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Report of the
Standing Senate Committee on
National Finance

MATCHING GRANTS PROGRAM OF THE GOVERNMENT OF CANADA

Chairman
The Honourable Fernand-E. Leblanc

Deputy Chairman
The Honourable William M. Kelly

Second Session
Thirty-Third Parliament

August 1988

Report of the
Standing Senate Committee on
National Finance

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ORDER OF REFERENCE

Extract from the Minutes of the Proceedings of the Senate of Tuesday, March 1, 1988:

"With leave of the Senate,
The Honourable Senator Doody moved, seconded by the Honourable Senator Bielish:

That the Standing Senate Committee on National Finance be authorized to examine and report upon the expenditures set out in the Estimates for the fiscal year ending the 31st March, 1989, with the exception of Privy Council Vote 15 (Official Languages).

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

MEMBERSHIP OF THE COMMITTEE
(as of July 22, 1988)

The Honourable Fernand-E. Leblanc, Chairman
The Honourable William M. Kelly, Deputy Chairman

and

The Honourable Senators:

Cools, Anne C.
MacDonald, Findlay
Marsden, Lorna
Olson, H.A., P.C.
Robertson, Brenda M.
Stewart, John B.
Haidasz, Stanley
*MacEachen, Allan J., P.C. (or Frith, Royce)
*Murray, Lowell, P.C. (or Doody, William C.)
Ottenheimer, Gerry
Rossiter, Eileen
Turner, Charles

**Ex officio Member*

Note: The Honourable Senators Atkins, Bazin, Cogger, and Hicks also served on the Committee.

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Introduction

On February 26, 1986 the Minister of Finance announced that $1.08 billion over a four-year period was being added to the budgets of the three research granting councils, the Medical Research Council (MRC), the Natural Sciences and Engineering Research Council (NSERC), and the Social Sciences Humanities Research Council (SSHRC). Of this, $315.9 million was to be allocated to increase their annual budgets, an additional $369 million was expected from the private sector, and the remaining $369 million to come from federal matching of private sector contributions. (The government has subsequently increased these amounts to $380.2 million.) This amount was to be used under the newly created Matching Grants Program. The five-year expenditure plan for the three councils covering the period 1986-87 to 1990-91 is shown in the table in the annex.

The government's intention was to raise the base-level budgets in 1986-87 for the three councils from $480.4 million to $562 million. For each of the subsequent four years, the budgets were to be frozen at $537.7 million. Any increase in each of the councils' budget was to come from the Matching Grants Program. Subsequently, in May 1988, the Government altered that policy and announced that the base budgets of the three councils would increase annually over the next five years.

In a federal document entitled STRENGTHENING THE PRIVATE SECTOR/UNIVERSITY RESEARCH PARTNERSHIP: THE MATCHING POLICY RULES, the Government of Canada established three objectives for its Matching Grants Program:

> to increase, in partnership with the private sector, the overall level of university-based research, research training, and directly related activities,
>
> to increase the overall level of private sector-university collaboration in terms of both the mutually desired direction of university research and the transfer of the results of that research for application by the private sector,
>
> to encourage joint research activities that capitalize on the strengths and interests of the private sector and the universities for the economic and social benefit of Canadians. (page 6)

The Committee's intention in reviewing these estimates was to examine and report on the effectiveness of this program. The Committee was also aware that this current review could highlight possible elements that should be considered when the government undertakes a review of this program in 1989-90.

The Committee heard from the following witnesses:

April 21, 1988:

Ministry of State, Science and Technology Canada:
Mr. Al Cobb; Director General, University and Research Councils;

Mr. J.A.D. Holbrook, Manager, Science and Technology Data Intelligence Branch.

Natural Sciences and Engineering Research Council:
Dr. A.W. May, President.

May 5, 1988:

Social Sciences and Humanities Research Council:
Mr. Ralph Heintzman, Director General, Programs;
Mr. Gaston Bouliane, Treasurer and General Director, Administration Branch;
Mr. Pierre Chartrand, Acting Director, Financial and Administrative Services;
Mr. Alan Fox, Senior Policy Analyst.

May 12, 1988:

Medical Research Council of Canada:
Dr. Pierre Bois, President;
Dr. Lewis Slotin, Director, Programs Branch.

Alcan International Ltd.:
Dr. Hugh Wynne-Edwards, Vice President, Research and Development.

May 19, 1988:

University of Toronto:
Professor David Nowlan, Vice President, Research;
Ms. Carole Gillin, Director, Office of Research Administration.

All the witnesses provided excellent testimonies and the Committee wishes to thank them for their efforts.

PART ONE

The Matching Grants Program

Witnesses from the three research granting councils explained that the government matches eligible private sector contributions to university research by providing this money directly to the general operating budgets of the councils. While the councils must use the government matching grant to support the direct costs of university research, there is no condition that it be used specifically to support university-industry related research. There is also no condition that any part of the government portion be used to reward the university or individual researcher for their efforts in generating the private sector support. There are, however, some differences in the way the councils use this matching grant.

NSERC has been trying to encourage university-industry cooperation for some time, but began a formal university-industry (UI) program in 1984 to encourage much closer ties between these two sectors. Through this program, NSERC jointly funds university-based research activities with the private sector. With the start of the matching grants program, NSERC decided to devote its federal matching grants to its UI program. Any unused portion would then be used to support other program activities. For the first year of the program, NSERC received $25.4 million in federal matching contributions and devoted $20 million to the UI program in 1987-88. Officials from NSERC told members of the Committee that they expected to receive $40 million in federal matching grants for 1988-89 and anticipated spending close to $30 million on the UI program.

In addition to allocating the first draw of the matching grants to its UI program, NSERC also provides some incentive to universities for generating private sector support. For the first year, 1986-87, NSERC gave 10 per cent of the maximum federal contribution, or $2.54 million, to the universities generating the private sector support. Because the eligible support amounted to $68 million, the actual incentive was reduced to 3.7 per cent. For 1987-88 and 1988-89, the incentive is set at 20 per cent and 30 per cent of the maximum federal matching grant, or $8.1 million and $19.2 million, respectively.

For NSERC, fifty institutions reported receiving private sector contributions of $68 million in 1986-87. Of this, $39 million came from the business sector with 61 per cent of that coming from Ontario and 16 per cent coming from Quebec. The reported contributions received by each university are unevenly distributed with the universities of Toronto and Waterloo each receiving approximately one-sixth of the total. The top five schools (Waterloo, Toronto, McGill, Queen's and Alberta) account for half the total. In fact, twenty universities account for close to 90 per cent of this total. Chart One in the annex compares NSERC's and SSHRC's experience in this area.

Prior to the Matching Grants policy, SSHRC did not have any specific program to encourage university-private sector collaboration. In the 1986-87 fiscal year, SSHRC introduced its Canada Research Fellowships program to increase the career opportunities of promising researchers in the social sciences and humanities. While this program was to be financed jointly by the private sector, SSHRC reported that there was virtually no response from the business community. Virtually all the money used for this program came from the endowments of universities, which according to government guidelines, are eligible for federal matching grants.

SSHRC reports that in 1986-87, fifty-one institutions received $24.7 million in private sector contributions that were eligible for federal matching grants. Of this, only 17 per cent came from private businesses. University endowments, providing 35 per cent of the total, were the largest single source of eligible contributions. (See Chart Two in the annex for comparisons between NSERC and SSHRC of these data.)

The University of Toronto, with 23 per cent of the total, was the largest single recipient. The University of Alberta followed with 10 per cent . Just as with NSERC, five schools (Toronto, Alberta, Queen's, York and Ottawa) generated over half the total contributions.

SSHRC, like NSERC, provides an incentive to the universities that generate the private sector contributions. In the first year SSHRC intended to provide 20 per cent, or $1.2 million, of the federal contribution of $6 million. However, due to the ineligibility of the private sector contributions made under the Canada Research Fellowship program, this was reduced to $840,000.

MRC, like SSHRC, did not have any program in place to foster university-industry activities directly. Following the announcement of the matching grants policy, MRC adopted the objective of enhancing the interaction between university and industry researchers in the health sciences. In 1987-88, the first year of its UI program, MRC reported spending $600,000 and indicated that they expected this to rise to $3 million in 1988-89. Industry contributions under the program are expected to equal about half of MRC's support.

MRC also indicate that they have been supporting university-industry collaboration since 1980, but without a formal program. In 1986-87 contributions by industry to MRC-funded research (mainly from the pharmaceutical sector) amounted to $7.7 million. Over the same period, MRC contributed $10.8 million to these projects.

Details about the source of eligible private sector support and the universities which received this support under the Matching Grants Program were not provided by MRC. It did report, however, aggregate information indicating that it had exceeded the amount that the government was prepared to commit, thereby insuring that it received the maximum of $13.1 million for 1987-88. It should be noted that only the amounts from private agencies such as the National Cancer Research Institute and the Heart Foundation that exceed $65 million are eligible for federal matching grants. This minimum amount was the aggregate level of university research supported by these private agencies in the year before the beginning of the program.

PART TWO

Issues for consideration

When the Committee began its examination of the estimates associated with the Matching Grants Program, it was aware that the government was planning to review the effectiveness of the program in the 1989-90 fiscal year. From its previous report on COMPREHENSIVE AUDITING, members of the Committee are well aware that measuring effectiveness in the broadest sense means much more than determining whether the program achieves its intended results. It was one of our intentions in producing this report to outline some of the characteristics of effectiveness that are appropriate for this program and to indicate our findings to date.

Appropriateness of the Program

Is the design of the program appropriate for meeting the objectives?

The objectives of the program essentially are to get the universities and the private sector to increase their overall level of collaboration and the volume of university-based research. Yet the program the government and the councils have designed offers nothing to individual researchers for seeking out private sector support. Any incentives paid go directly to the general research budgets of the universities and not to the projects supported by private sector money. (Professor Nowlan did inform the Committee that the University of Toronto was an exception and returned some of the money to the individual researchers who generated the initial private sector contribution.)

In addition to the lack of incentives within the program design, the definition of the private sector established by the government and used in this program may be flawed. That definition includes the following:

- businesses;
- individuals;
- designated Crown Corporations;
- private non-profit organizations;
- private foundations and trusts, e.g. university endowment funds;
- charitable organizations.

As indicated earlier, SSHRC reports that for 1986-87, $3.7 million, or 15 per cent of the total eligible contributions from the private sector, came from business organizations whereas university endowment funds represented the largest single contributor providing $10.5 million, or 42 per cent of the total. NSERC reported that 57.3 per cent of its eligible contributions of $68.1 million came from the business sector while university endowment trusts contributed $10.1 million, or 14.8 per cent of the total. While the MRC did not provide such information, Dr. Bois, President of the MRC, indicated that a large share of the eligible contributions came from the drug companies.

It would appear that the broad definition of the private sector has had a significant impact on the level of eligible contributions, particularly for SSHRC and to some extent for

NSERC. If the government matched eligible contributions from the business sector only, SSHRC would have been eligible for $3.7 million in the first year of the program or $2.3 million less than they did receive. NSERC still would have received its full complement of $25.4 million since the business sector contributed almost $39 million.

But if the intent behind the objectives of the program was to increase the level of university-business collaboration, the broad definition of the private sector clouds the extent to which that collaboration has occurred. Alternatively, without this broad definition, SSHRC would have had difficulty in obtaining the maximum federal contribution. The Committee was told that the university community had requested that university endowment funds be included in the definition and we can see why they would want this. But is it really appropriate? This is the kind of question we would hope that the evaluators will consider when they review the program.

Achievement of Intended Results

Is the program achieving what was expected when it was introduced?

From the information received from the three research granting councils there is nothing to indicate one way or another whether the program has been instrumental in generating any *additional* support from the private sector.

In the previous section, we reported on the amounts of money that the councils were receiving from the private sector. The problem is that no one seems to know whether this is more, less or the same level of support than before the program began because that information has not been collected. It may be possible to obtain those data but that would require universities research offices to pull it together, something they have not been asked for and something they might be reluctant to do because of the time and expense. Furthermore, there are no signs to indicate whether private sector support is on the rise since the program began.

Relevance of the Program

Does the program make sense in the context of the problem or condition?

In the document entitled STRENGTHENING THE PRIVATE SECTOR/UNIVERSITY RESEARCH PARTNERSHIP: THE MATCHING POLICY RULES, there is an open letter from the Minister of Finance and the Minister of State for Science and Technology calling for stronger collaboration between the private sector and the universities. It states:

> ...it is anticipated that the transfer of research results to the private sector and the speed of their application for the economic and social benefit of the country will be significantly enhanced

This statement implies that the problem we face in Canada is an inadequate level of new knowledge being transferred from university labs to the marketplace. Dr. Wynne-Edwards, Vice President, Research and Development from Alcan International Ltd. told the Committee that this was not really an accurate understanding of the matter. He said:

> The objective of the scientist in the university system is to produce new knowledge and to publish it internationally.....A lot of it is done and published internationally in order to access the rest of the world knowledge in that field. No matter how munificent the taxpayer in Canada becomes we will never perform more than 1 or 2 per cent of the

research going on in the world. So a major task of universities is to be a listening post, to gather the other 98 or 99 per cent going on elsewhere. Part of the competitive situation we are in now is that other countries are much better than we are at picking up that knowledge and making money out of it. The problem does not lie in universities, but in Canadian business. (Page 31: 24)

Dr. Wynne-Edwards did not mean that industry wants universities to stick to basic research while it will carry out the applied side. Professor Nowlan refined this argument by pointing out that the concepts of basic or curiosity research, and applied research are outmoded. He contended that a better classification is to consider research as either pre-competitive or competitive. Using this classification, industry is more than willing to see universities engage in research that does not have direct application to the market.

Professor Nowlan pointed out that this kind of research needs to be published and exposed to peer review so that the best ideas are honed and refined. If these ideas reach the competitive stage and have direct application to the market place, industry will be likely to terminate their university collaboration on that particular activity and continue the applied research in their own labs.

None of this means that university-industry collaboration should be discouraged. Rather, it means that high expectations of important results from this collaboration are likely to be disappointed. From our hearings, the message seems to be that university-industry collaboration is necessary to establish the networks so that our best minds are pursuing pre-competitive ideas in areas where Canadians are capable of undertaking world-class research.

The Committee hopes that when the government begins its evaluation of this subject, it will look at what Canada hopes to achieve to encourage universities and industry to collaborate. If we are trying to increase the competitive stage of research, then we may have to strengthen the incentives to industry to do this kind of research. In doing so, we will have to understand that the nature of this kind of research makes it secretive because it will have direct application to the marketplace Alternatively if we want to increase the collaboration of industry and universities in the pre-competitive stage of research, then we should not necessarily expect it to have direct application to the market in the immediate future or ever.

These are the issues that should be looked at to determine if the program in place is relevant to the condition or problem we are trying to resolve.

Acceptance by the Community

Has the community accepted this program?

We define the community as the clients or the direct participants in the program. This includes the three research granting councils, the universities and their research staff, and the private sector contributors.

The three research granting councils are the direct clients of the government, leaving the university community and the private sector at arm's length from the primary source of the money. In fact, the government has been deliberate in maintaining this relationship and allows the councils a considerable amount of room in deciding how to use the federal contribution. Where the government has intervened is in establishing a definition for the private sector, and in placing conditions on the definition of eligible research activities, limiting these to such areas as research

projects and equipment, research training and development, and university chairs. It does not allow activities primarily related to education nor investment in land and buildings.

The clients of the research granting councils are the universities and the research community. It is individual researchers who first report to their universities that they have received a research grant from a private sector donor. The universities in turn report to the research granting councils the total amount of eligible private sector contributions they have received. The research councils then decide how much, if any, they will return to the universities as an incentive for generating the grant. And it is up to the individual university to decide how much, if any, to return to the individual researcher or project as an incentive for generating the grant that started the whole chain of events.

From the evidence heard, the Committee concluded that at the present time there is nothing to indicate that the program has gained any acceptance or positive endorsement by all the key players. With respect to the research granting councils, they clearly want the program to succeed, but their acceptance seems to be clouded by the fact that they always are in need of additional money. With respect to the universities, they too want the program to succeed, but like the granting councils, they see this program as a new-found source to create and support research activities that are not supported elsewhere. But the group that is essential to the success of the program, the individual researchers and the private sector donors, see virtually nothing new in this program compared to what was available to them before the program started.

Secondary Impacts

When this program was first announced, there were many who were critical of its success because of its design and more importantly because of the inappropriateness of the objectives established for it. Many observers felt that the principal issue that had to be faced was not a need for increased collaboration between universities and industry, but the shrinking budgets (in real terms) of the three research granting councils. In our report on FEDERAL POLICY ON POST-SECONDARY EDUCATION we supported the view that the research granting councils should have their base budgets increased in line with inflation. This did not mean that we supported all the work of these councils but we felt that there was, and still is, a role for the kind of research that the councils support and that it should not be diminished simply by erosion through inflation. Yet that is what the government had been doing until its announcement in May 1988 to increase the base budgets of the councils by $200 million over the next five years. This program, which started out with the objective of increasing the level of collaboration between academia and business appeared just as much geared to increasing the level of the granting councils' funding base. Yet in trying to do both, it appears that neither is being done very well. The councils have been relying on funding increases that are conditional upon private sector participation; yet there is no incentive to encourage that participation.

In addition to this program being an inappropriate way to augment council budgets, it also redistributes this money to the large research universities. Earlier we described how five universities (Waterloo, Toronto, McGill, Queen's, and Alberta) accounted for half the reported income from the private sector under NSERC rules. For SSHRC, five universities (Toronto, Alberta, Queen's, York, and Ottawa) also accounted for about half the reported income in the first year of the program. We are not saying that this is wrong, but the government must realize that this is a secondary and possibly unintended effect of the program.

These secondary effects of this program, i.e. the impact on council budgets and the redistribution of research dollars, must be considered when the government reviews this program next year.

Cost of Administering the Program

Any review of a broad-based definition of effectiveness must include an examination of the economy and efficiency of the operation. The Committee did not spend a lot of time on this subject but did discover some interesting facts. First, the granting councils had to engage additional staff to administer the program. In fact, Dr. May, President of NSERC, told the Committee that NSERC added sixteen persons to administer the program. Yet no part of the money the universities received from the councils could be used for administrative purposes. Dr. May told the Committee that he expected the universities to engage additional staff to administer the Matching Grants Program. But Ms. Carol Gillen informed the Committee that the University of Toronto had not hired any new people to handle its administration. There is little doubt that without these resources, the universities would be hard pressed to administer this program effectively. The Committee hopes that when the government looks at the effectiveness of this program, it will examine the extent to which there are inadequate resources to make the program operate effectively.

The Committee recognizes that this policy of not using research money from the granting councils for administrative support is consistent with the practice of the councils before this program began. The Committee believes it is wrong for the government to assume that the overhead costs of research will be covered out of general operating money of universities. This too was a matter we looked at in our report on FEDERAL POLICY ON POST-SECONDARY EDUCATION, where we recommended that when the government supports research at universities, either through a grant or under contract, the overhead costs of that research should be covered fully.

PART THREE

The Next Step

While our Committee decided not to question the objectives of this program at this time, it became very clear that the Matching Grants Program of the federal government needs very careful and serious examination because it appears to contain some serious flaws. These range from a program design that is unsuited to meeting the objectives established for it, to the achievement of program results that may never have been intended.

At this stage we would like to offer some suggestions for a redesign of the program that should be considered when this program is to be evaluated.

First, we suggest that there be a reconsideration of the premise for university-industry collaboration. If we need to increase the transfer of ideas from the universities to industry, the solution may not be more university research supported by industry. The problem may lie with industry's inability to adapt good ideas that are in the pre-competitive stage and move them to the competitive stage and the market. If this is true, then more university research is not the answer; it may require other industrial incentives. The now defunct Special Research Tax Credit program had a very reasonable objective but was flawed by program design.

For more pre-competitive research that is world class, the answer could lie in strengthening the Network Of Centres of Excellence program the government announced in May of this year. But because this program is still in the design stage, it is not possible to comment on its chances for success.

Alternatively, if the government feels that we need to maintain the current level of basic research that now takes place in our universities independent of university-industry collaboration, then the solution is to ensure that the base levels of the granting councils keep up with inflation.

The Report of the University Committee of the National Advisory Board on Science and Technology (NABST) to the Prime Minister also was critical of the attempt by government to try to solve the underfunding problem and the need for university-industry collaboration with one ill-defined program. The report states:

> While conceptually interesting, the matching-grants policy will fail to provide any real increase over inflation before the fiscal year 1989-90. Far from solving the problem of funding university R&D, therefore, it simply compounds it. (p.126)

We note that the government has announced an additional $200 million increase in the budgets of the three councils over the next five years. This appears to be very close to estimates for inflation over this period.

The report of the University Committee of NABST also states that:

> The major flaw in the matching-grants policy is that it attempts to achieve too much and fails to address the fundamental issue. While the objective of increasing collaboration and joint research activities between the private sector and the universities can be met, it is unrealistic to expect this policy to solve the overall problem...Thus the design of the matching-grants policy leaves much to be desired. (p.128)

While we have focused on the University Committee of NABST, its Industry Committee also was very critical of the Matching Grants Program.

PART FOUR

Conclusions

To conclude this report, the Committee offers the following suggestions for the redesign of a Matching Grants Program.

Recognize that research in the social sciences and humanities is different from research in the natural sciences and engineering, which in turn is different from medical sciences research. A sophisticated understanding of these significant differences is essential in designing a program of university-industry collaboration. The kinds of industry that support each of these three divisions of research are considerably different from one another and have considerably different access to financial resources to support research.

Recognize that if the objective of the program is to encourage university-industry collaboration, including university endowment funds as part of the private sector does not meet that objective. The inclusion of this category seems to be there simply to allow social sciences and humanities to get the maximum federal matching of private sector contributions.

Recognize that if the objective is to encourage an increase in support from the private sector, then there has to be some encouragement to the researchers and universities to solicit this support, and there has to be an incentive for the private sector to increase their contributions from their current level of support. This means providing overhead funding so that universities can develop such a program.

Recognize that before it renews this program, the government must undertake a thorough broad-based evaluation of its operation to date. While the government is already committed to undertaking a review, we wish to stress that such a review must not be so narrow as to focus exclusively on whether the program has met its objectives. It must include a review of other factors that go into any broad-based measurement of effectiveness. This includes such elements as the appropriateness of the program, its relevance to the stated needs, its acceptance by the community it is intended to serve, its secondary and unintended effects, and the cost of its delivery.

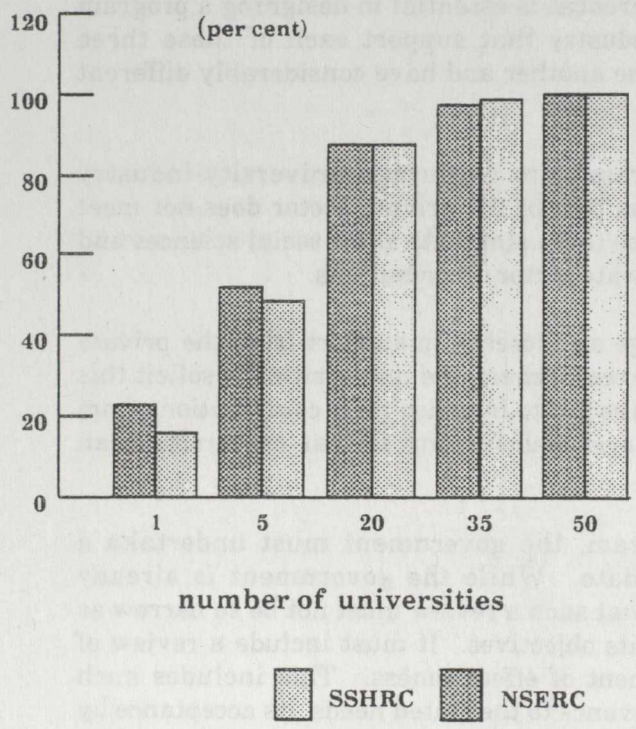
The review must include an examination of the original purpose of the program and an evaluation as to whether the achievements of this program are still appropriate. This also means consideration of whether there are better ways of achieving the stated objectives such as alternative programs like the new Network of Centres of Excellence program or special strategic grants through the research granting councils.

Lastly, if the government is to undertake this broad-based review in 1989-90, it should begin now by paying special attention to the design of the evaluation and by submitting it to the program clients to ensure that the evaluators will be looking at the right things. For example, it may be that a special evaluation committee should be set up to advise the Minister or Deputy Minister on what is an appropriate set of elements that should go into this evaluation. We look forward to seeing the results of this evaluation and serve notice that we may call on the department at the beginning of the next fiscal year to explain how the department will undertake this evaluation.

