation.

The Nongovernmental Organization at Bay

AN occupational hazard of philanthropy is repeated exposure to the financial plight of others. While the reaction may at times be a kind of relieved "there but for the grace of God . . . ," more often it is one of deep concern, even anxiety. Why do so many of our private nonprofit organizations seem to have perpetually engrossing financial problems? Why should the men who run them have to spend so much time and effort making the rounds of potential donors, hat in hand, often with disappointing results and always at the expense of their primary administrative and program functions? Has the system for maintaining these organizations become basically unsound?

These are questions that each year become more insistent as the social value of nongovernmental organizations continues to mount in response to the steadily broadening aspirations of our society and to the nation's expanding international commitments. Indeed, the financial uncertainty of these organizations in the face of growing responsibilities and sharply increased costs threatens to limit their future usefulness and undermine the private side of a public-private partnership through which the nation is now accomplishing some of its most important public business.

Definition

The term "nongovernmental organization" is used in several ways and is often ambiguous. As used here, it is arbitrarily limited to those organizations that have a private and nonprofit status but are *not* universities, colleges or schools, hospitals, fully endowed foundations, or religious missions. It includes scholarly, professional, educational, scientific, literary, and cultural associations; health, welfare, and community action agencies; non-

university research institutes; agencies providing overseas technical assistance; defense advisory organizations; and agencies that have educational purposes but are not part of the formal educational system. Thus, the term takes in only part of that heterogeneous list of approximately 100,000 organizations that are tax exempt and to which contributions are deductible under federal income tax law.

A few hundred of these organizations have national or international purposes and are individually important to the nation at large. The remaining thousands operate only at the local level but have national significance collectively as a vital part of our system of democratic pluralism. In both groups, but especially in the former, are to be found an ever growing number that derive part of their income, and in certain cases a goodly portion of it, from federal grants and contracts. Some of these organizations have moved into the federal orbit by choice, seeing there new sources of financial support. Others have entered it in response to a call for help from Washington. Still others were created by, or as the result of an initiative from, a federal agency.

The kinds of services offered to government by these private nonprofit organizations are too varied and numerous to catalogue here. Indeed, it is a striking fact that nowhere in the Federal Government does there exist a central record of these services, the organizations providing them, and the volume of expenditure involved, and even at the department or agency level this information is not readily available. "We just don't look at it that way," is the explanation offered, and so separate statistics are hard to come by.

Nevertheless, the use of nongovernmental organizations to carry out public functions, a rare occurrence before World War II, is now accepted policy in most parts of government. Gone are the days when most people in Washington would agree with the once widely held view that public money should be spent only by public agencies. A more flexible approach to the art of government, which also includes an expanded use of universities and private business firms, is growing steadily.

In the Government's Service

Examples drawn at random from current government operations illustrate the variety and ingenuity to be found in the ways private nonprofit organizations are serving government.

The United States Employment Service of the Department of Labor has

recently contracted with the National Travelers Aid Association to provide supportive social services in the relocation of families from areas of labor surplus to areas with a labor shortage. The Office of Regional Economic Development of the Department of Commerce, to assist local industrial growth, purchases research services having to do with new products and new markets from such nonprofit organizations as the Midwest Research Institute, the RAND Corporation, and the New England Economic Research Foundation.

The Bureau of Educational and Cultural Affairs of the Department of State uses the services of the National Social Welfare Assembly for planning and administering travel programs of some foreign visitors to this country. The same bureau has for a number of years relied on the Conference Board of Associated Research Councils and the Institute of International Education to assist in the selection of American scholars and students for research, teaching, and study abroad under the Fulbright Program.

The Agency for International Development employs International Voluntary Services for rural development work in Laos, and the American Institute for Free Labor Development to train labor leaders from Latin America. It contracts with the African-American Institute for a variety of educational services in many parts of Africa, and with the Near East Foundation for agricultural education and extension services in Dahomey. It finances a program under which CARE is assisting Algerian doctors to develop their capability to run an ophthalmological clinic. Peace Corps volunteers are being trained by the Tucson, Arizona, branch of the YMCA for service in Venezuela.

The National Science Foundation under its course content improvement program has given substantial contract support to Educational Services Incorporated for curriculum work in science, mathematics, and social studies. The U.S. Office of Education, under its ERIC (Educational Research Information Center) program, an enterprise that also involves ten universities and two private business concerns, has recently contracted with the Modern Language Association and the Center for Applied Linguistics to set up clearinghouses for information on, respectively, the common and the less taught foreign languages. The Office of Education has also provided contract support to CONPASS, a newly formed consortium of professional associations, including the Association of American Geographers, the American Historical Association, and others, to make possible a continuing appraisal of the $33 million annual National Defense Education Act pro-

gram of teachers institutes in such fields as foreign languages, geography, English, history, reading, and the arts.

In the poverty field well over half of the 900-odd newly created community action agencies supported by the Office of Economic Opportunity are private nonprofit organizations. The OEO also finances demonstration programs carried out by long-established private agencies. An example in the community action area is the Office's support of Project ENABLE, jointly sponsored by the National Urban League, the Family Service Association, and the Child Study Association. A second example is OEO's support of programs of the National Legal Aid and Defender Association. A third is the contract with the YMCA to help meet the costs of a job-training program for young people in the Bedford-Stuyvesant area of New York City. The Department of Labor and Office of Education also contribute to this program.

The Food and Drug Administration has recently engaged the National Academy of Sciences to carry out a reassessment of the efficacy of all new drugs marketed in the years between 1938 and 1962. Previously, at the request of the same federal agency and with funds provided by it, the Public Administration Service, a private organization in Chicago, had made a study of state and local food and drug control procedures to help the Federal Government determine its area of responsibility.

Government by Contract

These are but a few instances of one aspect of the rapidly growing phenomenon of government by grant and contract. The phenomenon will almost certainly continue to grow despite the opposition of some members of Congress, who believe it would be preferable for federal agencies to develop their own internal capacity to take on all the new tasks society is assigning to Washington rather than hire others for this purpose. These critics contend that contracting is no more than a subterfuge by which government gets around its own regulations and salary scales. More importantly, some have real doubts as to how far federal agencies should go in delegating their public responsibilities to private contractors. Can the elected officials of a democratic government, they ask, be held fully accountable to the public for tasks that appointed officials have contracted with others to perform?

This is a fair question. At the same time the greatly increased use of nongovernmental organizations to serve government ends is the product of a

powerful and pervasive new force that is not to be denied. This force is the growing complexity of the domestic and international problems with which government must cope—complexity that is rooted in scientific and technological advance, in population growth, in urbanization, in international tensions, and in still other factors. Solution of these complex new problems requires ever greater specialization, both of facilities and professional and technical manpower. Government cannot hope to build up and maintain such a capacity within its own bureaucracy. It has no alternative but to buy the specialized help it needs from the universities, from private enterprise, and from the nongovernmental organizations.

Beyond this reason, however, are other sound justifications for the government's use of nongovernmental agencies to carry out the nation's public purposes. These agencies by their very nature should have the kinds of attributes that an alert federal administration needs today, if it is to have an adequate sense of responsibility for the nation's well-being. Not all private organizations have these qualities, but many do. They include the capacity to move swiftly, flexibly, and imaginatively into a new area of critical need; the power to arrive at a disinterested, objective appraisal of a situation free of political influence; the freedom to engage in controversial activities; the ability to experiment in an unfettered manner—and if need be fail; and finally the capacity for sympathetic personal attention to the variety of human problems that beset our increasingly dehumanized world.

A New Partnership

Realizing the need for access to such qualities, Washington officialdom has in recent years authorized an ever greater use of nongovernmental organizations, and Congress has provided the necessary funds to buy their services and support their projects. A partnership has been sealed, as it was between government and the universities in scientific research and development. The result is that just as we now have the "federal grant university," so also we have the "federal grant nongovernmental organization." And just as we have learned to worry about the impact on the universities of large-scale, mission-oriented federal support, we must also develop a concern about the impact of this kind of money on the weaker partner in the new alliance between government and the nongovernmental organizations.

At the moment such a concern both within and outside government has not arisen, as it did in regard to the universities. Why? One explanation is simply that the volume of governmental contracting with the private organ-

izations is smaller than it is with the universities. This in turn is explained by the predominant part research and development have played in government's needs for outside assistance and the universities' special—though not exclusive—capability in this area. Federal contract and grant support, much of it for research, now represents a substantial part of the annual income of many of our leading universities. No sensible person in government or the universities can ignore the implications of this development. But among nongovernmental organizations research is a much more limited activity, and no other single area of government dependence on these organizations has yet been great enough to arouse concern.

Nevertheless, important as research and development requirements remain, other types of government needs have been growing rapidly, especially for the kinds of operational and management services that nongovernmental organizations of the types we are considering here may provide more appropriately than universities. As the nation increasingly grapples with its domestic problems of educational expansion, urban blight, poverty, housing, race relations, health, and environmental pollution, as well as with its international responsibilities, the use of the nongovernmental organization must inevitably continue to mount.

Concern developed slowly over the implications of government dependence on the universities for research. Originally federal agencies believed they could simply buy research from the universities as a kind of commodity, much as the army once bought mules. This simple notion was later replaced by a more sophisticated realization that to get the research it needed government would also have to support the research universities wanted to do. There developed, therefore, a dual system of relationships, one based on contracts, the other on grants. Gradually, however, the distinction between the two has faded as the result of changing procedures, until the grant and the contract are now virtually indistinguishable.

More recently the government has recognized that it not only must administer its university research support flexibly but also must help build up the basic long-term strength of the universities. It is doing this through the new institutional grant programs of the National Science Foundation, through general research support and grants for facilities to the medical schools by the National Institutes of Health, through the "sustaining university" grants of the National Aeronautics and Space Administration, and through Office of Education grants to the universities for buildings and equipment.

Finally, in the new international education legislation Congress and the Administration are contemplating yet another step. They are now proposing to give general support to universities to enable them to develop the capability with which to provide international technical assistance, not only in research but for training and operational services as well.

Let the Seller Beware

Clearly the university case has been well made. But the same case has never been made for using public money to develop the general capacity of nongovernmental organizations to do their jobs more effectively. The standard government position here is that it is simply buying services as a commodity and has no responsibility for the basic health of the suppliers. Therefore it must not pay for a whit more (and often less) than the tangible products it receives, whether research or services; it must buy at the lowest possible price; and it must limit its support to the program and administrative costs of a carefully defined project with a specified terminal date.

This kind of support is in the long run harmful to the nongovernmental organizations. It tends to produce mushroom growth and to place them in a position where they must continually seek further project support of the same nature to prevent the laying-off of staff and closing-down of programs. Thus, the paths of these organizations become characterized by frequent changes of direction induced by Washington's concerns of the day, rather than deliberate courses set by the organizations' own boards of trustees. This process in turn can diminish the interest of the trustees, and hence their sense of responsibility—which is the very heart of effective voluntary private service in the public interest.

The probability is that project support alone will in time make these organizations little more than appendages of government. What may also develop, since government officials cannot in the very nature of their jobs take consistent responsibility for the affairs of private organizations, are situations in which responsibility falls somewhere between government and trustees, with no effective check on the activities of staff. The dangers here are obvious.

The management of a nongovernmental organization, guided by its own sense of what is best for the organization, does, of course, have a free choice of whether to accept or reject government contracts. This can be said to be a basic part of management's responsibility. One can say, therefore, that if the organization begins to exhibit hyperthyroid or schizoid tendencies as

the result of an overdose of government contracts, it has no one to blame but itself. In practice, however, many organizations have found the rejection of government business extremely difficult because of their unwillingness to appear—and be—unresponsive to the national need. In some instances also it is their own identification of a pressing problem that leads them to take the initiative in seeking government support. Finally, they know that organizations that consistently give a higher priority to their own stability than to venturesome growth run the danger of removing themselves from the battle altogether.

Why have the private nonprofit organizations not come together and made their case to government as the universities did? Perhaps it is merely a matter of not yet having had time. A more likely explanation, however, is that they have no ready means of cooperation, so great is their diversity and so amorphous the field of which they are members. Each of these organizations has a constituency of its own and inhabits a world that rarely intersects or overlaps that of another organization. The men responsible for their affairs often do not even know each other. There has, therefore, never been a concerted initiative for the creation in Washington of a single voice to speak for the interests of the nongovernmental organizations field, a voice such as that provided for higher education by the American Council on Education. Perhaps, given the diversity of the field and its lack of integration, this is the way it has to be, but the result is a babel which amounts to no voice at all.

A New Approach

Were government now to recognize the need for building a long-term service capability in organizations with unique or special talents, it would seem an easy matter for federal agencies to begin to apply to the private agencies on whose services they depend the same principles now applied to the universities. For example, "sustaining grants" to such organizations could provide funds for administrative costs not allocable to contracts. Such grants could also provide "venture capital" for programs which, though not of current interest to the government, would develop the general competence of these organizations, and hence their longer-range usefulness to government.

From government's point of view several problems stand in the way of a new approach of this kind. Many Washington officials and members of Congress who believe in the public-private partnership would still hesitate

to see government provide general support to private organizations, because they believe this would turn them into veritable arms of government, thereby destroying the very qualities that make them indispensable. General support, they point out, would oblige government to audit the full accounts and monitor the entire program of an organization being helped, whereas with contract or grant support the auditing and monitoring need apply only to a specific project. Others in Washington disagree with this conclusion, saying that if the will existed, there could be as much latitude in government's approach to the nongovernmental organizations as there is in its flexible and generous new attitude toward the universities.

A more serious difficulty from Washington's point of view is that some private organizations seem to be badly run and others are apparently still addressing themselves to yesterday's problems, while still others give the impression of being nothing but lobbying groups promoting the selfish interests of particular professions or occupations. Liberalized financial policies that included such organizations might, it is suggested, simply reward inefficiency, obsolescence, and venality. While the point can be made that government has no business using the services of such organizations anyway, the argument is, nonetheless, generally persuasive, and it indicates that any change of policy must be applied selectively and with discriminating care.

This argument also points up a fundamental difference between universities and nongovernmental organizations. The very nature of the academic enterprise provides a kind of built-in system of responsibility upon which government can rely. Each scholar is accountable not only to colleagues at his university, including boards of trustees or regents, but also to a wider circle of scholars in his discipline at other universities. And at the institutional level, individual universities are accountable to a national—even international—community. This system of self-audit within the academic enterprise has its moments of failure. But on the whole it is remarkably reliable, and it provides a substantial assurance that the money will not be misspent when government gives public funds to the universities.

Nongovernmental organizations, on the other hand, being more disparate, lacking intercommunication, and possessing no sense of community and tradition do not have such a built-in system of discipline. In their case, responsibility is a more localized matter and lies primarily with their boards of trustees. Government's protection in its grants to these organizations is to make sure that the trustees recognize their responsibility and

discharge it. Where the trustees are strong and active, the protection afforded government can, in fact, be even greater than that provided in grants to universities.

Responsibility for Support

Most people in Washington believe responsibility for the basic financial health of nongovernmental organizations lies in the private sector. The rightness of this view cannot be disputed when we think of philanthropy as a broad, undifferentiated activity in which the individual is free to give his dollar, or million dollars, for any purpose he chooses. Along with hospitals and educational institutions some nongovernmental organizations benefit from this kind of giving. This point of view provides one framework for thinking about these organizations, appropriate for those with purposes that tug at the heart strings—the "sailors, dogs, and children" group, as the British say—but wholly unrealistic in regard to those with less emotional pull.

Another framework is provided by the notion that at least certain nongovernmental organizations are national resources of such importance to the public welfare that their financial health cannot be entrusted to the vagaries of individual philanthropy. Here people in government tend to take the view that financial responsibility lies essentially with the foundations and business, an assumption that neither accepts.

With the exception of a number of quite small, local trusts most foundations take the position that only in exceptional circumstances is the provision of long-term, general support to an organization justified. They tend to be especially wary if the purpose for which a general support grant is requested is simply to put an organization into a position to accept government project grants or contracts. Indeed, the foundations regard project support as *their* particular province and are not ready to have responsibility for some other role thrust on them. Their funds, they argue, are severely limited in size and must be used for the kinds of experimental purposes for which no other funds are available. While this antipathy to general support may be as disappointing to the nongovernmental organizations as is the restricted policy of government, any other attitude would soon tie up foundations' funds and destroy the very flexibility that gives them their unique value.

Within the business community the general rule seems to be that corporate giving, beyond donations to educational institutions, hospitals, and

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the usual private charities, should be restricted to purposes at least indirectly related to a company's interests. Thus, a firm with markets in Latin America is more likely to support a private organization providing technical assistance there than one with the same purposes in Southeast Asia. Or a company manufacturing agricultural machinery may support an organization concerned with farm life but probably not one involved in, say, the arts. This is understandable. But the net effect is that a number of nongovernmental organizations qualify for little or no support from business at all.

Beyond this is the fact that some companies either cannot or do not choose to give. And for all of them there remains the basic consideration that they are by nature profit making, not philanthropic, enterprises. So while it may be argued cogently that business firms should support nongovernmental organizations more heavily, there are some good reasons why, for the present anyway, passing the hat among them is a frustrating exercise.

Finally, those in Washington who regard the private sector as having full financial responsibility for the nongovernmental organizations, even organizations essentially serving important public purposes, seem to be less than fully aware of the enormously increased costs today of operating these agencies. Both administrative and program costs have risen drastically, because salaries have had to be raised to meet the competition offered by rising government and academic salaries.

A more fundamental explanation, however, of why the resources of the private sector are no longer adequate lies in the dramatic rise of our national aspirations. Under Great Society legislation we have launched a frontal assault on many of the nation's most grievous social, economic, and environmental problems—in poverty, civil rights, health, education, welfare, urban renewal, and air and water pollution. The nation has taken on enormous new tasks costing hitherto undreamed of sums. The impact on government has been traumatic. And no less forceful has been the impact on private organizations. They, however, lack within the private sector a new source of funds comparable to the new kinds of Congressional appropriations available to federal agencies.

While comparisons between nations are always hazardous it would appear that the same type of conscious reexamination of the role of the nongovernmental organization, and reassessment of its relationship with government, which have taken place in Britain since the appearance there of the Welfare State twenty years ago must now take place in the United

States. Influential in the British reexamination have been Lord Beveridge's book *Voluntary Action*, published in 1948, the report of the Nathan Committee in 1952, and the subsequent Charities Act of 1960. From these and other contributions to the debate there have emerged both a reaffirmation of the value of voluntary effort in a democratic society and a new recognition of the interdependence of voluntary and statutory effort in an era of greatly expanded governmental responsibility for social welfare. The reexamination in this country must, however, be extended beyond simply the social welfare field to other areas, such as international education and technical assistance, where nongovernmental organizations are now in partnership with government. Furthermore, the process here will be more complex because, among other reasons, our three-tier system of government provides a greater variety of relationships with the nongovernmental organizations.

The Central Issue

Nonetheless, the real issue is beginning to emerge clearly. Is the nongovernmental organization of the future to be simply an auxiliary to the state, a kind of willing but not very resourceful handmaiden? Or is it to be a strong, independent adjunct that provides government with a type of capability it cannot provide for itself?

If it is to be the latter, and for most Americans the question is one that is likely to admit of no other answer, then we must face up to the difficult problem of how we are to finance these organizations. More can be done on the private side, as private responsibility will—and should—continue. For example, there might perhaps be some advantages to be found in experimenting more widely with the notion of cooperative fund raising which has worked so well for some community chest organizations. But the question must also be raised as to whether responsibility for the general financial health of at least the most important of the nongovernmental organizations should not now be shared by the Federal Government. Certainly the time has come for a comprehensive and careful study of the problem from both the governmental and nongovernmental sides.