ANNEX

CHART ONE

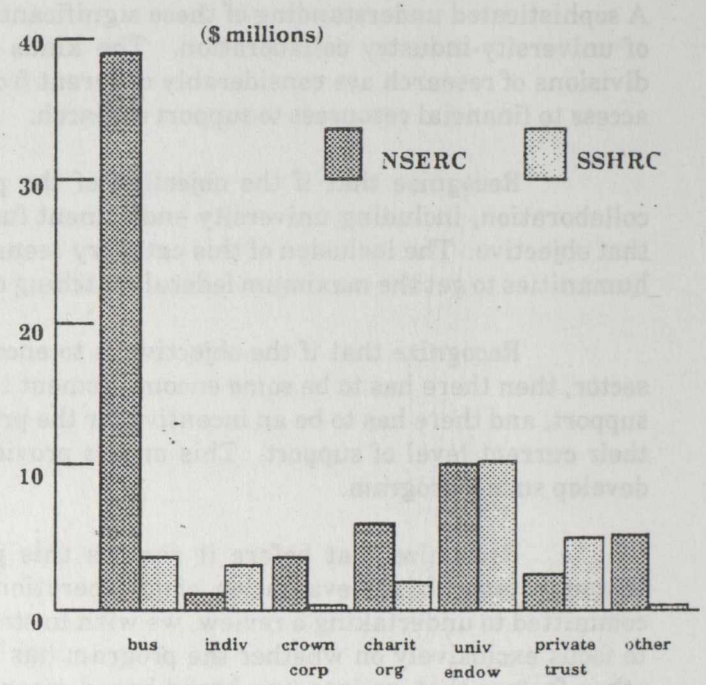
Cumulative Distribution Matching Grants 1986-87



Source: SSHRC and NSERC

CHART TWO

Source of Contributions 1986-87



Source: SSHRC and NSERC

TABLE ONE

THE FEDERAL 5-YEAR PLAN FOR UNIVERSITY RESEARCH

($ MILLIONS)

	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1986-91
1. TOTAL OF THREE GRANTING COUNCILS							
a. Base Budget	536.7	562.0	537.7	556.7	560.7	575.7	2792.8
b. Federal matching of PrivateSector Contributions, Maximum	-	-	44.5	69.7	110.3	155.7	380.2
c. Anticipated Private Sector Contributions	-	-	44.5	69.7	110.3	155.7	380.2
d. Total Anticipated Funds	536.7	562.0	626.7	696.1	481.3	887.1	3553.2
2. NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL							
a. Base Budget	311.6	324.1	312.6	322.6	324.6	331.6	1615.5
b. Federal Matching of Private Sector Contributions, Maximum	-	-	25.4	40.5	64.0	90.4	220.3
c. Anticipated Private Sector Contributions	-	-	25.4	40.5	64.0	90.4	220.3
d. Total Anticipated Funds	311.6	324.1	363.4	403.6	452.6	512.4	2056.1
3. MEDICAL RESEARCH COUNCIL							
a. Base Budget	161.4	167.9	161.4	167.4	168.4	174.4	839.5
b. Federal matching of Private Sector, Contributions, Maximum	-	-	13.1	20.9	33.2	46.8	114.0
c. Anticipated Private Sector Contributions	-	-	13.1	20.9	33.2	46.8	114.0
d. Total Anticipated Funds	161.4	167.9	187.6	209.2	234.8	268.0	1067.5
4. SOCIAL SCIENCES AND HUMANITIES RESEARCH COUNCIL							
a. Base Budget	63.7	70.0	63.7	66.7	67.7	69.7	337.8
b. Federal Matching of Private Sector Contributions, Maximum	-	-	6.0	8.3	13.1	18.5	45.9
c. Anticipated Private Sector Contributio	-	-	6.0	8.3	13.1	18.5	45.9
d. Total Anticipated Funds	63.7	70.0	75.7	83.3	93.9	106.7	429.6

EVIDENCE

Ottawa, Thursday, April 21, 1988

[*Text*]

The Standing Senate Committee on National Finance met this day at 11.00 a.m. to examine the Main Estimates laid before Parliament for the fiscal year ending March 31, 1989.

Senator Fernand-E. Leblanc (*Chairman*) in the Chair.

The Chairman: Honourable senators, our first witness this morning is Mr. Alan Cobb from the Minister of State for Science and Technology. Mr. Cobb, you may proceed with your opening statement.

Mr. A. L. Cobb, Director General, Universities and Research Councils Branch, Ministry of State for Science and Technology: Mr. Chairman and senators, I am not sure that I will entertain you, but I will do my best to inform you. We at the Ministry of State for Science and Technology are pleased to be your first witnesses as you examine the federal government's matching policy for the funding of university research. Ours is a policy ministry as opposed to an operating department, and I shall therefore restrict my opening remarks to an explanation of the matching policy, its financial provisions and the overall results of the program to date in its first year. I shall leave the more detailed explanation of how the policy is implemented to the three research grant councils who will be appearing before you at a later time, but I will do my utmost to answer any questions you might have.

The matching policy for university research was introduced in the February-1986 federal budget as part of the first-ever five-year financial plan for the three research granting councils. Under this financial plan, the base budgets of the three councils were increased above previously approved levels, with the result that their total base budget, or base funding, was established at the 1985-86 level in current dollars through to the fiscal year 1990-91. The total base budget allocated in that announcement in the federal budget of 1986 amounted to just over $2.7 billion for the five-year period.

At the same time, the federal government introduced a new policy to match private sector contributions to university research with equal funding to the three research granting councils. To support this matching policy the government committed itself to an additional $369 million over four years to 1990-91. Since the matching policy and the associated funding were to come into effect only on April 1, 1987—that is, just over one year after it was announced in February 1986, the budget provided a one-time bridging allocation of over $25 million for the 1986-87 fiscal year.

As recently as last August, the government announced a further $11 million increase in the matching ceilings for the year just passed as one of the first initiatives under InnovAction, the Canadian strategy for science and technology. As a result of

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that latest increase, the new four-year maximum for the matching grants policy is $380 million. It is divided annually with $44 million for last year, the first year of the policy, $69.7 million for this year, and $110.3 million for next year. In the final year of the five-year plan, $155.7 million is allocated. These amounts for the matching policy are in addition to funding provided to the base budgets of the granting councils. Last August the government announced an additional $7 million for the National Sciences and Engineering Research Council to support microelectronics research in universities as part of the earlier-announced federal microelectronics strategy.

To summarize the financial context, the total funding for university research channelled through the three research granting councils for the five-year period to 1990-91, including the private sector contributions under the matching policy, amounts to just over $3.4 billion. This is an increase of over $1 billion, or more than 50 per cent, compared to the previous five-year period from 1981 to 1985. The matching policy provides the opportunity for future growth in the funding available to the councils to support university research. In fact, when the base budgets and the $380 million in federal matching policy funds are added, the councils' budgets will increase by an average of more than 5 per cent per year over the five-year period of the financial plan. University research will benefit further from the $380 million or more that the private sector will contribute to universities that also triggered the federal matching funds. I might add that the federal government, mainly through the three research granting councils, provides about 60 per cent of all external funding of sponsored research at universities. The universities, in turn, perform about 25 per cent of all the research conducted in Canada.

Senator Stewart (Antigonish-Guysborough): Are we talking constant dollars here?

Mr. Cobb: They are current dollars.

Senator Stewart (Antigonish-Guysborough): So we have to discount these percentage increases to the extent of inflation?

Mr. Cobb: Yes.

Senator Stewart (Antigonish-Guysborough): In other words, what appears to be an increase may in reality be a level situation or, indeed, a decrease?

Mr. Cobb: Depending on the level of inflation, that is correct.

Senator Hicks: And 5 per cent would be the critical inflation rate? If the inflation rate was more than 5 per cent per year, the real dollar value would actually decline, would it not?

Mr. Cobb: That is correct. I would draw to the attention of senators the forecast of the Minister of Finance in respect of future projections for inflation rates.

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We have provided the staff of the committee with a document, which we produced in the ministry for the post-secondary education forum held in Saskatoon in October, that gives a great deal of additional information on the overall situation related to university research in Canada.

Next, I would like to address the matching policy objectives. These are stated in a separate document which I believe is also available to you. In announcing the policy the government established three objectives: First to increase, in partnership with the private sector, the overall level of university-based research, research training and directly related activity; second, to increase the level of private sector/university collaboration in terms of both the mutually desired direction of university research and the transfer of the results of that research for application by the private sector; and third, to encourage joint research activities that capitalize on the strengths and interests of the private sector and the universities for the economic and social benefit of Canadians.

I suppose what these three objectives indicate in summary form is the federal government's view of the importance and benefits to be derived from closer and expanded research collaboration between the two sectors; and in recent years, as I am sure the committee may have heard from a number of sources, the same view has been expressed increasingly by the business community and, certainly, by some in the academic and scientific community and by a number of provincial governments.

Between the announcement in the February 1986 budget and the start of the program in April of 1987 we did have substantial lead time. I suppose it is fair to say that in that period of time the new policy generated a very extensive debate in the university community and in the scientific community. This was less so in the business community.

Looking back on that period of time with probably 20-20 vision, it is fair to say as well that it was a highly beneficial period for two reasons: It helped us at the bureaucratic level to structure the terms of the program in such a way that we had the input of the affected parties and, probably equally important, it was a policy that crystallized a debate in the community itself that had been percolating for some time. I think it probably advanced the issue much beyond our expectations when the policy was first introduced. I think the result of that debate was an identification of some of the myths and barriers, both perceived and real, that existed between the two communities that prevented a stronger partnership between the two sectors.

In any event, the lead time we had allowed us, during the summer of 1986, to consult extensively with the business, university and scientific communities in drafting the rules for the matching policy. In November of 1987 the Minister of State for Science and Technology issued the policy rules in a booklet, which, incidentally, is available to committee members. I would also draw your attention to the August 1987 announcement by the minister of the additional increases to the policy.

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I will not go into the absolute detail of these rules in my attempt to summarize them for you. The federal government itself provides funds to the granting councils to match private-sector contributions made directly to the universities by the private sector or to the councils. Of course, there is that $380 billion ceiling, over a four-year period, on the federal government's contribution.

The councils, which operate at arm's length from the government, determine how to allocate these funds, along with their base budgets, across the range of their grant and scholarship programs and, in particular, to their programs that support joint private sector and university research activities. When a council is asked by the universities and the private sector to support the research activity that the private sector is also supporting, that application is subjected to the normal review processes by the council, including peer review.

Where the private sector contributes directly to the university, but ther is no request to the council for public funds, such cases are not subject to peer review by the council since no public funds are involved. However, the councils and universities must certify that the activity supported at the university level by the private sector is eligible. By that I mean that it falls within the normal boundaries of the research that each council supports. In these cases, as well, the councils' budgets will be increased by the amount of the private sector contributions as well.

Senator Hicks: It counts as part of the funds to be matched by the Government of Canada to the councils, is that correct?

Mr. Cobb: Yes, sir.

Senator Hicks: Supposing the activity relates entirely to one council, does the increased money go to that council?

Mr. Cobb: Yes, it goes solely to that council.

Senator Hicks: Therefore, if it is a medical matter it would all go to MRC, is that correct?

Mr. Cobb: That is correct.

Senator Hicks: And if it is an NSERC matter it goes all to NSERC and so on; is that correct?

Mr. Cobb: Yes.

Senator Hicks: What structures have you in place to keep track of this money? Do you rely purely on the initiative of the universities that, say, receive a $50,000 grant from a particular company?

Mr. Cobb: Yes.

Senator Hicks: Do you notify the federal authorities to trigger a $50,000 matching transfer to the appropriate council?

Mr. Cobb: Yes. The funds for each year are held by Treasury Board pending submission by each council to Treasury Board of the details that will satisfy Treasury Board that the contributions made to the university and judged by the coun-

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cils are, in fact, eligible. The universities report directly to the councils. The councils, in turn, report to Treasury Board.

Within the rules, we have defined the private sector broadly to include individuals, businesses, private nonprofit and charitable organizations, private foundations and trusts and certain crown corporations, both federal and provincial.

In addition to that, and in recognition of the strong support that charitable organizations make to university-based health research, the government provides funds to the Medical Research Council to match eligible contributions from such organizations that exceed $65 million per year.

I now turn to the impact of the matching policy. Apart from the $65 million estimate for nonprofit medical research funding, we did not have firm baseline data at the time the policy was introduced. We did, however, have various estimates both from the councils themselves and from Statistics Canada that indicated that industry was contributing somewhere between $48 million and $60 million, or about four per cent of the expenditure in the higher education sector in the 1985-86 year. That, by the way, compared at that time to about 5 per cent contributed by industry in the United States to university research.

The private nonprofit sector, on the other hand, was contributing about 10 per cent of the total funding of research conducted in universities or about $160 million in the 1985-86 year.

More recently, we have, I think, for the first time much more solid data reported by the universities to each of the granting councils on the actual contributions from the private sector for the year 1986-87.

In summary, the total eligible contributions for natural sciences and engineering research reported by the universities to NSERC for the 1986-87 year amounted to $68.1 million. I should note, Mr. Chairman, that a higher amount was reported by the universities to NSERC but the amount judged eligible was $68.1 million. Some of those areas not judged eligible would be things of a routine testing nature done for industry and a number of activities that fall outside the scope of that granting council.

Senator Hicks: Roughly, what would be the amount that would not be accepted as eligible?

Mr. Cobb: I would have to ask Dr. May. He says it is ten per cent.

Senator Hicks: Therefore, the $68.1 million is roughly 90 per cent of the amount submitted for approval, is that correct?

Mr. Cobb: Yes.

In addition, based on that experience, it exceeds the $25.4 million target for the first year of the matching policy. Quite an excess amount was contributed by the private sector in the first year.

In the case of the Medical Research Council, we do not yet have the final numbers. What the council has told us is that their ceiling of $13.1 million for last year has been exceeded

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and that amount is over and above the $65 million baseline that was established. They anticipate no difficulty in meeting or exceeding their targets through the remaining three years of the policy.

I suppose one of the most surprising and most debated issues, when the policy was introduced, was the extent to which the private sector would, in fact, support social sciences and humanities research. The data reported to us by the Social Sciences and Humanities Research Council indicate that in the 1986-87 fiscal year, the total contribution by the private sector to those sciences amounted to $25 million.

The ceiling established in the federal matching policy for last year was $6 million. Just to give you some indication of the scope of it, the ceiling established in the policy for the final year is $18.5 million. It is a very pleasant surprise to all of us in the system, and clearly that council will also achieve its financial targets.

Senator Hicks: It does mean that, in effect, the federal treasury is not coming anywhere near to matching the sums received in relation to the SSHRC from the private sector.

Mr. Cobb: That is true, senator.

Senator Stewart (Antigonish-Guysborough): In other words, what sociologists call negative reinforcement to contributions in the future?

Mr. Cobb: Not being a sociologist, senator—

Senator Stewart (Antigonish-Guysborough): I think you can guess what the term means.

Mr. Cobb: Yes. The councils themselves will undoubtedly provide you with much greater detail on the performance of their programming and the implementation activity they have undertaken; but to us, at the policy level, it was clear that the policy has been successful in its first year of operation, and in particular has been highly successful in respect of the financial targets that the federal government established at the time it introduced the policy.

There are, however, as committee members will undoubtedly recognize, a number of more fundamental issues and considerations that we have not been able to address to date. Our view is that those can only be addressed by a competent formal evaluation of the policy, given adequate experience with the policy, and the programs associated with it. We plan to conduct that evaluation in the 1989-90 fiscal year.

Some of the questions that we intend to address in that evaluation are the extent to which the policy strengthens the linkage between university research priorities and market forces; the extent and nature of private sector participation; the effects on the council's allocation of funds among the various programs; the effect on the level of overall support for university research; the effect on the mix of university research—that is, by discipline, by basic versus supply of research, size and location of universities, et cetera; the effect on the level of private sector R&D funding; and the effect on the overall level of R&D in Canada.

Those are ambitious undertakings to assess. Nevertheless we will be making that attempt. We do not have the data at the moment to adequately address any of those more fundamental questions.

If I might conclude, we are pleased with the overall results that have been achieved in the first year of the policy. We recognize that we do not have the answers to all of the questions that you and others may have. We need more experience with the implementation of the policy and more data. We intend to attempt to answer them in the 1989-90 fiscal year.

However, I think it fair to say that within government we are very encouraged and highly optimistic that this policy will have a significant impact on bringing the two sectors—the private sector and the university—into closer collaboration in the research area. I will be pleased to answer any questions.

The Chairman: Thank you, Mr. Cobb. Senator Hicks, before you leave, do you have any questions?

Senator Hicks: I do not want to preempt other people's rights, but I will make one observation. First, I was surprised to find the $24.7 million figure relating to the SSHRC—Social Science and Humanities Research Council. But that is broken down into $10.5 million, which came from university endowments or trust funds and was there anyway; and, according to figures in front of me, $2 million came from charitable organizations and $3.4 million from private foundations. So that only $3.6 million came from private businesses, and so on.

So if you are going to include in those figures moneys that the universities were already receiving—let me switch away from SSHRC for a moment—I should say that at the university with which I have been most familiar, we have a medical research foundation. We have been very successful. We started it only about seven or eight years ago. We are now up to almost to a $10 million capital amount and it is now generating nearly $1 million per year. That will be sent in and most of it will then be eligible for matching grants from the federal treasury to the Medical Research Council; is that so?

Mr. Cobb: Such endowments are eligible to generate additional funds to the council, to the extent that the university decides to spend money on eligible research. In other words, the capital in the endowment is not eligible.

Senator Hicks: Of course not; I understand that.

Mr. Cobb: But it is an incentive.

Senator Hicks: The point I am making is that if the figures I have just quoted—and I cannot give you the source—about the SSHRC are correct, then you have $10.5 million that came from university endowment or trust funds, and it is an ongoing thing. So the SSHRC will qualify for the maximum amount of transfers, provided that the $10.5 million is spent on eligible

projects, and so on. So, in other words, it really is not necessary to get another dollar from other sources in order to put the SSHRC in a position where it qualifies for the maximum amount of transfer.

Mr. Cobb: That was in our consultations in the summer of 1986 in developing the rules. The universities themselves in particular were very strong on the point that the income from such endowments be eligible, and you are quite correct that it is there in place at the moment, but not in every university. It varies from university to university, obviously. I suppose the argument might be made that it is an additional incentive being eligible under the matching policy for universities to direct income from those sources to eligible research.

Senator Hicks: With this proviso, that the matching money doesn't come to the university that is most effective in directing its research into qualified areas; the additional money that is transferred goes to the SSHRC, or whatever the council may be.

Mr. Cobb: Yes. The university itself, in the case of SSHRC, then has two ways in which to access that money—and that council can explain it in more detail than I can. First, it can make submission to the council for funding of individual projects; and, secondly, that council has an incentive scheme in place whereby at the end of the year it provides a proportionate amount of incentive back to the university president's fund for distribution to research within the university.

Senator Hicks: The specific university, or in the president's fund which is then divided by another formula?

Mr. Cobb: University by university.

Senator Hicks: Thank you, Mr. Chairman.

Senator Marsden: The review in 1989-90 will be interesting indeed. You did not say anything about the problem of overhead. I gather that nothing is changed there.

Mr. Cobb: No; you are correct in that I did not say anything about overhead, and nothing has changed. Currently council's support are grants in aid of research. It does not incorporate support for the overhead cost of research. The position that has been expressed by a number of federal government representatives is that the support to the overhead costs of research is provided through the transfers under EPS. I am aware of representations made by both the Senate committee in its report last year on post-secondary education, and others who have made a contrary proposition. At the moment nothing is changed.

Senator Marsden: And it is not listed as one of the items for review in 1989-90?

Mr. Cobb: No.

Senator Marsden: I would like to know a little bit more about the development of what is new policy, but not a new idea, of matching grants. From your point of view inside the ministry, it is quite clear what are the general aims of the policy; but can you tell us a bit more about the background that is done inside the ministry to see if it would be a workable

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policy. In other words, did you do any research of a comparative nature—that is, in other countries? Did you do systematic research in industry and elsewhere to see whether the aims could be achieved, before the policy was announced?

Mr. Cobb: The short answer to your question is no, for two reasons: first, personally I was not in the ministry prior to November 1985 and therefore I was not associated with the development. Secondly—with due respect, I appreciate the intent of your question—it is probably a question that the minister himself would likely wish to answer.

Senator Marsden: Perhaps, but it would be very helpful indeed if you could let us know later on whether there is background work on it, because this is not a new idea. People have been talking about this for a long time. So it certainly was not launched straight out of the minister's mind. I might say that this is not intended as a political question. I am really interested in whether this idea can work, because, as you know, there is a body of thought that suggests that this is not the way to go about creating a climate for R&D in any society, and it is an empirical question as to whether or not that is correct. So perhaps, Mr. Cobb, if you could get back to us on that question, that would be very helpful indeed.

Mr. Cobb: Yes.

Senator Marsden: You issued a document recently—and I regret I do not have it with me—in which you analysed the research done in every ministry in the federal government. In other words, how much research was done inside the ministry and how much was done by contracts and grants elsewhere?

Mr. Cobb: That is right.

Senator Marsden: In an overwhelming number of those departments, over 60 per cent of the research, by my rough calculations, is done inside rather than outside the ministry. I wonder whether that statistic was taken into account in setting up this policy?

Mr. Cobb: Senator, you might wish to access this little booklet which attempts to summarize the overall federal expenditures on science and technology. I would be pleased to provide you later with the available statistics that might address your question.

Senator Marsden: I have the statistics. What I am asking for is the policy basis in the sense that vast amounts of R&D money in this country are spent inside the federal government's own departments. As you said in your brief, the objectives of this program are to increase the overall level of university-based research, research training and directly related activities. To my mind, there is a bit of a contradiction there and I would like to hear what you have to say about that in your position as policy chairman.

Mr. Cobb: In respect to your first question, senator, the policy of the federal government in respect of contracting out more of the research that is now performed in the federal laboratories, for example, has been stated as a policy objective

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of the federal government. We have introduced the technology centres policy as one of the efforts in helping to achieve that goal. The other is what we refer to as the extramural performance policy which has similar objectives with respect to transferring out, particularly to universities, of work that can and should be done within a university context unless a very solid reason can be given as to why it should be done inside. Those reasons would include security or other reasons. Therefore, the policy position is quite clear.

What we were attempting to do with the matching policy, which is not a contracting-out policy, was to attempt to forge a stronger linkage or partnership in research between the private sector itself and the universities. The $380 million provided to the granting councils, over and above their base budgets, was the financial incentive to help achieve that goal. Therefore, I do not see the immediate linkage between the contracting out of government research from government labs to the policy objectives of the matching policy.

Senator Marsden: I am looking for the philosophical explanation as to why it should occur, rather than for the numbers. It is quite obvious that some of the great research in the country has been done by the Department of Agriculture. There is no question about that at all. Also, there is no reason to believe that that research could necessarily have been better accomplished in the universities, so I am asking what is the explanation for why one would have a policy that says that there should be more work done in the universities than inside the government? In other words, I am looking for the ministry's underlying analysis of the situation that led to this policy.

Mr. Cobb: I suppose one of the fundamental views of the ministry is that research and research spending in a university setting, as opposed to that research being conducted in federal laboratories—or even industry laboratories for that matter—produces a secondary benefit that is not ordinarily achieved in a government or an industry laboratory, and that is the production of highly qualified people. Therefore, there is also that element.

In respect of your question as to why the federal government would want to see greater research collaboration between the private sector and the universities, I know the view prevails that universities possess a great deal of expertise. They possess knowledge, not only from their own universities but from the academic community at large and worldwide, that could indeed be beneficial to the industrial sector in particular. Therefore, to the extent both parties work closer together, we would expect that the benefits would be more widely dispersed and exploited by the private sector. Those, I suppose, are some of the philosophical underpinnings of the policy itself. However, senator, I am not sure that I am addressing the question of the linkage that you have raised.

Senator Marsden: Your answer is helpful, because I assume, then, that one of the assessments that you will be making in the 1989-90 period is whether more qualified people are produced. In fact, most of those research funds will go to faculty

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members who would have graduate students attached to them in any event.

Mr. Cobb: Yes.

Senator Marsden: I do not suppose that the funds will be filtered down to the undergraduates in any way, shape or form.

Mr. Cobb: You will recall, senator, that the Prime Minister announced in January the implementation of the Canadian Scholarships Program for undergraduates in science and engineering. The minister, Mr. Oberle, gave further details on that program at the end of March. That is a program directed to the undergraduate level, as opposed to the matching policy.

Senator Marsden: I see, as opposed to through this policy. I suppose we can return to that question when we talk to other witnesses.

Mr. Chairman, I just have one more question at this stage. Mr. Cobb, you said that, so far, you have received value for money. In other words, you have met the objectives of the program and your measure of success was the amount of money emerging from the private sector.

However, your minister sits on the executive committee of the National Advisory Board on Science and Technology and in their university report in December, 1987, they were very critical of the matching grants policy in terms of meeting those objectives. Also, I assume that, as a member of that executive, your minister agrees with those criticisms. Perhaps he does not, but I have not seen him issue anything to the contrary. Therefore I would like to hear a bit more about that contradiction in your measure of success.

Mr. Cobb: Senator Marsden, I think my statement indicated that, as measured against the financial targets that the government established for the matching policy in its first year, from that perspective it is clear that those financial targets have been achieved and surpassed. There was a great deal of skepticism in the community that those targets could be achieved when this policy was first introduced.

Also, from that perspective, it is fair to say that that particular objective, the financial objective as established by the government, was in fact achieved.

In respect of the report from the National Advisory Board on Science and Technology, I was not party to that report. I would not attempt to explain it to you. I have read it and I suppose it is fair to say that it is probably one of the most public of private reports that exist at the moment.

Senator Marsden: However, that is an important body and I suppose it has a major steering effect on the development of science and technology research policy in the country. So what it has to say is interesting for a variety of reasons.

Therefore, Mr. Cobb, in terms of the three objectives stated on page 3 of your statement this morning, and with particular reference to the first one, increasing the level of university-based research, you do not even say the level of funding there. In fact, raising money is not one of your objectives; so this

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measure of success that you are using is some interim measure of exceeding expectations rather than meeting any of the objectives stated here. In other words, we do not know anything about research yet, do we?

Mr. Cobb: Not so far, no. However, to the extent that the councils have funded individual projects and have reviewed all of the contributions submitted by the universities to councils themselves, we have a good sense of the types of research, et cetera.

Senator Marsden: Thank you very much, Mr. Cobb. Thank you, Mr. Chairman.

Senator Stewart (Antigonish-Guysborough): Mr. Chairman, I have two or three questions. The first concerns the figures provided on page five of the document. I would like a little assistance in putting them together. The first paragraph deals with the year 1985-86, and two figures are given there; one in regard to industry contributions, and let us round that off to $60 million to take it to the upper limit of your bracket, and the other is the private, nonprofit sector contributions of $163 million for a total of $223 million in 1985-86. Do you have comparable figures for any later year?

Mr. Cobb: The only figures I have available at the moment are the figures I quoted in the subsequent paragraphs related to the reports to the councils by universities. I would make one other comment with respect to the amounts of $48 million to $60 million and the $163 million. Based on the experience to date, those numbers would have to be discounted if we wanted to arrive at a number commensurate with expenses on eligible activities in a granting council sense. Included in those numbers would be contract research, routine testing services, those kinds of things that would not be eligible under the granting council support.

Senator Stewart (Antigonish-Guysborough): Would it be fair to assume that in 1987-88, for example, the private, nonprofit sector in Canada contributed roughly as much as it had contributed in 1985-86? Do you know of any reason why that figure should have dropped?

Mr. Cobb: No, I do not.

Senator Stewart (Antigonish-Guysborough): How much has the increase in industrial contributions gone up over the $60 million it was at in 1985-86?

Mr. Cobb: The only way to estimate that figure—and I am not sure of the precise years involved—is to go back to data provided by Statistics Canada at the time, which indicated something in the order of $40 million to $45 million. I defer to Dr. May from NSERC, who may be able to find something in the evaluation study of their operating grants program that indicated something in the order of, I believe, $48 million from industry. However, I cannot recall the year.

Senator Stewart (Antigonish-Guysborough): You cannot recall the year?

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Mr. Cobb: No.

Senator Stewart (Antigonish-Guysborough): The matching contributions attracted from the contributions of the private nonprofit sector would seem to be very good from the viewpoint of the universities. However, if those contributions are "bulking" large in the overall program, then the aim of inaugurating a new period of industrial support for research may well be slipping out of focus. That is why I asked how much new money is industry contributing to basic and applied research, but you do not seem to be able to tell us.

Mr. Cobb: As I indicated in my statement, that is one of the issues we want the evaluation to uncover for us. At the moment I cannot give you a precise answer. I think the indications are, in the experience of the councils operating the programs to implement the policy that industry awareness and involvement is increasing. However, I do not have the precise data to answer your question. We will attempt to answer that question in the evaluation.

Senator Stewart (Antigonish-Guysborough): I am not looking for precise data. I merely want an assurance that it has gone up measurably or significantly, but you do not seem to be prepared to put even that description on the record.

Mr. Cobb: I am a little reluctant to say as much with great firmness, because I believe that the best test you can get—and I do not have the details available to me at the moment—is that of the experience of the granting councils as they implement their programs. I suspect that Dr. May and representatives from the Medical Research Council and the Social Sciences and Humanities Research Council could give you a good feel for what their on-ground experience is, and that is probably your best immediate test.

Senator Stewart (Antigonish-Guysborough): You have not provided me with a foundation for my second question. I am forced to build on billiard balls as I do not have anything concrete, but let me ask the question anyway so that you will know the line of thinking I am following. Can you give us the figures as to the kind of research activity these industrial-sourced contributions are going for? Are they going for applied research or for basic research? Of course, if you cannot tell us the extent of the increase in the contributions from industry, it will be very difficult for you to deal with this second-level question.

Mr. Cobb: I cannot answer the question for you, but the granting councils can.

Senator Haidasz: What percentage of the grant is going for basic research and what percentage is going for applied research?

Mr. Cobb: That is a difficult question to answer. Again, the councils would be able to give you examples and some indication. The only comment I would make is that the distinction often made between basic research and applied research is becoming increasingly blurred and is subject to definitional issues. I think the experience, not only with the granting councils but elsewhere, has been that the interplay and the interconnection between basic and applied research is becoming much closer. From the academic community point of view, it would appear that the issue is becoming more of the integration of the two but making sure that at the university level there is the freedom and independence to pursue scholarships. I do not know of any way to give you a precise line between applied and basic research, but I think the experience of NSERC in particular will suggest to you that the two are not mutually exclusive in the program they have under way.

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Senator Haidasz: What have been the contributions of the Canadian subsidiaries of multinational pharmaceutical companies to basic and applied research?

Mr. Cobb: I cannot answer that question.

Senator Haidasz: Who can?

Mr. Cobb: In terms of the overall contributions to research by the pharmaceutical companies and particularly those in the category you mentioned, I suspect that the Department of Consumer and Corporate Affairs would have that information. I can follow up on your question if you wish.

Senator Haidasz: I would appreciate that, as soon as possible. Is the committee monitoring the effectiveness of these research programs or activities composed of representatives from the private sector, government and university administration?

Mr. Cobb: There are three bodies intimately involved in the overall monitoring, the most important of which are the councils themselves, made up of appointed members from the academic community and the private sector. Secondly, we do have an evaluation steering committee from the councils composed of people from the offices of the Comptroller General, the Department of Finance, Treasury Board and so on, along with ourselves, to deal with the formal evaluation we will be launching. Then there would, of course, be the involvement at the deputy minister level and the presidents of the council.

Senator Haidasz: Does the Auditor General have any role to play in this monitoring process?

Mr. Cobb: As far as the evaluation is concerned, the Comptroller General provides advice to us in terms of structuring a proper formal evaluation of the program.

Senator Marsden: You say that it is difficult to tell the difference between applied and basic research in some areas. I suppose you could say that they are becoming melded. As you know, we have some enthusiasm in the Senate for the pharmaceutical question. Under the RSA, for example, is it considered a related science activity if a pharmaceutical firm has a seminar to explain its product?

Mr. Cobb: I would have to defer to the person who knows the answer to that question.

Mr. J. A. D. Holbrook, Manager, Science and Technology Data Intelligence Branch, Department of Science and Technology: The definition of related science activities is "those activities carried out in support of an R&D function"; so this

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would include library functions, data collection and technical information services. Whether that would include a seminar of the type I think you are talking about is debatable. I said "yes" on the ground that we would give them the benefit of the doubt.

Senator Marsden: In terms of matching grants, would that be generally related to straight research activity?

Mr. Cobb: In terms of the matching policy, no.

Senator Marsden: So there is some difference between applied and basic information?

Mr. Cobb: Yes.

The Chairman: I would like to thank Mr. Cobb for appearing before us this morning. I would ask our next witness to come forward please.

As was announced in the notice of meeting, we have with us today from the Natural Sciences and Engineering Research Council, Dr. A. W. May, President of that council. He is accompanied by Dr. Gilles Julian, Ms. Mireille Brochu, Ms. Louise Dandurand, Mr. Léo Derilex.

I understand that Dr. May would like to make a presentation before we move to questioning.

Dr. A.W. May, President, Natural Sciences and Engineering Research Council of Canada: Thank you very much, Mr. Chairman. May I say that I am honoured to appear before you this morning to discuss the impact of the matching funding policy on NSERC and to reflect with you on its future.

When it was announced in February of 1986 by the Honourable Michael Wilson in his budget speech, NSERC was awaiting a decision on its second five-year plan, which had been submitted the previous summer. The announcement of the matching policy at the time was something of a surprise and something of a disappointment since it did not respond directly to the five-year plan.

We, nevertheless, decided to make matching a success and we already had in place a powerful tool to implement the policy, that being our university-industry program. Two years later and after more than a year of experience with the policy, which formally began on April 1, 1987, we can say that we made it a success.

According to the matching funding policy, the government will match the council's private sector contributions to university research up to a maximum of 6 per cent of the council's budget.

When the policy was announced, I was confident that the government's first year goal of $19.4 million—since adjusted to $25.4 million—would be attained. In fact, for the first year of the policy, total eligible private sector contributions reported to NSERC, as we heard earlier this morning, amounted to

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more than $68 million. That is for activities which took place in 1986-87. Not only is this amount far in excess of the established target, it is also well in excess of everyone's expectations.

Our analysis of these private sector contributions reveals some interesting statistics. More than half, about $39 million or 60 per cent, of the private sector contributions reported by the universities were received from business and industry sources. The remaining portion is made up of contributions from private, nonprofit organizations, private foundations and trusts, charitable organizations and individuals.

More than half of all contributions were received by Ontario universities. Ontario and Quebec together received more than 75 per cent of all contributions and the proportion of private sector contributions received from the industrial business sector, as opposed to other private sources, was highest in Ontario, lowest in Quebec, with the other provinces coming in between.

More than one quarter of all industry support was in the form of contributions in kind, primarily research equipment, which is eligible to be evaluated for purposes of matching funding.

The discipline breakdown shows that engineering and computer sciences received about half of the reported private sector contributions with the life sciences and mathematical physical sciences receiving about one quarter each.

There are two channels through which private sector contributions to universities can generate matching dollars for NSERC and for the other granting councils. First, through our university-industry programs which involve joint funding of university research activities by NSERC and the private sector and, second, through R&D contributions or donations directly to the universities without the involvement of NSERC in funding, for example, fund-raising campaigns or revenues or endowments which are used for research.

In this latter case, we are obliged to return to the universities an incentive or bonus for contributions reported. This bonus was ten 10 cent last year and it will be 20 per cent this year. To be very frank, I am not at all sure, using hindsight, that such a generous incentive was ever required. Like everyone else, we had underestimated the amount of private sector contributions defined as eligible under the policy. It, therefore, appears that the incentive is actually a windfall and will do little, by itself, to build university private sector links given the existence of dollar for dollar matching via our university industry programs. Since those incentives could reach $8 million this year and $19 million next year, we are seriously wondering if we can afford expenditures of this magnitude.

In fact, the real incentive for industry to contribute to university research is via our university-industry programs and there are, essentially, two programs. There are cooperative research and development grants which support activities rang-

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ing from short-term projects to commercialize university innovations to longer-term research of interest to several sponsoring companies. Secondly, there are industrial research chairs, which provide research and salary support for one or more distinguished research professors in fields of mutual interest to the sponsoring companies and the host universities.

In 1987-88 those programs accounted for more than $20 million, and we are forecasting that it will be nearly $30 million in the current year—a 50 per cent increase.

There is no doubt that the policy has been a success in fulfilling the specific objective of bringing the university and industrial communities closer together. Our university industry programs are growing.

But matching is not a panacea. There are urgent financial requirements for university research, for which matching alone cannot be a solution.

Facilitating and stimulating collaboration between R&D performing sectors in Canada is but one of NSERC's responsibilities. Other and fundamental goals are to ensure a healthy research base in universities and to contribute to an adequate supply of highly qualified personnel in the natural sciences and engineering. We cannot fulfil those major responsibilities relying on additional funds from matching alone. I think this is the most important point that I would like to make today. The success of the matching funding policy should not cloud the real need for much healthier support for university research in Canada. The matching funding policy is an example of the tendency to keep adding new storeys to a building whose foundations are starting to crack.

Industry will not be interested in collaborating with institutions whose equipment is obsolete, whose environment is not stimulating enough to keep the best scientists and to attract the best students—and this is important to remember. University-industry collaboration will only be fruitful if universities are dynamic institutions, intellectually and physically equipped to work at the frontier of knowledge. It is only in such a context that matching, as a corollary mode of financing university research, will really bear fruit.

I think we all agree that Canada could have a much stronger industrial R&D base than it currently has and that everything must be done to stimulate Canadian business to perform and to use more R&D; but this cannot be done in a vacuum and there is no short-term solution to the problem. The solution lies in the adequate supply of first-rate scientists and engineers in Canada. That is what NSERC is all about. By providing the stimulating environment to do research, and by directly supporting young people who wish to embrace a career in science

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and engineering, NSERC can help Canada's economy to be more competitive and dynamic. Thank you, Mr. Chairman, for your attention.

Senator Kelly: For clarification, you seem to be saying two different things. Let us get back to the matching policy objectives that were described to us by Mr. Cobb, the previous witness. The first was to increase, in partnership with the private sector, the overall level of university-based research, research training and directly related activities. Is that a good objective?

Dr. May: That, to my mind, is too ambitious an objective for the matching funding policy.

Senator Kelly: But is it in itself a good objective?

Dr. May: In itself it is a good objective.

Senator Kelly: So your only concern is that it is unlikely to be fully achieved; but will it be partly achieved?

Dr. May: It will be partly achieved.

Senator Kelly: The second is to increase the level of private sector university collaboration, et cetera. I think you did say that is a good objective.

Dr. May: That is an excellent objective.

Senator Kelly: The third was to encourage joint research activities that capitalize on the strength and interests of the private sector and the universities, et cetera. That is a good objective?

Dr. May: Yes.

Senator Kelly: You also seem to say that it is working in that direction.

Dr. May: Yes.

Senator Kelly: You said that it is increasing the interest on the part of the private sector jointly to develop these programs.

Dr. May: Yes.

Senator Kelly: So far, things seem to be working; yet, on page 4 of your brief, you say that this collaboration will only take place if universities are dynamic institutions. First, you say that it is taking place, but then you say that universities are less and less dynamic institutions. So I have to conclude that either you are getting yourself confused, or you are saying that this is only momentary, that in time that curve will start going down.

Dr. May: I think I am saying the latter. We are drawing from an existing capacity. We are not adding to the capacity, but we are drawing from it all of the time without adding to it.

Senator Kelly: But the adding to the capacity is another objective; it is not included in this program. What you are

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really saying is that at some time there will have to be another program that has to address that particular objective.

Dr. May: That is why I hesitated about the first of the three objectives. The second and three objectives clearly are directed toward increasing university-industry interaction. I am saying that the program is working beautifully to that end. But what it is not doing, or only to a limited amount, is achieving the first objective, which is to increase the overall level of activity.

Senator Kelly: So your disappointment really springs from the fact that that particular objective was not included among the objectives in this program. The program itself, to the extent that it goes, is satisfactory and working well, in your opinion.

Dr. May: Yes. I simply think that the program attempts to achieve too much, and that, as you suggested, something more is needed to address the broader objectives.

Senator Marsden: I have a series of questions arising from your brief. You describe the announcement of this policy as something of a surprise and a disappointment. Was it a disappointment because it forced you to deviate from long-range objectives

Dr. May: No—a disappointment because the five-year plan that was put forward did not get a direct response. No one said anything was good, bad or indifferent about that plan.

Senator Marsden: You then go on to say that nonetheless you have made it a success—and possibly you are using the word "success" in the same sense as Mr. Cobb did, in connection with the number of dollars. But, in terms of what you see in the long term for the development of science in Canada, how can you know whether it is a success or not, because clearly this is having a steering effect on what universities are doing and producing. Is that consistent with NSERC's review of what is happening?

Dr. May: I think the steering effect is relatively minor. We support some 6,700 professors to do research in Canadian universities. We do not expect that any more than 10 per cent of them will take advantage of our university industry program—which means that the other 90 per cent have to have some other means of their research being supported. So it is not the steering effect that worries me; it is the level of absolute commitment to the great majority of researchers in Canadian universities.

Senator Marsden: On page 2 you talk about the regional breakdown. It is quite obvious that it is largely all happening in Ontario and Quebec. Does NSERC then become a redistribution agency?

Dr. May: No, I do not think so. This question has come up right from the beginning of the policy, in terms of our university partners. People ask us, "Because we expect that most of this matching funding money will be utilized in central Canada, will NSERC then adjust its other programming to take account of the regional disparities that this program would create?" The answer is no, we would not. We are not a regional distribution agency. We cannot be one. We award

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research grants on a competitive basis through a peer review system. Any program that stimulates the university industry interaction, or that rewards university industry activity, is bound to be a program that puts most of that money where the industries are. That goes without saying.

Senator Marsden: Then what is the intention going to be between what you are able to do through matching grants in Ontario and Quebec and the centres of excellence proposals that others are coming up with? Will there not be a conflict there?

Dr. May: I am not sure that there should be. It depends on the criteria that will be developed for a centre of excellence program. Those criteria are not known yet. If there is to be a "national centres of excellence" program, my guess is that it will be primarily a program based on competitive bids, building upon capacities which exist.

Senator Marsden: So then again it will be carried on in Ontario and Quebec for the most part?

Dr. May: If half the capacity in the country exists already in Ontario then, all things being equal, one might expect that half of the new funding will go to Ontario. I am not intending that to be a prediction, but, unless there is some very different approach the money tends to go where the successes have already been achieved.

By the way, if I may say so, senator, there are some fine institutions and some excellent research going on all over the country, in every province.

Senator Marsden: Yes, I know that to be the case. That is why the figures are so distressing. They may not be distressing for individual researchers.

Dr. May, you talk about bonuses. Can they be used for overheads by the universities?

Dr. May: No. We are adhering to a very strict guideline issued by our own council that our funds are to be expended for the direct costs and not for the indirect costs.

Senator Marsden: Dr. May, I do not wish to put words in Senator Kelly's mouth, but isn't that exactly the problem you are getting at in the last part of your statement? As you know, without overhead, the university base just begins to disintegrate. Would you contemplate changing your policy about these bonuses or are you, in fact, suggesting at the end of that paragraph that you intend to take them away in any event?

Dr. May: I think our council will rethink those bonuses, because this is the only money that we spend that is not peer reviewed. It is a formula approach, and it is a great deal of money. I think I can say without hesitation that if our budget were doubled, we would be interested in funding overhead, but, if it is not and if the issue of overhead is raised, then it is an entirely different situation. People say to me that if we start paying overhead the provinces will stop paying overhead; so we have not achieved anything except to replace a provincial expenditure with a federal one. This is the crux of the debate; it is all tied up with EPF and those larger issues.

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The Chairman: Yes, on which this committee has previously commented.

I do not wish to take up too much of the committee's time, but I would just like to ask you a couple of other questions. How many people have you added to your staff since the beginning of this program?

Dr. May: We have added 16 since the program announcement was made. I should add to that that this is a particularly labour-intensive program compared to some of our other programming because it involves bringing two different partners together, namely the university and the industry, and will later include a negotiated process of developing a proposal. However, the short answer is 16.

Senator Marsden: Do any of the funds that come through this program go towards paying the salaries of people who must operate the university end of the matching grants program?

Dr. May: They may.

Senator Marsden: Those funds may be used for salaries?

Dr. May: Yes. I will take a specific example. The industrial research chair program is a program whereby the full salary of the professor who is appointed is paid.

Senator Marsden: But what about the staff people, the non-faculty people?

Dr. May: Yes. You could have a research team which includes post-op students and technicians.

Senator Marsden: What about secretaries or filing clerks?

Dr. May: Secretaries and filing clerks tend to fall into the category of overhead.

Senator Marsden: Exactly, so universities have probably not added the comparable 16 staff members to complement the 16 on your side.

Dr. May: They usually have to, because it is really a three-way commitment. If the university accepts industrial funding and NSERC funding for an industrial research chair, there is always a concomitant necessity for the university to contribute to the overhead, and they do.

Senator Marsden: I hope I will have the opportunity to talk to university people about this problem and the necessity to contribute.

I have just one further question. Some of Canada's leading economists suggest that we are mad to think about undertaking R&D here in Canada because we can import it cheaper, better and faster. In the last page of your statement, you say:

> I think we all agree that Canada could have a much stronger industrial R&D base than it currently has and

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> that everything must be done to stimulate Canadian business to perform and use more R&D.

I suggest to you, Dr. May, that that is not the advice that a lot of Canadian business is receiving from some economists. What is your view of that problem?

Dr. May: I am convinced even more that economics is the dismal science.

Senator Marsden: No argument there.

Dr. May: However, my serious answer is that we have depended for a long time on immigration from other countries to solve all our problems, including our R&D capacity. Fully 50 per cent of our grantholders are first generation Canadians, and that is marvellous. However, the next question is: Can we expect to continue to do that through the 1990s and into the twenty-first century? I have not talked to any economists, but people in business and in universities and in the technological world do not think that we can continue to do that, because every other country has the same aspirations as we do, to increase capacity, to have a high-tech industrial base, knowledge-intensive industries, et cetera. Therefore, I think the chances of our being able to continue to rely on people from other countries to supply half the scientists and engineers that we need is likely to result in our being very sorely disappointed.

Senator Marsden: Thank you.

The Chairman: Senator Haidasz?

Senator Haidasz: Thank you, Mr. Chairman. First of all, I have a general statement to make. I was shocked to hear that, after all the taxpayers' moneys that have been flowing from our provincial and federal governments for post-secondary education, even today the equipment at our universities is obsolete, as you say in your statement on page 4, and the environment is not stimulating enough to produce a good scientific effort. It was also disappointing to hear that in 1988 we still do not have what you call the best scientists and the best students to do the job of developing effective R&D research results. Is that really true, Dr. May?

Dr. May: I think I would prefer to say that—

Senator Haidasz: Are you exaggerating?

Dr. May: No, I am sounding a warning that we may be slipping; that we may not be in a position to maintain an environment or to ensure that state-of-the-art equipment is available. The problem is there, and I see it growing unless more resources are committed to it.

Already some university people are using the line that the equipment in the labs is older than the students they are training. Of course, that is not universally true but, to the extent that it can be said of any institution, it is problematical. Thus, you can wind up training students on equipment that is not the equipment they will see when they graduate and are employed by the industrial sector; so they will have to be trained again. This is not very productive.

Senator Haidasz: What percentage of your grants or industrial grants go to equipment?

Dr. May: Our equipment budget is much smaller than we would like it to be. We think it ought to be about 15 per cent of the budget, which would then be somewhere between $45 millon and $50 million per year. I think in the year just passed we spent about half that, or just over $20 million.

Senator Haidasz: So you need more money?

Dr. May: Yes, sir.

Senator Haidasz: And universities also need more money to stimulate that environment and to get the best students, professors and scientists.

Dr. May: Yes.

Senator Haidasz: Let us say that a researcher comes up with a good product—for example, lasers applied to cardiology. Who eventually gets the patent for that product and, therefore, the profits flowing from it?

Dr. May: It may be somebody in the university or somebody in the private sector. It depends on the negotiations between the discoverer and the developer.

Senator Haidasz: So sometimes the university does not get a penny?

Dr. May: It depends on the particular university and its policy. It is not something we involve ourselves in.

Senator Haidasz: Is that not under your mandate?

Dr. May: No.

Senator Haidasz: So you just give them the money? You do not care whether the university professor or the pharmaceutical company takes all the profit?

Dr. May: We give grants, and they may be to single university professors, to groups, to joint industry-university groups and so on. On questions of intellectual property, patents, ownership, that sort of thing, we simply say, "You make your deal." We are prepared to fund the operation and that is all. We do not impose any particular rules or standards.

Senator Marsden: No doubt you are familiar with the argument made by Keith Pavitt and others that science is one thing but that the development side goes on best inside the industry; that they are different cultures with different histories that arise from different circumstances. Do you give any weight to that argument and, if so, can you tell us how a matching grants program of this type can help the development of applied research in Canada?

Dr. May: Yes, I give weight to that argument, just as I give weight to what I would call the opposite argument; namely, that fundamental research is best done in the university environment as opposed to the day-to-day profit-driven environment of a company. Ten per cent of the university community is active in joint work with industry. Half that group is in the engineering disciplines; one quarter is in the life sciences—and, more and more, this category tends to require people who are involved in semi-engineering or quasi-engineering endeavours, biotechnology, that sort of thing; the other quarter is in the maths and physical sciences end, with chemists and physicists who are close to chemical engineers and so forth.

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This has always been the case, and it is a natural thing. For example, engineering schools with co-op programs have very close liaison with industry, and students make those connections at a very early stage in their development. What the matching policy will do through the vehicle of university-industry programs is strengthen that liaison and maybe push the number from 10 per cent to perhaps 15 per cent and reward that kind of activity. I think this is marvellous.

Senator Marsden: But the other side of that question is: does it not abandon support for the innovativeness of workers in factories? Is not Pavitt's point that what really led to technological development was the clever but not necessarily university-trained worker who saw how an innovation would improve the product made in the industrial setting?

It seems to me that there is an assumption that only universities are capable and an abandonment of the craft workers and people inside plants who could make a major contribution to the development side.