If such a study should confirm the findings suggested by informal evidence and indicate the need for a new approach by government, three problems will then have to be considered: the mechanism for distribution of general support, how such support can be given without compromising the independence of the organizations aided, and how quality can be maintained.

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Would a new central mechanism in Washington, created with a broad charter, to act as a sort of analogue to the National Science Foundation, prove feasible as a device for channeling general support grants to the nongovernmental organizations? It would seem so in theory, but there would be many problems that might make the idea unworkable. A more practical approach, but one that also contains potential dangers for the organization seeking funds, would be to have each federal agency decide for itself which organizations it considered essential for its purposes and then determine the amount of general support each should receive. As noted above, such a process would have to be rigorously selective, with a wary eye open for possible incompetents and self-servers. The process would also have to be based on criteria politically defensible to Congress and the public.

Preserving the independence of the organizations aided would not appear to be an insoluble problem, although it may be a more difficult one than guaranteeing the independence of the universities has proven to be. It would require on the part of many people in the administration and in Congress a new attitude of greater trust in the nongovernmental organizations. It would entail new administrative practices, based in some cases on new regulations or even on new legislation but in other cases simply on a more liberal interpretation of existing regulations. Lastly, it would demand of the nongovernmental organizations that they continue to seek a wide diversification in the sources of their income, and linkages to as many constituencies as possible.

Government acceptance of a shared responsibility for the financial health of those nongovernmental organizations on whose services it most depends would not solve the problem of how other organizations, not linked to government, are to be adequately financed in the world of tomorrow. But it would be a specific response to the pressing difficulties of at least some of our most valuable private agencies. If we want to avoid an ever more extensive and powerful Federal Government, it would seem that we must now, paradoxically, use federal money to ensure that we have a viable alternative—a network of vigorous, well-financed nongovernmental organizations ready to serve government but able, in the public interest, to maintain their independence of it. This further financial burden on government may be unpalatable to many. But the logic of it is hard to escape.

APPENDIX 29

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

J. B. WARREN

SOME SCIENCE POLICIES NEEDED IN CANADA.

A. FOR THE NATURAL SCIENCES, PURE AND APPLIED.

1. The Pruning of the Tree of Science to yield more and better fruit.

Research programs may usefully run anywhere from 5 to 20 years hence roughly 10% of existing research programs should be chopped each year, so forcing these scientists to get out of their groove. Such a pruning process will cause anguish when first instituted but eventually will be accepted and become a habit.

All federal government research agencies, including bodies responsible for University research grants, should be required as policy to build into their annual procedures a pruning procedure. Thus they might be required to show in their Annual Reports what projects and programs have been terminated in one year and the financial saving thereby made. It should be the responsibility of a technical offical of the Treasury Board to examine the savings so made, and if over a 3 year period these do not average to more than 10% per annum, then the Treasury Board should withhold a sum from the allocation to the department concerned for the following fiscal year to make it 10% by the end of the 4th year.

2. More Youthful Representation on Research Councils making Policy.

The constitution of research councils making scientific policy, except in wartime, is very largely confined to men over 35 years of age.

While wisdom and willingness to think about general policy grows with age, yet science is very much a young person's activity. Since policy making, especially in pure research, is very much like gambling on horses in that one is gambling on people, it is important that policy making bodies as a policy include some persons of age under 35; I would advise 30%. This policy not only would invigorate the councils and perhaps make them bolder, it would also make sure that some of the ablest young scientists, who tend to be among the narrowest, would be forced to become aware of the more far reaching problems of science as a whole.

In certain councils one might also advocate a percentage

representation by women.

Policy on these lines must be codified, otherwise even with the best intentions it lapses by default.

3. Scientific Advisors to Ministries.

While some departments of governments include scientific endeavour within their scope and some do not, the impact of science and scientific thought might be more effective if there was a system of scientific advisors to all Ministers. Such posts should be held by an individual for a period of six years, long enough for him to see something accomplished but not so long for policy to have become too one-sided or rigid. Such advisors might, of course, go from one ministry to another.

While responsibility for the scientific direction of a Ministry would be vested in these advisors, their primary job would be to see that scientific knowledge and method was applied to those areas where it was lacking, and to avoid duplication of scientific effort.

This approach to introducing more science to government is to be preferred to an attempt to set up a Ministry for Science. It would lead to a wider and more sensible appreciation of the use of science and scientific method in government and society..

4. Policy concerning Spin-Off from Defence Research into Civilian Economy.

While Defence Research Policy is rightly not a subject of public debate or public information, it would appear,

a) some fraction of the effort is "awareness" research i.e. investigations made to keep abreast with our allies, so that potentialities of their new developments may be properly assessed. While this may be necessary for a small country, it tends to be demoralising to the scientists concerned.

b) perhaps in part because of 'a', the spin-off from Canadian Defense Research into our industry and civilian life has been negligible, nothing like as large or effective as that of some of our allies.

Defense Research Policy as to areas of development to be undertaken by Canada should include as a weighting factor the potential spin-off into Canadian civilian development. To this end one technical member of the D.R.B. should be appointed to represent this civilian potential view-point (perhaps from the Department of Trade and Industry or Department of Northern Affairs).

Thus as one obvious area the Defense Research Board is responsible for the research and development pertaining to defense in our Northern Latitudes and mountainous countryside: thus specifically for latitudes above 65°N the D.R.B. should carry through R. and D. in communications, engines and lubrication, clothing, living, building, sewage, survival, rescue and first aid, ecology, meteorology etc. until the full civilian potentialities of this work are realized. As another, the development of underwater, nuclear powered exploration vehicles for investigation of the immense area of continental shelf which bounds Canada, should be part of Defense Research and Development even though their application may come from the Department of Mines, Energy and Resources.

5. Policy concerning Allocation of Resources.

a) Financial.

The political policy decision as to the percentage of the Gross National Product which should be allocated to Research and Development in Canada is best based on the success of others and history. But quantum jumps up and down in the amount to be spent should be expected; in some years nothing new should be started and in others many things depending on the good ideas available. Since timing is of the utmost importance for return on scientific investment the Treasury Policy must be flexible.

Specifically some large sum ($8,000,000 per annum perhaps at this stage) should be allocated for initiation of new projects and support thereof for a period of 5 years. To this the federal agencies should also add the 10% pruned per annum, as proposed in section 1, p.1. This represents an extension of the Negotiated Development Grants idea of N.R.C. but should be extended to all agencies and to applied

and not only to pure science.

b) Geographical.

Policy concerning the geographical location of viable research or development groups in University, Government or Industrial environments to achieve optimum interactions and results has been almost non-existent over the past 20 years. This has resulted in a ludicrous over-balance of scientists in the Ottawa valley, self-perpetuating and expanding, with a minimum interaction with industry or local problems. It should be recognized that a sizable group of scientists would form a very useful section of the community in many other urban areas of Canada.

Policy should now be that no more laboratories be set up in the Ottawa Valley and no more scientists be employed there than now exist.

c) Balance between Chemistry, Physics, Biology and Mathematics.

In so-called pure University style research in these areas, the N.R.C. maintains a sort of balanced cash flow into the first three with less going to Mathematics, as only paper is consumed by mathematicians. This division of natural science dates back 100 years or so and is perpetuated in the structure of N.R.C.'s own laboratories.

As a result there is very little resource going into the exciting fringe areas or interdisciplinary researches or in new fields which don't quite belong in any one of the four. It is very difficult to get such work started at Universities where recruitment to faculty is completely dominated by existing undergraduate teaching departments.

To break down this severe distortion of science, medicine and engineering in Canada -

(i) the N.R.C. Grants policy should be heavily biased to interdisciplinary research ventures for the next five years.

(ii) the N.R.C. structure be changed to Applied Task Groups tackling specific problems more comparable to the Australian

These two steps might greatly assist the solution of the fundamental problem created by the 7 year University brain washing of young scientists, which in Canada has given them a sadly distorted and academic image of their particular specialization.

d) Allocation to Mission Oriented, Applied Research.

It is easy to designate problem areas, particularly semi-scientific social ones, and the Science Council is good at this. It is however, much harder to designate specific missions to which at this particular date in history it is possible to apply fundamental scientific knowledge and achieve success. Yet many spectacular applied science feats, like radar for air defense, were this kind of mission.

Thus "Pollution Research and Control" is primarily a legal-political-economic research problem and the scientific or even engineering research required is relatively minor. "Mental Health", an enormously costly item to our country and a problem which affects almost everyone sometime in their life seems, in contrast, a problem about which little can be done with our present state of fundamental understanding. More support of fundamental work in this may not be so easy to justify either, as the few able persons involved would probably accomplish less if they had more money to spend!

The Science Council neither generates specific ideas nor has any mechanism for collection thereof, so it tends to create policy in something of a vacuum.

It should become policy of the Science Council to encourage the generation of specific ideas, and their presentation and discussion at meetings of the Royal Society and other learned societies. The Science Council should also advise as to the best agency (industrial, government or University) for the exploration of a worthwhile idea.

6. Scientific Education.

The point has been made many times that two institutions, the

M.I.T. and the Cal. Inst. of Tech., have played a quite extraordinary role in the development and application of science in the U.S.A. (for example, see attached note "A Canadian Institute of Technology for a Centennial Project").

In Canada we have gone on erecting Variety Program Edifices under the mistaken impression that the Liberal Arts University is the only kind one can have. It is essential that a start be made to create two institutions of the Cal. Tech. kind, one in Eastern Canada and one in Western Canada. They will, of course, take 20 or 30 years to blossom.

It is difficult for Provincial governments, where lies the responsibility for education, to set up such expensive institutions. Existing faculties of applied science are naturally opposed to the setting up of rival and probably better institutions.

It should be science policy to set these up as soon as possible. One way might be to set them up as private universities in which the federal government provides two dollars for every dollar provided by private industry.

B. FOR THE SOCIAL SCIENCES.

For 20 years the subjects under this heading have been referred to as "Sciences" though their content contains practically no scientific method, no scientific objectivity and a complete minimum of quantitative formulation of problems. It would be one thing if this misuse of the word science were merely a fraud pulled on the public. But many of the latter day practitioners, particularly at Universities, have genuinely come to believe that they are practicing science!

This group are generally highly politically motivated with zero training in natural science, with no ability to define problems objectively and quantitatively, without even an ability to sift data in a reasonable way.

As Parkinson pointed out to me "these incompetents, as they gain political power, are going to sit on the necks of you natural scientists". The training of persons in this area is the major disaster of the past twenty years, not only in Canada, and its rectification is very difficult and very urgent.

Two policies are proposed, one to produce an immediate effect, the other for the longer term:

1. the establishment of mixed research teams of lawyers, economists, town planners, "Social Scientists", engineers and natural scientists to work together in one building on problems eventually requiring political decisions. The director in all cases must be a natural scientist.

   For example the Pollution Research Establishment just being formed should have such a team. Many other areas of government research should be encouraged to do this e.g. agriculture, urban and city planning, building, transport, northern development. The current wheat shipment fiasco in the Port of Vancouver could hardly have occurred if persons with a moderate knowledge of arithmetic and some logistic experience had been organizing the shipment of grain. No single group in the Department of Mines, Energy and Resources looks at the overall energy situation - thus Atomic Energy of Canada looks

only at its own economics and fortunately this appears to be done by natural scientists!

The Defense Research Board might well contribute some experts in Operational Research and Logistic Problems to such mixed research groups. Operational Research need not just be applied to devising the optimum milk distribution system for a city, but few city planners or engineers are aware of what problems can be defined and analysed. However the great and immediate gain to the formation of mixed research teams is that some understanding of the potentialities of real science (computer science etc.) might rub off onto the social "scientists".

2. The long term educational policy recommended is the strong financial support of a few selected graduate social science institutes at Universities which accept only, repeat only, students who have achieved a degree of some sort in natural science. Eventually one might hope to see this entry level raised to a second class majors degree or any sort of honours degree in a natural science. This would ensure an intake of persons with adequate scientific understanding, with some mathematics and computing background, with a proper appreciation of scientific objectivity and the experimental method, thus ensuring the faculty would learn some of this from their students.

It must be emphasized that there is no point in now spending large sums in "social science research" however desperate the problem. It is not merely that this money would be wasted; much worse is that the solutions advocated would almost certainly be so wrong as to lead to a worsening of the situation.

It is therefore proposed that policy be established making the National Research Council responsible for administering grants in the area of the "Social Sciences". One half of the monies at present scattered by the Canada Council should be channelled to the N.R.C. for this purpose. This policy might also encourage those social scientists who do attempt to apply the techniques of natural science - they would know that their applications for grants received competent consideration.

J. B. Warren
February 10, 1969

APPENDIX 30

BRIEF SUBMITTED TO

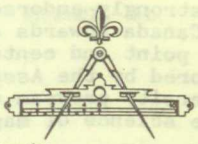
THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

ASSOCIATION OF CANADIAN MAP LIBRARIES

Association of Canadian Map Libraries



Association des cartothèques canadiennes

Founded at Ottawa, June, 1967.

- an independent and unique Canadian association with national membership, representative of a diversity of disciplines, correlating all available knowledge relating to the custody and use of maps and related cartographical material in Canada, domestic and foreign, current and historical.

- including virtually all active map repositories in Canada (40 as of December 31st, 1968), and some 50 individual members.

Objectives:

To promote national interest in the custodianship of maps, atlases and related cartographical materials, archival and current.

To provide guidelines for the organization of cartographical records now in custody.

To provide criteria for the development of reference and research services in support of the several physical and social sciences demanding cartographical data.

To focus national attention on a hitherto obscure branch of archival and library science.

Current programs:

The Association is at present sponsoring a National Union List of Maps held in Canadian repositories. Exchange and redistribution programs are in operation amongst many of the participating libraries. Committees have been established to correlate all available knowledge in the various subject areas relating to the acquisition, preservation, and the use of maps. Studies are being made on the feasibility of adopting uniform classification schedules across Canada. A Directory of Canadian Map Collections will be published this Spring.

The Association strongly endorses the present development in the Public Archives of Canada towards a central map library which will provide a focal point and central management control for certain projects sponsored by the Association. The Association will also endorse any university program directed towards the inclusion of courses in the science of map librarianship in their curriculum.

It is expected that the Association's potential in respect to the advancement of map reference and research will express itself in service to many significant sectors of Canadian society inclusive of governments of all levels, universities, and industry.

Karen Edwards,
President
Association of Canadian
Map Libraries.

APPENDIX 31

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

DR. D. A. E. SHEPHARD, BEDFORD, N.S.

21719—26

CANADA'S ROLE IN CHEMICAL AND BIOLOGICAL WARFARE RESEARCH

Canada's recent co-sponsorship of a resolution tabled at the United Nations Assembly calling upon U Thant to prepare a report on the dangers of chemical and biological weapons, is a notable step toward disarmament. The possibility of the use of chemical and biological weapons constitutes a serious threat to mankind, and the peoples of the world should be aware of the dangers of such use.

Yet Canada has placed herself in a false position in the eyes of the world. Through secret research into chemical and biological warfare (CBW) in cooperation with the USA, Great Britain and Australia, Canada has helped to create the very dangers which, at the United Nations, she claims are so great.

In the face of such apparent inconsistency in Canadian policy - an inconsistency of the kind which is noticeable in some other aspects of Canadian policy, especially vis-a-vis internationalism and continentalism - it is appropriate to examine Canada's role in the world today. The problem of CBW research would seem to be peculiarly suited to analysis in this respect, illustrating as it does a number of areas which, at present, detract from Canada's standing in the world, but which, through changes in policy, might place this country in a very favourable light. Furthermore, at a time when the Canadian Government has expressed the desire to review many aspects of policy, an examination of such a sensitive area as CBW research is imperative.

Present Canadian Policy

1. Under an agreement between the United Kingdom, USA, and Australia, Canada collaborates in the Technical Cooperation Program (TTCP), which has been described as "our most important international program" by the chairman of the Defence Research Board (DRB)[1] Research into the defensive aspects of biological, chemical and nuclear warfare is conducted in such a way as to improve the "combined efficiency of these four countries and (minimize) duplication of effort" [2] It is evidently "an area with many security restrictions",[3] and its importance is evident from the fact that, according to the 1966 DRB Annual Report, the expenditure for the two main establishments associated with TTCP accounted for about 16% of the total DRB budget of over $44 million.[4]

According to available information, the work is purely defensive, While this may be considered at first sight to be acceptable, and accpeting the argument that at least some defensive measures can be taken against CBW (although the efficacy is open to question), it must be recognized that there is an extremely tenuous line existing between what is "defensive" and what is "offensive". The secret work carried out under TTCP is, in this context, of considerable concern for the following reasons:

a) One aspect of the activity of TTCP has been described as "a program of testing some type of agent... which has arisen as a result of UK or US development work. We provide some of the machinery whereby this agent may be evaluated."[5] Canada, in fact, to the chagrin of Albertan farmers, provides an "open air laboratory",[5] taken out of over 1000 acres of prime farmland, and it is not surprising that both the British and the Americans"rely on Canada to provide....scientific and technical know-how to help them do the sampling and measuring"[5] of bacterial materials.

b) The extent to which the research program is defensive is

questionable. Particularly significant is the statement from Porton in England (the Microbiological Research Establishment at which a worker recently died from plague) in relation to the British program, from which Canada "benefits", that " we are interested in both aspects, offensive and defensive."[6] The line between "defensive" and "offensive" already tenuous, becomes even less well-defined. And further, when the use of defoliants and tear-gases in the Vietnam war is openly admitted by the USA[7] which is allowed to use Canadian Research facilities, the line vanishes and Canada becomes party to the suffering in that strife-torn country. Canada's dependent position is mainly the result of her present role in CBW research.

2. The value of a defensive research program of this kind is itself open to doubt. Defensive measures are needed against chemical and biological agents which are colourless, odourless, tasteless and impalpable. Effective protection of the Armed Forces, with which the Defence Research Board program is mainly concerned, would be a herculean task; protection for the more vulnerable civilian population would be a problem of the magnitude only appreciated by the Sœrer's Apprentice. For practical purposes there is no real defence against CBW, and it is important that the public realize this. The taxpayer may well reach the conclusion that defensive research of such magnitude and cost is hard to justify unless there is a change in overall planning.

3. CBW research is essentially secret and it has been stated on the best authority that "Secrecy is clearly essential to preparations for chemical and biological warfare".[8] It is not surprising that in the USA., "the chemical and biological weapons program is one of the most secret of all US military efforts".[9] Canadian policy leads directly to the creation of international tension, and as responsible scientists have warned "Secrecy on the part of possible enemies is . . .. productive of anxiety, suspicion and hostility, and may precipitate hostile reactions."[8] Secrecy breeds the germs of war; the secret deterrent does not deter but rather aggravates: "the best defence is knowledge".[9]

4. Canada's part in CBW research places her, in the eyes of the world "in particular, in a position which is closely aligned to that of the USA., Canada's involvement in this field, which itself is so erosive of ethical principles, prevents her from assuming a role which in the long term is of far greater import. It is a role which Canada could and should play if Canada is to make an effective international contribution in the next decade or quarter-century. Two aspects are particularly important: her relationship to underdeveloped countries in their vital needs for assistance in growth, and her stature as an impartial but sincere Peacekeeper wherever and whenever her services are required. Both of these roles are poorly played under present conditions. Quoting again the Pugwash group of scientists, "We believe that nations which build their national security on secrecy of scientific development sacrifice the interests of peace and of the progress of science, for temporary advantages....."[10]

A Possible Role for Canada

Such considerations speak very strongly in favour of a change in Canada's policy vis-a-vis CBW research. What then should Canadian policy be?