Dr. May: It seems that as time goes on these things get more complex. So one cannot imagine anymore, for example, an Alexander Graham Bell sitting in an ill-equipped situation using his intellect to invent things that create whole industries. Today it is more a team approach, with much more sophisticated equipment being needed.

The main issue is the time frame between discovery and application. It used to be much longer than it is today. In order to be competitive in the world economy today you want to get the jump on competition or shorten the time frame between discovery and application. If a new product or new process emerges from a university lab, the question will be how to get it into commercial production faster than somebody else, because that university discovery will be published in international literature and will ultimately be available to everybody.

So the six-month or twelve-month jump on the competition becomes important, particularly if licensing and patenting are involved. That is the essence of what we are talking about.

The key to all this is the trained student. The expression use to be, "The best technology transfer is a pair of feet with a head attached going from the university to the company." The essence is putting together the intellectual capacity of the country. Some of that capacity is in the universities, some in government labs, and some is in industrial labs and so forth, and we are trying to shorten that time frame between recognizing that you have something of commercial potential and realizing that potential.

Senator Marsden: So it is a top-down process?

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Dr. May: What do you mean?

Senator Marsden: In other words, you do not see any of the money going into an industrial lab to help the people who are already there?

Dr. May: I am sorry; I had missed your point. Of course, I do. Our programing does not have to be done within university walls. Some of it can be done in the industrial lab. Of course, there is another whole set of programs involved here. For example, there is the IRAP program of the NRC, which is specifically geared toward the industrial sector. We are not looking at that area. Our programs are not industrial research subsidies. Our programs are meant to be the glue that binds together the communities that, until now, have been quite disparate.

The Chairman: If there are no further questions, on behalf of the committee, we thank you for your time.

The committee adjourned.

EVIDENCE

Ottawa, Thursday, May 5, 1988

[*Text*]

The Standing Senate Committee on National Finance met this day at 11:00 a.m. to examine the Main Estimates laid before Parliament for the fiscal year ending March 31, 1989.

Senator Fernand-E. Leblanc (*Chairman*) in the Chair.

The Chairman: Honourable senators, this is the third meeting of the committee to examine the expenditures proposed by the Main Estimates laid before Parliament for the fiscal year ending March 31, 1989, and we have the pleasure to have with us today as a witness from the Social Sciences and Humanities Research Council, Dr. Ralph Heintzman, Director General of the program. I understand that Dr. Heintzman has an opening statement that has already been distributed to all members.

The floor is all yours, Dr. Heintzman.

Doctor Ralph Heintzman, Director General, Programs and Policies, Social Sciences and Humanities Research Council of Canada: Thank you, Mr. Chairman. First of all, I would like to thank you on behalf of the Council and its President, Mr. John Leyerle. Mr. Leyerle is in the United States and unfortunately cannot be here today.

I'm certain he regrets not being able to be here.

We appreciate this opportunity to relate to you our experience with the matching fund program. To begin, I would like to introduce my colleagues who are here with me today. To my left is Mr. Gaston Bouliane, the Council Treasurer. To his left is Mr. Pierre Chartrand, the Director of the Council's Finance Division and to my right is Mr. Allan Fox, Senior Policy Analyst with the Council's Policies and Planning Division.

As I have said, we are very pleased to be with you today to discuss our experience with the matching funds policy during the last two years and to make a preliminary assessment of the anticipated impact of the Policy on the Council's ability to support research in the social sciences and humanities.

In 1985, the Social Sciences and Humanities Research Council approved its second "Five Year Plan" (1985-1990). The plan called for budget increases to address the following priorities: the maintenance of a strong discipline-based research component; the expansion of human resources development programs; the launching of new strategic themes; and the establishment of a new program to support research centres.

In the five year plan, the Council contended that there was a growing need for research in the social sciences and humanities to address the complex problems facing Canada's policy-makers in the transition to a knowledge-based society but the rising costs of carrying out such research have threatened to limit the Council's ability to fund this much needed research. It was noted that not only had the costs of carrying out research

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increased, but the budget available to the Council had not kept pace with inflation or with the growth in the Council's clientele and the demand for support from its limited funds. Three years later, as the following statistics illustrate, the position has not changed much.

In constant dollars the Council's base budget is now lower than it was when the Council was established in 1978. I should point out that that's a technical definition of "base". In terms of the actual dollars available to us for program activities, we are about even or slightly ahead depending upon your calculation but with no significant growth. Perhaps a more interesting fact is that the level of funding for the humanities and social sciences is actually significantly below in constant dollars the level that is was 20 years ago in 1968.

In 1978 the Council received 16.2 per cent of the Tri-Council budget. That is the funds made available to the three research councils: the natural sciences and engineering research council, the medical research council, and the humanities and social sciences research council. Its current share is 12 per cent.

The share of National Gross Expenditures on research and development, the GERD, devoted to the social sciences and humanities has decreased from 11.7 per cent to 8.3 per cent over the last ten years.

The federal government's own funding of the social sciences and humanities component of the GERD has decreased from 7 per cent in 1978 to 5.3 per cent in 1987.

Since the Council was established, it has expanded its programs to support research training and has also introduced new strategic grants programs to address important problems faced by contemporary society. This has resulted in a substantial increase in the applications handled by SSHRC since it was established, about 50 per cent. At the same time the SSHRC's staff has declined by 12 per cent.

The decision of the government, therefore, to freeze SSHRC's base budget at the 1985/86 level and to allow increases up to a maximum of only 6% a year through the matching funds policy was seen by the Council as a matter of some concern. Although the government announced that the new policy would provide stability of funding for the next five years, it does, nevertheless, create some uncertainty about the financial future of the Council. In the first place, the base budget is frozen at a relatively low level in relation to funding which has been provided to the other two Councils and at a level which is substantially lower in real terms than it was during the early 1970s. The matching funds policy therefore uses a much diminished base for SSHRC, which will continue to erode in real terms during the duration of the Policy, if matching funds are not included in the base. And, of course, even if they are and should the inflation rate change in any way, we might still continue to erode.

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Universities also expressed serious reservations about whether private sector contributions to research in our disciplines would grow fast enough to reach the established ceilings especially in the later years of the cycle. Finally, even if the Council does succeed in generating private sector funds to reach the established ceilings, it is difficult to plan future activities because the matching funds do not go into the Council's base budget. After the final year of the matchings funds policy, the Council's budget will decline from $82.2 million to $63.7 million. The Council would therefore like assurance that this will not occur and that the matching funds will be included in its base budget.

Nevertheless, faced with the challenge of responding to the matching funds policy, the Council acted quickly. In 1986/87, it introduced the Canada Research Fellowships (CRF) program which is jointly financed by the SSHRC and the private sector. This program was designed to improve the career opportunities for promising researchers in the social sciences and humanities and to ensure an adequate supply of highly qualified Canadian researchers to meet the expected demand for faculty and research appointments in Canada throughout the next decade. Despite the best efforts of universities, there was virtually no response from the business sector and almost all CRF's were funded using university endowment funds. Our experience with this program, therefore, has confirmed our concern that the opportunities for gaining substantially increased funding from the business sector for research in the HSS are probably relatively limited.

The council also embarked on a consultation with the academic community to review its priorities in the light of the anticipated financial implications of the matching funds policy. Given the deterioration of its budgetary situation and concern that matching funds would not reach the ceilings established for years three and four, the council made the hard decision to cancel seven of its programs to protect its core activities. In the spring of 1987, it prepared a discussion paper, "Focus on Priorities", which was circulated to the academic community seeking their views on how SSHRC could develop new initiatives which would attract more private sector contributions in the future.

Generally, respondents to the council's consultation document expressed serious reservations about the implications of the matching funds policy for the council. They felt that the policy was an inappropriate approach for providing basic funding for SSHRC, as much of the research it funded related to government or quasi-government organizations and would not, therefore, be eligible for matching funds under the terms of the policy.

Despite the academic communities' reservations and the council's own apprehensions about the ability of universities to generate sufficient private sector funds to ensure that the ceilings would be reached, the results from the first year under the

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program have in fact far exceeded our expectations. The $6 million ceiling was not only reached but surpassed, with eligible contributions in 1986-87 amounting to $24.7 million. The large volume of funds reported was due largely to the fact that a broad definition of "private sector" was allowed under the policy which included university endowments and trusts, private sector trusts, non-profit corporations and foundations. Of the $24.7 million of eligible private sector contributions, 42 per cent came from university endowments and trust funds. That is, moneys already raised by the universities for their own purposes. A further 13.9 per cent came from private foundations and trusts. Contributions from business organizations amounted to $3.7 million or 14.9 per cent of the total. It should also be noted that 80 per cent of the eligible private sector contributions came from large universities and they will therefore be receiving 80 per cent of the return rate paid by the council. However, the fund-raising efforts of these large institutions do benefit the entire university research community as they provide a financial return to the council which will be distributed through its programs to assist all successful applicants, whenever they are in the country.

Although the council is pleased with the universities' response to the matching funds policy during the first year of its operation and is hopeful that the large volume of funds reported will enable it to reach the ceilings for the third and fouth years, there is no guarantee that this will occur. At this stage it is not clear to what extent the matching funds reported are new funds, and also whether or not there is any room for significant growth in private sector support of humanities and social sciences research.

To encourage universities actively to solicit private sector contributions for university research, the council has offered the universities an incentive fee, and that is in two parts. In the case of the funds received for Canada Research Fellowships, the council matches 100 per cent of the private sector contribution raised by the university. In the case of other contributions, the incentive fee is 20 per cent of the matching grant claimed by the council for the first two years of the program. The council intends, however, to review the payment of the incentive fee for the last two years of the policy, in light of its budgetary situation, and the experience with the first years of the program.

The amount of eligible claims for 1986-87 is $18.7 million above the established ceiling of $6 million. Under the rules of the matching funds policy, the council is not able to carry forward the overmatch to the next year. This means that incentives paid to universities will be substantially lower than that expected by the universities. The SSHRC has requested the government to increase the matching ceiling or to allow it to carry forward the overmatch, but so far the government has been unwilling to accede to this request. This means that the

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effective incentive payment to universitities is substantially lower than what they were expecting and is likely to result in some disappointment on the part of the universities.

In broad discussions in the research community about the matching grants policy, the following concerns have been raised. It has been suggested that while the matching funds policy is conceptually interesting, it fails to provide the granting councils with any real increase over inflation. As such, it compounds the problem of funding university R&D rather than solving it. It has been recommended by some that substantial increases should be provided for the base funding of the granting councils so that university research in science and technology can be brought up to a level which will enable it to sustain international competition and to serve as a catalyst in a knowledge-based production in this country. That clearly is not the case at present, especially in the social sciences and humanities disciplines, where there has been a steady erosion in the real value of research funds available for basic research in these disciplines.

Our experience with the matching funds policy appears to confirm the view that the policy is an inappropriate means to provide base funding for the granting councils, and especially for the SSHRC, where many of the users and potential beneficiaries of the research are governments or quasi-government agencies. However, given adequate base funding for SSHRC, the matching policy is potentially a very useful instrument to encourage increased collaboration between private sector organizations and researchers in such disciplines as management, psychology and industrial relations.

The SSHRC has estimated in its five-year plan and in subsequent discussions with government officials and ministers that it requires an increase of approximately $200 million over five years to restore its base funding to a level which can adequately support strategic research and to enable it to undertake new initiatives in response to the need for multidisciplinary research on the transition to a knowledge-based society, even to bring success rates in its core programs up to levels that are comparable with the other granting councils.

Given adequate base funding, the SSHRC believes it can play an important role in encouraging research on the management of technology. As has been noted in reports by the Science Council, by the Economic Council and in many other studies, there is an urgent need for increased research on a broad range of issues relating to the successful transfer of technology and innovation from the laboratory to the market.

In attempting to encourage increased university-industry collaboration and private sector funding, however, the SSHRC is disadvantaged in relation to the other granting councils because of the provisions of the Income Tax Act. Under Regulation 2900(f) research in the social sciences and humanities is specifically excluded from the definition of scientific research

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for purposes of R&D tax credits. Although the government did change the Income Tax Act following the introduction of the matching funds policy to allow for private sector contributions to the granting councils, the regulation excluding the social sciences and humanities remained intact. This is a significant impediment to the efforts of the SSHRC and the universities to encourage greater collaboration between universities and the private sector in social sciences and humanities research, and places our council on a very different footing, therefore, than either of the other two councils.

In the challenge to develop strategic technologies to ensure Canada's international competitiveness—the focus of much of the government's attention at this time—we must not lose sight of the important role played by the social sciences. Technological change is, after all, a social process. Human factors are vital at the organizational level, to ensure the successful development and marketing of technology. It is also in the social domain that we ultimately judge the benefits and costs of technological change. Research in the social sciences and humanities is an essential component of a broadly based strategy to ensure that the costs of transition are minimized and the benefits of technological change are shared.

In conclusion, the SSHRC would like to emphasize the following points.

As a minimum, the matching funds received by the council should be included in its base budget, and if the policy is to be continued after 1990-91, the ceilings should be increased to reflect the anticipated volume of private sector support for humanities and social sciences research.

Moreover, the base budget of SSHRC should be substantially increased to ensure that research in the social sciences and humanities is able to contribute to the development of a knowledge-based society in Canada.

To encourage industry-university relations, and particularly the joint funding of research projects on the management of technology, R&D tax credits should be made available for research in the social sciences and humanities, at least insofar as contributions under the matching funds policy are concerned.

Thank you very much, Mr. Chairman.

The Chairman: We will hear questions first form Senator Marsden, and then from Senator Stewart.

Senator Marsden: Your brief is very helpful. It is particularly helpful with respect to the tax implications and the necessary tax change and various technical points that I will come to in a moment on other issues.

I have three general areas I would like to pursue. Can you tell us what the policy-planning basis is of the matching grants program? In other words, was this something that you had dis-

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cussed with the government for some time before it occurred? Do you think it is rooted in international experience of countries who are trying to accomplish the same objective as we are? Where do you think it comes from?

Dr. Heintzman: Perhaps that is a question that should be addressed to Mr. Cobb or to the policymakers at MOSST. I was not at the council at the time this policy was developed. However, I am informed through discussions with my colleagues that there was not extensive discussion with the granting councils before the policy was put in place.

On the question of international experience, I am not aware of any other experience of an exactly similar kind. Perhaps one of my colleagues might want to comment on that.

Senator Marsden: Therefore you do not see this as part of a larger, overall plan of adjustment policies for Canada in the new world economy?

Dr. Heintzman: My sense is that the policy, as conceived, was intended to respond to what is a genuine problem in this country. That is to say, if we make international comparisons we discover that the level of government contribution to R&D in this country is not so very different from that experienced in many other countries. Where this country really falls down, in overall comparisons, is in the area of private-sector investment in research.

I suppose the question that could be asked is whether the appropriate place for the private-sector research is in the kind of basic research which the granting councils fund and perform, or whether the area in which the private sector in this country needs to be stimulated to become more active is in the kind of applied and market-oriented research that they more typically fund

Senator Marsden: Thank you. I wonder if you could comment on what is widely known as the Lortie Report. I am not even sure whether or not it is public, but everyone seems to be in possession of a copy. In fact, perhaps Mr. Lortie will be a witness in front of this committee. I think it would be very helpful. In his report, Mr. Lortie was not flattering about the matching-grants program. Could you comment on that from the point of view of the Social Sciences and Humanities Research Council?

Dr. Heintzman: Senator, of course none of us has yet seen a copy of the Lortie Report, but we all read the newspapers. My understanding of what the Lortie Committee is saying is not dissimilar, perhaps, to what I have said to you this morning. That is, that we have serious questions about whether the matching-grants policy is really suitable to fund a broad base of fundamental, basic curiosity-driven research in this country, or whether it would be more appropriately used for quite targeted purposes in the way that I discussed in my remarks.

Our council, for example, is exploring the possibility of greater collaboration between the Social Sciences and Humanities Research Council and other public and private-sector agencies and organizations, in a manner perhaps analagous to what the FCAR in Quebec does through its actions concertées programs, and that sort of thing.

I believe, in that context, that programs which through matching and appropriate tax measures, encourage the private sector to invest in fundamental research of the type that is of direct and immediate interest and benefit to them could be extremely useful. I think the questions that need to be asked—and, at this point, they are, in our minds, questions rather than conclusions—is whether it is an appropriate mechanism to fund a broad base of fundamental curiosity-driven research in this country.

Senator Marsden: The leading advisory group to the Prime Minister and the cabinet on science and technology, namely NABST, received this set of comments by Mr. Lortie. I want to put this on the record so that we will remember both the context of your comments and his.

I would like now to move to more specific questions. Dr. May from NSERC was our witness last week and he told us that he has added 16 staff members to his grants from council in respect of the matching-grants program. How many have you added at the Social Sciences and Humanities Research Council?

Dr. Heintzman: We have had an increase of two person-years in the last year.

Senator Marsden: Is this adequate?

Dr. Heintzman: Let me put it this way, senator: We have been able to cope in the current year. However, whether the resources that we have at this point in time would be sufficient for the future is, at this point, difficult to say.

Senator Marsden: Thank you. I wonder if you are aware that one of the recommendations that was made by this committee during its study of the financing of post-secondary education was the need for overhead to be met in order that universities might continue operating with grants from councils, and so on. I understand what the policy on overhead is, but I would like to ask you about your comments on what I think you have called the incentive grant. Can any of that be used for overhead?

Dr. Heintzman: No. I think it is rather like our other grants to universities: They must be used for the direct costs of research.

Senator Marsden: As you explain in your brief, you believe that these will diminish. Therefore universities will have less of the incentive fund and will not have any of the overhead. In your experience, have the universities been able to hire the staff that are needed to make the matching-grants program work from the university end of this arrangement?

Dr. Heintzman: I do not think we have had any extensive discussionis with universities with respect to their experience in administering this program. I do not think I am in a position to comment on that, senator.

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Senator Marsden: On page 6 of your brief, you are talking about who makes contributions. In other words, 80 per cent of the eligible private-sector contributions came from the endowment funds of large universities, and so on, and therefore these large universities receive 80 per cent of the return rate paid by the council. However, you then go on to say that this fund-raising benefits the entire research community and that you redistribute these funds through programs to all successful applicants. My question is: Is this a conscious redistributive mechanism to ensure that universities which are not large, or which lie in outlying parts of the country, receive funds?

Dr. Heintzman: No, not in that sense. It is simply that the moneys that the council receives through the matching-grants program go into our regular program activities. Therefore they are funds which researchers, no matter where they are located in the country, can compete for on the basis of excellence. Indeed, as it happens, our distribution of research funds across the country by region is not far off, in percentage terms, distribution by population, although decisions are made on the basis of excellence.

However, that is not the case with respect to incentive grants. Under the incentive-grant program, the prairie region and Ontario—particularly Alberta and Ontario—come out significantly ahead, because they have access, apparently, to significant private-sector contributions.

However, in our normal research-granting activities, to which the bulk of the matching grant goes, other than the incentive grant, researchers anywhere in the country can compete on the basis of excellence and, in fact, although it is on the basis of excellence, the regional distribution is not far off the distribution of population.

Senator Marsden: Thank you. In your brief you also point out that if you are successful with this, essentially you will be punished because the matching grants are not in the base budget. Therefore there are two disincentives for your council to make matching grants a success: One is tax and the other is this erosion of the base budget. Might I ask: What are your plans for coming to terms with these problems, insofar as the universities and others are concerned? In other words, short of planning meetings, negotiations, conferences et cetera, will you be able to work this out? According to Dr. May, NSERC is in a far better position than you are.

Dr. Heintzman: Senator, we are having ongoing discussions with government officials about the future of the program, and recently we made clear to them our concern about the fact that without some kind of assurance, the council would fall off the precipice in a few years. It is very difficult to conduct any planning or to have any sense of ongoing programming. The council has also been going through a quite rigorous program of self-examination and discussion with the research community about its future priorities, its future activities and orientation under this program, and under other conditions that it faces. We have had two task forces on priorities working in the past year, one of which was referred to in the document and another which is ongoing and which is looking at a number of

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things, including our relations with the private sector and the kinds of new programs or allocation mechanisms that we might examine, of the type I already mentioned.

Senator Marsden: Thank you. Mr. Chairman, I will come back to that later, if I may.

The Chairman: I have a supplemental, Mr. Heintzman.

You stated that in your negotiations with government officials, you requested an additional $200 million in credits.

How did you arrive at this figure of $200 million? Is this $200 million per year or $200 million for your five-year plan? What results would this give? Would your percentage change significantly?

I'm asking these questions because your treasurer is here and perhaps he could provide us with additional figures.

Dr. Heintzman: The $200 million would be spread over a five-year plan. It would not be in one year. The rationale for that kind of figure—this being hypothetical, because it would be a question for the council to decide, in fact, what it wanted to do with that kind of money—is that we calculate that the council would require about $47 million over a five-year period to bring its basic research programs up to a level at which it would be capable of having a dollar success rate comparable to NSERC, for example. We calculate that in the area of highly-qualified manpower—that is, our fellowships, the training of doctoral students, and the like—we would require about $56.5 million over five years to bring our fellowship programs up to a success rate comparable to those of the other granting councils. At the present time they are almost half—20 per cent as opposed to 43 per cent. We estimate that about $16 million is required to go into research-based development and small universities. This comes back to the question we were talking about earlier concerning the disproportion of resources available to some of the larger and smaller universities where there is considerable excellence in research, or excellence which would be there if it could be nourished. We have a small-universities program which is intended too assist that kind of development. We have not been able to make an addition to that for eight years now, and it is eroding just like our council's budget. We estimate that about $16 million is needed for that activity. We estimate that about $13 million is required for the support of the research libraries and related activities. You must understand that, in the humanities and social sciences, libraries are really the laboratories; they are the equipment. They are the equipment that a researcher needs to work in our disciplines. This is something that is very difficult to make clear to people, because it is easy to see the need for test tubes and magnetoscopes, or whatever, that one may require today. Research libraries are the actual infrastructure that researchers in our disciplines need.

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We estimate that approximately $11 million is required to enhance research communication in this country—that is, to make it possible for researchers to find out what other researchers are doing through journals, meetings, travel, and that kind of activity.

We believe that the council needs about $43 million to be invested over five years in strategic programming—that is, targeted programming—to assist in the resolution of important policy issues and social problems facing the country. We have a strategic program in which we identify things like management, women and work, family and social change, and a number of the really pressing problems facing the country. We estimate that about $43 million of target money is required in those areas.

Our five-year plan emphasizes the need which the government is now coming to realize for the strengthening of centres of excellence. We have estimated that about $20 million is necessary for the council to create the kinds of centres of excellence in this country that are required for the social sciences and humanities.

That is a rough breakdown of what the $200 million represents.

Senator Stewart (Antigonish-Guysborough): I have four main questions.

You referred just now to the need for doctoral training in the social sciences and the humanities. Is there a good market for people with this training at this time? Are they getting jobs?

Dr. Heintzman: The answer to that is, yes, although they are not all necessarily getting jobs in universities. In the universities the situation varies from discipline to discipline.

There is a question of university demography. As you are well aware, there is a perceived need for an increase in the faculty hirings in the 1990s to replace a professoriate that will be aging and possibly retiring at that time. We believe that a significant investment in training is required for that purpose.

One of the reasons why we launched the CRF program, for example, was precisely to be able to hold in the research community some of the best researchers in the country, in order to provide a pool for hiring in the 1990s.

Senator Stewart (Antigonish-Guysborough): What is the CRF program?

Dr. Heintzman: It stands for Canadian Research Fellowships, to which I referred earlier.

Senator Stewart (Antigonish-Guysborough): Assuming that we do not train our own, are you saying that Canadian colleges and universities will have people in their classrooms, teaching Canadian government, economics and sociology, who will come from faraway places? Is that what is likely to happen?

Dr. Heintzman: I am not sure the council would take responsbility for it, but a number of responsible researchers

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have estimated that in these disciplines there will be a shortfall of manpower available to be hired for Canadian faculties in the 1990s. If our graduate schools are not producing enough persons, I can only assume that hiring will have to come from abroad.

Senator Stewart (Antigonish-Guysborough): It has been argued—and I wonder if you would agree—that it is more important that we should be able to provide jobs for people who have been trained in Canada in these disciplines, than to provide jobs for those trained in engineering, physics or medicine.

Dr. Heintzman: I do not think there is any doubt that that is the case. That point goes well beyond the particular issue of fellowships and training. I think it has to do with the overall importance of research in the social sciences and humanities.

Although it may not be a wise thing to do, technological know-how is something that we can import. We cannot import knowledge of our country, of its institutions and of the social matrix which might make that work.

The Chairman: On that question, is it very easy to import people in particular disciplines? Are they available from all over the world, or is that resource being reduced?

Dr. Heintzman: That varies from discipline to discipline. For example, in the business faculties there would be a signficant problem because there is a comparable shortage, or perhaps even a worse one, in the United States. In other disciplines, I think the difficulty would not be so great. We certainly have had experience of a period in which, as a result of a shortfall in training manpower in this country, the universities had to turn to other countries in order to hire, and they were able to do so.

Senator Stewart (Antigonish-Guysborough): When Dr. May appeared before the committee on April 21, he described the program we are now discussing. He said that it affected the natural sciences and the National Engineering Research Council of Canada. At page 20 of the record of that day he said:

> There are two channels through which private sector countributions to universities can generate matching dollars for NSERC and for the other granting councils. First, through our university-industry programs which involve joint funding of university research activities by NSERC and the private sector and, second, through R & D contributions or donations directly to the universities without the involvement of NSERC in funding, for example, fundraising campaigns or revenues or endowments which are used for research.

My question is: Do both of those channels apply in the case of your council; and, if so, what is the weighting as to their importance in terms of matching dollars?

Dr. Heintzman: We do not have the university-industry program in the sense that NSERC does. As I mentioned a little earlier, one of the possibilities that we are exploring is new

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programs through which cooperation between the council and the private sector might be more possible. We do not have any programs of that kind at the moment except for the Canada Research Fellowships Program, which I mentioned earlier, which, in a sense, is a program whereby we match private sector contributions. In that case, as I also pointed out, the actual contribution from the private sector was just about nil; so mot of that money—even for the Canada Research Fellowships—came, by and large, from university endowments. I do not think the comparison holds with our council.

Senator Stewart (Antigonish-Guysborough): Is that because you really have only the second channel?

Dr. Heintzman: Yes, at this time, that is true.

Senator Stewart (Antigonish-Guysborough): I have a question which follows on from that reply. It is based on what was said at pages 5 and 6. You talk about a large volume of funds, and you go on to say that the large volume was due mainly to the fact that a broad definition of "private sector" was allowed. You then give us something of a breakdown. You say that of the $24.7 million of eligible private sector contributions, 42.4 per cent came from university endowments and trust funds, and a further 13.9 per cent came from private foundations and trusts. Contributions from business organizations amounted to $3.7 million—in other words, roughly 14.9 per cent of the total.

When I add up those percentages, I do not get 100 per cent. What did you decide was irrelevant?

Dr. Heintzman: If you like, I will go right down the column. It is 14.9 per cent from business; 12.7 per cent from individuals; .9 per cent from crown corporations; 6.5 per cent from private non-profit organizations; 13.9 per cent from private foundations and trusts; 7.9 per cent from charitable organizations; 42.4 per cent from university endowment trust funds; and .8 per cent from others. I am assured that that adds up to 100 per cent.

Senator Stewart (Antigonish-Guysborough): I am looking for an answer to the following question: Of the total, how much money would have come in, either through the universities directly or through the council, without this program? How much impact did the program have in eliciting support for research in your discipline's field?

Dr. Heintzman: As I mentioned in my opening remarks, that is something that we really cannot tell at this point. We will have to await the evaluation study which MOSST, in cooperation with the granting councils, is designing at the present time.

It would be a fair research hypothesis in our case that a considerable portion of these funds are not new funds and were not attracted into the university system by the matching grants program. I only say that on the basis that such a large proportion have come from university endowments and the like, and that such a small proportion has come from the private sector directly.

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Until the exact source and motivation of that private sector contribution and other private charitable contributions are studied more carefully, I do not think we can answer the question.

Senator Stewart (Antigonish-Guysborough): Let us focus in on the 14.9 per cent which you report as contributions from business organizations. Would that include contributions to university fund-raising campaigns where, let us say, a university says, "We need a new building to house the social sciences and humanities departments."

Dr. Heintzman: I do not believe that contributions to overhead of that kind would be eligible. I think they would be ruled ineligible. However, private sector contributions made to the university through a general appeal in that year, which were, as it were, earmarked for a particular type of research support, would be eligible. In other words, if I understand your question, it is conceivable that a considerable portion of that 14.9 per cent might have come into the universities from the private sector anyway through its normal fund-raising activities in the course of that year. However, as I say, we cannot answer that question at the present time.

On the specific question of contributions for a building program, I believe they would be ineligible under the matching-funds program.

Senator Stewart (Antigonish-Guysborough): I realize that that is an unfortunate example. I know of one university which has a fund-raising drive in process at the present time. It is proposing to endow the St. Thomas Aquinas Chair in Human Civilization. Presumably that will be eligible for matching. I suspect that the university would be able to raise that money with or without this program.

Dr. Heintzman: Having raised it, it would be able to report it.

Senator Stewart (Antigonish-Guysborough): Senator Marsden asked you questions regarding centres of excellence. Do you have a plan for centres of excellence in the social sciences and humanities?

Dr. Heintzman: At this time we do not have a fully developed plan because we have never been able to come very close to achieving the kind of funding that would make it sensible to start very detailed planning.

In broad, conceptual terms we have given a certain amount of thought to it, and are giving considerable thought to it at this moment, in cooperation with the other granting councils, as a result of the government's own initiative in the area of centres of excellence. The answer to your question would have to be "no", that we do not have a developed plan for centres in this country at this time.

We do believe it is important, as does the government, for the country and the granting process to be able to focus funds in a way that reinforces excellence and brings excellence together. Our council is very much in sympathy with the approach—that is common these days in reflection on centres of excellence—that they, in large measure, should, in fact, be

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networks, bringing excellent researchers together and allowing the critical mass to accumulate; that something can be done that moves up to another notch in terms of, as I say these days, world class excellence.

Senator Haidasz: Is there still confusion, or dovetailing, or conflicting work between your council and the Canada Council; and do you have a good working relationship or cooperation?

Dr. Heintzman: I am happy to report that we have very good working relationships with all of the other councils. However, the various councils are remarkably different in their modes of operation, and that has to do with a variety of things. One aspect is the history of some of the institutions. They have evolved in different ways. The Medical Research Council, for example, evolved from a group of medical deans across the country and, as a result, the actual council is very actively involved in the decisions on funding in a way that the other granting councils are not. The other granting councils are trustees for a peer-review process which is carried out by someone else and not by the councils themselves.

In the case of our relations with the Canada Council, we have a definition problem which, in a sense, we also share with the National Sciences and Engineering Research Council. The Social Sciences and Humanities Research Council makes no distinction as to the location of the researcher. It does not matter whether a researcher is or is not on a university campus; we consider them a researcher, we review their excellence and we fund them depending upon the decisions of our peer-review committees.

The Canada Council and the National Sciences and Engineering Research Council operate somewhat differently. The National Sciences and Engineering Research Council *de facto*—and I think *de jure*—also fund only university-based researchers. The Canada Council, by contrast, more *de facto* than *de jure*, does not fund any university-based researchers. So we have a situation where some persons, active in areas on university campuses which might seem to fall within the mandate of the Canada Council, cannot obtain funding from the Canada Council and turn to us for funding; but, in fact, their activities do not actually fall within our mandate and we are not able to fund them.

So, particularly in the fine arts area, there is a gap, as it were, between those two councils at the moment. We are discussing the matter with the fine arts community, and trying to resolve the issue—and we hope it will be resolved—but the different modes of operation of the council sometimes throw up those little hitches, which need to be worked out.

Senator Haidasz: Let us take, as an example, psychology. Is there any research that you are doing which is duplicated by the Medical Research Council?

Dr. Heintzman: No. In the psychology area we have a tri-council mechanism that works very well. Our staff meet and, in both the fellowships and research grants area, where required, they sort out where an application should go or who should handle it. So there is no overlap in that sense. Sometimes there is vigorous discussion as to who, in fact, is the

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appropriate council, but there is never a case where we are doing the same things.

Senator Haidasz: On page 5 of your presentation you say that your council had to make the hard decision to cancel seven of its programs to protect its core activities. Which seven programs did you have to cancel?

Dr. Heintzman: I am not sure that I can name them off my head. We cancelled several in the international area.

Mr. A.F. Fox, Senior Policy Analyst, Policy and Planning, Social Sciences and Humanities Research Council of Canada: The programs were the special MA Fellowships; the Population Aging Program; grants for International Collaborative Research; and we have four bilateral exchange programs, with Japan, Hungary, China and France.

Senator Marsden: May I interrupt to say that the French are very annoyed by the cancellation of the programs. I have heard vigorous protests coming from the research centre in Paris.

Senator Haidasz: That's bad. Dr. Heintzman, could you send me some information about the Hungarian program that you had to cancel?

Dr. Heintzman: We will be delighted to do so.

Senator Haidasz: Did I understand you to say that you had cancelled programs with regard to visiting professors from abroad to lecture at Canadian universities; also those programs that help our Canadian professors to travel to conferences abroad? Have those been curtailed or cancelled?

Mr. Fox: Those programs were cancelled the year before. That was another round of cancellations.

Senator Haidasz: By your staff?

Mr. Fox: Because of our budgetary situation, yes.

Senator Haidasz: Who looks after Canadian representation at international conferences?

Dr. Heintzman: We have a program to fund representation at international conferences. The International Scholarly Conference is a program that we have actually devolved, through a block grant, through the universities themselves to administer. We also have a program which the council administers directly to fund people to attend the business meetings or executive meetings of International Scholarly organizations.

Senator Haidasz: No doubt the Secretary of State has nothing to do with that. I guess he is just informed that you have cancelled them. He does not have anything to say about it, does he?

Dr. Heintzman: No. It is an arm's length agency, and decides what are its priorities and what it can afford to do. Unfortunately, with great regret, given the funding situation which I described in my opening remarks, the council has found, over the last few years, that in order to maintain its core programs in any kind of shape—and even those are suf-

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fering in the way I have already described—there were some things that it simply could not afford to do, even though, in the council's view, they were very important things to do. The cancellation explicitly stated that they were things which the council believed were important and did not want to remove from its mandate, but which it simply was not in a position to continue doing at the present time. In some cases the administrative costs for those programs—particularly in person-year terms—were relatively high. Simply because of the nature of the activity, it required more of our precious person-year time and operating budget than we could afford.

Senator Haidasz: What happens if some foundation or university abroad wants to match some funds for research programs? They can no longer do that? Concerning the ones that you cancelled with France, Hungary, Japan and China, what happens if they come up with a proposal to match the research?

Dr. Heintzman: I am not sure that I can comment on a hypothetical situation. I think that if someone offers the council money to do something, we would consider it.

Senator Haidasz: You also stated that you would like to see R&D tax credits available for research in the social sciences. Have you seen the minister or his officials about that matter?

Dr. Heintzman: Yes. There has been considerable discussion with government officials at various levels over the past year. Indeed there was a report and resolution of the standing committee of the House of Commons recommending that, in the case of the matching grants program, the restriction imposed by Regulation 2900(f) be removed; and, yes, our president has had discussions with the Department of Finance and the relevant ministers. The Department of Secretary of State has also been informed.

Senator Haidasz: What has been the conclusion of those talks or discussions?

Dr. Heintzman: The view of the Department of Finance to date is that the question is not closed, but that to date they have not found a means by which they think it could be easy to administer and which would not have sufficient loopholes to allow significant draining of tax funds. So I think that one of the tasks facing us is to try to redefine the issue in a way that the Department of Finance can live with.

Whether their position is justifiable in the case of the matching funds program itself is, I think, a relevant question. I think it would be possible for them to unhitch the provision in the Income Tax Act relating to the matching funds policy from the other regulation, while maintaining it in place for the broad purposes of tax, without creating an enormous difficulty—because, as we can see, the size of private sector contributions to administer social sciences is not enormous.

Senator Haidasz: I guess your council is pursuing this matter with the Ministry of Finance?

Dr. Heintzman: Yes, we are.

[*Text*]

Senator Marsden: I would like to ask you—we asked this of Dr. May—whether you think that the matching grants program has had a steering effect on the direction of research that the council has funded or undertaken, in either of one or two ways: Do you think that universities and faculty members are readjusting their research to try to be attractive to university endowment funds, or the private sector, or not for profit corporations—or are the committees of your council, which decide on the allocation of grants and awards, taking this into account in ways which they did not do before?

Dr. Heintzman: On the last question, I think the answer is "No." I do not think that our adjudication committees are in any way affected by the matching grants policy. They are simply adjudicating applications on the basis of research excellence in the way they always have.

On the question of whether researchers in universities or research projects are redefining their projects of topics in ways to attract private sector funds under the matching funds program, I do not think we are in a position to comment; I do not think that I have any information on that, and I do not believe the council has generally.

Senator Marsden: But the council has strategic grants programs in connection with which they do want to get people to redefine their interests in a certain way. They have been quite successful in getting people to redefine their interests.

Dr. Heintzman: We know what our strategic programs have done. What I do not think we can tell, however, is whether the matching-funds program itself has been a significant incentive for any particular researcher to redefine his project or to go to a new area. I just do not think we have any information on that.

Senator Marsden: I understand the terms of reference for the major review, which was built into the matching-grants program but has not yet been struck. That would seem to me to be an important term of reference.

Can you tell us what kind of private-sector enterprise funds research in this area, and in what areas that money is spent?

Dr. Heintzman: I do not think we can, at this point. Mr. Treasurer, do you want to comment?

Mr. Gaston Bouliane, Social Sciences and Humanities Research Council: I am sorry, I did not hear the senator's whole question.

Senator Marsden: Can you tell us what kind of private-sector groups fund research groups in the social sciences and where that money is spent? For example, is it spent largely on management studies programs, on employee adjustment research, or is it spent on medieval history and scholarly publishing?

Dr. Heintzman: We have a breakdown for the matching-funds program as a whole as to the disciplinary area for which eligible funds have been reported, and I can give you the breakdown, if you like, of the various areas. For example, the humanities had 23 per cent of the eligible funds contributions

[*Text*]

and the social sciences had 54 per cent; and we can break down those figures by discipline.

We can also break down, as we have already done, the various areas from whence the contributions come. However, what we cannot do, in terms of an analysis at this point, is be precise enough to say from what particular areas of business the private-sector contributions are coming and to what particular types of projects those funds are being allocated—in other words, is the private sector funding management or is it funding literary studies? Also, I do not know whether we have the tools to do that analysis in this round, although we may be able to do it in another round.

I might say, senator, that literary studies come out fairly well in the general matching program, but that may be because so much of the money is coming from university endowment funds. However, I do not think we can do the kind of detailed analysis that you would like at this point in time.

Senator Marsden: I have one more question I would like to ask. Did you have an opportunity to read the report last week of the Royal Society of Canada on AIDS?

Dr. Heintzman: I did not, no.

Senator Marsden: In that report there is a recommendation that the Social Sciences and Humanities Research Council of Canada receive $38 million over the next five years to fund social science research on AIDS because, as everyone knows, there is no medical solution at this stage and prevention is the only means available.

Perhaps, Mr. Chairman, since the witness has not yet read the report, I could ask him to let me know later on how those funds, if they were granted, would be treated. In other words, would any portion of them come under matching grants or not; and how it would work out in terms of tax—because, as you know, municipalities, school boards, et cetera, are spending millions of dollars on what they are referring to as "education on this subject" and no one knows whether or not it is effective. Part of the Royal Society's recommendations are that someone should find out very fast whether or not it is effective, and it will obviously be social scientists who will undertake that task.

Can I ask you to respond on how those funds, if granted, would be treated—and perhaps that answer could be added to the record next week, Mr. Chairman, as an example.

The Chairman: If the witness wishes to reply now, it is his prerogative.

Dr. Heintzman: Senator, it is hard to reply without knowing the details of the other report or the situation.

Senator Marsden: Exactly.

Dr. Heintzman: However, I am making an assumption here that if the Royal Society of Canada is making a recommendation of funding of that type, then most of that funding will come from the public sector in some form or another. If it comes from the public sector, it simply does not fall within the matching-grants program at all.

[*Text*]

Senator Marsden: Although crown corporations do.

Dr. Heintzman: I suppose that is true. Yes, senator, you are quite right. I suppose if Air Canada wanted to make a contribution, it would be acceptable.

Mr. Fox: Provided, of course, that they are not majority-funded by parliamentary appropriation.

Senator Atkins: There are, however, two parts to that report. One relates to research and the other to the education side. Those are two requests for public funding.

Senator Marsden: That is correct.

Dr. Heintzman: The research is something in which our council could be involved. The education is probably someone else's responsibility.

Perhaps I might make a quick comment, senator. The kind of thing that you are noting—that is, a situation in which a department or an agency of government or cabinet itself might decide that a particular area was of social priority, and it was prepared to put funds into that area to support research—is exactly, or very like, the kind of activity which I said earlier our council was considering at this point; that is to say, putting itself in a positon whereby it would be in a position to propose or respond to suggestions from either the private sector or the public sector to collaborate on research in priority areas. That might be with the Department of Health and Welfare or it might be with Magna International, for instance, if they and the council had a common research interest, and if the organization wished to put money into the support of research—and, on our side, we were prepared to use our expertise in the adjudication and administration of research to ensure that research was done in that area. As I say, the council is not committed to this new avenue of activity, but it is an area that one of our task forces is actively exploring at this time. The kind of initiative you are talking about in the AIDS area would seem to me to be eligible to fall into that kind of program or activity, were the council to get into that area.

Senator Marsden: I. raised the matter partly because of Senator Haidasz's question about overlap with the other councils. There is an explicit recommendation in the report that MRC and SSHRCC form a joint committee to ensure that they do not overlap.

Dr. Heintzman: May I take it that my answer responds to your question, or do you wish a further response?

Senator Marsden: That is fine, thank you. I think that answered my question.

The Chairman: I believe Senator Atkins has something to say.

Senator Atkins: I was just curious. You talked about the importance of libraries and about public-sector support. I am curious to know whether the publishing firms in this country, or internationally, give support, in either name or in dollars, to libraries? If so, how much do they give?

[*Text*]

Dr. Heintzman: I am afraid I do not have that kind of information at my fingertips, and I do not whether any of my colleagues have, either. I am just not in a position to comment on whether or not publishing firms contribute to library support. However, I imagine they do.

I know they do in the sense that a great many of the review copies and the gratis copies that are sent out by publishers find their way into university libraries and are, in fact, an important part of that growing collection. As the former editor of a learned journal, I know that a great many of the books that came to us eventually ended up in the university library and were very welcome. That was at the courtesy of the publisher.

The Chairman: Are you telling us that you do not buy all of the books that you have: that some books are given to you by the publisher or the editor?

Dr. Heintzman: The publishers normally provide review copies to learned journals, free of charge.

The Chairman: I see. So do you have an idea of how many volumes you have in your library at the present time?

Dr. Heintzman: Are you asking me how many volumes there are in Canadian libraries, or in university libraries?

The Chairman: No, I am referring to your library.

Dr. Heintzman: We do not have one, Mr. Chairman.

The Chairman: I see. I thought you had a library for your council.

Dr. Heintzman: The SSHRCC is not a research council in the sense that the National Research Council is a research council. That is to say, it does not carry out research of its own and does not employee researchers. What it does is to fund basic research by university-based and non-university- based researchers throughout the country. That is the same for the MRC and NSERC. They are granting councils, not research councils in the sense that the NRC is a research council. So we do not have, for example, a research library.

Senator Atkins: If IBM were to donate a system to a library, would there be any kind of matching funds toward that kind of contribution?

Dr. Heintzman: If a case could be made that it was a donation to support research it would be eligible. Indeed, I am confident that the University of Toronto has reported donations of that kind in the current year.

Mr. Bouliane: It has to be tied to a grant from our council to the institution. That is one of the conditions.

Senator Marsden: I am pleased to see in your brief that you have put so clearly the need for understanding the organizational and social aspects of technological change, what you call a knowledge-based society.

At a research council meeting—not your council, another one—one of the country's leading economists said that we do not need to do basic research here because we can import it all.

[*Text*]

We have done that in management organization systems in the past, as Lowe has documented in his recent book. What are your views on that? Do you think that we can simply import all social systems for adaptation to new technology in a knowledge-based society?

Dr. Heintzman: I think the simple answer is, no, I do not think that we can. There are very specific characteristics of the Canadian society, the Canadian polity, and the Canadian psychology which affect management organizations.

To take one example, a study was recently done for the Economic Council of Canada regarding the atomic energy industry in this country. One of the points that the report made was that our economy is very much a political economy in a way that other economies are not. The role of governments, public bodies and public policy has been very much more prominent in the marketplace and in business activity than in other countries, and that is a specific characteristic of Canadian life which needs to be taken into consideration in economic planning and in anything else. Our organizations are not the same; our political institutions are not the same. We relate to them in different ways. In order for even technical know-how to be brought in from abroad and used here effectively, and in a way that benefits the country, we need to have that understanding of how Canadians work and how Canadian institutions work. That work can only be done here by Canadians, by and large.

Senator Atkins: I have a question in an area that I think is beginning to emerge. If there were a notion of a Human Life Act, the whole question that relates to genetic engineering, to the moral issue of taking lives, and so forth, would come up. Do you feel that in the area of social sciences and the humanities a significant part of that question is related to your interests?

Dr. Heintzman: Very definitely. All of the struggles that our society is now going through, as a result of technological advancement, are, in large measure, related to moral questions. They are ethical questions, and are questions which are not, by any means, exclusively dealt with by the social sciences and the humanities but which form a central portion of what the social sciences and humanities deal with, particularly the humanities. The whole ethical dimension of modern managerial life, modern technological change, bio-medical ethics, and such, is very much at the centre of the concern of our research community in general and the council in particular.

I might, in fact, mention that the council is funding this year a special one-time experimental program in which it has given grants to five national organizations to explore the state of knowledge and research and activity in this country in particular areas which the council believes—and the research community believes, since it proposed them to us—to be of particular national importance, or public policy importance, at this time.

For example, we will be funding the Social Sciences Federation of Canada to establish a work program and map of the researchers in this country in the area of the management of technology over the next six months. We will be funding the Canadian Federation of the Humanities to bring together a

similar network of people in the area of the ethical challenges and problems of the modern entrepreneurial and technical society.

Senator Atkins: This is where there can be potential overlap, and you will have to work with others. Can that be done easily?

Dr. Heintzman: Yes.

Senator Atkins: There is not a competitive interest among researchers?

Dr. Heintzman: As far as research councils themselves go, I do not think there would be much dispute as to which council has primary responsibility for an activity in a particular area. As I said, that is an area of real interest and concern to the council.

Senator Atkins: It will be an interesting political issue over the next few years.

Senator Marsden: It is just that doctors always assume they know everything and that the rest of us are merely subservient, and so there is no fight.

Dr. Heintzman: It is in a context like that, if I may add one more comment, where it is clear that these are absolutely crucial questions for our society, and one has to wonder when one notes, as I did, that Canada's funding of social sciences and the humanities research, in real terms, is now about two-thirds of what it was 20 years ago. Not only has there not been any growth, but we are significantly behind where we were 20 years ago.

The Chairman: With that, I thank the witnesses for their presentation this morning.

The committee adjourned.

EVIDENCE

Ottawa, Thursday, May 12, 1988

[*Traduction*]

The Standing Senate Committee on National Finance met this day at 11:00 a.m. to examine the Estimates tabled in Parliament for the fiscal year ending March 31, 1989.

Senator Fernand-E. Leblanc (*Chairman*) in the Chair.

The Chairman: Honourable senators, we now continue our review of the Estimates tabled in Parliament for the fiscal year ending March 31, 1989. This is the fourth meeting on this subject.

We are fortunate to have with us this morning Mr. Pierre Bois, President of the Medical Research Council of Canada, who will testify on the Council's behalf.

Also appearing before us today is Mr. Lewis A. Slotin, Director of the Programs Branch of the Medical Research Council of Canada.

I understand that Mr. Bois has an opening statement, so I will yield the floor to him.

Mr. Pierre Bois, M.D., Ph.D., President of the Medical Research Council of Canada: Thank you, Mr. Chairman. I am pleased to be here with you this morning to discuss the matching-funds policy.

The budget speech in February 1986 brought an entirely new dimension to the efforts of the federal government in support of research and development through the federal granting councils, with the announcement by the Minister of Finance of the implementation of a matching grant policy to promote the funding of university research by the private sector. The new policy also provides a mechanism to determine the council's budgets for the next five years. Beginning in 1987-88, the government will add to the council's base budgets each year an amount equivalent to the contributions of the private sector to university research in the previous year. However, a maximum has been set for these annual matching funds in accordance with an established formula. During the five years of the policy the base budget of each council will be maintained at the 1985-86 level and there will be no provision for inflation. Exceptionally, for the 1986-87 year a one-time increase equivalent to 4 per cent has been added to the base budget of the council.

Thus, while conceptually interesting, the matching grant policy fails to provide any real increase over inflation before fiscal year 1989-90. In other words, the MRC will have to continue to apply some reductions to its level of activities until 1989 unless some readjustments are made. The smaller number of new grants offered in 1986-87 reflected this situation.

As a result of the matching policy, the granting councils must encourage increased private sector contributions to university research. If they fail, they will see their budgets shrink, and Canadian university research funding reduced as a consequence.

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How to promote private sector support of university research remains the major issue. Notwithstanding the fact that the matching program has been well publicized and that tax incentives are in place to encourage more involvement by the private sector in university research, clearly this by itself is not enough. One means of meeting this challenge is to offer programs which might be attractive to both the private sector and university researchers. In 1984, the MRC Standing Committee on Priorities and Planning began developing a new program to support applied research. This project was approved in principle by the council in the fall of 1985 and was finally approved in May, 1986 to start on April 1, 1987. There is every indication that this new program of cost-sharing of university-industry projects will be successful and will increase private-sector contributions to university research. However, as noted previously, since the matching policy will not provide any real increase in the council's budget until 1989, MRC will have to reallocate funds from current programs to support university-industry projects for the first two years of the program.