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It is here that Canada could achieve greatness through a reversal of her present policy. It would require of Canada a measure of independence, because a much greater international perspective would be demanded. Akey to the role Canada should play is a quotation from the Vienna Declaration issued by the Third Pugwash Conference in 1958:

> "As scientists, we are deeply aware of the great change in the condition of mankind which has been brought about by the modern development and application of science. Given peace, mankind stands at the beginning of a great scientific age. Science can provide mankind with an ever increasing understanding of the forces of nature and the means of harnessing them. This will bring about a great increase in the well-being, health and prosperity of all men".[10]

Peace is the ideal. It is worth working for,. Canada can help.

1. The dangers of CBW must be emphasized by Canada. In this respect Canada's co-sponsorship of the resolution is a commendable step. Canada should, furthermore, press for some kind of United Nations Commission or Committee on Chemical and Biological Warfare, similar in type to the UN Scientific Committee on the Biological Effects of Radiation. Such a body would collate knowledge of CBW and would be the catalyst required to bring knowledge into the open.

2. Canada should consider encouraging the work of the Pugwash Conference on Science and World Affairs. It is significant that a study group, following the 13th Conference,recognized the potential importance of BW; the group realized that it was still a relatively "insensitive" activity although closely connected with public health problems, and decided to test the feasibility of a voluntary system of inspection. Pilot studies were done, cooperation was remarkably good, and ideas for future control were collected. More recently the Stockholm Peace Research Institute, with support and advice of the Pugwash group, sponsored teams of scientists from Eastern, Western and non-algined countries to carry out specific research in the field of detection and identification of biological weapons, of a kind which otherwise might be carried out mainly under military auspices. This is a promising possibility which Canada should certainly encourage.

Canada, in fact, could seek to cooperate in international research work on the control of CB, instead of conducting secret,nationalistic research work for her own dubious benefit. A potential loss of defensive capacity - already small in so large a country - would be more than offset by the gain in goodwill.

3. Canada might go further and offer its biological laboratories to a truly international and apolitical organization such as the World Health Organization. This has been proposed for the USA by Herriott, who felt that "this action would be a giving up of very little by any nation and would be a demonstration of good faith. It would reduce tensions somewhat and would permit Russia and the USA to work out administrative arrangements for inspectionetc., on this model."[11] Such laboratories could become models of cooperative efforts, and eventually the need for secrecy and classified research might disappear. Ideally, the aim would be "to dispel the miasma of secrecy that fosters international suspicion and tension, and in its place to extend the benevolent application of microbiological and chemical knowledge for the benefit of all men.[8]

4. Canadian policy, if truly international, would have no need to participate in programs such as TTCP. If a review of such organizations as NATO is in order, and even advocacy of withdrawal from NATO, so then should the DRB program be reviewed.

5. Canada should seriously question her priorities both at home and abroad. Important issues, of which CBW research is an example should be openly discussed in the public forum, The British policy of "opening" the Microbiological Research Establishment - almost essential following the case of plague - is one step in this direction, which Canada should follow. Parliamentary responsibility is considerable, but essentially it is the Canadian public which must learn to use democratic processes to their advantage. In a democracy the public is entitled to know the facts; for the protection of democracy the public must know the facts. And so, the basic policy of Canada must in the end come from the informed citizen. Only then will Canadians, and all people understand with Einstein that "Science has brought forth this danger, but the real problem is in the minds and hearts of men".

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D.A.E.Shephard, M.D.,
25 Shore Drive
Bedford,
Nova Scotia

APPENDIX 32

MEMORANDUM SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

CANADIAN ADVERTISING RESEARCH FOUNDATION

The following memorandum deals with a brief historical review of the Canadian Advertising Research Foundation. This is followed by a perspective touching on your area of interest as it pertains to Marketing and Advertising.

1. The Canadian Advertising Research Foundation

CARF was established as a non-profit organization in 1949, operating under a Dominion Charter. Then, as now, it was jointly sponsored by The Association of Canadian Advertisers and the counterpart representing the Advertising Agency field,The Institute of Canadian Advertising.

The Foundation's activities centre on a 12 man Board of Directors, elected to represent equally the two parent bodies. In addition, ad hoc committees are drawn from among marketing research practitioners, under the jurisdiction of the Foundation's Technical Chairman. These Technical Committees serve for the life of a research study whenever a request is received, and approved by the Board.

Fees received for such work are minimal, the proceeds of which are used to pay for necessary administrative functions provided by A.C.A., and to maintain a membership in the much larger American counterpart, The Advertising Research Foundation.

Neither the CARF Board, nor Technical Committee members, receive remuneration for their services. More importantly from the viewpoint of capacity, all work on an extra-curricular basis.

The terms of reference in the originating charter established the Foundation's purpose as, 'To promote greater effectiveness in advertising and marketing through completely impartial and objective research'.

While this statement has a very broad implication, the actual nature of service rendered has until recently been of a much narrower framework. Over the past 20 years, the Foundation has been involved in well over 100 studies. With a few notable exceptions, all of these have been concerned with the field of media research, thereby designed to measure in either quantitative or qualitative terms, the audience to those Canadian media employed for advertising purposes.

Specifically stated, the role of the Foundation has been to review research objectives and methodology, together with the execution thereof, for the purpose of determining whether or not the resulting information is reliable and objective. The net result is,therefore, a combined audit of procedures together with a validation of analyses and interpretation as determined by the research company involved on behalf of the study sponsor.

2. Current Thinking Toward the Future

While the previous section accurately describes the Foundation's past role and current organizational structure, there has developed a considerable amount of investigation and thought as to future direction.

Even within the confines of media research, it is well-recognized that much of the study currently conducted, while relevant, deals on the periphery of any true measure of media effectiveness. This is not to suggest that current media research is necessarily technically inadequate. It does reflect recognition of the fact that estimates of media audience, whether quantitiative or qualitative, deal with the capacity to be effective, not with the determination of effectiveness per se. This is a fine but important distinction.

In a broader persepctive, there is also a clear understanding that media research, relevant as it is, can by no means be considered the total horizon if further progress is to be made toward better understanding and thereby improving our knowledge of advertising.

Not only must advertising be viewed from the message as well as media vehicular side, but in turn it must be related to the general field of marketing, of which advertising is one of several functional elements.

Certainly there is no lack of theory related to the field of advertising as a totality, although a great many of the theoretical constructs are in need of investigation and validation.

It is also true and perhaps understandable to note that the Canadian Advertising industry is very dependent on sources outside this country, particularly the United States, for both the evolution of theory and for technological research and development.

Whether or not this dependence is more than it should be, or can be, is difficult to judge. It is interesting to note in the Fifth Annual Review by the Economic Council of Canada that the same question was brought forth in a much broader vein as concerned with Research & Development activity in this country.

Whatever may be the source and means at our disposal, at least three things would seem self-evident if further progress is to be made in the field of advertising research.

1) At the theoretical level, the various concepts must not only be expanded and examined further for validity as individual entities, but they must be brought together into a more cohesive framework than currently exists. Advertising theory has a tendency to be rather compartmentalized, perhaps an indication of the stage of our present development.

2) There is a definite need for more research and development at the technological level. This does not mean that we should be

oblivious to what is done in other countries, some with much greater means at their disposal. Rather it suggests that what may be learned elsewhere must be tested and put into practice here.

3) In light of the existing or likely expanded capacity to deal with advertising theory and research technology, we believe that strategic direction is critical if what we are able to accomplish is to have utility, and minimize redundancy.

This in turn suggests particular attention to be paid to maintaining efficient communication channels, not only within industry, but between the advertising sector of industry and Government as well.

As with the Science Council of Canada's report issued last Fall, this Foundation does not have too many answers to the very basic question of administration and communication channels that are prerequisites of furthering direction and implementation. Nor do we know exactly what role CARF can or should play in conjunction with other industry or Government bodies.

At this point in time, our chief concern is with developing a definition of that role, with establishing as many communication channels as appear pertinent, and with examining capacity needs.

J.M.Philp,
Chairman
Canadian Advertising Research Foundation

APPENDIX 33

SUBMISSION TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

EXPORT CREDITS INSURANCE CORPORATION

The Export Credits Insurance Corporation (ECIC) does not consider itself as engaged in scientific activity. To a small extent, ECIC is involved in research. The Economics Department of ECIC evaluates the creditworthiness of overseas countries with the help of the usual sources of economic information and tools of economic analysis. This evaluation is summarized in reports which are sent to various government departments interested in export financing. In the future, the Economics Department plans also to work in close collaboration with the Department of Trade and Commerce to ascertain the impact of ECIC's operations on the pattern of Canadian exports. The Department has a staff of four economists and an increase is likely in the future. However, in view of the small size and the limited amount of original research undertaken by the Economics Department, the following comments refer only to the items mentioned in paragraph 2.10 regarding organizations not currently engaged in scientific activity.

ECIC provides insurance against non-payment for exports sold on short and medium-term credit and also provides financing for exports of capital goods sold on long-term credit. The details of ECIC's operations are summarized in its Annual Report, a copy of the latest which is for 1967 is enclosed.

The direct impact of changes in technology on ECIC has not been great. The relentless march of progress continues, of course, to produce more ingenious typewriters, calculators and copying machines, of which ECIC has its share. Probably the only development which might excite the Committee's interest is the fact that ECIC has made use of a computer since 1961.

The first-generation computer used until 1963 was a Burroughs product. Since 1963, a second-generation computer from IBM has been rented on a monthly basis. By the end of 1969, an IBM third-generation computer is expected to be in service.

The computer processes ECIC's insurance statistics. It offers a much greater range of data assembly and analysis than do other methods of calculation. ECIC is aware that it has far from fully tapped the potential of even the second-generation computer and that the third-generation of the species opens still wider horizons. ECIC is therefore working with programming companies to enlarge the computer's contribution to the Corporation.

The indirect effect on ECIC of technological changes in Canadian industry is more difficult to estimate. The proportion of manufactured goods in Canadian exports is clearly related to the rate of scientific and technological progress in Canada. Exports of goods that have a high technological content have increased considerably since the beginning of this decade and are likely to increase further in the future. ECIC's operations will be affected by this increase in technological exports and its operations will be enlarged to cope with the new situation. As was indicated in the speech from the Throne, a bill providing for the expansion of both export credits insurance and export financing facilities is expected to be introduced in Parliament this Session.

F. P. Jeanjean,
Economist.

APPENDIX 34

SUBMISSION TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

INTERNATIONAL SYNETICS FOUNDATION

International

Synetics

Foundation

Box 200
New Westminster,
British Columbia, Canada

Cerebrarium
Top of Grouse Mountain
North Vancouver, B.C.

Please reply to:

Ste 30
3491 Atwater Avenue
Montreal, Quebec.

Secretary,
Special Senate Committee on Science Policy,
Senate Chambers,
Ottawa, Ontario.

Dear Sir:

Although you may consider it unorthodox we have sent you under separate cover copies of the September 1968 issue of MACLEANS magazine and CANADIAN BUSINESS for March 1969 as our brief on "Science Policy".

These magazines contain articles on the special non-academic type of "Think Tank" that we suggest should be seriously considered as a part of any national science policy for the future. To restrict all "research" to the academic scene or conventional type of thinking, we feel is dangerous, will further inhibit true creativity and will not be accepted by the growing number of young people in our country.

It is our contention that logical thought as practised by the so-called "research depts" in many of our country's universities only extends, improves or modifies what is already known. We feel that in the type of lateral thinking as used by us the chances of creating the truly new greatly outweigh the methods now generally in practise in most academic communities.

We would request that these articles be circulated and read by the members of your committee so that this type of thinking may also be considered during your deliberations.

The writer would be willing to come to Ottawa at your convenience to discuss this further with your committee should this be considered worthwhile.

Sincerely,

INTERNATIONAL SYNETICS FOUNDATION

(Signed) Frank Ogden.

EXTRACT I

(EXTRACT FROM MACLEANS MAGAZINE OF SEPTEMBER,1968)

Consider the problem: Lake Erie is polluted almost beyond redemption. Scientists engineers, conservationists, ecologists - the experts who rule our lives by right of their specialized knowledge - say we should spend billions to clean it up, which is not much help, since we can't or won't afford it. And so, one balmy Wednesday evening in Vancouver a few months ago, a dozen men who pride themselves on not being experts sat down in somebody's living room and decided that the solution to Lake Erie's problems is to pull the plug and drain all that dirty water away.

If this solution strikes you as extravagantly improbable, then maybe you're not plugged into the fact that a funny thing has happened to Canada on the way to its second century: and that the men who want to pull the plug on one of the Great Lakes are neither dreamers nor put-on artists, but quite possibly the forerunners of a new race of anti-experts who are about to take over the world.

The man who got the notion first happens to be a high-school teacher named Wayne MacCulloch. And the main in charge of that Wednesday-night meeting was Frank Ogden, a man who makes his living as an LSD therapist, and who is the founder and chief guru of Canada's generalist think-tank. A generalist is somebody who is capable of thinking in a way that is both very new and very old; by using his imagination to leap across the barriers that specialized knowledge imposes. By definition, he avoids the obvious : he is, therefore, unafraid of proposing the outlandish.

And it's precisely because Ogden and his fellow thinkers, who have incorporated themselves as the International Synetics Foundation, are not afraid to dream and fail and perhaps look deceptively foolish that they're somehow a perfect symbol of what's happening in Canada. The same spirit made Expo a mind-blowing experience, when everybody sort of expected we'd build a glorified country fair. It's what elected Pierre Trudeau, a man we knew

nothing about, except that somehow we all wanted to touch him. There were any number of Blue Meanies (Winters,Stanfield,et al) we could have chosen. But we listened to our blood instead of our bellies. And at that instant the control of this overcautious country began to pass from the people who ask "Why?" to those who say "Why not?".

Why Not? That should be the slogan of the psychoelectronic revolution that is happening in Canada, and it might as well be the corporate motto of the International Synetics Foundation. At the moment, the foundation is a legal entity with no corporate assets except the men who meet weekly to solve problems that have beaten the experts. Once they think up an idea, no matter how bizarre, they turn it over to a peripheral group of experts, who try to assess its feasibility. If the idea looks sound, they present it to whoever might be able to use it. And they hope to be paid for their contribution. The foundation has even incorporated a subsidiary company, the International Synetics Development Corporation, which has the right of first refusal on any ideas that look as though they might be profitable. The group's "inner core" are from a variety of fields. Some of them are already looking to the day when they'll be able to quit their jobs and make a good living solving problems they know nothing about.

Ogden's imaginative amateurs include a businessman, a microbiologist employed by a brewery, two commercial artists, a sculptor, a free-lance photographer, a high-school teacher, a botany professor from Simon Fraser University and a broadcaster. This is the core group that meets each week in a variety of locations. They've met a mile underground, at the bottom of a working mineshaft; and in the gondola of a barrage balloom, which one of the group's associates - in a typically Synetic solution - uses to haul logs from inaccessible areas; in a yacht cruising in Georgia Strait; and in a cabin on Grouse Mountain (they call it the Cerebrarium) that Grouse Mountain Resorts Ltd. has donated.

Besides the core group, and the peripheral team of experts, the foundation has set up an "outer galaxy" of big-bore thinkers who have agreed to keep in touch. These include Patrick Watson, Dr. Albert Schatz, the co-discovered of strptomycin, and Buckminster Fuller, inventor of the geodesic dome and the grandaddy of all futurists everywhere. Ogden talks long-distance to Fuller as often as several times a week.

The product of all this cerebration has been a collection of ideas that range from preposterous to brilliant. Among the groovier notions; to cool down tensions in Asia, why not sell Australia to the Chinese, and move the Australians to Canada? The suggested price would be $250 billion, to be paid over a 30-year period. This would cost the Chinese $10 per capita per year, and make it possible to pay each Australian man, woman and child a flat $25,000 compensation fee. As an afterthought, the Synetics group also propose moving Australia's 170 million sheep to Canada, too. "Okay," says one Synetician, "so it's a bit of a put-on. But remember Seward's Folly?" He was referring to Andrew Johnson's Secretary of State, who bought Alaska from the Russians in 1867. At the time, a lot of people thought that was a put-on,too.

Sure, it's a nutty idea. I, for one, would sooner risk a nuclear confrontation with China than be engulfed in my own country by 11.6 million back-slapping, beer-swilling Australians.

But the fact that no sane diplomat would suggest such a thing is exactly why the Synetic method could be valuable. Since they're not experts, the Syneticians are free to dream up anything that teases their fancy. The first 100 ideas so produced might be worthless, but there's always a chance that the 101st could be a brilliant solution that has evaded the experts for years.

That, at any rate, is the theory. And the foundation's track record, after less than a year, is impressive enough to suggest that the

theory is working. One Synetic idea - they won't say what it is - was sufficiently feasible that John Hoegg, president of Grouse Mountain Resorts, Ltd, will propose it in the fall to his board of directors. Another suggestion has interested Arthur Block, western Canada's biggest real-estate developer, to the extent that he's willing to invest up to $10,000 in a feasibility study. James Lovick Ltd. an advertising agency, has paid them to suggest new sources of revenue. And at least two departments of the provincial government are studying Synetic ideas with much more than routine interest.

One idea is actually close to happening, a new -esign for an aquarium that features a plastic tube that the people walk through. This way, you're not on the outside looking in, the fish and their environment are all around you. It was Chuck Diven, a free-lance photographer, who campe up with the concept at one of the Wednesday meetings. What happened from there indicates that Synetics is much more than a put-on.

They decided that, since Vancouver already has one of the world's best aquariums, Victoria would be a logical place to build it. So they approached Victoria's Mayor Hugh Stephen. He steered them to Bert Enman, who is associated with Victoria's Tussaud Wax Museum. Enman was excited by the commercial possibilities, and put up $500 for an engineering feasibility study.

One of the group's members, engineer Bob Devault, was assigned to the job. Working with designer Lutz Haufschild, he came up with a bow-shaped aquarium 70 feet deep, shaped like an opening flower. The tube running through the middle surves right around the inside of the bowl, and it's shaped like a chain of bubles. In mid-July they presented the whole package to Enman - a workable design and a cost estimate of from $150,000 to $200,000. Enman bought the deal, and signed a contract with the foundation's subsidiary company, the International Synetics Development Corporation Limited, that will give the group's members a percentage of the gross when and if the aquarium is built. Enman says

he can finance it already, and is prepared to go ahead if market studies confirm that the aquarium could make money. He's already scouting locations in Victoria and San Francisco. And so it is now close to a probability that one of the world's most remarkable aquariums will be built within a year - as a result of an idea generated by a group of imaginative people who don't know anything about aquariums.

The Syneticians don't know anything about fighting forest fires either. But they've conceived several ideas for attacking the problem that are already being considered by the provincial Department of Lands and Forests. Among them:

> Infrared sensors - instruments that can detect and distinguish between heat cources, from a burning bough to a lighted cigarette - strung from a network of barrage balloons;
>
> A network of radio receivers that would monitor thunderstorms in remote areas and with triangulation by computer, instantly feed the location of lightning strikes to spotter airplanes. "The problem now," says Ogden,"is that most of British Columbia's big forest fires are caused by lightning. And a lot of the time there's no way of detecting the blaze before it has become a full-scale conflagration".