A simple analysis of this new situation reveals a significant change in government policy vis-a-vis the council. The government is demonstrating a clear intention of playing an active role in selecting council priorities in the programs for funding research. This is the first time that such a situation has occurred since MRC was created 27 years ago. It is obviously too early to determine the effects of this on the future biomedical research in Canada.

Mr. Chairman, I have added to this text a table that I feel will give a clear picture of the impact of the matching funds. Do you wish me to discuss the table now?

The Chairman: Yes, you may as well give us some indication of what is contained in that table before we begin the questioning.

Mr. Bois: The table is meant to give a clear idea of what will be available for grants and awards—that is, the research budget of the council—during the years of the matching policy. You will notice that the base budget of 1986-87 is $157.9 million. That remains approximately the same for the duration of the matching policy. You will also notice that the matching funds which come in in 1987-88—that is, $10.1 million plus the $3 million which was added as an increase of the ceiling of the matching funds for that year—finally represent $170.4 million, which is a 4 per cent increase compared to the previous year.

This goes on until 1990 and you will notice that, by 1990, the increase is 6.9 per cent. Therefore, it means that in 1990,

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there are approximately 2.9 percentage points over inflation, if inflation remains at 4 per cent further on into 1990.

Mr. Chairman, it is impossible to avoid the cost of inflation in the support of research. There is no way to compress inflation which is calculated to be slightly higher than 4 per cent. However, even if you maintain the inflation figure at 4 per cent, that simply means that each year you can support the same level of research as you did in the previous year with a slight decline. Therefore, even if there are $10 million in matching funds in 1987-88, the capacity to support research remains the same as it was in the previous year and almost the same for the current year, 1988-89. In 1989-90 we have a slight edge over inflationary costs, and it is a bit better yet again in 1990. What this says is simply that the government might have decided that instead of the matching policy, the adjustment would be 4 per cent from 1985 to 1990, which would have left us in exactly the same situation. The matching financial support does not appear to be of any significance really on the ability to support research in the country. Yes, it is a mechanism to stimulate private sector contributions, but if the funding remains at the same level you cannot increase the funding by much more than the fraction we have there in the table. Whenever the council funds university industry projects, it is at the expense of other programs, as the figures in the table show.

I have one last point. In the early 1980s upon the advice of the then Minister of Health, Madame Bégin, which was supported in 1984 by Mr. Epp, it was suggested that the MRC should try to increase contributions for funding university research. That suggestion was applied, and by 1986-87 and 1987-88 a number of projects and researchers received joint support from industry and MRC. In 1986-87, that support from the industry amounted to about $8 million, and it was provided without any matching program. This was as a result of an indication by council to reseachers to develop programs with the industry, and about the same amount was provided by MRC, giving a total of $16 million, all of which was paid out without any matching grants.

Therefore, it seems to me that while the matching policy is interesting and useful, the statistics confirm that, as far as MRC is concerned, the situation was already there. In our proposal for adjustment of the five-year plan of 1984, additional funds of about $2 or $3 million, if I recall, were requested specifically to support more university-industry projects. Those funds were never made available to the council, but if the request was made, it means that this concept of stimulating private sector contributions to university research through MRC programs was already there. So, in conclusion, I think that the government's policy will be useful in that it will produce a significant increase in university research projects by the years 1989, 1990 and 1992, but in the preceding years, it will mean a decrease in the base budgets for regular programs of the council. That is why we will have so many problems in the first years of this new matching policy.

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Senator Stewart (Antigonish-Guysborough): I would like to refer to the budgetary data which you provided. With regard to matching funds, the table shows that for 1987-88 there will be some $10.1 million, for 1988-89, some $20.9 million, for 1989-90, some $33.2 million and, for 1990-91, some $46.8 million. How is it that you can be so specific about the amount of matching funds that will come to the Medical Research Council in each of those years?

Mr. Bois: These amounts were determined by the Treasury Board and form part of the matching policy. In other words, these amounts represent the ceilings for MRC. The amounts for ENSERC and for SSHRC are different. These amounts were calculated in such a way that in the end the total increase would be close to 4 per cent. They were not determined by the MRC.

Senator Stewart (Antigonish-Guysborough): Were they determined by the amount of private sector contributions? Suppose private sector contributions were suddenly terminated completely, would these matching funds disappear?

Mr. Bois: They would be reduced accordingly.

Senator Stewart (Antigonish-Guysborough): In other words, they would disappear entirely if the private sector contributions disappeared?

Mr. Bois: Yes.

Senator Stewart (Antigonish-Guysborough): So what you are saying by implication is that there is a volume of private sector contribution to medical research which has existed, which exists and, it is presumed, will continue to exist, and those private sector contributions would have been there in the complete absence of the matching program; is that correct?

Mr. Bois: To a certain degree, yes.

Senator Stewart (Antigonish-Guysborough): To what degree is it not correct?

Mr. Bois: Private sector contributions to university research, which includes in the case of MRC hospitals and research institutes, have always received from the public significant support in this country. I do not think that the matching policy has much influence on those contributions. The second point is that although the university-industry program stimulates the private sector to submit joint projects with the university research sector, it amounts to an increment on private sector contributions to university research because it is no longer done passively as it was in the past. It is more active.

Therefore, I would say that those two components of public support of our institutions and university-industry programs of the council will increase the private sector contribution to a certain level that cannot be estimated for the moment. It is increasing significantly now. Since the change in the Patent Act, we have had a large number of joint projects with the pharmaceutical industry.

[*Text*]

I have no fear that these amounts of contributions from the private sector will disappear—unless there is a tremendous change in the economy or in the philosophy of the people.

To use that device as such in order to establish a budget of the council is, I find, rather complex. It can be achieved without this calculation. This is 6 per cent of the previous year's budget which has been established as the ceiling for matching. Why go through all of that to arrive at about a 4.5 per cent or 5 per cent average increase?

I see these as two very different things. One is a formula to establish the budget of the council, and we go through all of these steps. That is one objective. The other objective is to promote university-industry research projects. A mathematical formula to determine a budget is one thing but joint funding of university-industry programs is quite another. That is going well but not because of the complex calculations used to establish the budgets.

Senator Stewart (Antigonish-Guysborough): What kind of knowledge do you have concerning private sector contributions to university-based research?

Mr. Bois: There are three domains. One involves private agencies such as the National Cancer Research Institute and the Heart Foundation. This involves about ten major private agencies. These agencies, in total, produced an aggregate of $65 million in Canada in the year 1985-86, which was the base year. We are supposed to be able to use the excess over that figure for Treasury Board to provide matching funds. In 1987-88, these same agencies had an aggregate of $72 million that may be matched.

The second group is private donors, who contribute particularly to hospitals more than to universities. A large amount of money is given by the public throughout the country for support of their hospitals. In some cases that is used for research and in others it is not. In many instances, these funds provide for some infrastructure and also for the high cost of research. The pool is fairly important. I do not have an exact figure, although we wrote to each one of the forty or more hospitals where we have some research projects, and it was estimated that the figure might be in the order of $40 million. That is an estimate because we have not gone into the details. We did not need to do that.

The third pool of support from the private sector, and the most important as far as we see it, is industry. As I mentioned earlier, in 1986-87 we can identify $8 million in additional funds coming from industry to support university research. The figure will be more than $8 million but we have not yet determined the final figures, because, one, we already have the amounts needed to reach the matching ceiling and, two, industry supports a fair number of activities labelled "research" which the council would not fund. For instance, a company may have a number of patients who may have had a new diuretic and they will ask a nephrologist in our teaching hospital

[*Text*]

to test or evaluate this new drug, which has, of course, already been evaluated. It is a question of numbers. That is very expensive. They call that "research." It is not real research and it would not be funded by the council.

That is a summary of where funds come from.

Senator Stewart (Antigonish-Guysborough): We are talking, not in a specific year but in an ideal year, of approximately $120 million, that is, $72 million plus $40 million plus $10 million.

Mr. Bois: Yes, but the $72 million is not matchable.

Senator Stewart (Antigonish-Guysborough): I am coming to that. Of that, what amount would be matchable?

Mr. Bois: The $7 million difference between $65 million and $72 million would be matchable.

Senator Stewart (Antigonish-Guysborough): Would the $40 million of private donations be matchable?

Mr. Bois: I can say, without hesitation, that half of that would be matchable.

Senator Stewart (Antigonish-Guysborough): What about the $8 million or $10 million?

Mr. Bois: That is fully matchable. The reason I reduced the private donation is that, as I told you, a good measure of these funds is used to support research but another portion is used for infrastructure and to pay for some services—what we call, "indirect costs" which the council would not fund. I would point out again that we did not go into fine details on this figure. The moment we reached about $15 million or $18 million matchable funds, we felt we had spent enough time in looking at the policy and explaining it. I did not want to spend any more time trying to find out if, say, the last $10,000 was matchable.

Senator Stewart (Antigonish-Guysborough): Have you done an analysis of the kinds of research for which industry makes its contributions; and who are the industries? You mentioned the pharmaceuticals a moment ago? Another way of putting the second part of my question is: What percentage of the industry money comes from the pharmaceutical companies?

Mr. Bois: I will have to make a guess on this. I would say that in the industry component most probably the largest part, perhaps, 75 per cent or 80 per cent, comes from the pharmaceuticals, other industry devices and straight chemicals.

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Senator Stewart (Antigonish-Guysborough): So those are industries which are making those contributions as an indirect way of advancing their industrial aims?

Mr. Bois: Yes. If you wish, I can give you a couple of examples. One pharmaceutical company is in Toronto. The council supports a very interesting program to try to achieve gene therapy for AIDS patients. That is very basic research and has the advantage of involving the best knowledge and scientists that we have in Toronto. That is supported in part by industry and in part by MRC.

Another program is in Vancouver, in the area of monoclonal antibodies, which, as you know, could provide a means of very accurate diagnosis in cancer, and can also be used in the treatment of certain types of cancer. I would say that at the moment it is an area that is very hot, so far as industry and the patients are is concerned.

Those are two typical examples of basic science-type research that are supported by university-industry. Another one that we are looking at at the moment is in the area of devices. In Montreal there is a large American company—there is also a Canadian one—connected with radiology which is trying to develop a new method for diagnosis of cardiac function, which, I would say, would involve almost no radiation. That also is extremely interesting and promising. There is a group of radiologists involved, but a few experts in physics are also involved in that, as well as people the field of chemicals, because they use rare isotopes. Also involved are people involved with the manufacture of radiographic machines. That is a fairly good example of the kind of work that we have been supporting through the university industrial program.

Senator Stewart (Antigonish-Guysborough): Do you anticipate an increase in that kind of activity, an increase which would be attributable to the matching grant policy—or would any increase that you can anticipate probably have taken place anyway? We have to be speculative here, because we are talking about a five-year budget.

Mr. Bois: Let me put it this way: In the 1970s—and, I would say, even in the 1960s—there was really very little that went on with regard to university industry programs. There were two good reasons for that. The first is that universities were not very favourable to that—it was looked down upon—and industry was not very interested. During those 10 years—I was a member of the council in the early 1970s; so I have a good knowledge of what went on—I believe the council funded four projects in connection with university industry in the 1970s. Beginning with the 1980s, we have seen an enormous change in the universities, as well as in industry and government. At the beginning of the 1980s it became important to promote science and technology, and government made it known. When we look at the situation and compare it with 10 years ago, each university now has an office for university industry services. That is a big change, an enormous change. It is progressing, and government made it very clear that it was

[*Text*]

very important to promote the development of technology and the transfer of technology from universities to industry.

At the MRC, as I said before, we already had something going along those lines beginning in 1982, 1983 and 1984, and there was real interest on the part of researchers. That is a policy which the council approved and supported before the matching grant policy appeared. As I said before, the matching grant policy, so far as the MRC is concerned—I cannot speak for the other councils, was like défoncer une porte ouverte. It was there. Concerning the purpose with regard to establishing the budget, I find it is very complex to arrive at 4 per cent.

Senator Stewart (Antigonish-Guysborough): Mr. Chairman, I have a couple more questions, but I do not want to take all of the time.

The Chairman: I appreciate that, because both Senator Cogger and Senator Haidasz wish to ask questions. If we have time, we will get back to you.

Senator Stewart (Antigonish-Guysborough): Perhaps I may be permitted to ask one final question. Mr. Bois, you are saying that you think that this program is a cumbersome way of fixing the MRC budget, and that probably little private sector money is coming for medical research which would not have come in the absence of the program. Let me ask you, if you participated in the origin of the program, whether you were consulted. Are you today confessing that your advice was wrong?

Mr. Bois: No. We were not consulted when the policy was decided in January or February of 1986. The councils were not consulted as far as this was concerned. We were involved in the writing of the rules of the three councils. Many hours were spent in producing these rules, but that was not really consultation.

Senator Stewart (Antigonish-Guysborough): Thank you, Mr. Chairman.

The Chairman: Senator Cogger.

Senator Cogger: Dr. Bois, before asking a question, I would like to make one comment.

I was happy to hear you mention a moment ago what an important contribution the pharmaceutical industry was making to research . . .

Senator Haidasz: That was my question, too, Senator Cogger.

Senator Cogger: . . . particularly since the Act to amend the Patent Act was passed.

Senator Haidasz: That's a bad piece of legislation!

Senator Cogger: Senator Haidasz, the witness has just said the Act is having some highly beneficial effects. That's what I want to point out.

You know perfectly well that the bill was debated all last summer. In any case, Senator Haidasz, you will never convince me! Don't waste your time bringing it up.

[*Traduction*]

Dr. Bois, I would like you to clarify two points you made in your presentation that I have difficulty reconciling. To me, they seem almost contradictory. On the one hand, you say:

> As a result of the matching policy, the granting Councils must encourage increased private sector contributions to university research.

Yet later you said:

> The Government is demonstrating a clear intention of playing an active role in selecting Council priorities in the programs for funding research.

It seems to me that the more you solicit research funding from the private sector, the more you lose control over the priorities, isn't that so? If industry contributes heavily to research, isn't it true that industry will set the priorities?

I am having difficulty understanding this: you tell me that the government is trying harder, on the one hand, to play a role in setting priorities and, on the other, to obtain industry contributions and participation.

Can you reconcile that for me?

Mr. Bois: Let's say there are two things here. The first is that enhancing the industry's contribution was something that was already underway before this policy. The policy has just told us, "Not only do you have to do that if you want the matching funds, but if you don't, your budget will be cut back." It's an order. At that point nobody really knew what the volume of the private sector contributions would be. All sorts of figures were mentioned, 15 million, 20 million, nobody knew.

If we take the scenario that there wouldn't be much, you can see that the Medical Research Council would have to reduce its ordinary research-support activities so that it could finance academic and industrial research. We have only the one budget, and even though it might be called large, it's still just the one. Because of this, the Council is forced to choose a university-industry priority, which may be larger than we might perhaps have liked.

You're right to say that if that program increases in proportion to all the others that the Council has in the next two, three or four years, it's certain that it'll be directing the types of research that are a priority with industry. They won't always perhaps be university priorities. For the Council, priorities are in a manner of speaking very broad. You can't say the Council would have serious problems with that. If the proposed research was meaningless in the eyes of the Research Council, it wouldn't be feasible.

Senator Cogger: You say you wouldn't have any serious problems. With respect to things like overlapping work, for example, if three pharmaceutical companies wanted to get into

[*Traduction*]

the same research, even if they would be working for example jointly with three educational establishments or three different universities, I imagine that would create a problem for you.

Mr. Bois: These are hypothetical situations. I've never seen research programs that overlapped like that, especially in the case of industry, where as you kwow they watch one another very closely and want to compete.

I don't have enough experience with industry at the moment, because it was two years ago that we had a certain number—I have the impression from what I can see that industry has already set its priorities in this area or that. They're close neighbours, almost the same! For example, the use of technium in X-rays that I mentioned just now, that's very very specialized. If another industry had another very rare isotope, a better one, I don't think anybody would object if that project were considered and the other were allowed to drop. The competition is very fierce. I'm not too worried about it.

Senator Cogger: There's just one last point I'd like to clear up. In the table you provided for us, starting this year your operating costs go down. In 1987-88, you're spending $1.7 million and in 1988-89, you'll be spending $1.5 million. Those are your operating costs.

Mr. Bois: That's a projection we made. I won't say—though I'd like to!—that we'd like to be able to operate on nothing, but we can't seem to manage it! This is a projection, you see, it's the same figure all through 89-90-91, because there was a reduction that was supposed to apply in our operating costs and in practice I believe now—

Senator Cogger: That's what I find hard to understand. In 1988-89, your salaries went up by $200,000, about 10 per cent. Your operating costs went down by $200,000. I don't see how you're going to work that one out.

Mr. Bois: It's simple, Treasury Board asked us to adjust our administrative costs by transferring money from the grants budget, which wasn't done prior to 1985-86 or something like that. So every year for the past two years now, I have asked the Board in March or June to transfer a certain amount to the administrative budget. That's accepted Treasury Board practice. We need more personnel. If Treasury Board approves a certain position, it still has to be paid for from the grants budget. It's a different type of management from what we had previously.

The Chairman: A supplementary question—you have 2.310 for salaries in 1988-89 and 2.224 in 1989-90. Are you cutting staff or cutting salaries?

Mr. Bois: Neither.

Mr. Lewis A. Slotin, Director, Programs Branch, Medical Research Council of Canada: In accordance with the policy of overall reductions in the public service, the Medical Research Council has also had to reduce its person-years by 10 per cent

[*Text*]

over a 4-year period. What you see there is the result of the reduction in the number of person-years, but balanced off by the projected growth in the salaries of those that are remaining.

The Chairman: But that is only a projection. We don't know yet when that will happen: you have just projected that it could be that way.

Mr. Slotin: That is the current policy of the government as adopted in 1984-85 I believe.

Mr. Bois: 85-86.

The Chairman: Dr. Bois, in the January 1988 issue of Bulletin Université-Industrie, which is very interesting, you state that in the spring of 1986, you formulated a new objective, namely:

> to promote co-operation between university and industry researchers in the health field.

I assume that the two sides were not co-operating up until then. Or perhaps they were, but not in a regulated or organized manner.

Mr. Bois: You're correct, Mr. Chairman. As you say, this activity, which had full backing, fit in well with our plans. We wanted to do a little more to increase the visibility of Université-Industrie. That's why we decided to make an official announcement and to have it published, so that all researchers would be informed. We advertised the program.

The Chairman: You have already begun to co-operate with the industry. You note on page 3 that you have researchers looking for partners in industry and on page 5, you state that companies are looking for researchers. Isn't there some way of resolving this dilemma by matching researchers up with certain companies and vice versa?

Mr. Bois: Mr. Chairman, certain researchers and industries have asked us to do just that. They asked us: why don't you advertise the opportunities available, both to industry and to researchers? We have taken that initiative. Another thing we have done is to organize a series of meetings or symposiums. We started three weeks ago in early May. These meetings, which last one and a half days or so, bring together scientists from the industrial and university communities. These gatherings are an opportunity for them to meet one another when in the past such meetings occurred only during scientific conferences abroad. For example, members of the Society for Neurological Sciences include researchers from industry as well as universities. These Canadians do not know one another very well. This is especially true of those working abroad, at the head offices of foreign pharmaceutical companies.

These individuals did not have occasion to meet Canadian researchers. We have not actually established a program, but rather taken the initiative of arranging a series of meetings. The first was held several weeks ago and focussed on diseases

[*Traduction*]

of the nervous system and mental illnesses. In attendance were thirty to forty Canadian researchers who are very active and very well known in this field. Also present were some fifty representatives of pharmaceutical companies interested in diseases of this kind.

The next meeting will probably be held in September, with cardiovascular diseases being the topic of discussion. This is another area in which industry is very actively involved. These meetings seem to have been very successful. The number of requests we receive in this area is constantly increasing, to the point where we are almost overwhelmed. Thus, the administrative budget to which you alluded poses problems of another sort. I truly believe that something is going to develop very soon.

Senator Haidasz: Perhaps this question was previously answered, and if it was you do not have to answer it again.

Mr. Bois, what are the priorities of the MRC now in the field of biomedical research?

Mr. Bois: As a principle, the council supports research in all areas of health sciences, including the biomedical area, the dental sciences, the pharmaceutical sciences, nursing and other health sciences. In large measure, the main support is described as biomedical, basic and applied, to the medical trials. That is the total picture.

Within this, last October the council had a special meeting and it identified that, as a general priority, the domain of the brain and aging should receive special consideration or priority. Aside from that, the council has a few other types of priorities. One is through the program called the Development Grant Program. This is a program for which only schools of medicine where the level of research activity is much below the other universities in this country can apply. Schools of dentistry and schools of pharmacy can also apply. It was recently modified to help develop research in the nursing schools.

In fact, this is a way of giving a special instrument to these schools to develop a research basis with sufficient assistance. A development grant usually provides for the salary of a researcher for five years, renewable, and provides for equipment, supplies and technicians. It could imply more than one—maybe two or three—researchers. It has been very useful.

Senator Haidasz: Obviously, the Medical Research Council does not set its priorities according to the Statistics Canada tables of different diseases or causes of death. For example, the No. 1 disease is cardiovascular. Even though that kills over 50,000 Canadians per year and makes others very ill during a lifetime, that is not your No. 1 priority?

Mr. Bois: You must understand that the best indicators for priorities with respect to research projects are the researchers themselves, who are really within the field itself. Also, it is very simple to analyze because the largest amount of funding

[*Text*]
the council provides is with neuroscience and mental diseases, including behaviour.

Senator Haidasz: Why do you do that, Mr. Bois?

Mr. Bois: We do not do it. It is in answer to the applications.

Senator Haidasz: In other words, you do not give leadership to biomedical research in Canada? Rather, you just follow with your bag of money from the taxpayer and if some scientists have a quirk that they want to study the *substantia nigra* of the brain, you give them what they want?

Mr. Bois: We have perhaps one grant relating to *substantia nigra* at the moment, as far as I know. This is not as simple as that.

Senator Haidasz: You said that the money you give depends upon what is being asked for. If a neuroscientist at the University of Toronto says, "I want to study something special. Give it to me," you go ahead and give it to him. Even though the No. 1 killer disease is cardiovascular disease and the No. 2 disease is cancer, you are going to give the taxpayers' money to do some little research somewhere on a project that is not very vital. When you compare how many people are killed and get sick with Parkinson's Disease with 50,000 Canadians dying every year of cardiovascular disease, I do not know how you set your priorities.

Mr. Bois: I would say we support the best research in the cardiovascular area.

Senator Haidasz: Why do you not give most of your money to cardiovascular research, which is where it is needed? Canadians are suffering and dying from the disease and you are giving most of your money to neuroscientists.

Mr. Bois: Let us go to the beginning, please. To date, research is at the level of molecules. We support the area of clinical work, which is ongoing. We support it through clinical trials and the like in the most urgent and important subjects. You talk about cardiovascular—

Senator Haidasz: What is the Medical Research Council's most urgent priority? Is it cardiovascular disease? If so, how much money do you put into it to support that research?

Mr. Bois: If you wish to identify what cardiovascular research is today, you have to go into molecular biology and you have to go into fields of very basic science. If you wish to have a new model, as we are studying at the moment, of the cardiac implant, the largest part of the work is in physics, microelectronics and microbiology. That is under the heading of cardiology but it applies, in fact, to most every tissue in the body. We have been supporting basic research to all domains of pathology for a good, long while so that the basic research in cardiovascular disease in this country is excellent. Further,

[*Text*]
we have the Heart Foundation in this country, and since the beginning MRC and the Heart Foundation, have jointly funded many projects. Most of the researchers supported by the Heart Foundation also have support from MRC to provide the base of their budget.

Senator Haidasz: What percentage of your annual research funding goes into cardiovascular disease—for anybody, whether the Canadian Heart Foundation, the Heart and Storke Foundation of Ontario, or any other cardiovascular association.

Mr. Bois: That is very important question, because we get all the funding requests dealing with mental problems and neuroscience, which has a lot to do with cardiac disease, by the way. That is funded almost solely by MRC. There is no agency that supports neurosciences. The mental disease support is about $1.8 or $2 million, for Alzheimer's disease and the like. That is about what it receives. We have in Canada the best science in neurosciences. It goes back to the prewar years. That is for mental diseases. The cardiocascular diseases, receive probably the next largest percentage, maybe of the order of 12 per cent; that, as I said, goes with the Heart Foundation, so that, all told the support there is larger than that for mental diseases. Similarly with cancer, MRC provides a large amount of funding for research.

Senator Haidasz: I want to know the figures. How much?

The Chairman: Mr. Bois, could you possibly ask your administrators to supply the figures requested by Senator Haidasz? I believe this might shed some light on a situation that now appears somewhat confusing, both to you and to Senator Haidasz. If you provide these precise figures, I think that we would all have a clearer picture. If you supply us with statistics for, say, the past year or two, since these would the easiest to compile, then we would have a good idea of where your funds go.

Senator Haidasz: Thank you, Mr. Chairman. Coming back to cardiovascular research, one of the most recent advances there is the dissolving of clots within, let us say, four hours of the onset of a myocardial infarction. I am referring to tissue plasminogen activators. How much money did the Medical Research Council allocate for any research by any company in the field of dissolving or lysing of blood clots?

The Chairman: Tell us if you don't have these figures right now. You could supply them to us later instead of continuing a discussion that, in my mind, is confusing.

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Senator Haidasz: You see, what I am driving at is that we know that Genentech has the licence for TPA. I just want to know whether the MRC gave any money to Genentech to develop TPA.

Mr. Bois: No.

Senator Haidasz: No? All right. Whenever a pharmaceutical or biomedical company works in conjunction with the MRC, does that research have to be done in a university or can it be done at, say, Sandoz's factory in Basel, Switzerland? Where is that research done in a university or in a pharmaceutical company somewhere?

Mr. Bois: It is done in Canada.

Senator Haidasz: Where in Canada? In a university?

Mr. Bois: Mostly in universities.

Senator Haidasz: Mostly, but also in some pharmaceutical company's manufacturing plant?

Mr. Bois: I think we have some projects where part of the work is done within the industry because of equipment and some facilities. However, in large measure the money is given to the university for administration. It is never given to the industry.

Senator Haidasz: When you say "for administration", that means the salary, work and instruments of the scientists doing the research; is that right?

Mr. Bois: Yes.

Senator Haidasz: Very well. Once a product is developed by a university professor or scientist, who owns the patent? In other words, who profits by that science? Is it the university, is it the professor or is it the Sandoz company?

Mr. Bois: It is up to the university to decide. We have no say.

Senator Haidasz: You have no say? In other words, you are giving the taxpayers' money for a research project, and Sandoz makes all of the profit, on top of the profits that they are making by selling their drug products at very excessive prices?

Mr. Bois: The program we have is the same as for the other councils. The university and the researcher are the ones who first make their decisions. They are the ones who are in relation with the company and it is their own responsibility.

Senator Haidasz: Yes, and this is what I do not like. In other words, you do not have any priorities. The priorities are those of the researcher at the university or some researcher in a pharmaceutical company, and all you do is give the taxpayers' money to these researchers and then they do whatever they want. They choose their own topic and they have their priorities, and you do not have any priorities. I must remind you that you are dealing with the taxpayers' money. You should do whatever is good for the taxpayer. For example, the man who has a heart attack needs some medicine at a reasonable and affordable price in order to treat his ailment. The taxpayers'

[*Text*]

money should not go to satisfy a scientist at a university who has a pet project.

Mr. Bois: We do not support pet projects.

Senator Haidasz: But you just told me, Mr. Bois, that you have no priorities; that you give money for whatever the professor at a university wants to do with it. Therefore, Sandoz goes to a pharmaceutical scientist at the University of Toronto, let us say, and says: "Listen, doctor, would you be interested in developing an idea that we have?" Then if they agree, you give half of the money, do you not?

Mr. Bois: Sometimes.

Senator Haidasz: Is it not a matching grant system?

Mr. Bois: The matching grant is for the budget. It has nothing to do with the university-industry program.

Senator Haidasz: In any event, I am merely trying to stress the fact that really I am disappointed that the MRC does not have its own priorities, but rather follows the priorities of a researcher, a scientist or those of a biomedical or pharmaceutical company. I think that is wrong, especially since Bill C-22 was enacted. That is a Canadian law which protects the monopoly of foreign pharmaceutical companies. I do not think any other country in the world has passed a law protecting and giving monopolies to foreign pharmaceutical companies who are making billions of dollars. Only last week, Eli Lilly announced that its first quarter profit was $223 million. That was the profit for the first quarter of this year.

The Chairman: I am sorry to interrupt, Senator Haidasz, but we have another witness to hear from.

Senator Haidasz: Very well, thank you, Mr. Chairman. If you are so busy with your priorities, then I think I am just wasting my time on this committee.

The Chairman: On the contrary, senator. However, the thing is—

Senator Haidasz: Mr. Chairman, I am being cut off and I have not even started on my questioning.

The Chairman: Senator Haidasz, you can ask the same questions of the next witness.

Senator Haidasz: The other witness is from the Aluminum Company of Canada, and that has nothing to do with medical research.

The Chairman: But Mr. Bois may answer your questions at the same time.

Senator Haidasz: I might as well leave.

The Chairman: We will then ask Dr. Hugh Wynne-Edwards to come forward and make his opening statement.

Dr. Hugh Wynne-Edwards, Vice-President, Research and Development, Alcan Aluminum Limited: Mr. Chairman, my name is Hugh Wynne-Edwards. I am the Vice-President for Research and Development of Alcan Aluminum Limited.

which is headquartered in Montreal. I am the company's chief scientific officer and, by way of background, I currently sit on the National Advisory Board for Science and Technology. Also, I have been a member of the Science Council of Canada for the last four or five years. Earlier in my history I had a tour of duty in this city as an assistant deputy minister and I also spent a long period as a professor in two Canadian universities.

Mr. Chairman, I am pleased that you are lookin at this issue. The subject we are addressing is one of enormous importance, and I mean important on a much larger scale than perhaps the specific question of matching funds. Therefore I have decided to spend the time I have in trying to fill in some of that framework with the hope that the discussion will broaden somewhat.

However, as a preamble, let me say that I think the objectives of the matching grants program are fine and noble. We, as a corporation, have been participating, and I can talk about that later if you like. However the program, no matter how successful, will impact on perhaps only 10, or at the maximum 15, per cent of the research done in universities in Canada, which overall, is a minute part of the Canadian problem.

The reason the subject is important is that a consensus has formed in the world and in Canada that the next round or the next few decades are going to be enormously competitive economically. We will have winners and losers on a vast corporate scale and also, I believe, on a national scale because of the globalization of markets and the increasingly savage competition out there. At the same time, the low value-added products, which are largely the commodities based on natural resources and raw materials, have moved into chronic surplus in the long term. There are shortages from time to time, but in the long term they are in surplus.

Moreover, the revenues or the profits, if any, fall to the low-cost producers. Therefore, with companies like mine—and it does not matter whether you are making whiskey, wine, wheat or aluminum—everyone is trying to be excellent and trying to have the lowest costs. There are many reasons for that, not the least of which is that productive capacity continued to rise in the 1970s when demand began to slacken. Also, as this expansion took place, a lot of it occurred in countries seeking to produce primary or raw materials for jobs and convertible currency, rather than for profit. Therefore, those are the plants that keep on running, day in and day out, and the result is that the prices become tremendously squeezed and it is very hard to make a sustainable profit out of those kinds of businesses.

Of course, Mr. Chairman, as everyone sitting here knows, those kinds of businesses are the backbone of the Canadian economy. We run from year to year with a trade balance that is generally favourable but close to being balanced. Inside that balance is a most tremendous bias toward materials produced from the natural resources of this country. There is a huge

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trade surplus in natural resources and a correspondingly large deficit in finished goods, manufactured goods and, what we will call for this debate, knowledge-intensive goods, which, increasingly, are the sustainable, profitable, growing businesses. So, if you like, you can think of our economy as having a very large backbone of resource-based industries which are finding it hard to generate the sustained revenues to keep them where they are, and a very shrunken and inadequate—in world terms—collection of knowledge-based industries, which will have to carry the load in this next round of competitiveness.

One can almost use knowledge and technology interchangeably. Technology is using knowledge that has shown up in some form that has been judged socially, politically or economically useful. Because of this, in the 1980s Canada and other countries have converged on science and technology as a key competitive tool. The knowledge is fairly deep, I think, that a lot of economic restructuring is going on, will go on and must go on. My own company has been doing a lot of this sort of thing, and that is probably why I am here to talk to you. We have been going through a tremendous number of changes internally to try to take ourselves, not out of aluminum, which we think is still a very promising and fast-growing industry, but to balance our core businesses with businesses that have higher growth and profit potential. I suppose it is trite of me to say so, but it is not an easy task. It takes a lot of time, courage and energy.

The spotlight then turns to the science and technology performed in this country. Everybody knows that these efforts are partly in government, partly in university and partly in industry. Suddenly it has become important to have technology and knowledge in this country that generates wealth. We have always had this technology to some extent, but it has become a large priority.

Let us look at the three sides of the triangle. The objective of the scientist in the university system is to produce new knowledge and to publish it internationally. I think that part of the testimony here today, including the testimony we heard earlier, involves a difference in perception as between that goal and the goal of generating wealth, which is the goal and task of the private corporation. So the research that is done in the university system tends to be basic. A lot of it is done and published internationally in order to access the rest of the world knowledge in that field. If you do not belong to the club, you do not know what is going on. No matter how munificent the taxpayer in Canada becomes, we will never perform more than 1 or 2 per cent of the research going on in the world. So a major task of universities is to be a listening post, to gather in the other 98 per cent or 99 per cent going on elsewhere. Part of the competitive situation we are in now is that other countries are much better than we are at picking up that knowledge and making money out of it. This problem does not lie in universities, but in Canadian industry.

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The second sector, the government sector, which is largely federal but growing at the provincial level, has a large body of scientists. Their reward system is directed toward applied research to support the mission of their department, agency or whatever. Their goal and reward is the publication of international, national or provincial reports; it is not making money.

Let me come to industry. The task of industry in this field is to use research, development, engineering and marketing to generate revenues and profits from innovation. This takes a lot of confidence, and you have to know what you are doing because you are risking large sums of money and the success is not high. It takes confidence in the management of technology, which anyone will tell you is a difficult and rather chaotic task.

I think—and I am speaking for myself, not my company—we have massive structural problems in all three sectors. In the university system, as you heard, we have a laissez-faire funding policy which lets the researchers be the best judge of what they should be working on, and, by and large, that is the right approach until you get into trouble economically, and then one would like, somehow, to mobilize that energy and steer it a little into places where it will do the most good. But the work in universities will remain basic research.

Basic research is no good unless it is excellent. It has to be world-competitive and at the top of the tree. We could spend a whole day debating this point, but we have created an education system in this country which costs a very large amount of money by national comparison and produces rather mediocre results. I guess we all know this. We are perhaps one of the few developed countries in the world that have not achieved a sort of tertiary or top level university system to draw the rest forward. The competition to get into the University of Tokyo is so savage that it is like a football game. People who get in are cheered and carried around, and, once they are in, they know that they are at the top and that they will be expected to lead in the country thereafter. The same is true of some of the great institutions of Europe and the United States. Unfortunately, we have not achieved that here, and it is something that I would like to talk about later.

Moreover, in the government sector we have government science structured for the first half of this century, and we are almost out of the second half. It appears to be an intractable problem with immense political ramifications which no one is prepared to tackle.

Another point is that we have an industry base without much experience or confidence in the things that have to happen now. Let me put this in perspective for you. Let us look at the industrial revenues that contribute to GNP in this country and isolate the high-tech sector, so called because of the pharmaceutical industry—which we will not go into—which does not show on the list. So the high-tech sector in Canada is very largely electronics and aerospace. Those companies spend about 14 per cent of their sales on research and development, collectively, and they get about 5 per cent of private sector revenues, which amounted to about $10 billion in 1986 figures, whereas, the rest of industry has a cashflow of around $195 billion and spends collectively about .8 per cent of those sales on research and development.

So you have one segment at about 14 per cent of sales but only 5 per cent of the cashflow of industry goes through their hands, and the other at less than 1 per cent with $195 billion flowing through its hands. In terms of industrial research and development, the two groups perform about 50-50. The top group, the high-tech group, does about 47 per cent of R&D performed by industry in Canada, and the other, large group performs the remaining 53 per cent. So the task in industry, if you want, is that, for every dollar that, for example, Spar Aerospace holds as the money flows through the company, there is $20 in the other low technology or low knowledge-intensive companies. What happens to that $20 bill if profit becomes ultimately important? Traditionally, it has been spent on what worked before, that is, on economies of scale and expansion of capacity. For the last ten years or more that has not been a successful formula. Companies like ours are actively working to redirect some of that revenue to things that have higher growth profit potential, and, by definition, they have a higher knowledge intensity, a higher technology intensity and are more difficult to manage and more difficult to bring on.

I thought, rather than reading a brief—because I am sure you have lots of those—I would bring along a diagram. I did bring a few copies. I will describe it to you.

About six weeks or so ago, there was a trade delegation from Sweden, led by the King of Sweden, which I attended and in which I participated. I spoke in a symposium to launch the visit to Ottawa. One of the Swedish representatives produced a cartoon of the research expenditures in Sweden which is on the left-hand side of this diagram.

The reason I am using Sweden as an example is, as we found in that symposium and as you all know, there are a lot of commonalities between Sweden and ourselves. We have a lot of natural resources; we have small populations in relation to our geography; and we stare down on the map at very large, very sophisticated businesses and markets to the south.

Sweden, with eight million people, has 22 multinational corporations headquartered in Sweden which are in the Fortune

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500 list on a world scale. I think if we counted the very large multinational branch industries in Canada that are headquartered elsewhere, Canada would probably have something like ten.

How did Sweden achieve that? Much of it has to do with the whole ethos that technology is what drives industry and technology is what makes you successful.

I thought it would be instructive to look at the structure of science in Sweden. In the middle of the page, I deal with the structure of science in Canada as it is now. On the right-hand side, we look at the structure that we would have in Canada if Canada matched Sweden's structure, which may not be the right thing to do, but it is just an illustration.

Looking at the left-hand side, at Sweden, you will see that the industrial R & D is the largest box. The boxes in the middle represent the performers of research. The largest box is industry and it is very largely self-funded, which is illustrated by the arrow coming in from the right.

At the bottom is the higher education sector, which is very largely public sector funded. That is illustrated by the arrow coming in at the bottom on the left.

In the middle, there is a very small amount of government institutional activity funded partly by the private sector and, curiously, partly from private sector funding.

Looking at Canada, which is in the middle of this piece of paper, you will see again that industry is the largest box in terms of performing R & D, and, again, it is largely self-funded. That looks to be a different size but it is comparable.

In terms of government institutions, that is represented by a much larger box in proportion to the one on the other side and that is, naturally, public sector funded with nothing coming in from the private sector.

At the bottom, there is a box about the same size as the one representing governments with money coming in from both sides and from the bottom, the bottom representing the very large government funds coming out of the university operating budgets.

Over on the right-hand side we have the mathematics of all of this. If we were going to restructure our size and technology establishment to compare with Sweden's, we would have to multiply the private sector effort and funding by something like $114 billion. We would have to trim back the effort in research and development in government institutions by a factor of something like two-thirds. We would have to take the higher education sector and pump public sector money into it to increase it by a factor of something like 85 per cent overall if you treat the university operating fund component as government money.

[*Text*]

In dollar terms, to get Canada to the situation which Sweden is in, relatively, you would be putting an additional $2.4 billion in from the private sector, but you would also be flowing money from the existing government structure into the universities. You would also be stimulating industry to put in another $4 billion.

I used this cartoon to show you that we are facing a dilemma of enormous proportions. Having spent the best part of 20 years as a student of science policy in this country and as an advocate for change, both in my corporation and elsewhere, my dream is that we will stop playing house on this issue and address the main problems. When I say, "playing house," the other metaphor I might have used is "rearranging the deck chairs on the Titanic." The point is, it is tempting to use the existing institutions and to try to stimulate them to substitute for work that should be going on in another sector, but there is no substitute for industrial research because that is the only place where the reward system for that research has to do with the generation of wealth. No matter how we realign the universities, they are best at what they do, which is generating new knowledge and training people, but they are lousy at making money out of new knowledge. That is nor their profession, not their calling, and it involves a very difficult management task which does not happen in universities.

The argument about who holds the patents is not the right argument. The people who make the money are those who succeed in drawing that invention through to reality, which is a very expensive process.

I am sorry if that sounds more like a sermon than testimony, but these are matters which I think are of profound importance to the country. I am very pleased to have had this opportunity to talk to you.

Senator Stewart (Antigonish-Guysborough): Mr. Chairman, first, as a point of order, I would like to propose that this diagram be inserted in the minutes of today's proceedings. I would prefer that it not be appended, because I think it should appear at an appropriate place in the testimony so as to be useful in terms of following what we heard.

The Chairman: Is it agreed, honourable senators?

Hon. Senators: Agreed.

(*The text of diagram follows*)

Senator Stewart (Antigonish-Guysborough): Mr. Chairman, we have just heard an extraordinarily valuable contribution. I think we have real nourishment for our minds before us now.

I wonder if Dr. Wynne-Edwards has had an opportunity to see the report prepared by this committee on the financing of post-secondary education in Canada. I am asking him if he has had that opportunity because some of the things he has said about the quality of education in Canada seemed at least to parallel and perhaps even to go beyond the findings of the committee.

Dr. Wynne-Edwards: I apologize, but I have not had that opportunity.

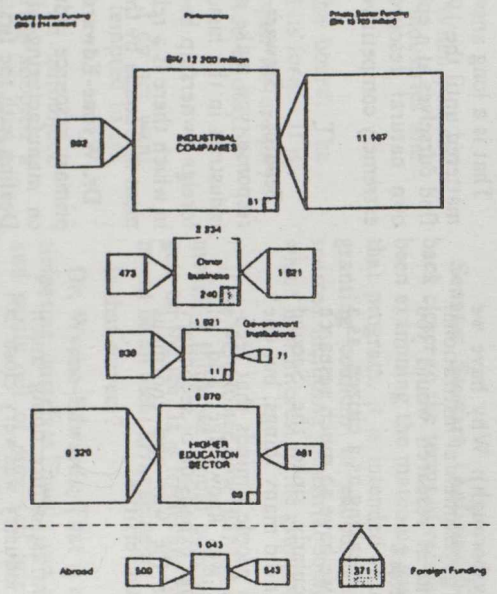
RESEARCH AND DEVELOPMENT COMPARISONS BETWEEN SWEDEN AND CANADA

SWEDEN

(Diagram Made Available at a Meeting
With the King of Sweden, March 14, 1988)

Figure 1

Total R-D Expenditure (Natural Science and Engineering only) in 1988
(Forecast: SKr 22 325 million)

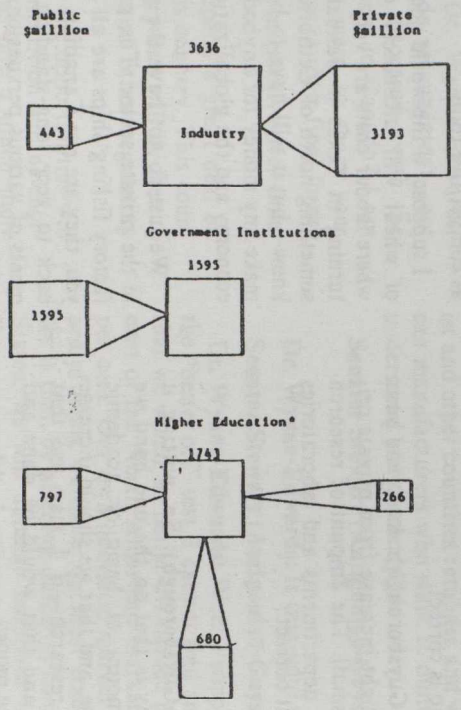


Source: STU [sector] forecasts by Statistics Sweden are one per cent lower (SKr 22 100 million)

CANADA

Expenditures on R&D in Higher Education

(Statistics Canada Estimates for 1987)

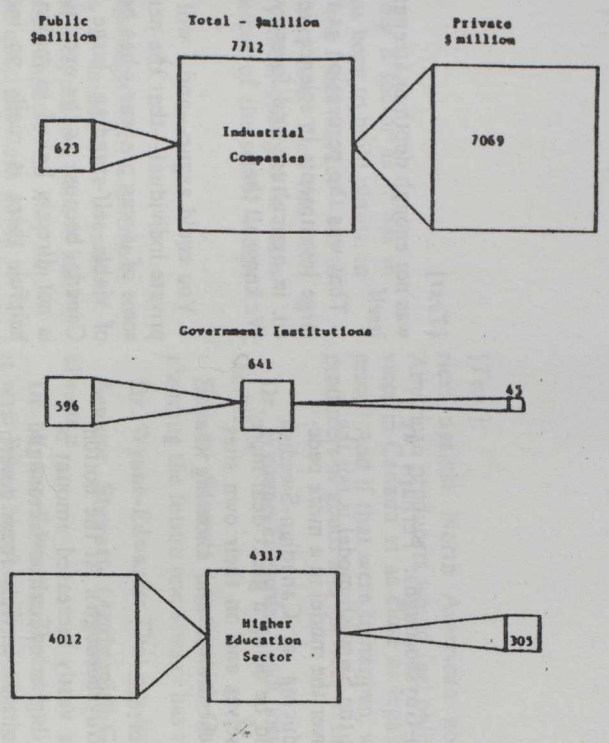


Support from University Operating Funds

Source: Statistics Canada Publication 88-203, 1985.

*N.B. - Where Swedish data are for Natural Science and Engineering only, the Canadian figures above include, as well, MRC and SSHRC.

WHAT CANADIAN R&D EFFORT WOULD BE IF CANADA MATCHED SWEDEN'S PERFORMANCE



Source: Data from Swedish delegation; adjusted to Cdn. $ (.2092) and CDN/SWE population (3.034).

[*Text*]

Senator Stewart (Antigonish-Guysborough): Perhaps we can put that into your hands.

You say that it is possible that the Swedish model is not the ideal one for Canada. Let us go over the model in a more pedestrian way. If we were producing a Canadian-Swedish performance, our industries would be doing a great deal more research and development themselves and on their own sites. They would be financing that themselves and choosing the projects; is that correct?

Dr. Wynne-Edwards: That is correct.

Senator Stewart (Antigonish-Guysborough): At the bottom of the diagram there would be a vastly increased amount of research work being done in the higher education sector, and the increase would be financed almost entirely from government sources.

Dr. Wynne-Edwards: That also is correct.

Senator Stewart (Antigonish-Guysborough): As I read your diagram, there would be some slight increase from private origins, but it would be relatively small. The amount of research then being done by government departments and laboratories would shrink considerably; is that correct?

Dr. Wynne-Edwards: Correct.

Senator Stewart (Antigonish-Guysborough): So, putting it all together, what it seems to say is that on the one hand we should increase greatly the amount of basic or academic research at the taxpayers' expense, and that we should increase greatly the amount of applied research—if I may use that term—money-making research; and that would be done and paid for by people hoping to make money.

Dr. Wynne-Edwards: Correct.

Senator Stewart (Antigonish-Guysborough): Why have we put so much relative emphasis upon governmental institutional research in Canada, and what kind of research would you think should be continued in that sector?

Dr. Wynne-Edwards: Again I am speaking as a citizen, as a private individual. The reason why we have so much research in government is historical, particularly since the Second World War. The Second World War did many things, but one of the things it did was to embed in people's minds that technology was power, was important, was knowledge; and, of course, it led, in this country, to a huge expansion of secondary and post-secondary education after the war and enormous investment in bricks and mortar for universities.

Because there was no industry infrastructure doing much research—in those days the bulk of industry was very close to natural resources and producing raw materials—government institutions and government departments, in paternal fashion, took on the function; so that research was performed, first on behalf of the government and the taxpayer, and, secondly, on behalf of industry by government institutions, because there

[*Text*]

was not enough depth or strength in Canadian industry to do it itself.

That was the perception at the time, and it has led to very large investments in science, in the National Research Council, in agriculture and forestry, fisheries, mining, and so on. We know all that.

You could argue—and I will argue, because I am here as a private individual—that the net effect of that over 50 years—some of it was pre-war—has been to impede the development of viable self-standing, large industries in those sectors in Canada, because as the expertise rests inside government and is not directly linked to making wealth, but simply to being helpful, there is really no incentive for the private sector undertake those tasks itself at its own expense and to use them as competitive tools.

I suppose, if the world goes on the way it is, that the growing of wheat will ultimately depend—in the developed world, where labour costs are very expensive—on combines that start turning in Texas in January and drive north until they hit something north of Lethbridge at the end of October. I don't know—but it will have to be done on a large scale in order to make any money for anybody, given the structure of the world economy and the globalization of competition.

We just do not have the grasp of the problem on that scale in the private sector. The same is true of fisheries. The large factory fishing ships are all Japanese, Russian, and what have you; they are not Canadian. I think you can trace a lot of that back to very long-standing government policies, by governments of various persuasions, which were dedicated largely to helping the small fisherman row his dory just below the horizon—and, incidentally, voting for the party in power. That has been with us for a long time.

That is a long answer to your question. Perhaps that has not mattered until the 1980s. But now the chips are down, and we find ourselves at a colossal disadvantage, even in deploying our own natural resources competitively and profitably in an extremely competitive world.

Senator Stewart (Antigonish-Guysborough): In your response, you make much of the importance of the extractive industries in the historic Canadian economy. Do you see that foreign ownership had much to do with producing a situation in which there is a relatively low level of research and development in Canada by the industrial companies?

Dr. Wynne-Edwards: I do not think it has very much in the primary resource industries. It has had a tremendous impact on manufacturing—in the secondary and tertiary industry. Dealing with the first—the primary sector—the mining industry would view its exploration budget as something akin to research and development. It is money at risk looking for something new. Canadian companies have been competitive and successful in their exploration strategies, by and large.