Although the group has little direct experience of hospitals, one of their ideas is under serious consideration by the BC Department of Health. The concept: a privately financed apartment-hotel, probably erected near a hospital, equipped with a small medical staff and diagnostic facilities. It would be a "halfway house" for the sort of patient who needs non-intesive hospital care - the man with a broken leg who needs three weeks in traction, for instance, or the patient with a tricky health problem who's been hospitalized for a month of observation, or the woman who needs two weeks in hospital to recover from an operation. The idea of convalescent hospitals is not new; but the idea of having one built by a private developer is unique, and uniquely attractive; preliminary cost estimates indicate that, with each patient-tenant in the 144-bed building paying less than $200 per month rent, the costs to the BC Hospital Insurance Service would be one fifth of the

present hospital rate. Health Minister Ralph Loffmark is already considering whether or not such a project would be eligible for BCHIS coverage; and Arthur Block, the developer whom the Synetics group approached with the idea, says he's ready to gamble $10,000 on a feasibility study if BCHIS decides to support the scheme.

Ogden says he decided to form his own free-lance think-tank last year, during the solitary hours he spent on a 24,000 mile helicopter journey he took around Canada as a personal Centennial project. He says the trip "started me thinking about the fantastic potential in Canada, and how we waste so much through a failure of imagination." He coined the word synetics (a variant of the Greek word for the study of creative processes) and says he didn't discover until months later that a similar organization - the Synectics Group - has been operating in Cambridge, Massachusetts, for several years.

Ogden is entitled to his advanced views on the subject of imaginative processes. For the past six years he has been a therapist at New Westminster's Hollywood Hospital, a private institution that has acquired a continent-wide reputation for using LSD to treat alcoholics and the mentally disturbed. Ogden - working behind closed doors and a sign that says: "Positively No Admission. Do Not Knock. Do Not Enter" - is a "trips guide" who helps prepare patients for their hallucinatory journeys, stays with them during their trips and helps bring them down afterward. "What I've seen behind that door," he says, "helped convince me that the imagination is a fantastically powerful force, if we can only free it from the structures that limit human potential."

"Maybe you don't need a bridge"

Ogden talks like this all the time. He is a rumpled, owlish man of 48 who possesses no formal academic qualifications, but has an obsessive fascination with the future. He dropped out of the veterans' class of the University of Manitoba after one year, and has been a pilot, a highly successful insurance salesman, and proprietor of a swimming pool company that went

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broke . He became interested in LSD after reading Sidney Katz's accounts in Maclean's of early experiments in Saskatchewan and at Hollywood Hospital, and persuaded Hollywood's director Dr.Ross McLean, to put him on the staff. He spent two years gradually acquiring the insight and expertise that today permits him to hold a job that ordinarily would require a trained psychologist. The experience has given him an irreverence for experts of all kinds - men whose training is of such narrow scope that they're unable, or unwilling to see the larger aspects of a problem.

"Engineers know how to build bridges," Ogden explains. "But that doesn't mean an engineer is necessarily the best man to consult when your problem is getting traffic from one side of Burrard Inlet to the other. The engineer will tell you to build another bridge, and he'll tell you how. But maybe you don't really need a bridge. Maybe the best solution is to figure out a way of inducing people to leave their cars at home. An engineer isn't likely to take that approach. But a generalist is. And that's all synetics means: bringing together a bunch of imaginative amateurs who can take an overall view of any problem."

The technique is hardly new. The great American think-tanks, such as the Rand Corporation and Herman Kahn's Hudson Institute, pioneered the use of "war games", in which teams of experts in diverse fields dream up imaginery crises and decide what to do about them. In the 1920s, adman Bruce Barton invented "brain-storming" as a technique for generating creative ideas. (The crucial element in Barton's method is that, during a brainstorming session, no one is allowed to say, "But that won't work.") And in San Francisco, there is a joyouse manifestation of the synetic principle embodied in a firm called Generalists Inc., which has invented among other things, Ramparts magazine, the Scientific American paper airplane contest, and the Beethoven Sweatshirt.

The company's resident geniuses are an advertising man named Howard Luck Gossage and Dr. G.M.Feigen, a San Francisco surgeon who doubles as a TV

personality and spends two or three days a week with the firm.

Escalator to fame

It was Gossage and Feigen who advised Ramparts magazine, a failing journal for liberal Roman Catholics, to become a radical tract that utilizes all the techniques of slick journalism. Ardent conservationists, they designed a series of newspaper ads that mobilized public opinion to block construction of a dam that would have flooded much of the Grand Canyon. And it was Gossage and Feigen who were chiefly responsible for the popularization of Marshall McLuhan.

After reading his books, they flew from San Francisco to Toronto in 1965 for the sole purpose of having lunch with him. Then they took him to New York and set up a series of strategic lunches in such places as the Time Inc. boardroom. Within a matter of months, McLuhan's underground reputation escalated into international celebrity. "We spent a lot of our own money promoting McLuhan," says Dr. Feigen,"but we figured it was worthwhile. The man deserved to be widely known. We beat the normal time for recognizing genius by about five years.

"The generalist point of view," he says,"is that the problem as it appears is probably not the real problem. For instance, say a businessman comes to us for advice on locating a new building. But that isn't his problem. The real problem is that this guy has domestic troubles. His desire to expand, to put up another building, is just an expression of his dissatisfaction with life. We,ve had cases very similar to that. Instead of telling the guy to put up his building, we've advised him to see a marriage counselor, or get a divorce, or maybe just go to Spain for a year. We take an extra-environmental look at the problem, try to see the total picture." Gossage and Feigen may spend anywhere from a few minutes to a few months on a client's problems; in either case, the normal fee is $5,000.

The methods and personnel of these think-tanks vary widely. The problems they try to solve range all the way from war, peace and doomsday machines to building a better can-opener. But all of them are committed to

solving problems by approaching them in new ways. And the means by which these new routes are found is currently the subject of considerable academic interest.

In England, Cambridge University's Dr. Edward de Bono articulated the process in a book, published last autum,n. called Lateral Thinking. The brain, he explains, is a very conservative instrument: "Life would be impossible if the brain did not always assume that things were what they seemed to be and what they had been before." But this biological conservatiem, which creates the patterns that allow us to organize our lives, is the enemy of creative thinking.

Conventional thought - the kind that imprisons experts of all kinds - is called "vertical thinking" by Dr. de Bono. In seeking solutions it simply reinforces previously recognized patterns, which usually gets you nowhere. It is, says Dr. de Bono, like a man who wants to dig a hole in a different place, but instead just digs the same hole deeper.

Creative thinking - "Interal thinking" is Dr. de Bono's term - consists of deliberately escaping these repetitive patterns, of deliberately rejecting the obvious ways of looking at any problem.

He summarizes the differences between vertical and lateral thinking in four ways:

(a) Vertical thinking is logical,proceeding neatly from one point to the next. Lateral thinking isn't: "You can jump and then fill in the gap. You may also saturate the field with ideas and then wait for some pattern to emerge."

(b) Vertical thinking uses negatives to block off certain pathways. But in lateral thinking (as in Bruce Barton's brainstorming technique) negatives are forbidden.

(c) Vertical thinking always starts from the obvious, most reasonable approach. Lateral thinking tries to explore as many approaches as

possible: there'll be plenty of time later to decide which will work and which won't.

(d) Vertical thinking seeks to exclude the irrelevant. Lateral thinking welcomes the irrelevant, since it may lead to a new approach.

Einstein: old stuff - and new

Einstein, says Dr. de Bono, was a classically great lateral thinker. He performed no experiments and originated no new data. Instead, "he just looked at all the old stuff which everyone else had been conent to put together in the Newtonian way - and he put it together in a new way, the way that leads to atomic energy."

My own personal demonstration of the powers of the disciplined imagative leap came when I interviewed Frank Ogden. Instead of talking in the clinical atmosphere of Hollywood Hospital, we strolled for several blocks to a place where I used to play as a child. It was called Tipperary Park then. Almost 30 years ago, I believed that the place was inhabited by leprechauns and goblins.

A New Westminster mayor with gumption and imagination a few years ago built a Japanese garden in the park, next door to the city hall. The area where I used to hide in the long grass is even more magical now; water burbling over cool rocks, miniature trees, delightful little bridges. Ogden and I sprawled on the manicured grass to talk about Synetics. The whole scene moved me. I got up and paced around, and then stood at the edge of an ornamental brook.

Ogden is very hip to other people's moods, so he quit talking and watched me. Then, very quietly, he said, "Go ahead. Jump".

The brook was about 10 feet wide and I'd never jumped that far before. I sized it up, stepped back, took a run at it and made the leap. For a long second I thought I'd -all short. But then my instep hit heavily on the other side and I was across. I felt good.

Ogden stood up and looked at me across 10 feet of trickling water. He was smiling.

"You see?" he said.

EXTRACT II

(EXTRACT FROM CANADIAN BUSINESS OF MARCH,1969)

To claim that a problem is "insoluble" may not now carry any weight,especially if your business is on the West Coast. You will be told to write to 532 Homer Street, Vancouver, for the solution. That is the address of Canada's first synetics group. If you follow up the suggestion, you will be joining a number of businesses and government agencies that have given tough poses to the group. Almost without exception, they are impressed with the stimulating "different" answers they receive. The answers come from International Synetics Foundation, a new company in the ideas business.

What is synetics? The word is a new one, defined as "the study of creative processes, especially as applied by a group of diverse individuals, for specific problem solving." Synetics devotees are anti-specialist and anti-dogma. The theory runs a little like this: the usual approach to a problem is to call in specialists. If management decides an office expansion is needed, a group or architects is called in. Once the designers are acquainted with the problems involved, they propose new designs. Certainly, the designs may differ from each other slightly, but they are all office units. However, when the same problem is given to a synetics group (each of them a specialist in some field, but providing a solution from a group effort) it will be tackled again quite differently: "Do these people really need another office block? How else can they deal with their administration problems without building". So, instead of providing variations on the same theme, the group gives a number of solutions which attack the problem from many directions. A synetics group might give the following answers to the abofe problem:

a) Increase the staff of the branch office slightly, and have them make up their own financial statements instead of leaving this chore to

head office. (b) Lease time on a computer to take care of the more detailed accounting work. (c) Buy out, or come to some arrangement with the ABC Company. It would like to get into the market with some of your lines, and it has lots of redundant office space you could utilize.

International Synetics Foundation (the group decided to drop the "c" from their name because synectics was hard to pronounce, and also to show their total disregard for convention) has provided solutions which are claimed to have halved the cost of certain company problems. Characteristically, it is generally the more-recently established businesses that try the services of the Foundation. Government agencies and older companies tend to be sceptical of the often unusual approaches of the ISF. Frank Ogden, the dapper, 48-year-old chairman of ISF is not worried by scepticism, however, It's a simple matter of talking to the wrong man, as far as Ogden is concerned. "If after ten minutes I am unable to convince an executive of the worth of a futuristic project, I usually reach for my coat",says Ogden. "If the company is progressive, that executive will be gone five years hence; if the company is resistant to change, the company will be gone. Either way, it is a waste of my time to force unwanted ideas on the man." Ogden maintains that the ISF suggestions are never abstruse, that anyone with a little imagination could immediately see their worth.

Here's how the group is structured: The central "core" group consists of 16 members. They meet twice weekly, and it is at these meetings that problems are considered and solutions sparked. Just about all the core group are professionals; they include a sculptor, a business executive, a microbiologist, a geologist. Should the solution to any problem need the advice of an expert not included in the main group, a specialist from the peripheral group (presently numbering 30, but will be 60) is called in. The peripheral group includes a large sprinkling of PhD's, MD's, and political experts. In

addition, there is an "outer galaxy" group of very specialized people who do not reside in Vancouver, but who can be called in for letter or telephone consultation.

Amongst the "outer galaxy" people are Patrick Watson of the CBC, Dr. Huston Smith, head of the philosophy department at Massachusetts Institute of Technology, Dr. Stanley Krippner, director of the psychic research laboratory at Maimonides Medical Center in New York. Buckminster Fuller (who designed the U.S.pavilian at Expo 67) joined the ISF "outer galaxy" group early last year, and Dr. Albert Schatz, co-discoverer of streptomycin, is a more recent addition.

The grou- is incorporated as two distinct units: International Synetics Foundation, and International Synetics Development Corporation Ltd. The core group members operate within the Foundation, giving their time voluntarily. All the core group members have occupations besides contributing time to the Synetics Foundation. It is hoped that some core group people will become full-time"ideators" in the future, but so far the Foundation is not on a sound enough financial basis to permit this. The Development Corporation was created as a separate entity to handle financial details. Paul Barry, a business equipment executive, is in charge of the corporation.

The money coming into the Synetics group (in the form of retainer fees, percentages from projects created by the group and given to industrial companies for development, and research grants) is received by the Development Corporation, and is given out by it for consultant work done. For example, the group recently thought up an idea for a new kind of aquarium. This proposal was presented to business interests in the city of Victoria. They liked the proposal and gave the group a sum of money to cover the costs of further development. The Development Corporation then decided who (within

the various levels of the group) is best qualified to work on this particular project, and the money is dispensed to them.

The legal fees of incorporation were donated by a Vancouver law firm, John Taylor & Associates, In return, ISF is looking into ways to improve corporate litigation. Taylor calls the formation of International Synetics Foundation "a natural development. Studying business problems in an environment detached from business details might be the clue to providing real leadership for industry. If their ideas are provocative, that's all right. Some government agencies tend to be shaken up. The fast changes of today will not be ignored." Taylor says the Immigration Medical Services is one area with much redundancy and which might benefit from ISF services.

Last month, Frank Ogden, the ISF chairman, was out to Montreal for talks to set up an eastern branch of ISF. An offshoot of ISF is also planned for the near future. It is called TECH. The idea is for TECH to specialize in communications media, and specifically will produce educational and informative films and recordings.

Synetics groups (commonly called think tanks) may be new to Canada, but the United States has seen many appear in the past few years, some with specific objectives, some with the more general outlook of Vancouver's ISF. At least three of the American groups are multi-million dollar operations: The Hudson Institute of New York, the RAND Corporation and San Francisco's Center for Advanced Study in the Behavioral Sciences. RAND's major contract is master planning for the U.S. Air Force, and much of the work done by The Hudson Institute (comprised mainly of engineers) is likewise for the American military establishment. This is one area in which ISF differs: no military work undertaken, says the prospectus.

The reasoning here is tied in with the "International" on ISF's masthead. The members express their feelings about a real need for some international co-operation without dealing through a restrictive government. "Who

says it's not possible for a group of intellectuals to get together and rationalize their countries' differences?" asks the group. At the moment, the group is considering contact with a synetics group in the USSR.

One of the many interesting aspects of the meeting of the core group of ISF thinkers is the location. Creativity of thought requires a creative setting says Ogden, so one week might find them deliberating on board a large launch cruising off the B.C.coast and a few days later in an artist's workshop. Apart from the New Westminster office of Ogden, the group owns a cabin at the top of Grouse Mountain - just outside Vancouver city limits and one of the most picturesque spots in B.C. The cabin is used for all-day brainstorming sessions.

But ISF might be dismissed as just another discussion group, such as might be put together by any large company from its professional staff. How can industrial concerns gain from the services of ISF? There are two important answers here. It is not "just another discussion group" because it has no built-in prejudice such as a company's own staff might have. Secondly, any and all suggestions are listened to, no matter how "far out" they may seem.

Having no vested interest makes the group particularly attractive as a research tool for different levels of government. Pressure groups tend to get through to politicians eventually, but the Synetics Foundation runs into almost no delays, using their "look,what a good idea we have for you" approach. In March, 1964, the group came up with a proposal to use remote Wigwam Inn (a deserted settlement accessible only by boat, 25 miles from Vancouver) as a rehabilitation centre for the large numbers of young marijuana offenders with whom the city has had to cope. The group pointed out the penitentiary was turning them into criminals - they were learning from the older inmates. By keeping them separate, spending a large proportion of the time outdoors, and getting them to attend interesting classes, there was a far better chance the

offenders would not become recidivists when released. The council voted unanimously in favor of the proposal - the first unanimous assent it had given any project in 1968.

As a result, Alderwoman Marian Linnell is encouraging Vancouver City Council to retain ISF on a permanent basis. Says Mrs. Linnell, "I believe the consultants we currently use are tied down with restrictive guidelines. The council is widely criticized for a failure to correct the problems that face us, and to be creative in our approach. I believe that we need the approach of a think tank."

Two projects ISF is currently working on are for the provincial government. One is to study leisure, recreation and culture. The other, which illustrates the broad scope of the group, is to find solutions to forest fires.

One of the first private firms to use the services of ISF was a Vancouver advertising agency. At the present time, Ogden is working on a project for a large construction development company. By bringing this company and the provincial government together into an ISF scheme for chronic care centres, it is hoped that overall hospital efficiency can be improved, B.C.hospital insurance costs can be halved and the development company make a profit. Two out of the three directors of the B.C.H.I.S. have given their assent to the suggestion, and the development company has given Ogden "firm assurance" of $1.5 million initial backing.

Because the group is so new, there has not yet been any definite fee structure set up. However, the most frequent arrangement is like this: A company presenting a problem to ISF must pay a standard "examination fee" of $100. The group may come up with five or ten solutions to a problem - they have yet to be stumped for an answer, they claim - depending on the problem

and what the company asks for (the more restrictions placed on the group, the fewer solutions). Ideas from the group are then submitted, together with a costing-out for each suggestion employed. Often, the costing takes the form of a percentage of any earnings resulting from following the ISF procedure. As Ogden says, "It's hard for a company to lose. If they increase their profits from using the think tank, they pay. If they don't, all that is lost is $100 - and where can a company get such a group of experts to give opinions for that price?.

In the near future, the group may be able to give a probability percentage to prospective clients when they are approached. By taking all the relevant details on the problem, feeding them through a computer and analysing the results, it is hoped that the probability of finding a solution can be determined. The group would tackle those with a 50% or greater rating.

One testament to the group's work is the large number of plans, suggestions and ideas it has managed to generate in only a few months. Ogden's files are filled with fascinating concepts, some of which are under consideration by public or company officials, some of which are still in the planning stage. "Often we think up an answer first, then go looking for a problem to fit it," says Ogden - never afraid to show his McLuhanist attitude to projects.

Some of the ISF concepts now being considered or finalized are:

An aquarium with a difference for the city of Vancouver. Seven foot diameter plexiglass tubes wind through the waters of huge tanks, and the visitors literally walk through the water.

Reclaiming useful materials from sewage. This involves the use of micro-organisms and their fermentation cycles.

A downtown traffic solution for Vancouver includes a free, small-gauge railway circling the area, and "executive buses" with hostesses serving coffeee, reserved seats with morning paper provided.

Making the mountainous areas of B.C.useful by importing

animals which thrive in such terrain. Llama and vicuna are suggested, having valuable fleece.

A floating university for Canada. By getting the provincial and federal governments to co-operate, one of the redundant ships of the navy would be turned into a floating higher education centre, housing one thousand students. The money to effect the conversion would be diverted from provincial university expansion programs. The upkeep would be from the federal government anyway, whether the ship was part of the navy or in a new education category. Such a ship cruising around the new could strengthen Canada's "peacemaker" image, and might encourage other nations to do the same. "What better thing can you think of to do with a navy?" says Ogden.

No matter where the problem lies, whether in international politics, local government or in business, the ISF approach is the same "There must be a better way."

APPENDIX 35

THE CANADIAN MEDICAL ASSOCIATION BRIEF

TO

THE SENATE COMMITTEE ON SCIENCE POLICY

The Canadian Medical Association
150 St. George Street
Toronto 181, Ontario.

21719—28

THE CANADIAN MEDICAL ASSOCIATION'S BRIEF TO THE SENATE COMMITTEE ON SCIENCE POLICY

Mr. Chairman, Honourable Senators, Members of the Senate Committee on Science Policy:

1. INTRODUCTION:

The Canadian Medical Association is pleased to have the opportunity of presenting its views on Science Policy to the Senate Committee. We believe that a review of Canada's Science Policy is timely, and agree with the broad goals and priorities established in Report No. 4 of the Science Council of Canada entitled, "Towards a National Science Policy for Canada" of October, 1968.

2. The object of this brief is to emphasize the need for the Government of Canada to:

(1) establish immediate and long term priorities in support of research,

(2) establish a consistent long term policy for the increasing supply of research funds,

(3) improve communication facilities and services between medical and other sciences within both governmental and non-governmental agencies,

(4) involve to a greater extent the non-governmental sector in helping to form government policy and in decision making re. government programs.

3. THE CANADIAN MEDICAL ASSOCIATION:

The Canadian Medical Association is a voluntary, non-profit organization founded in 1867, which represents approximately 20,000 physician members in Canada, including all fields of medical practice, medical research, teaching and administration. In order to orient the Committee to the formation and activities of our Association, the chief objects of the C.M.A. are listed below:

4. The Association is a federation of ten autonomous provincial medical associations, and is considered the senior medical organization in Canada. Our Association is affiliated with medical societies and medico-lay organizations, having founded a number of organizations in both groups such as the Royal College of Physicians and Surgeons of Canada, College of Family Physicians of Canada, Canadian Hospital Association, Canadian Cancer Society, Canadian Heart Foundation, and many others.

5. The objects of the C.M.A. are as follows:

   (a) to promote the medical and related arts and sciences and to maintain the honour and the interests of the medical profession;

   (b) to aid in the furtherance of measures designed to improve the public health and to prevent disease and disability;

   (c) to promote the improvement of medical services, however rendered;

   (d) to publish the Canadian Medical Association Journal and such other periodic journals as may be authorized, together with such transactions, reports, books, brochures or other papers as may promote the objects of The Association;

   (e) to assist in the promotion of measures designed to improve standards of hospital and medical services;

   (f) to promote the interests of the members of The Association and to act on their behalf in the promotion thereof;

   (g) to grant sums of money out of the funds of The Association for the furtherance of these objects; and

   (h) to do such other lawful things as are incidental or conducive to the attainment of the above objects.

6. Our Association does not carry out research itself, nor give grants for research, but is concerned with research through the activities of our members. The Association

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publishes the Canadian Medical Association Journal and the Canadian Journal of Surgery, two periodicals which publish scientific information including the original work of Canadian medical scientists, a function which is important nationally as well as internationally. We have standing and special committees of The Association which are concerned with the improvement of medical practice and public health in Canada. Studies by these committees frequently result in policy recommendations of our Association to Federal or Provincial Governments for the improvement of public health or medical care.

7. MEDICAL RESEARCH IN CANADA:

Canada has no long term policy or priorities for the support of research, and this is perhaps why the Senate Committee has been established. We would hope the studies of the Senate Committee would establish national goals and objectives as well as the mechanics for attaining them.

8. In medical science we are interested not only in basic research, but in clinical research and operational research which utilize the scientific method in assessing the relationship of human patients to the forces which beset them in health and disease. The relation of research to medical education has been given increasing attention during the last decade. It is now common parlance to refer to medical educations as "teacher-scientists". There has also been more interest in the social sciences in recent years, as well as the importance of environmental and community factors on health, and in methods of delivery of medical care.

9. Over the past thirty years, Canada's scientific health manpower has grown piecemeal largely as a result of the various health programs or research grants that have been introduced by the government or voluntary agencies. Sometimes research has resulted as a by-product of these programs' whereas other programs have been research oriented themselves. Examples of these are the Government's health programs which began with

the National Health Grants in 1948 and continued with the Hospital of Diagnostic Services Program in1959, Health Resources Fund in 1965-66, and more recently the Medical Care Act in 1967. The founding of the Medical Research Council in 1960 and the activities of other grant-giving bodies in Canada and the U.S.A. have been other important parallel developments which have stimulated research programs in Canada. It should also be pointed out that voluntary agencies have been providing from 20-25% of research funds in Canada, but there has been a minimum of co-ordination of effort between those working in the Government and private sectors. A lack of co-ordination and communication has also existed between health and other important disciplines in the scientific community.

10. One of the major problems that has resulted from a lack of government priorities is a shortage of medical scientists, including teacher-scientists, at a time when they are badly needed to increase the production of medical and paramedical personnel. Our Association is particularly aware of this problem with the marked shortage of research personnel and teachers in the clinical and basic sciences in medicine. This shortage has been aggravated by the introduction of voluntary and government medical services insurance programs which are accompanied by a high demand for medical services by an affluent and sophisticated public. The production of medical doctors for community services has not kept pace with the demand for medical services.

11. It is therefore time to "take stock" of Canada's science policy, establish priorities within each discipline and between various disciplines, improve communications, and establish some degree of co-ordination without discouraging free initiative and thought.

12. It is also time that decisions on science policy have a broader base than heretofor by including representatives of the profession, such as community practitioners who are applying scientific knowledge and techniques at the community level.

13. Government Organization:

As science is a multi-disciplined affair, and crosses several departments of the Federal Government, it is unlikely that any separate department or ministry is required or desirable to co-ordinate science policy at the government level. However, it is important that an agency of government with as much independence and autonomy as possible be established to be the co-ordinating force between government departments, and to assist in communications with and between the scientific community, both governmental and private.

(a) Our Association suggests that the Science Council of Canada and the Science Secretariat of the Privy Council with some strengthening from its present form would be the logical governmental body to co-ordinate and communicate the scientific activities between Federal Government departments and agencies and to provide information for non-government organizations. We believe representation on this policy making Council should be as broadly based as possible from various scientific disciplines, especially those engaged in medical research from the private sector.

(b) In the field of health and biomedicine, the Medical Research Council, the Dept. of National Health and Welfare and other government agencies engaged in medical research should be strengthened in personnel and funds and should work closely with the Science Council and Science Secretariat in providing information and co-ordination with other government agencies in related disciplines.

14. Establishing of Priorities:

It is important that representatives of all interested government and voluntary medical and health agencies meet annually to establish priorities for government spending in medical science research. These would then be brought to the attention

of the Science Council by the organizations concerned, either individually or collectively. Such priorities would need to be taken into account in respect to priorities in other fields and the budget available. The same should apply to other scientific disciplines.

The voluntary granting agencies would be aware of priorities in their field of interest and could co-ordinate their grants accordingly.

15. Co-ordination and Communications:

(a) There should be a closer co-ordination between medicine and the other scientific disciplines such as engineering, physics, chemistry and others.

Notable achievements have been made over the years, in the fields of agriculture, physics, electronics and other disciplines, and achievements in these various fields might have application in the field of medicine. Joint research projects between disciplines might also be rewarding. This means much more communication is required not only between medical science itself, but between various other disciplines, than has resulted to date.

(b) The Federal Government should, therefore, establish a communication centre for the dissemination of technical information to Federal and provincial governments, universities and voluntary agencies interested in such information and research.

(c) It should be pointed out that voluntary professional organizations such as the Canadian Medical Association have and are providing the major role in facilitating essential communications between scientists in their own field

through professional journals, conferences and other media. This role should be supported and strengthened by the Federal Government rather than impeded through increased postal rates.

16. Research Funds:

(a) There are four basic groups into which medical doctors may be classified. Each of these areas are interdependent, all are underfunded and priorities are different for each, but all should be included in the provision of research funds. These are grouped in accordance with the work that they do and include: the basic researcher, the clinical teacher-scientist, the community practitioner, and the public health-administrator-scientist.

(b) Although science policy in medicine should include all of these areas, priorities should be established for each, and funds spent according to relative priority between these groups. There is also some overlap between some of these persons, as often those conduction basic research also carry out clinical or applied research, whereas clinical teachers may be conducting some basic research as well as clinical research. A community practitioner makes use of the basic research by applying it to his practice following clinical trials, and the public health-administrator-scientist may be interested in operational research or in basic or clinical research, depending on his position.

17. Federal Research Funds:

(a) Although more research funds have become available through the Federal Government in recent years, we are still a long way to go in the provision of realistic research funds in the health field. One has only to refer to the Gundy Report of 1965 and the Canadian Medical Research Survey and

Outlook Report No. 2 of 1968 to see our shortcomings. The C.M.A. agrees with these reports and recommends that the budget of the Medical Research Council be regularly increased each year by a factor of 30-35% for the next five years, and a minimum of 25% for the following five years. If this recommendation is implemented, the budget of the Medical Research Council would go from $31,200,000 in 1969-70 to over $40,500,000 in 1970-71.

(b) It is our understanding that most of the National Health Grants programs of the Federal Government will be phased out commencing this year. Although the Public Health Research and Training Grants will be continued, our Association believes that additional funds should be provided for operational research in the diagnosis and treatment of disease in and out of hospital, as well as for the study of methods of delivery of medical care, improvement of medical care in mental hospitals, and other forms of operational research in the fields of preventive diagnosis, treatment and rehabilitation of disease. Substantial funds of a non-matching nature, and not requiring provincial approval, should be made available in this field. This will enable medical organizations such as the C.M.A., in co-operation with universities, governments and others, to carry out and develop experimentation in new methods of delivering medical care which may be more economical in the use of medical manpower. As these will necessarily be fairly long-term studies, they should be undertaken as soon as possible. The application of modern electronic equipment to medical practice should also be considered in these studies.

(c) There is much urgency in providing more funds for capital and operating expenditures for health science centres and health science research in university centres. This is to supply the badly needed medical and para-

medical health personnel. A great deal of momentum has been built up since the augmented grants to the Medical Research Council and the introduction of the Health Resources Fund. This momentum will be dissipated by the present government cutback of the Health Resources Fund. It will take years to restore confidence and re-develop the momentum. It is therefore very urgent for the Federal Government to make their policy position known and hopefully to provide very much more optimistic figures for financial support.

(d) It should be emphasized that long-term planning is essential in research and teaching in order to have stable programs in university centres and to attract and maintain qualified staff. This is all the more important when it takes at least two years to train a research scientist. Widely fluctuating Budgets from year to year cause uncertainty in universities and impairs them from proceeding with confidence to rectify our health problems.

18. Other Areas Requiring Government Funds or Assistance:

(a) Increasing amounts of money are also required for our environmental problems of soil, water and air pollution, as well as studies on health hazards relating to sound, heat and radiation. It is important that Canada's activities in these fields be increased substantially, as we are gradually approaching serious hazardous conditions from these causes. Long-term planning should be started now, and studies in these fields should be included in Canada's science priorities.

(b) Private industry in the health and other related fields should be encouraged by the Government to carry out basic and applied research for the benefit of the population. Research by industry, such as the pharmaceutical industry, has made a substantial contribution to the health of this country and others,

and they should be supported by the Government to continue and expand such operations in Canada. The work of industry should be co-ordinated and communicated to others carrying out similar or related research.

(c) Military research should also be related to those in the civilian areas and vice-versa for better communications and co-ordination.

(d) There are also other areas requiring attention and research to improve the public health. Some of these include a program of physical fitness for all Canadians and improved health service to Indians and Eskimos.

(e) In the field of international liaison, Canada should be in the forefront of developing inter-related programs of teaching and research between both developed and developing countries.

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APPENDIX 36

SUPPLEMENTARY BRIEF SUBMITTED BY

THE UNIVERSITY OF ALBERTA

to

THE SPECIAL COMMITTEE ON SCIENCE POLICY

OF THE SENATE OF CANADA

July, 1969.

SCIENCE POLICY FOR CANADA

Introduction

The brief submitted to the Special Committee by The University of Alberta on March 1, 1969, was prepared before the report of the Macdonald Study Group became available. A few brief comments on specific recommendations in this report were contained in the statement made on behalf of the University of Alberta to the Committee on May 29.

This supplement to our brief is submitted, as suggested on May 29, to deal with some specific recommendations in the Macdonald Report and to attempt to answer some specific questions raised at the meetings with the Senate Committee, May 27-29.

The Macdonald Report

The University of Alberta committee wishes to go on record as supporting strongly the basic recommendations that Federal Research Councils should support all disciplines recognized by Canadian universities. The following sections deal only with a few specific items and these are the recommendations concerning which we feel most strongly. Failure to comment does not mean unconditional support - in fact it may mean that no real concensus was reached. It also means that, in keeping our comments brief, we have stressed the items considered most important.

Recommendations 4 and 5 refer to Canada Council and the establishment of a Humanities and Social Science Council.

We support these recommendations despite the comments of Canada Council concerning them. We reject, however, the statement in the Macdonald report that "the whole argument for separating the cultural activities of the Canada Council from research support is essentially the same as the argument in respect to N.R.C." In the case of N.R.C., both functions deal with science and scientific research and generally in the same disciplines. In the case of the Canada Council, the cultural activities bear little relationship to the research support program and generally they are concerned with entirely distinct disciplines. We believe that the Canada Council, as at present constituted, cannot give the informed attention that will be necessary under hopefully expanded responsibilities for research support in the whole field of humanities and social sciences. We think that the decisions regarding support of opera, symphony orchestras, and

artists involve such fundamentally different criteria that priorities for the allocation of Canada Council funds for these and research purposes should not be determined on the basis of competition from such diverse interests.

Finally, we feel very strongly that Canada Council is still making decisions which have the effect of determining university policy and we submit that no federal council should be in a position to do this. While we think that there might be some differences in the way the three Councils operate, there must be more uniformity than would be possible with the present Canada Council organization. We believe that all Councils should operate with the close consultation and agreement with universities that now characterize N.R.C. and M.R.C.

Recommendation 22 proposes that N.R.C. grants to university computing centers be discontinued and that all Councils support computing for research through research grants.

We consider that this will create enormous problems for universities since grantees will feel that the provision of funds for computing services guarantees them the necessary use of university computers. It is our opinion that computing services should be organized and administered like libraries - to serve the whole university on a coordinated basis.

We therefore believe that general support for computing centers should be maintained but that it should be provided through all Councils. It is not realistic to expect N.R.C. to provide the funds necessary for all research computing regardless of the discipline.

Recommendations 23 and 24 deal with the payment of indirect costs arising from council-supported research in each university. There appears to have been general support for these recommendations by universities without adequate consideration being given to some possible implications. We wish to discuss these.

First, and most important, we wish to go on record that the funds for such indirect costs must be over and above the funds provided for grants for research. We are opposed to the proposal if it means that 35% of funds available for research grants were to be automatically used for indirect costs.

Second, we prefer the Bladen suggestion that such funds be in the form of an increased grant to the President of the university, rather than designating these funds as "indirect costs." This would permit greater flexibility in the use of these funds. We believe that universities should not be entirely dependent

on federal funds for research. While recognizing that staff salaries and buildings and facilities constitute a substantial university and provincial contribution, we would like to see flexibility in the use of any general support funds that may be provided over and above actual specific research grants.

Recommendation 58 proposes that all remuneration to university research personnel be taxable.

We question the rationale on which this recommendation is based, in that we believe that anomalies will remain. It appears to us that adoption of this recommendation would result in federal money granted for research support by one agency being collected as taxes by another agency. The inevitable result of such taxation, it seems to us, would be an increase in stipends to compensate for the taxation and therefore an effective reduction in the services a research grant would purchase.

This applies not only to post-doctoral fellowships and research leaves but would also have a detrimental effect on assistantships paid from grants (see other comments below). At the University of Alberta such assistantships are now income tax-free because the student uses, for thesis purposes, the results obtained in the research. This is a major reason for students accepting the present $3000 level for such assistantships. This level would not be at all competitive if these assistantships were taxable.

Recommendations 62 and 63 would limit national competitive scholarships to about 10% of the full-time graduate enrolment and essentially eliminate the support of graduate students through research grants.

We are convinced that insufficient consideration has been given to the questions involved in the financial support of graduate students, and that this matter should be thoroughly studied before these recommendations are accepted. Furthermore, we believe that the Graduate Schools of Canada should be strongly represented on any committee or commission that makes this study. This representation should be through the Canadian Association of Graduate Schools.

There are several reasons for our objecting to the Macdonald recommendations 62 and 63, the most important being:

1. There is need for flexibility in graduate student support programs, so both scholarships and assistantships from both federal and university or provincial sources are necessary.

2. Present national scholarships and fellowships (mostly N.R.C., M.R.C. and Canada Council) account for more than 10% of full-time graduate

students at some Canadian universities now (13% at the University of Alberta). If all disciplines were equally eligible for such assistance, then there would be a serious decrease in the support now offered in the sciences, medical sciences and the disciplines now supported by Canada Council if the 10% recommendation were accepted.

3. The elimination of graduate student support on research grants, and the allowance of graduate student awards as a cost in computing fiscal transfer, would have a serious effect on a National Science Policy. The provision of graduate student support through fiscal transfer to provinces would mean that Provinces not the Federal Government would determine science policy so far as universities are concerned.

4. Graduate education is a national, not a provincial matter. One need only review the movement of graduate students, both before and after graduation, to recognize this fact.

Other items

Should there be a Minister of Science? We believe there should be but question whether "Science" is the best term to use if the minister has responsibility for three Councils proposed by the Macdonald report. We do, however, suggest some important revisions of the U.B.C. organizational structure. We feel very strongly that the position accorded the Science Secretariat in the U.B.C. scheme is undesirable. This would enable the Secretariat to screen the information to be supplied to the Minister of Science and hence to become the unquestioned power in the structure.

We recommend instead that, in order that the Minister be in the best position to represent the scientific views and needs to the Privy Council Committee on Scientific and Industrial Research, both the Science Advisory Committee and the Interdepartmental Advisory Committee report directly to the Minister, and not through the Science Secretariat (Fig.1) We can see no basic reason why the Secretariat should be an intermediary. We do not attempt to define the role of the Secretariat outside of the relationship under discussion.

The same basic arguments lead us to recommend equally strongly that the Presidents of the three Councils (N.R.C., M.R.C. and H.S.C.C.) report directly to the Minister. This recommendation was implicit in the opening remarks

presented by the University of Alberta on May 29 (See B.2(c)). We now submit that the person referred to should be a Minister.

National Science Policy

We have already referred to this matter, but wish to underline the importance of considering the universities of Canada as part of the structure on which any national science policy must rest. Universities can play their role effectively only if at least some major decisions on financial support of university research are made at the Federal level. It is our firm opinion that this demands that major operating research funds must come from federal sources and that an appreciable portion of graduate student support come to universities directly from Federal sources. Failure to recognize the importance of these arguments would, we believe, result in the vital decisions on research at universities being made entirely at local and provincal levels. We respectfully submit that this would destroy the excellent relationships built up over many years between federal agencies and the major Canadian universities, and would tend to nullify decisions necessary for a National Science policy.

Respectfully submitted,

J. S. Colter - Professor and Chairman, Department of Biochemistry

H. E. Gunning - Killam Professor and Chairman, Department of Chemistry

E. J. Hanson, Professor of Economics

S. M. Hunka, Professor of Educational Psychology and Director of Educational Research

A. G. McCalla, Professor of Plant Bio-Chemistry and Dean, Faculty of Graduate Studies

F. V. MacHardy, Professor of Agricultural Engineering and Dean, Faculty of Agriculture

D. B. Robinson, Professor and Chairman, Department of Chemical and Petroleum Engineering

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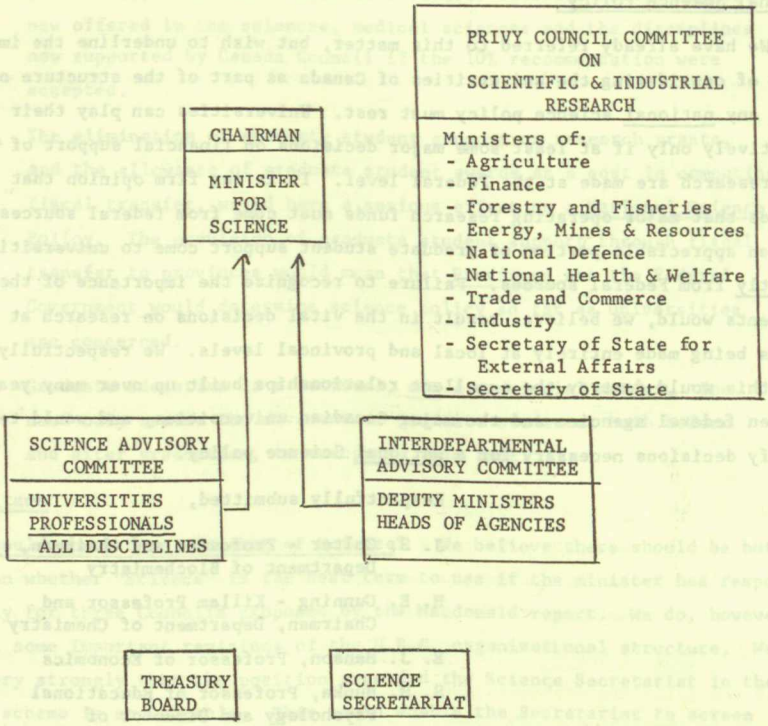
Fig.1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TREASURY
BOARD
SCIENCE
SECRETARIAT

APPENDIX 37

BRIEF SUBMITTED TO

THE SPECIAL COMMITTEE ON

SCIENCE POLICY

BY

CANADIAN INSTITUTE OF ONOMASTIC SCIENCES

ONOMASTICS - A NEGLECTED DISCIPLINE IN CANADA

A Brief presented to the Honourable Senator M. Lamontagne by the Canadian Institute of Onomastic Sciences, October 22, 1969.

Introductory

In the search for truth and in the evolution of human knowledge there should be no discrimination as to "better" or "worse" areas of study. It is only from the utilitarian, commercialistics, viewpoint that some disciplines are regarded in the contemporary world, and especially in Canada, as more "profitable", "Rentable", "Practical", than the other; it becomes evident that the principle l'art pour l'art in the scholarly research, evaluated from this standpoint, appears to be waste of energy and time, an unnecessary field of intellectual endeavours, and consequently not deserving any serious attention or support.

And yet, it is a fundamental belief of those who are deeper concerned with the spiritual and cultural growth of our country that the present state of things is only transitional, temporary. It is firmly hoped that the newly created Senate Committee on Science Policy will look into the very essence of the matter and will seriously attempt to find a balance between the "applied" ("recognized", "vital", "directed", "nationally important" - whatever the terminology might be) disciplines and the "basic" ones which, though being no less "important" and "vital", belong to the category of underdeveloped and/or neglected research areas in Canada.

Before going into medias res we would like to explain the terms "underdeveloped" and "neglected".

In our opinion, the "underdeveloped" disciplines are those fields of scholarship which found some recognition and support in this country, primarily thanks to their introduction into curricula at some Canadian universities. Such

disciplines in this country which deserve mention are, e.g. comparative literature and linguistics, ethnic studies, orientalistics, political sciences (the latter being so designated by the Canadian Political Science Association in its Brief of 30.4.68). "Neglected" disciplines, on the other hands, are those fields of study which are not introduced into university curricula and thus lacking interest of scholars. Neglected areas of research in Canada are genealogy, numismatics, paleography (Greek, Latin, Slavic), Egyptology and African studies in general, Byzantology, and finally onomastics or onomatology - a science of names, personal (anthroponymy), geographical (toponymy), ethnic and national (ethnonyms), etc. Well developed abroad, sometimes having a long tradition of high scholarly level (France, Great Britain, U.S.A., Belgium, Poland, etc.,) they found in Canada little or no support nor understanding, evoking, in some instances, a deserved opinion of the country as ultima Thule in this field of humanities.

Onomastic Research: Neglected

With regard to research, one point stands out above all others, namely the vast amount of study that needs to be done and little attention paid to the research efforts in this respect. This point has been noted by some Canadian scholars and can be emphasized yet again in several ways. Dr. M. H. Scargill, Professor of Linguistics, University of Victoria, President of Canadian Linguistic Association, put it this way:

> It is surprising that before 1951 very little attention had been paid to the scientific study of Canadian names, either names of places or names of families and peoples. It is surprising because Canada is a country where the naming of places still continues and where family names of very recent introduction are resisting or undergoing change at this very time. Canada is, therefore, a veritable laboratory for onomastic studies which yield valuable information of a type that can be obtained in no other country. All too often, the reasons behind onomastic changes are hidden in the mists of history. But this is frequently not the case in Canada; and studies here can help to explain processes of change that have occurred in other and older countries. One of the most important

> and practical uses of onomatics is in sociology. The modification or loss of names and the introduction of new names explain very readily a number of sociological changes...Two of the richest areas for the name study in Canada are the Canadian West and the Maritimes...

The above statement, one of several which we have on file, emphasizes the desperate need for research in the field of onomastics in Canada and consequent need for moral and financial support.

Existing Research Support

In reviewing the support for research it becomes clear that only one branch of onomastics, namely that of toponymy has some governmental support: (a) on side of Canadian Permanent Committee on Geographical Names in Ottawa, and (b) La Commission de Géographie du Quebec. In both cases, as can be seen from the appended Reports of Dr. J. K. Fraser and Mr. Jean Poirier, it involves "practical", directed investigation of quantity and quality of Canadian geographical names without going into the pure research of origins, semantics morphological structure, typology, and other aspects of toponymic research. As bodies codifying Canadian geographical names they are not particularly interested in building up those aspects of study. Moreover, the vast amount of Canadian anthroponymy (and here primarily Canadian surnames) remains beyond the sphere of interests of both governmental agencies.

Due to the fact that there is no chair of onomastic studies in any of the Canadian universities, there is no understanding nor support of this research area in our academic institutions.

Consequently, with the exception of a few private, personal financings of research and publication in the onomastic field, no organized efforts to subsidize this kind of study were made in this country.

Canadian Institute of Onomastic Sciences

Having in view this sad state of things, a group of scholars attending the ninth Congress of Onomastic Sciences in London, England, in 1966, decided to organize a Canadian Centre for onomastic research and the following state-

ment was released before the General Assembly of the Congress:

> To mark the Centennial of Canada (1867-1967) and in implementing the resolutions of the previous Congresses the undersigned members of the 9th International Congress of Onomastic Sciences in London, England, July 8, 1966, have formed a Canadian Institute of Onomastic Sciences (CIOS) with the aim to develop this important branch of humanities in Canada... The first Canadian meeting of the Institute shall be held in Ottawa in June 1967 during the meetings of Learned Societies of Canada.

As planned, the first CIOS meeting took place on June 17, 1967, at Carleton University, Ottawa, being followed by the second one on June 14, 1968, at the University of Calgary. The relatively high number of participants, the novum in Canadian scholarship, high level of papers read at the sessions aroused great interest in this new Canadian venture both in Canada and abroad. Here are two statements made in this connection, one by Dr. Davidson Dunton, President of Carleton University, the other one by Prof. H. J. van de Wijer, Secr.-General of the International Committee of Onomastic Sciences, Leuven, Belgium.

Remarks of Davidson Dunton,
President, Carleton University,
at the Founding Session of the Canadian Institute
of Onomastic Sciences

A new learned society is being born here today -- and Carleton University is highly honoured to be the scene of its birth. We are delighted to welcome to the University this distinguished group of scholars interested in onomastic sciences who have decided to found an Institute to develop this field of knowledge and to advance their common interests.

The establishment of the Canadian Institute of Onomastic Sciences seems to me an excellent idea. Knowing something of the individual work of some who are present today, I predict a lively and fruitful future for this new body.

Je suis très heureux de constater qu'il y a présents aujourd'hui des savants francophones ausai bien qu'anglophones; et des experts dans bien d'autres langues, d'autres cultures et d'autres pays. Et c'est àremarquer au'au Canada méme,il y a bien des noms de provenance autre qu'anglaise et française. Nous souhaitons une bienvenue très cordiale aux participants venant des Etats-Unis.

Once again, I emphasize the warmth of our welcome; and the best wishes of Carleton University to the Canadian Institute of Onomastic Sciences for a long and increasingly successful like.

Dr. Davidson Dunton,
President, Carleton University

International Committee of Onomastic Sciences
Secr-Gen. Prof.H.J.Van de Wijer

International Centre of Onomastics

Ieuven, June 5, 1967.

To the President and Members of the

Canadian Institute of Onomastics.

Dear Colleagues.

On behalf of the International Committee of Onomastic Sciences, grouping at the moment the onomatologists of some forty-seven countries in all parts of the world;

on occasion of the first meeting at Ottawa, to mark the Canadian Centenary, of the Canadian Institute of Onomastics, set up during the London International Congress (July 1966).

I most heartily welcome the new-born Institute in the steady widening circle of the onomastic Institutes, Centers or Committees, which have been created all over the world, in the course of these last twenty-five years.

On several occasions, I have been pleased to note those astonishing onomastic realizations, to which I may add now the setting up, together with the Canadian Institute of Onomastics, the "Instituto di Scienze onomastiche" at the University of Firenze, and the "Instituut vir Naamkunde" at the University of Pretoria.

They are eloquent testimonies to the constant development and the scientific standing of the study of our discipline, to which your Institute is called to contribute in a very important way.

It is a privilege for me to convey herewith my best wishes for the success of your first meeting and to congratulate the

staff and the members of the Institute on their initiative, tending to further in Canada the study of a most important branch of humanities.

We all greatly appreciate the scientific achievements in our field of study, and the growing interest in onomastics in your several universities.

A côté de vos universités, il est de mon devoir de rendre hommageici au travail de récolte des noms de lieu, envisagé par la Commission de Géographie de Québec (une première condition en vue de l'interprétation scientifique des toponymes), préparé d'ailleurs par la publication de l'excellent petit volume de J.Poirier, "Toponymie. Méthode d'enquête", imprimé aux presses de l'université Laval, préfacé par M.F.grenier, directeur de l'institut de Géographie de cette université.

I am convinced that the conjunction of all those initiatives in one sole body will prove to be a most powerful stimulus for the scientific evolution of Onomastics in your country. At the same time, the new Institute will be called to give an other example of loyal collaboration and mutual international comprehension.

With my sincerest wishes for a long and prosperous activity:

Floreat the Canadian Institute of Onomastic !

Deeply regretting not being able to attend the meeting, I remain, Dear Colleagues,

With kindest regards,

Yours very truly,

Prof. H.J.van de Wijer,
Secr. - General I.C.O.S.

Conclusion and Recommendations

Recently, in his welcome address to the Learned Societies in Calgary, Hon. Erenst C. Manning, premier of the host province, stated, among others, as follows:

> A nation is a composite of many efforts, social, industrial and inteelectual. The contributions of its best intellects are essential to its continued viability. The nation that neglects the nurturing of the minds of its people does so at its peril. Civilization rests firmly on the quality of man's thought. Without an increasing emphasis on the exploration of ideas, its foundation will weaken. The culture of a nation is a dynamic entity that must be fed continuously with the new and the venturesome in the field of ideas.

It seems that the practice of supporting intellectual endeavours in this country stressed primarily the "directed" or "applied" research. Onomastics belongs only partially to this category. As a pure scholarly discipline it is rather a "basic" area of scholarly inquiry and as such it needs adequate support to keep pace with standards internationally instituted in this respect. Since Canada does not have private foundations such as Rockefeller, Ford, Guggenheim in the United States, it appears very likely that all three levels of governments, and in particular the Federal Government through its agencies (The Canada Council ,S.S.R.C, and H.R.C.) will continue to be the most important source of research support in this country. It is, therefore, recommended to the Federal Government as follows:

a) That a balance be found between the support for "applied" versus "basic" sciences on the one hand, and between humanities and social sciences on the other.

b) That within the humanities the underdeveloped and neglected disciplines be supported on par with recognized ones.

c) That the Canadian Institute of Onomastic Sciences be appropriately financed, at least in two centres of research, Winnipeg and Montreal, where the branches of the Institute function.

d) That major projects in the field of onomastics, such as, Dictionary of Canadian Surnames, Etymological Onomasticon of Canadian Place Names, a. o., be financed as long-range plans in the field of Canadian humanities.

e) That pre- and post-doctoral awards and research grants be available to scholars working in the field of onomastics.

All of which is respectfully submitted.

J. B. Rudnyckyj
on behalf of

CANADIAN INSTITUTE OF ONOMASTIC SCIENCES/
INSTITUT CANALIEN DES SCIENCES ONOMASTIQUES

APPENDICES

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THE HISTORY AND FOUNDATIONS OF THE CANADIAN PERMANENT COMMITTEE ON GEOGRAPHICAL NAMES

By *J. Keith Fraser*

This paper describes briefly the background and current work of the national names authority of Canada, the Canadian Permanent Committee on Geographical Names. Toponyms, the names that are the concern of the Committee, comprise only one aspect of onomastics, and they involve over 250,000 names, increasing at the rate of some 2,000 annually.

The prime function of the Committee is the standardization of domestic geographical names in order to establish correct identification, eliminate duplication and ensure propriety. Although it is recognized that toponyms serve to reflect the historical development of the nation, their fundamental purpose is a very practical one, to distinguish a particular feature or group of features so that it may be recognized and identified without ambiguity or confusion. Nevertheless, in determining the appropriate name, it is encouraging to be able to record its origin or meaning as well as the vital statistics of generic term, location and geographical coordinates.

New names make their appearance in various ways. Many come to light from provincial gazettes, the daily press, scientific publications, explorers' journals or hoary old government reports. The Post Office and the railway companies seek the advice of the Committee when establishing new post offices or stations. Surveyors collect new names and name changes in the course of their surveys. Increasingly, the research staff discovers hitherto unrecorded local names during investigations fielded expressly for this purpose. Scientists, especially in northern Canada, require names to identify unnamed features described in their reports. The need for carefully documented name records is demonstrated daily in the investigation of old and new names by the secretariat of the Committee.

In 1888, at the annual meeting of the Dominion Land Surveyors Association, a resolution was passed concerning geographical nomenclature in Canada. Following observations from surveyors and scientists on the deplorable inconsistency, duplications and errors in Canadian nomeclature, the Surveyors Association suggested that the Surveyor General's office be charged with the duty of collecting information on names and compiling a geographical dictionary of Canada, the names contained therein to be officially confirmed. The resolution went on to urge that special care be taken to avoid duplication and that all new names be submitted to the Surveyor General for approval.

The initial result of this resolution was that in 1890, an officer was assigned to undertake the arrangement and revision of the nomenclature of the North-West Territories. Instructions were issued to surveyors in 1891 and the following year the Surveyor General proposed the formation of a Board on Geographical Nomenclature "to decide authoritatively upon all questions which may arise with reference to the giving of names to unnamed places or geographical features, the choice between alternate names, the prevention of duplication, the correction and simplification of orthography, etc." This Board, despite widespread agreement as to its necessity, never operated except in a voluntary or informal fashion, and having no authority, its rulings were often ignored.

In 1897, the Surveyor General again proposed that an official names board be created. The United States had successfully established a Board on Geographic Names in 1895 and the Surveyor-General pointed out that they were ruling on Canadian names with their decisions being adopted in other countries. Accordingly, in 1897, the Geographic Board of Canada was created by Order in Council, which states "that all questions concerning geographic names in the Dominion which arise in the departments of the public service shall be referred to the Board, and that all departments shall accept and use in their publications the names and orthography adopted by the Board". It consisted originally

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of representatives of federal departments but it was soon recognized that the cooperation of the provinces was essential. In order to obtain this cooperation, to achieve greater uniformity and to draw on the local knowledge of the provincial officers, the constitution of the Board was amended to give the governments of the Northwest Territories and each province the right to nominate representatives to the Board.

One of the first requirements of the Board was to draw up rules of nomenclature. These concerned the priority of names by establishment through publication, restoration of original forms of names changed by corruption, avoidance of the apostrophe in possessive forms, avoidance of hyphens in native names and the application of the rules of the Royal Geographical Society concerning orthography. As the experience of the Board broadened, these rules were amended or added to. The importance of local usage became emphasized, qualifications were added to certain rules, and others incorporated concerning particular terms such as *canyon* and *brook*. In 1909, a rule was added stating that "generic terms may be translated from French to English or *vice versa* for use in French or English publications as the case might be, if it can be done without producing a mixture of French and English". This pecular rule remained until 1924 when the last qualification was dropped. They specified that duplication of names especially within one province was objectionable, but excluded common descriptive names, such as Trout, Clear, Red, Mud, etc. Obviously the Board was having difficulty in the application of some of the rules. From the beginning, however, the basic principle of local usage was given preference over the others.

Nineteen reports were issued by the Board between 1898 and 1924, the bulk of the content being cumulative lists of approved names with brief locational descriptions. Several special papers were appended to these annual reports, including Place Names in the Thousand Islands, Place Names in Northern Canada, Nomenclature of the Mountains of Western Canada, Place Names of Anticosti and Place Names of Prince Edward Island. Later, two separate publications,

Place Names of Alberta and Place Names of Manitoba were issued by the Board. These special reports dealt with the origins of many names, but are incomplete and now considerably out-of-date.

In 1915, the responsibilities of the Board were extended by Order in Council to allow the expert advice of the members to be obtained regarding the compilation of new maps, symbols, scales and other cartographic matters. This authority was cancelled in 1922 when a Board of Topographic Surveys and Maps was created. During this period, the Geographic Board issued a catalogue of some 1,200 references to maps in the Board's collection and presented a report on map-making in the federal government.

Prior to World War II, the Board operated on a very slim budget and in fact practically all the work was handled by the secretary. With the increase in topographic mapping and hydrographic charting, particularly in northern Canada during and especially after the war, the need for more staff was recognized and the function of the Board reverted to the verification of map nomenclature and the recording of names. Due to this change in emphasis, the Geographic Board of Canada was reorganized in 1948 as the Canadian Board on Geographical Names. Over the next decade, the Gazetteer of Canada series was inaugurated, starting with the Gazetteer of British Columbia in 1953. Gazetteers of all the provinces have been published except for Newfoundland, to be published in 1967, and Quebec, anticipated in 1969. A revision of the British Columbia volume was issued in 1967; revision of the Gazetteer or Manitoba was begun the same year.

To provide for geographical research in Canadian toponymy and to acknowledge the authority of the provinces in the matter of place names, the Board was replaced in 1961 by the present Canadian Permanent Committee on Geographical Names. It is composed of senior officials from federal agencies with interests in nomenclature, among others the Dominion Archivist and the Superintendent of the Bureau for Translations, a representative for the Territories ap-

pointed by the Minister of Indian Affairs and Northern Development, and a representative appointed by each of the provinces. Quebec, Alberta and Newfoundland have established provincial names boards, the secretaries of which act as representatives on the Permanent Committee. The secretariat of the Committee was administered from 1962 to 1967 as the Toponymy Division, Geographical Branch, and in 1967 was moved under the directorate of the Surveys and Mapping Branch. This group looks after the processing and recording of names, and publication of the gazetteers, as well as undertaking research in Canadian toponymy.

The experience of the early Geographical Board of Canada provided a basis for the present regulations. These rules, which govern the decisions of the Permanent Committee, express the philosophy of geographical nomenclature and are deliberately phrased as guiding principles, not as strict directives to be rigidly observed. A new name, defined as a name that has never been officially adopted, is evaluated against these twelve principles. Accepted after careful consideration by all members of the Committee in 1963, these principles concern statutory names and those used by railways and resource development companies, public usage, uniformity and duplication, the use of French or English forms of a name, the delicate problem of personal names, the orthorgaphy of native names, the form and character of names, generic terms, the use of foreign names in Canadian publications, and the importance of information on origins. Copies of a pamphlet listing these principles are available from the secretariat.

To give some measure of publicity to new names and name changes, current decisions are published semi-annually in Supplements to the Gazetteer. Two Special Supplements have been issued, one listing named glaciological features in Canada, the other listing features named for surveyors. Both of these emanated from specific requests for information.

Much of the research in toponymy results from inquiries on names from other federal agencies, provincial departments, the publishers of commercial atlases and encyclope-

dias, and the general public. The secretariat answers an average of 50 inquiries a month, some of which are simple queries as to the location, origin, correct spelling or meaning of a name. Other inquiries may involve the verification of hundreds of names for a special map. To provide satisfactory answers on some obscure names, it is often necessary to search old files, refer to archival maps or seek additional information from sources outside the government.

Research initiated within the secretariat includes an expanding field programme, one aspect of which was a comprehensive study of the names of Renfrew Country, Ontario. Besides clarifying the nomenclature of the county so that it is likely that it now boasts the most locally acceptable toponymy of any part of Canada, the investigations were incorporated in a paper discussing the origin and development of the county names. Field studies have improved the nomenclature of Prince Edward Island and make possible an up-to-date supplement on the toponymy of that province. Field work in 1967 will include special investigations of parts of Muskoka District and Carleton County in Ontario and a geographer will commence a year's work in New Brunswick in order to standardize the names of that province. Office projects include a study of the names of Baffin Island, features named for royalty and statesmen, a history of the Geographic Board of Canada and its successors, and features named for World War II casualties.

This outline of the functions and responsibilities of the Canadian Permanent Committee on Geographical Names and its secretariat is intended to give some idea of the scope of the work in toponymy presently being conducted in the federal government. It is recognized that it is only one aspect of the science of onomastics and the secretariat is well aware of their limitations in linguistics and etymology in their research. Toponymy studies in Canada have in general been neglected by geographers and etymologists, with the significant exception of our colleagues in Quebec, and several aspects of this field should prove fruitful to those interested in the origins and distribution of geographical names in our

country. Toponyms derived from our aboriginal languages have evolved in a quite unsatisfactory and unstandardized fashion ever since the first Europeans began recording them according to their own linguistic backgrounds. Some advances have been made in recent years towards the establishment of a standardized Eskimo orthography; the various other Amerindian languages and dialects still leave much to be desired. Probably many of the long-established spellings of our attractive Indian names should not be altered.

An interesting aspect of toponymy concerns what the author calls "regional names", that is, the mainly unofficial but generally accepted terminology by which we have become accustomed to identify certain regions in Canada such as the Eastern Townships in Quebec, the Interlake Region of Manitoba, the Cariboo in British Columbia, the historical Klondike in the Yukon, the Clay Belt of Northern Ontario and Quebec, La Côte Nord du Golle du Saint-Laurent, the Barren Grounds and so on. What area springs to mind now when we hear the name Ungava, originally a discrete territorial district, now officially retained only in the name of the bay? The useful term Maritime Provinces was used prior to Confederation and now has the companion expanded term Atlantic Provinces. The designatiotn Prairie Provinces originated only after 1905. The fields of history, political science, linguistics, historical geography, even plant geography, as well as toponymy all touch on this aspect of Canadian nomenclature. The origin, development and use of these and other regionyms are of interest and worth our study as a part of the historical development of our country.

THE QUEBEC GEOGRAPHICAL COMMISSION

by Jean Poirier

The Geographical Commission was first established by two Orders in Council dated November 15, 1912 and November 26, 1915; the statute instituting this body was assented to on February 14, 1920.[1] Section 2 of this statute provides "The Lieutenant-Governor in Council may create a Quebec Geographical Commission consisting of persons whom he shall choose from among the officers of the various Government Departments."

The Geographical Commission set its first nomenclature standards in 1912.[2] They placed particular emphasis on the need to "preserve and retain geographical names hallowed by custom," and to "restore to maps, where applicable, the historical names given by the first discoverers on explorers."

From its inception, the main function of the Commission has been to verify and amend the geographical terminology of the maps published by various departments of the Government of Quebec; and, since 1925, the topographical and marine maps prepared by the Government of Canada have also been sent to it for inspection.

During its first years of operation, a large number of Amerindian terms disappeared and were replaced by French words. Other indigenous place-names were further shortened

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[1] Geographical Commission Act, 1920, 10 George V, c. 24, s.9.

[2] These standards of terminology appeared in the First Report of the Geographical Commission of Quebec, "Nomenclature des noms géographiet (sic) de la province de Québec" (Terminology for geographical names in the province of Quebec), Québec, Department of Lands and Forests, 1916, p. 3.

and spelled according to French practice: thus, the names Kakabonga and Kamikawinika became Cabonga and Canica; and similarly, the last two syllables of the name of the Kinojéviskatik River were cut off, making it Kinojévis. This was done for a quantity of Amerindian place-names.

On the other hand, many of the common names that often occurred several times throughout the territory of Quebec were deliberately eliminated because of the confusion which such a position produced for the administrative services. Thus, bodies of water named "des Iles," "Croche," "Brûlé," "Clair," "Rond," "Long" in particular, were in a multitude of cases replaced by names drawn from history.

Some years after it was set up, the Commission decided it would have to make on-the-spot surveys of place-names. In 1922, the Commission requested a survey to investigate the names of the Nicolet River tributaries; but according to the Commission records, it appears that extensive surveys were not much encouraged at that period. However, the question of usage is of special importance, when we recall that maps must indicate the names used by the population. With this in view, the Commission has since 1963 conducted very thorough field and record surveys.

The data thus collected have proved very useful as they allow the Commission to have a better basis for its decisions. Several significant conclusions emerge from these surveys: in our proposal we shall list only the most important. Firstly, they show that nomenclature in Québec does not have the quality of stability which we would expect to find there: as an example, during a period covering no more than the last

forty years, a large body of water in Papineau county was successively designated as "Rond" (round), "des Sables" (sandy), "Désormaux" (elm?), and finally "des Plages" (beach), which is its current name. It is important to emphasize in this respect that these changes took place without our Commission taking any action.

Moreover, these surveys prove that place-names were far from having all been shown on the maps. Two surveys made in the Montreal metropolitan area by Mr. Ludger Beauregard, geographer, during 1965 and 1966, make it possible for us to understand the extent of this problem: of a total of 671 names gathered by Prof. Beauregard, nearly 50 per cent have never been shown on maps and plans. The new names are mainly for islands, waterways, rapids, bays and headlands.

These surveys disclose the current status of place-names in Quebec; they enable the Commission to place exact geographic terminology on maps.

The Quebec Geographical Commission has, however, made its name particularly through another activity, i.e. its publications.

Between 1914 and 1926, the Commission published five texts. A report appeared in 1916 on the "Nomenclature des noms géographiques de la province de Québec" (Terminology for geographical names in the province of Quebec).[3] A second report, published in 1921, was compiled in the same

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[3] Geographical Commission of Quebec, "Nomenclature des noms géographiques de la province de Québec," First Report, Quebec, Department of Lands and Forests, 1916, 84 pp.

format as the preceding one, and it contains about 1700 names.[4]

In addition, two "dictionaries of rivers and lakes of the Province of Quebec" were also published at this period. The first dates from 1914,[5] and the second was published in 1925.[6]

The most recent publication by the Commission appeared in 1926. Titled "Noms géographiques de la Province de Québec," this text lists, giving meanings, the names of the divisions of the Legislative Council, electoral districts, townships, municipalities and territories in Quebec.[7]

These publications, dealing with place-names in Quebec, were clearly inadequate, as they showed only a portion of the geographical designations in Quebec.

In response to an urgent need, the Commission, in collaboration with the Canadian Permanent Committee on Geographical Names, is preparing the "Répertoire géographiques du Québec" (Geographical Index for Quebec). This Index, to be issued in 1969, will include more than 45,000 place-names in Quebec. Further, our organization is this year to publish a study on place-names in the Montreal Metropolitan Area. The

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[4]Geographical Commission of Quebec, "Noms géographiques de la province de Québec" (2nd ed.), Quebec, 1921, 158 pp.

[5]Department of Lands and Forests, "Dictionnaire des rivières et lacs de la province de Québec," Quebec, 1914, 432 pp.

[6]Department of Lands and Forests, "Dictionnaire des rivières et lacs de la province de Québec," Québec, 1925, 399 pp.

[7]Geographical Commission of Quebec, "Noms géographiques de la province de Québec" (3rd ed.), Department of Lands and Forests, Quebec, 1926, 158 pp. This publication was also issued in English.

place-names in this study are considered from three points of view: their usage, their meaning and their origin. Also, a map inserted in a pocket in this text will give the location of the names it contains.

As we have seen, the activities of the Geographical Commission since its creation have been varied. Reference to the Commission's files and minutes demonstrated that it is often difficult to find a suitable solution for the many problems raised by geographical terminology in Quebec.

To take only one example, there are often several usages for the same location, and this even occurs in areas which have long been inhabited by a homogeneous population.

Overlapping of place-names, which we see takes place nearly everywhere, is often a difficult situation to handle. In order to keep abreast of the names of Quebec lakes and waterways, in particular, it would be desirable for certain areas to be the subject of periodic surveys.

According to some estimates, there appear to be some 500,000 bodies of water in Quebec. Of this number, how many actually have names? - we would be tempted to suppose ten per cent. How are the others to be christened? Are we going to accept a long list of descriptive and meaningless names like "Black," "Cross," "Trout," "Long," "Green," etc.? And if these place-names are accepted into usage, what policy is the Commission to follow then?

This is a complex question if ever there was one, but a solution to this problem must be found, as well as to many others, and this particularly is what requires such an organization within the Government of Quebec.

CANADIAN CONTRIBUTIONS TO THE AMERICAN NAME SOCIETY

By *Kelsie B. Harder*

At this occasion of the initial meeting of the Canadian Institute of Onomastic Sciences, it seems most appropriate to acknowledge the scholarly and administrative work of Canadians in the American Name Society, a Society, which, despite occasional parochial manifestations, actually is international in scope, having some 150 of its 900 members in countries other than the United States. Thirty of these are from Canada.

The contributions from Canada have come from two sources: (1) Professor J. B. Rudnyćkyj's work at the University of Manitoba, and (2) the Canadian Board on Geographical Names in Ottawa. In the slightly chronological survey given here, work from each area will be noted, although at times some overlapping will occur.

The first membership list published in *Names*, Vol. 1, No. 4, December 1953, contained three names from Canada. One, M. J. Diakowsky, seems to have dropped almost immediately. The other two represent the two areas of contribution: P. E. Palmer, Canadian Board on Geographical Names; and J. B. Rudnyćkyj, University of Manitoba. Professor Rudnyćkyj, a charter member, has been a leader in the American Name Society since its inception. Now a Life Member, he has served on almost every committee and was President of the Society in 1959. An annual meeting without the presence of Professor Rudnyćkyj would not seem like an annual meeting.

The announcement of the organization of the Onomastic Commission of the Ukrainian Free Academy of Sciences at Winnipeg, Manitoba, appeared in the first issue of *Names*. Under the general editorship of Professor Rudnyćkyj, the Academy treated not only Ukrainian names but also place and personal names in Canada and elsewhere. The publication of *Onomastica*, a special series, in 1951, was a direct outgrowth of the work begun by the Academy.

In Volume 1, No. 2, *Names*, pp. 79 - 84, Mr. P. E. Palmer, then Chairman of the Canadian Board on Geographical Names, described the work of the Board and related its history since establishment in 1897. The first contribution, Vol. 1, No. 3, by Professor Rudnyćkyj discussed the name *Halicz* in Manitoba. *Halicz* (or *Halych*), according to Professor Rudnyćkyj, took its name from the residence of the West Ukrainian princes' and the capital of the former Kingdom of Galicia. In the last issue of 1953, the announcement was made that A. I. Bereskin of the Department of Natural Resources, Saskatchewan, had joined the American Name Society. Mr. Bereskin has been actively involved in the work of the Society since.

Although I do not intend to relate the contributions in volume by volume of *Names*, I do wish to establish the fact that Canadians were involved in the direction of the American Name Society from its incorporation in 1951. For instance, Professor Rudnyćkyj was appointed to the Board of Managers at the annual meeting in December 1953, and is listed in Vol. II, (1954) as a member of the Board of Managers.

One of the intentions of the founders of the American Name Society was to publish articles pertaining to names in the Americas, both North and South. That this intention was soon breeched is apparent to anyone who browses through the fourteen published volumes. Erwin S. Gudde, who could be called the founder of the Society, although Elsdon Smith has a right to be called the founder too, tried hard to keep the boundaries confined to the Americas. That he failed is obvious and that his failure has been fortunate for the Society is now indisputable.

Nevertheless, an attempt to confine research to the Americas was made, as can be documented easily from the first issues of the journal *Names*. Professor Gudde believed that there were enough outlets in scholarly magazines to treat onomastic matters adequately as far as Europe and other areas were concerned. He asked for articles from the different geographic boards in Canada and the United

States. He appealed to scholars for articles on names in Central and South America and in the West Indies. Madison S. Beeler published the first article to appear in *Names*: "America — the Story of a Name." Jack A. Dabbs, later a President of the Society, began his series of bibliographies of namelore in Latin America.

A survey of articles in the first issues indicates that universality won out. Professor Gudde, himself German, helped break out of the confinement. Articles came from scholars who were hardly interested, except in the usual intellectually curious way ,in the origin of some name ascribed to a place by the American Indians, say, or whether a certain Spanish name had been transliterated into an English name. They were, however, very much interested in toponomastic patterns of ancient Egypt, or the names of ex-voto objects in ancient Mesopotamia, or Frisian family and place names.

In fact, one issue of *Names* has no article that has anything to do with American names anywhere. The point to be made is that the American Name Society, an assortment of scholars with highly diverse interests, did not take kindly to being limited to the Americas, although one member, a Life Member, and a complete 100% U. S. patriot, insisted in some rather heated letters that all articles be confined to subject matter from the United States only. An article on Russian names brought a deluge of letters from the patriot. In this case the universality cost the Society a good deal of money. The member, quite rich by the way, had once said that he was going to leave a bit of money to the Society. He didn't.

In his Presidential Address to the Society in December 1959 Professor' Rudnyćkyj spoke on "Slaves or Glorious Ones? The origin of the Name 'Slav.'" This was a break from tradition, for former presidents had delivered their addresses on names in the United States or on personal names that are found there. Since his address, the Presidents have followed suit and have spoken on onomastic subjects that reach far beyond the Americas, even to names on the

moon. The address pointed to a major change in policy, although the beginning of the change took place almost with the first issue of *Names*. Published in Vol. VIII, No. 2 (1960), the addres was the final step toward universalizing the American Name Society. But Professor Rudnyćkyj's influence was even more pervasive. He brought into the Society several members whose interests in names were not necessarily confined to the American continents.

Although most of these members were primarily interested in Ukrainian names, their articles began to cross disciplines. An excellent example, and really a germinal article, was written by Robert Klymasz, published in 1963 (Vol. XI), beginning with the June issue, "The Canadianization of Slavic Surnames: A Study in Language Contact." This article, coupled with one by Professor F. L. Utley of Ohio State University, helped develop *Names* as a magazine receptive to articles in linguistics, and now the magazine is listed as one which takes articles of a purely linguistic subject matter, although it is not limited to this type of article.

Turning now again to the Canadian Permanent Committee on Geographical Names, we need to note that the influence has not been one of publication in *Names* but of help and direction given by the Executive Secretary, J. Keith Fraser, and also others in the Canadian Government. For instance, the files of the Society have many letters that give directions and suggestions by Mr. A. I. Bereskin, Controller of Surveys in the Surveys Branch in Regina, Saskatchewan. Mr. Bereskin's interest in Indian place names helped persuade us to publish a special issue of *Names* that will have articles pertaining only to Indian names. The issue, scheduled for September, 1967, will also contain a contribution by Mr. J. A. Rayburn of the Geographical Branch.

The Information Circular distributed by Dr. Fraser has been especially helpful to members of the American Name Society. During the past year, Dr. Fraser has also furnished many items for the archives of the American Name Society. The Circular is always filled with worthwhile information.

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Whereas our own Bulletin treats many areas in a brief manner, the Circular treats material in more depth and usually has an article that gives directions or suggests a plan to follow. Circular 21, just received, includes a copy of a letter from Rudyard Kipling concerning the name Medicine Hat. He wrote strongly about the proposed change in the name. Now that the Information Circular is being received regularly by officers and members of the American Name Society, I am sure that the articles and notes are exerting great influence. Clarence Barnhart, President of ANS and an active lexicographer, wrote that he thought it was one of the more informative circulars received in his office.

Now that I have given a short survey of the influence Canadians have on the American Name Society, I should also mention other names of Canadians who have contributed articles and other material to the Society and its magazines. One recent contributor is Dr. I. I. Tarnawecky, whose work promises more scholarly material to come. Jean Poirier has begun to contribute to the work of ANS. Professor Y. Slavutych has also served the ANS in several capacities. There are others who have contributed to the work of the American Name Society over the years, including E. R. Seary and F. Heier. Their articles are a part of the magazine or have been made a part of the Archives.

Since the beginning of the American Name Society, the contributions of Canadians have been far out of proportion to the number of members from Canada. Furthermore, these contributions have been the center of activity and have helped, with distinction, to turn the Society into a truly international group. It is my hope that Canadians will continue to support and contribute in the same manner in the future.

BRIEF FROM ACFAS

TO

THE SENATE SPECIAL COMMITTEE ON SCIENCE POLICY

L'Association Canadienne-Française pour l'Avancement des Sciences

(French-Canadian association for the advancement of science)

21719—32½

RECOMMENDATIONS

1 - That present efforts be increased so as to expand applied research, although basic research should be left free from all restrictions; support for applied research should take social and scientific considerations into account.

2 - That measures be taken to reduce the existing disproportion between the number of English and French-speaking scientists.

3 - That the proportion of French Canadians in the total population be considered in awarding grants: French Canada will receive its due share only if the policy of scientific excellence is coupled with a policy encouraging the development of science.

4 - Whenever austerity measures affect the rate of scientific development, that a distinction be made between measures causing only short-term dislocation and those which endanger long-term scientific development.

ACFAS was founded in 1925 when several local scientific societies united to form a single association; it received its letters patent from the Quebec Government on January 30, 1930. Each year since then this association has held a congress which brings together the majority of scientists from all branches of endeavour in French Canada. Some 1,500 people regularly register for these meetings; the number of scientific papers presented in its approximately 35 sections exceeds 500. During its congresses, ACFAS organizes symposiums on a question of current importance. It also organizes and conducts discussion groups on selected subjects; for example, on the 26th and 27th of September in 1969, the Association held a symposium on water at Laval University. As far as we know, ACFAS is the only Canadian scientific society which is open to all research workers in the natural and social sciences.

In addition to the activities mentioned above, ACFAS publishes its *Annales*, awards distinctions and above all does its utmost to awaken the interest of students by organizing numerous talks in the high schools to popularize science and by contributing to the publication of a journal: *Le Jeune Scientifique* (The Young Scientist).

POSITION OF ACFAS

ACFAS is interested in the advancement of natural and social sciences, both from the point of view of furthering knowledge and of applying it. It originated and works within the community of French-speaking Canadians.

As this brief is addressed to one of the federal government's Senate committees, the position we are taking

is that of French Canadians living under the present federal system of government. Since ACFAS is not a political body, this recognition of the state of affairs does not in any way imply a stand on constitutional questions.

Having made these points, may we offer our congratulations to the Government and especially to Senator Lamontagne and the members of the committee for the interest they are taking in science and the way in which they are carrying out their task.

The questions raised in this brief are grouped under two headings. In the first group, we will outline the main aspects of a science policy. In the second, we will discuss the situation of French-language scientists in Canada.

GENERAL CONSIDERATIONS

We have not yet worked out in detail the form of a science policy: this is an area in which people can agree more readily on the methods to be used than on the goals to be sought.

There is a commonly held view that the aims of science should be adapted to the aims of society as a whole. This is by no means a simple idea. We are confronted by two worlds, each governed in its development by its own logic, a situation which has led to friction between them. When seeking to harmonize the aims of science and society, we have to take into account the differing degrees of sophistication. In the area of basic research, which aims at a better understanding of nature, curiosity is the ruling force; however, this is not necessarily one of the main moving forces

of societies, past or present. Nevertheless, from this curiosity come discoveries which will make the society of tomorrow richer in ideas and technology. To restrict the aims of science to those of present-day society could easily lead both worlds to a dead end.

On the other hand, as far as joint activities are concerned, especially in the shaping of research policies, the concept of science in the service of present-day society must be retained. Within this context, science is a tool, and since we make use of this tool, we should obviously do so for purposes that are useful or agreeable to a society enlightened enough to see the implications. However, it is in the specific area of application that research becomes very costly, and this constitutes another argument in favour of selectivity at this level. Various procedures could be followed in order to make practical choices. One of these could be preliminary studies on the technical, scientific, economic and sociological aspects of research projects.

The distinctions between basic research and applied research seem all the more important to us at the present time in that applied research and directed research have been relatively neglected in Canada and that in the next few years we will probably see efforts made to strengthen their position. The more success we have in shifting the centre of emphasis without changing our perspective, the greater the chance that this readjustment will bear fruit.

ACFAS is especially interested in assistance to university research. At present, the chief source of direct assistance to university research programs is the federal

government, acting through several agencies, among which the most important are the National Research Council, the Medical Research Council and the Canada Council.

To equitably cover all the fields of study, a fourth agency would have to be added: a Social Sciences Council. A joint committee might be set up to rule immediately on all requests not clearly the responsibility of any one council.

The researcher should be able to draw on more than one source so as to have some measure of protection, whether from an error of judgment or from adverse policy changes which affect him in particular. Those best qualified to judge the competence of research workers are scientific juries; those best situated to understand their material and financial requirements are the directors of the establishments where the research is to be conducted. It would therefore be useful if agencies making research grants were to include in each grant a percentage to be put at the disposal of the institution and used to offset part of the general expenses and meet unforeseen needs for additional funds. This percentage should be larger for small research institutions than for large ones; in this way growth could be encouraged. We wish to emphasize this point because the French-speaking universities, which have not been generously endowed by the business world in the past, have almost no private sources of income, and are closely dependent on government sources for funds.

It must also be kept in mind that federal assistance to university research represents only a fraction of the total

costs involved. Buildings, basic equipment, working expenses and professors' salaries are usually financed from other sources such as tuition fees, private donations and, especially, provincial government appropriations. The rules governing grants and bursaries are laid down by the organizations distributing the funds, but every dollar they allocate involves at least equal additional expenditure over which the university has little control. The past policy of giving to each institution according to its research potential did not take into account the fact that not all had reached the same stage of development.

Failing all else, a part of the funds set aside by the federal government for assistance to university research could be pro-rated to the population and paid to the provincial governments for distribution to the universities on a basis adapted to regional needs, provided this basis is considered acceptable by the community of scientists. Under a similar arrangement, Switzerland has just set up a federal agency for assistance to research which will distribute part of its budget to universities for specific purposes and the remainder to canton authorities for use according to local priorities.

The training of a research worker is a process that does not produce immediate results; ten or fifteen years may elapse between the time when a student decides to prepare for a doctorate and the time when he reaches his period of peak productiveness in research. Individuals sacrificed during a cutback in government grants will not be there later when things return to normal. We realize that the government tries to cushion the harmful effects of its austerity policies, but perhaps it does not distinguish sufficiently between the

temporary results of its decisions and those which are lasting.

THE SITUATION OF FRENCH CANADIANS

For a multitude of reasons beyond their control, French Canadians were late in taking part in the industrial revolution and its accompanying scientific development. Efforts to catch up the lost time have fallen short: for the last twenty years, our scientists have made up a constant 10 per cent of the Canadian total, a figure well below the percentage of French Canadians in Canada's population.

We are not suggesting that the federal government alone is responsible for this disparity, but we do believe that its future policies should take this situation into account and bring into effect measures necessary to remedy it.

The present allocation of grants, based as it is on what each university has already, tends to maintain the status quo and often to accentuate inequalities.

The geographic distribution of scientific research establishments dependent on the federal government reveals a heavy concentration in the Ottawa area and a no less conspicuous scarcity in several of the provinces. Thus the National Research Council has a dozen divisions in Ottawa, but only two regional laboratories, in Saskatoon and Halifax.

It is pointless to draw up detailed statistics about a well-known state of affairs whose consequences are plain to see. For example, it is estimated that the federal government employs about 13,000 people in research centres located in Ontario. At an average salary of $12,000, that represents some $150 million a year and brings in about $30 million to the provincial treasury. Moreover, this group

of people, whose socio-economic level is relatively high, and who occupy such a strategic position, cannot help contributing significantly to the spread of scientific knowledge in this province.

It should also be noted that up until recently many of these research establishments were situated in places where there were few if any French-language schools, a fact that worked to the disadvantage of French-language employees. Let us not forget that every French-speaking Canadian who loses his native culture is a loss, if not for science, then for Canada.

The location in Quebec of a number of new federal laboratories in which French would be the working language would do much to correct this situation, and would have a beneficial psychological effect on French-speaking scientists. Perhaps it will be claimed that this suggestion is put forward at a time when the autorities are coming to the conclusion that too great a proportion of Canadian scientific research is concentrated in federal agencies, and that this is hardly the time to set up new ones. The paradox of this situation demonstrates that, as long as there is an appreciable lag between the stages of scientific development of the two ethnic groups, many necessary measures will seem untimely to one group or the other: when the scientifically less advanced community is ready for and able to benefit from a specific type of subsidy, this is no longer available.

It is abundantly clear that, understrength as it is, our group of scientists is particularly vulnerable to market fluctuations. Some alarmists need only take it into their heads that Canada is training too many scientists - which is still far from being true - and we, who can least afford it, are suddenly faced with a serious slow-down in growth. That is why we recommend that the Government carefully study the specific implications for science of austerity measures, for such supposedly temporary measures often have permanent effects.

The most effective way to begin correcting these shortcomings is to undertake a program of information. With this aim in view we believe that the French-language network of the CBC, which from time to time presents good programs to promote public interest in science, could do more if it set up a separate division for science programs, as it has done for drama and music.

ERRATA

Proceedings of the

SPECIAL COMMITTEE ON SCIENCE POLICY
1st Session, 28th Parliament, 1968-69

Issue No. 13
(Afternoon Sitting)

November 27, 1968.

Page	1303,	column	2,	line	25,	Delete line 25 and substitute therefor: "of the National Welfare Grants program, and Miss"
"	"	"	"		52,	Substitute "$3.6" for "$3.8"
	1308,	"	1,	"	21,	Substitute "Josie's" for "Chapman's"
	1310,	"	"	"	48,	Substitute "etiology" for "edeology"
	1314,	"	"	"	40,	Delete line 40 and substitute therefor: "Now, it is not the sulphur dioxide in the smog that causes"
"	"	"	"		42,	Delete line 42 and substitute therefor: "which is a gas, it combines with oxygen in the air and with water to"
"	"	"	"		44,	Substitute "sulphuric acid" for "it"
"	"	"	"		51,	After the word "air" insert the words "plus the SO_2"
	1316,	"	"	"	2,	Substitute "late forties" for "early fifties"
"	"	"	"		26,	Before the word "Medical" insert the word "Defence"
	1318,	"	2,	"	31,	Substitute "**Josie**" for **Bundock**" and "Chapman" for Josie"
	1319,	"	"	"	24,	Substitute "some" for "the southern"
	1320,	"	1,	"	34,	After the word "more" insert the word "sea"
"	"	"	"		48,	After the word "problems" insert the words "in the Lachine Canal."
	1321,	"	"	"	12,	After the word "through" insert the word "our"
"	"	"	"		13,	Substitute "offices" for "officers"
"	"	"	"		14,	After the word "as" insert the words "we do"
	1322,	"	"	"	40,	Substitute "per capita" for "matching"
"	"	"	"		41,	Delete line 41 and substitute therefor: "a research element of $175 million which is also on a"
"	"	"	"		42,	Delete "non-"
"	"	"	"		43,	Before the word "special" insert "non-matching"
"	"	"	"		50,	Substitute "$33" for "$30"
"	"	"	"		51,	Substitute "requests" for "submissions"
"	"	2,	"		14,	Before the word "committee" insert the word "statutory"
"	"	"	"		45,	Substitute "pharmacy and nursing." for "veterinary"
Page	1322,	column	2,	line	46,	Delete line 46 and substitute therefor: "Social sciences are included in some instances."
	1323,	"	1,	"	22,	Delete line 22 and substitute therefor: "which is just starting; it has gone on for only two years."
"	"	"	"		48,	Substitute "Our" for "Each"

1326,	"	1,	"	45, substitute "**Bundock**" for "**Josie**"
"	"	"	"	51, substitute "**Bundock**" for "**Josie**"
"	"	2,	"	38, substitute "**Chapman**" for "**Josie**"
"	"	"	"	42, substitute "**Chapman**" for "**Josie**"
1327,	"	1,	"	3, substitute "**Bundock**" for "**Josie**"
"	"	"	"	7, substitute "**Bundock**" for "**Josie**"
"	"	"	"	13, substitute "**Bundock**" for "**Josie**"
"	"	"	"	21, substitute "**Bundock**" for "**Josie**"
1329,	"	"	"	23, after the word "market" insert the words "without the issuance of a notice of compliance,"
1330,	"	"	"	21 & 22, after the word "preparations" insert the words "requiring laboratory investigation."
"	"	2,	"	7, substitute "**Bundock**" for "**Josie**"
"	"	"	"	32, Substitute "$6" for "$7"
1335,	"	1,	"	23, substitute "**Bundock**" for "**Josie**"

Issue No. 58

June 10, 1969.

Title page, under heading "Witnesses",	For "Mr. D. Kay", substitute 'Mr. Z. Kay".
Page 7067, col. 1, second paragraph from bottom,	For "Mr. D. Kay", substitute 'Mr. Z. Kay".
Page 7067, col. 1,	Strike out last five lines in col. 1 and first five lines in col. 2, and substitute: "Basically, what I think is involved here is not only the point of justice but indeed parity. What do the social scientists and the humanities people in this country mean? Simply, that we have been lagging far behind. I think it commendable that every individual organization and association has come forward in the hope of making an effective impact upon the members of the committee.".
Page 7067, col. 2,	Strike out lines 9 and 10 and substitute: "Let us look at some of the aspects in this survey, 'Federal Expenditures on Research in the Academic Community'".
Page 7068, col. 2, in the penultimate line:	For "thank God", substitute "please God".

Issue No. 61

June 12, 1969.

Page 7331, col. 2, last paragraph,	For "Mr. Biggs", substitute "Mr. Greenshields".
Page 7332, col. 1, second and fourth paragraph:	For "Mr. Biggs", substitute "Mr. Greenshields".

Issue No. 70

June 20, 1969.

Page 8273, col. 2,	Delete lines 26, 27 and 28 and substitute the following: "Our company has, in the last nine years, done roughly $600 million worth of business, of which about 80% has been exported".

Second Session—Twenty-eighth Parliament

1969-70

THE SENATE OF CANADA

PROCEEDINGS

OF THE

SPECIAL COMMITTEE

ON

SCIENCE POLICY

The Honourable MAURICE LAMONTAGNE, P.C., *Chairman*

The Honourable DONALD CAMERON, *Vice-Chairman*

No. 3

BRIEFS NOT SUPPORTED BY ORAL EVIDENCE:

39. Brief submitted by the Canadian Peace Congress.

21721—1

MEMBERS OF THE SPECIAL COMMITTEE

ON

SCIENCE POLICY

The Honourable Maurice Lamontagne, *Chairman*

The Honourable Donald Cameron, *Vice-Chairman*

The Honourable Senators:

Aird	Grosart	Nichol
Bélisle	Haig	O'Leary (*Carleton*)
Blois	Hays	Phillips
Bourget	Kinnear	Robichaud
Cameron	Lamontagne	Sullivan
Carter	Lang	Thompson
Desruisseaux	Leonard	Yuzyk
Giguère	McGrand	

Patrick J. Savoie,
Clerk of the Committee.

(Quorum 5)

ORDERS OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate, Tuesday, October 28th, 1969:

The Honourable Senator Lamontagne, P.C., moved, seconded by the Honourable Senator Burchill:

That a Special Committee of the Senate be appointed to consider and report on the science policy of the Federal Government with the object of appraising its priorities, its budget and its efficiency in the light of the experience of other industrialized countries and of the requirements of the new scientific age and, without restricting the generality of the foregoing, to inquire into and report upon the following:

(*a*) recent trends in research and development expenditures in Canada as compared with those in other industrialized countries;

(*b*) research and development activities carried out by the Federal Government in the fields of physical, life and human sciences;

(*c*) federal assistance to research and development activities carried out by individuals, universities, industry and other groups in the three scientific fields mentioned above; and

(*d*) the broad principles, the long-term financial requirements and the structural organization of a dynamic and efficient science policy for Canada.

That the Committee have power to engage the services of such counsel, staff and technical advisers as may be necessary for the purpose of the inquiry;

That the Committee have power to send for persons, papers and records, to examine witnesses, to report from time to time, to print such papers and evidence from day to day as may be ordered by the Committee, to sit during sittings and adjournments of the Senate, and to adjourn from place to place;

That the papers and evidence received and taken on the subject in the preceding session be referred to the Committee; and

That the Committee be composed of the Honourable Senators Aird, Bélisle, Blois, Bourget, Cameron, Carter, Desruisseaux, Giguère, Grosart, Haig, Hays, Kinnear, Lamontagne, Lang, Leonard, McGrand, Nichol, O'Leary, Phillips (*Prince*), Robichaud, Sullivan, Thompson and Yuzyk.

In amendment, the Honourable Senator Haig moved, seconded by the Honourable Senator Grosart, that the motion be not now adopted, but that it be amended by striking out paragraph 3 thereof and substituting therefor the following:

"That the Committee have power to send for persons, papers and records, to examine witnesses, to report from time to time, to print such papers and evidence from day to day as may be ordered by the Committee, to adjourn from place to place, and notwithstanding Rule 76 (4), to sit during sittings and adjournments of the Senate."

After debate, and—

The question being put on the motion in amendment, it was—

Resolved in the affirmative.

The question being put on the motion of the Honourable Senator Lamontagne, P.C., seconded by the Honourable Senator Burchill, as amended, it was—

Resolved in the affirmative.

ROBERT FORTIER,
Clerk of the Senate.

BRIEF NOT SUPPORTED BY ORAL EVIDENCE

The Committee has received many briefs which were not supported by oral evidence given before it. It has been decided to print these briefs separately from the ordinary Proceedings, in several volumes, of which this is the fifth.* The brief printed in this volume is as follows:

39. Brief submitted by the Canadian Peace Congress.

Patrick J. Savoie,
Clerk of the Committee.

*Volumes 1, 2 and 3 have been printed in Proceedings Nos. 78, 79 and 80 of the Special Committee on Science Policy, First Session, Twenty-Eighth Parliament. Volume 4 has been printed in Proceedings No. 2 of the Special Committee on Science Policy, Second Session, Twenty-Eighth Parliament.

APPENDIX "39"

BRIEF SUBMITTED TO THE SPECIAL COMMITTEE ON SCIENCE POLICY BY THE CANADIAN PEACE CONGRESS

P.O. Box 218, Station Q
Toronto 7, Ontario

10 March, 1969.

The Secretary,
Senate Committee on Science Policy,
The Senate,
Ottawa.

Dear Sir:

In response to the invitation of the Honourable Maurice Lamontagne of January 10, 1969, which we highly appreciate, the Canadian Peace Congress submits this brief to the Senate Special Committee on Science Policy.

The Canadian Peace Congress is composed of a number of associations in all parts of Canada which support its work for Peace based on three principles:

1. Peaceful co-existence of all nations regardless of differences in political, economic, social, and ideological systems.
2. Universal and complete controlled disarmament, in particular abolition of nuclear arms and of all other means of mass destruction.
3. Self-determination of all nations, free from foreign interference in any form; abolition of colonialism and neo-colonialism.

The Canadian Peace Congress is an educational, not a research organization. However, it is engaged in the dissemination of the results of relevant research carried out by other organizations and individuals. It is therefore vitally interested in such research. The C.P.C. shares the view of the late Albert Schweitzer that the gap between the success of science in enabling man to control his relations to nature and its failure to enable man to control the relations between men endangers the very survival of mankind. We therefore urge that Canadian Science Policy give greater emphasis to Social Science than has been done up to the present.

A. Strong support for the Canadian Peace Research Institute.
B. Strong support for universities and other qualified independent researchers for work in the following fields:
   1. Psychology and sociology of conflict and conflict resolution.
   2. The history and culture of other nations with particular regard to their role as determinants of attitudes and behaviour in international relations.

3. International Law and the role of organizations created for the development and implementation of International Law, such as the United Nations and the World Court.
4. Canada's role in carrying out international obligations, in particular as a member of the Control Commission in Vietnam.
5. The effects of past and proposed policies for the maintenance and strengthening of Canada's political, economic, and cultural independence.
6. The history of international relations in the post-war period, the origins of the Cold War and of military alliances, with particular emphasis on Canada's role.
7. The role of the Canadian Defence Establishment in strengthening or weakening the security and independence of our country.
8. The economics of armament and disarmament; development of models for the transfer of the portion of our G.N.P. presently devoted to National Defence to internal and international development.
9. The reasons for the increasing gap between developed and underdeveloped countries and the effect of Canadian trade, aid, and investment on narrowing or widening the gap.

Yours sincerely

for the Canadian Peace Congress

Dr. Hans Blumenfeld.

Queen's Printer for Canada, Ottawa, 1970

Second Session—Twenty-eighth Parliament

1969-70

THE SENATE OF CANADA

SPECIAL COMMITTEE

ON

SCIENCE POLICY

The Honourable MAURICE LAMONTAGNE, P.C., *Chairman*

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