[*Text*]

So I do not think it has been as big a factor as it has in manufacturing, where the tendency has been to build plants, to meet government policy, and to serve the local market—but to bring the knowledge in from somewhere else. That has been the tendency, and that has left us very short-changed in terms of the management skills and perceptions of the senior echelons of Canadian manufacturing.

Senator Stewart (Antigonish-Guysborough): Mr. Chairman, at this point, I have two questions in mind. Dr. Wynne-Edwards has said several times that he is appearing here in his private capacity. But even in his private capacity he may not want to venture upon an answer to the question I am going to put. But if he wants to say, "I did not come here to answer that question", we should understand that. Dr. Wynne-Edwards, what would be the impact of a free trade arrangement—not necessarily the one that is now being discussed—with the United States on research and development in Canada? I am sure you have thought of that. Do you want to share your thoughts with us today, even if they are not in their final form?

Dr. Wynne-Edwards: The effect would be positive over time. That is the first answer.

The second answer is that it would depend a great deal on the ingenuity of government policy in this country. This country, after free trade, will remain a country and will be free to make its own rules subject to GATT and other regulatory bodies.

Why I say it would be positive is that the opportunities will be enormous with free trade, but the competition will be enormous as well. All of a sudden it puts us into a much more exciting, rich opportunistic and challenging environment. I guess my lament—which I have been giving you this morning—is that we have not really been getting on our uniforms and exercising for that.

Senator Stewart (Antigonish-Guysborough): When you say "opportunities" you obviously mean in certain industries and in certain sectors, not across the board.

Dr. Wynne-Edwards: No, I mean across the board. The U.S. market is the largest market on earth in all its forms. It is the most open and has always been the most open to foreign goods. We would have privileged access by virtue of our history, geography and other commonality—

Senator Stewart (Antigonish-Guysborough): I do not want to go too far on this, Mr. Chairman, but I am tempted to ask one more question.

Let us assume—and I think it would be an unfounded assumption—that the United States of America adopted a highly protectionist policy, yet we did have a trade agreement with the United States. Would not other countries react to American protectionism—which would really be North American protectionism in that context—by raising their barriers against North American goods with the result that American producers would feel obliged to offer goods and services in Canada at as close as legally possible to the dumping price? And if that were to happen, would it not drive Canada's producers of goods and services to the wall?

Dr. Wynnne-Edwards: I got lost somewhere among all of the "ifs."

Senator Stewart (Antigonish-Guysborough): When one is planning the future one always has to deal with "ifs".

Dr. Wynne-Edwards: That is a hypothetical question.

Senator Stewart (Antigonish-Guysborough): The future always is.

Dr. Wynne-Edwards: To ensure I understood your question, it was: What happens if we align ourselves continentally with the United States and then the United States goes protectionist and other countries retaliate and we are attacked by American manufacturers who want to dump goods in Canada. Did I understand you correctly?

Senator Stewart (Antigonish-Guysborough): Yes, to survive.

Dr. Wynne-Edwards: Is that your scenario?

Senator Stewart (Antigonish-Guysborough): Yes, that's it.

Dr. Wynne-Edwards: Well, I suppose one would have to use the "better off" test. I cannot find an argument that would say that we would be better off denied privileged access to 90 per cent of the North American market while we cling to the 10 per cent. Our own domestic market cannot sustain the standard of living we have; we must trade. I think the danger you see is that, by aligning ourselves continentally with the United States, we will damage ourselves internationally and in the Commonwealth. I suppose that debate has gone on in these chambers since Confederation, and will continue to do so, but I do not propose to enter into it this morning.

Senator Stewart (Antigonish-Guysborough): Let me get back closer to the terms of reference, Mr. Chairman. We have been examining the matching grant program. As I understand that program, it is intended to encourage researchers of the granting councils to encourage contributions from private sources, including industrial companies, to the kind of research which is of interest to the granting councils.

If we were to see how that fits in with the Canadian-Swedish model, I think we would conclude that the policy just never gets on the ice. It is irrelevant to what you seem to be saying might be an ideal arrangement.

Is that correct?

Dr. Wynne-Edwards: That is correct. As I said, we are participating ourselves, partly out of good corporate citizenship and partly out of pure self interest. But what you must not encourage, in my view, is the private sector investment in R&D going up by fiscal transfers to universities which perform the research because that is not biting the bullet inside

[*Text*]

the corporate walls, which is taking it on oneself in order to make a buck. That is the way I see it.

As the debate mounts and the rhetoric gets refined, and corporations feel that they must respond, instead of getting on with the hard homework—which is very hard—they can appear to be responsive by flowing funds to universities at the government's behest instead of doing it themselves. I think that is distracting the industry from something it should be doing.

The reason for the policy is that that is a way of steering and focusing the research going on in universities by being more responsive to what the industry wants.

Senator Stewart (Antigonish-Guysborough): That is the answer I expected. Let me ask you this question: assuming the government were to change its mind and agree with you, how would you go about achieving the kind of restructuring that you suggest as a possible approach to a solution? I suppose there is no real problem so far as the higher education sector is concerned—at least in as much as the money is there, presumably, if the Minister of Finance can find it and the provinces do not raise too great a row—because that money could go in there and, presumably, researchers would be developed, and so forth.

How do we get to the kind of investment in research and development by industrial companies that you show at the top of the Canadian-Swedish performance?

Dr. Wynne-Edwards: If you would permit me, I will comment on all three sectors as I go. As I said, to stimulate industry to do that, the fellow holding the $20 bill has to feel he is making a better investment in a high technology activity to his right than in a traditional core activity to his left.

Most people who have spent their lives in primary industry since the Second World War have experienced most of their career in a period of continuous growth, give or take a business cycle, when expansions were the right thing to do. However, since 1974, it has not been like that which has been very tough for people. When the ordinary management tools are not working, it does not mean that they have been replaced with new tools; it just means that everybody is sort of up on a bridge hanging on in the storm. What we are calling for is a redirection of management, of priority, and of money. My view is that the government's role is to reduce the risk by the kinds of incentives already in place, that is, tax credits, capital allowances, and so on. We have done nobly as a country in putting those in place.

The problem has been that the bulk of the private sector has been underfunded in the last decade so that the corporate tax benefits are not always beneficial. The small firms, which is what everybody sees as the chrysalis of this new competitive knowledge-based world, is going to come out of new companies. Those small firms are usually in a high-growth pattern that does not allow them to make any revenues or to benefit from the tax credits. I am sure you have had many articulate appeals about that in front of you.

[*Text*]

The saddest thing that I have seen in the last ten years is the Science Research Tax Credit boondoggle which was the right idea badly drafted, leaving a big window open and all the smart money going through it, which was the right idea. We have done it for film, and for mining, and a variety of other things. It puts the private investor in a position of directly funding something that the country sees as beneficial. The trouble is that the tax formula in place for profit-making corporations, if redirected to the private citizen, would be unfair; and it would generate too much money for too little work. We need a very carefully tuned policy that will attract the private investor into that sector. That will take that figure up from three to seven very quickly. It has done it in these other sectors, but the Department of Finance was scarred by that experience; so nobody wants to touch it with an 80-foot pole which is a tragedy.

To amplify that, the Quebec Stock Savings Plan in Quebec, which was directed towards new treasury shares in Quebec-based corporations took several years to get going because in the beginning it was the Bell Canadas and the Alcans and the CP's that were all that you could invest in. As the message got through, there was an extraordinary variety of public offerings, and it succeeded in flowing through the Montreal Stock Exchange. Someone told me, and the figure is approximate, that $800 million of new money came into the stock market as investments. Unfortunately, since October 19, a lot of those stocks have had no market and the policy is being looked at again. It is another example of what can be done by putting the right mechanism in front of the private investor to stimulate the particular thing he wants to make. That would be my personal prescription for the box at the top of the page.

If we are going to do something like the box at the bottom of the page, which is flow a lot of public money into higher education, then that has to be directed wholeheartedly at achieving excellence. As I said before, you are wasting your money doing second-rate basic research. Forget it.' It is perfectly legitimate to target that money as it goes into the universities and to say, "We want more of this and less of that." That is perfectly legitimate, and we ought to have mechanisms for that. So excellence and targeting, I think, are essential in education.

Then, in the middle, you have this very large problem of how you restructure and, if you use this model, down-size the government research establishment. If that is done well, it will liberate huge skills and energies which may very well be picked up by the private sector as it reaches out to expand its box. Those things will take longer than one political term to achieve and more political will than I have seen exhibited to date.

The Chairman: I would like to thank you very much, Dr. Wynne-Edwards. It was very interesting to hear your point of view, which is quite different from others we have heard up to this point in time.

The committee adjourned.

EVIDENCE

Ottawa, Thursday, May 19, 1988

[*Text*]

The Standing Senate Committee on National Finance met this day at 11.00 a.m. to examine the Main Estimates laid before Parliament for the fiscal year ending March 31, 1989.

Senator Fernand-E. Leblanc (*Chairman*) in the Chair.

The Chairman: This is the fifth meeting of the committee to examine the expenditures proposed in the Main Estimates laid before Parliament for the fiscal year ending March 31, 1989. Before I introduce the witness there are some housekeeping matters to be dealt with. Because the committee will have to hold hearings on Supplementary Estimates (A) and on Bills C-103 and C-113, which I believe will be referred to the committee in the very near future, perhaps we should consider preparing an interim report on the Main Estimates. If the members of the committee think that we have heard enough evidence on the Main Estimates, perhaps we can make an interim report to the Senate, if that is agreeable.

Senator Stewart (Antigonish-Guysborough): Mr. Chairman, I believe that this would be a substantive report.

The Chairman: Yes.

Senator Stewart (Antigonish-Guysborough): I think some of us would like to have an opportunity to go over any interim report quite carefully before it goes before the house because this relates to a very important topic, and one on which we have had important evidence. If that could be arranged, I would have no difficulty at all.

The Chairman: That could be arranged very easily.

A meeting of the Subcommittee on Agenda Procedure was schedule for later today. Since we will be meeting again next Tuesday, and because I have to leave the Chair at approximately 12 o'clock, perhaps we should reschedule that meetihng until then, unless you want to go on with Senator Marsden, who has kindly agreed to take the Chair when I leave.

Senator Stewart (Antigonish-Guysborough): I think it would be useful to go on because I will be in Washington next week with the Foreign Affairs Committee.

Senator Marsden: I will not be here next week either.

Senator Hicks: Nor I. I will be in Washington with the Foreign Affairs Committee too.

Senator Stewart (Antigonish-Guysborough): This is a preview of the sort of thing that will take place regularly after we have become part of the North American economy. Mr. Chairman, perhaps the staff could start lining up witnesses on Bill C-103. I can suggest some names.

The Chairman: Bill C-103 has not been referred to the committee yet.

[*Text*]

Senator Stewart (Antigonish-Guysborough): It will be.

The Chairman: It will be, and so will Bill C-113 and Supplementary Estimates (A). I should like to mention to Senator Hicks that an invitation was extended to Dr. Robert Fournier of Dalhousie University to appear before the committee. Unfortunately, Dr. Fournier has indicated that he will be unavailable.

Senator Hicks: I have no axe to grind on his behalf. I just thought that if we were going to hear from someone from the great colossus of Toronto, we might also hear from someone from one of the universities on the outskirts of Canada. That was all.

The Chairman: And we agreed with you.

Senator Marsden: Senator Hicks will know that last night the Memorial University Alumni Association met here on Parliament Hill. Malcolm MacLeod from Memorial University is sitting in on the committee meeting this morning. So the smaller universities are not totally unrepresented.

Senator Hicks: Unfortunately we cannot ask him to participate as a member of our committee, but if he communicates his views at some future time, we will be very interested in them, Mr. Chairman.

The Chairman: Perhaps the clerk can talk with him after this meeting to see if he is available on some future date. We will see what the possibilities are.

I thank Professor David Nowlan for his patience. Professor Nowlan is Vice President, Research, University of Toronto. I understand that Professor Nowlan has an opening statement. Professor Nowlan, the floor is yours.

Professor David Nowlan, Vice President, Research, University of Toronto: Thank you, Mr. Chairman. I should tell you that in academic environments we begin all meetings at ten, so in fact you are precisely on time.

Senators, thank you for inviting me to appear before you today. I gather it would be appropriate for me to say a few words at the outset and then you may have some questions or we may have some discussions that will take us in one direction or another. I have some informal introductory remarks, introductory both to the history of the Matching Grants Program and to some of the tensions and issues that have arisen during its implementation period. You may have already been exposed to some of the history, but I would like to recount a few of the more important elements of that history so as to be sure we all have the same understanding of what has happened so far.

The Matching Grants Program received its public exposure first in Finance Minister Wilson's February 26, 1986 budget speech; and he, in that speech and in the accompanying papers, presented a few remarks about research in Canadian universities and the significance of the role of the federal granting councils to that research. He announced in his budget that the government would stabilize the core funding of all three grant-

[*Text*]

ing councils at the nominal dollar funding level that then prevailed, and that that stabilization would occur for a period of five years.

Finance Minister Wilson also announced that in addition to providing that stability to the nominal dollar funding—that is, not inflation adjusted—budget of the granting councils, the government would provide on a dollar-for-dollar matching basis money to match the contributions of the private sector for research in Canadian universities. He noted that this would constitute an addition to the budgets of the granting councils, the amount of which would depend on the success of the program up to a limit which he gave. The limit was roughly 6 per cent incrementing each year from the base budget of the granting councils. He said this would serve to help encourage more cooperative research between the private sector and the universities.

The statement by the Finance Minister was in one sense a response to the five-year funding plans which the granting councils had not too long before presented publicly, which they and we at the universities had been arguing for the support of in public places and before the government. I think it should be said that from the university perspective, the government's proposal for funding the federal granting councils over the succeeding five years fell far short of what we had expected it to provide in response to the five-year plans of the councils. It fell short of the requests made by the granting councils for funding.

It is worse being reminded of the quality and persuasiveness—at least to some of us—of those plans that the granting councils had presented. They were well thought out plans. Each council, from its own perspective, made a case for enhanced funding of the granting councils. I think those cases were extremely well based.

The announcement in February of 1986 was a disappointment, from that point of view. Of course, from the perspective of the instability year by year of the granting council's budgets up to that point, it also served to provide at least a base-known core funding. That, as a concept, was certainly welcome, although that core funding would not be guaranteed to move up as the cost of doing research moved up. As the enhancement to that dollar base, we were left with the Matching Funds Program. When that program was announced by the Minister of Finance, there was created an ambiguity that has been at the centre of controversies over the design and implementation of the Matching Funds Program, and, in fact, an ambiguity that will make it rather difficult to evaluate the success or not of the Matching Grants Program, since it was unclear at the outset—and has remained unclear—precisely the purpose of the Matching Grants Program.

The Minister of Finance—and subsequently his colleagues—clearly saw the Matching Grants Program as a way of providing some additional resources to the federal granting councils. At the same time, they saw this program as a particular way of encouraging more private sector university interaction, a way of encouraging the development of cooperative research programs between the private sector and the universities. These programs would, in their direction, be driven by the needs, in large measure, of the private sector. Of course, that responded well to those who struggle with the question of how we should direct additional resources to research. The matching grants answer, in part, is that the areas chosen as significant by the private sector would tend to be the directions in which we put incremental resources.

In any case, the budget papers and the minister's announcement did not elaborate on the details of the program. It simply gave the maximum dollars that would be available over the subsequent five years, and it stated very briefly what I have described as being ambiguous goals for the program.

After February, a committee or committees of officials in various ministries—led principally by the Department of Finance and the Minister of State for Science and Technology, but including members from the granting councils and from the Secretary of State—met to work out the details of the Matching Grants Program. Those details were destined ultimately to be recommended to the Treasury Board. Once approved by the Treasury Board, they would then be promulgated.

Senator Hicks: Are you still speaking of 1986?

Professor Nowlan: I am speaking of the spring and summer of 1986. We, at the universities, immediately began an aggressive activity to encourage the officials to design a program that we thought was best, given the constraints that the government had set out. In March, and subsequently once or twice later in the spring and early summer, we, at the University of Toronto, brought together colleagues from some other Ontario universities and senior officers from a number of private sector companies that have considerable interest in research and that conduct research.

We ultimately worked out a consensus document that was sent to the government, defining what we thought were some of the issues associated with the Matching Grants Program and ways in which those issues should be resolved. All of us who were assembled to produce that consensus document agreed that it would have been desirable for the government to have addressed the basic core funding problem of the granting councils without introducing the matching grants strategy—that is, without introducing it as a way of addressing the core funding problem. We also said that the matching grants strategy, in and of itself, could be a useful, additional element in research financing and in encouraging additional research in Canada.

In the work we did, we accepted the fact that there would be a Matching Grants Program, although we did—and continue to—attempt to keep in front of the government and the public the desperate need that the granting councils have for core funding for their basic research programs.

I should say parenthetically that there have to be a number of arm's length studies demonstrating the value to the community, the economy, society, as well as to the researchers, of the research council's program. We have a very fine system in Canada of national funds flowing to university researchers

[*Text*]
through the granting councils, one that in some respects is certainly the envy of researchers in many other countries.

Accepting the fact that there was to be a Matching Grants Program, we addressed what initially appeared to be flaws. We also developed some issues, as we saw them, for the officials to contemplate. In particular, we addressed the following questions.

The first question was what money from the private sector would be matched, and how we would define the eligible funds to the universities in terms of the extent of the agencies or companies that might provide research-directed funds. Here we argued for a broad definition. There were several reasons for that argument. One was in recognition of what we felt was an objective of the program, to encourage those outside the university—not in government—to support research generally in universities. We encouraged officials to understand that that support came in many forms. It is not just support for a specifically-targeted industrial research project. It may have as its objective the production of some invention. It also consists of support, for example, for graduate students. In our universities, graduate students are deeply involved in research, and we consider the graduate instructional enterprises integral to our whole research endeavours.

We encouraged the government to define, as eligible support from foundations or individuals, agencies generally for graduate fellowships, for general core support for research that was not specifically project oriented, and we encouraged the government to allow research support from foreign companies and non-governmental agencies to be counted as eligible, provided the results of that research were readily available to the benefit of Canada. That was one area that was in issue.

We asked what the government intended by the notion of additions or increments to research support, which had been a rather vague part of the initial concept, which was that the eligible matching funds would be incremental funds in support of research. I have to claim credit for this analysis, and I should tell you I am also a Professor of Economics, so it came somewhat naturally. We asked what kind of incentives would exist for the outside sector under different rules and ways of defining incremental funding. It was fairly easy to show that it was difficult to adhere strictly to the notion of additional funding to some base without creating enormously perverse incentives to the timing and the magnitude of flow of funds to the university. The question that was much debated was: Is the notion of increment to be an increment to the national total that existed at that time or is it to be an increment to the sum of money that was flowing to any one institution? Was it to be an increment to the support that any one company was giving at a base level? All of those ways of defining a base on top of which an increment would occur provided enormous difficulties for the program, really to the point of making it inoperable if one insisted on defining rigidly a base of those sorts.

We discussed the timing question; in other words, at what period of time we should start the clock ticking in order to generate eligible money, and pointed out that if that time period is set at some point in the future, then there will be further perverse incentives; there will be a tendency to delay support now in order to bunch up support later, and so on.

There was a small, intervening issue and that was that it was the original intention of government, as we understood it, to require the eligible private-sector funds to be directed through the councils. We argued that this, in fact, was an unnecessary complication to the scheme, and that it would be far better to allow eligible funds to be given directly to universities for support of research rather than the somewhat gimmicky bookkeeping scheme of sending them through councils.

We then spent a great deal of our time addressing the problem of how the matching money from Treasury Board should be distributed. We then engaged directly the question of what the purpose of the matching scheme was, and pointed out that if its purpose was to encourge the development of new relations and new cooperative arrangements between the private sector and the universities, then the matching money would have to, in some substantial part at least, be available directly to those actors—the decision-makers in the private sector and in the universities—who were putting together these new arrangements. Those actors would tend to be corporations on the one hand and, typically, the researchers or research groups on the other.

I must say that we, being the consensus group of a few universities and/or private-sector partners, at that time could not agree among ourselves precisely what the proper division of the matching funds should be. However, we did say that there should be a three-part division with part of the match being used to support the core budgets of the granting councils; part being used to support the general infrastructure of the universities where the eligible money started, and part of it to support the researcher and research group that was actually interacting directly with the private-sector partner. We also said that that last part had to be adequately high in order to stimulate additional projects. We also thought that we could achieve consensus on the fact that that part should be at a minimum 50 per cent of the match; so that much consensus we did reach.

Those comments, then, went in to the officials working on the program. I and others spent some time in Ottawa talking to the officials principally involved, and I think that they were very grateful for the interaction with the private sector and the universities. In the end, those consultations produced a report through Treasury Board, announced in September, I believe, by Mr. Oberle and Mr. Wilson, which adopted virtually all of the suggestions that we had made. I do want to say that the officials and the government were extremely responsive to the views submitted at that time by the universities and by some private-sector corporations. However, there was a wrinkle, and that was that the question of incentive, of distribution of the matching grants, was not addressed. It was left up to the granting councils, each in its individual implemention of the program.

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The other issues that we had discussed and written on—namely those of breadth; those of initial period; the concept of matching scholarship and general research support money and so on—were all adopted. Therefore when we got the Treasury Board document, it made for a program—again, given my initial caveat that we were addressing the best design of the program while still believing that it would have been better to have produced an equivalent total amount of money directly for the core supported granting councils—that met the design conditions and recommendations that we had suggested, but then left to the granting councils the specific implementation of some of the details and, most particularly, the distirbution of the matching money.

We then engaged with the granting councils in some discussion and they spent from September and October, in part, through until the next May or June, in fact, on the final fine-tuning of the implementation of the program. You will recall, I think, that the initial money to be matched was money that we would have raised from April 1, 1986. The first period for which the universities reported was April 1, 1986 through until the beginning of April, 1987. Then, because our fiscal year begins a month later, we added on the next fiscal year so that there were 13 months in that first reporting period. From now on, we will report in succeeding 12-month periods.

The granting councils struggled with this incentive problem and pay-back problem. They understood the point we were making that the lower the return of the matching money to the university and, through the university, to the researcher or research group generating the eligible matching money, the less would be the incentive for companies to join the program. Indeed, there would be less incentive for additional projects to be created because of the program.

On the other hand, the budgets of the granting councils were in desperate shape because the core budget had been set at a nominal value and not an inflation-adjusted value. They perceived, even with the passage of one year as they were beginning to set their 1987/88 budgets, that with rising costs and rising expenses, they could not maintain even the existing core program.

Therefore the councils had a natural inclination, with which we at the universities were most sympathetic, to retain as much as possible of that matching money in the core programs of the granting councils. In other words, once we had reported what we had received, it would be deemed eligible and they could claim, dollar for dollar, matching money. That was indeed a real struggle for the granting councils and it was difficult also for universities.

Universities tended to divide on the question, with universities such as the University of Toronto, and many of the large research universities in Canada, favouring a larger incentive return to the universities and the researcher. However, some of

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the universities that tended to be less successful in generating private-sector support for their research would, naturally, favour the maximum retention in the granting councils, on the expectation that that would be the way in which those universities would most benefit from the program.

That line of argument depended, of course, on the belief that we would meet the maximum eligible matching amount year by year without the incentives. I think everyone involved in the program believed that we would certainly do that in the first year, and perhaps for the second. However, it became more problematic for the third, fourth and fifth years when the maximum eligible amounts, as you will recall, rose quite substantially.

The upshot of that issue in granting councils was that NSERC decided to return to the universities what was thought of as an incentive element in the scheme, namely 10 per cent of the eligible money for the first year, 20 per cent for the next year and 30 per cent for the next year. The first year was the matching for 1986-87, and the 10 per cent return will come anytime now. The matching money for the 1987-88 fiscal year under the NSERC scheme is based on a 20 per cent return and on 30 per cent for the next year. SSHRC decided upon a 20 per cent return overall. MRC decided upon a zero return. It did that, I suspect, for one quite understandable reason, and that is there was a little wrinkle in the program designed from MRC's point of view only. We get a lot of our medical research support from private fund-raising foundations which address various aspects of health and medical research. The government decided that, rather than have us report the whole amount of the foundation support for university research, because it was very high, getting up toward $100 million per year across Canada—which would instantly match for a few years the whole of the matching fund program—they would define a base level of support from the foundations at $65 million annually and match the increment above that. So rather than having the funds reported individually by university, they simply took the accounts from the foundations. So the Medical Research Council could with some confidence assume, at least for the first few years, it would get all the increment it needed from matching simply through the accounts they received from the foundations and, indeed, that has proven to be the case. In that sense, the matter did not become an issue. It was an issue with the medical researchers in the universities, but it was not an issue that the council had to linger over very long.

The program as it turned out, in part because of the breadth of definition of matching funds, produced as eligible amounts money that far exceeded the cap on the initial year. In fact, if carry-forward does, indeed, take place as allowed, it will exceed the cap on the second year. This, among other things, has caused NSERC to go back and wonder whether the proposed 20 per cent and 30 per cent prepayments may be unnecessary as incentives, since it appears as if we can generate the amount necessary. So, in June NSERC plans to re-

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address that issue. I imagine that MRC will stick with zero per cent, and I have not heard that SSHRC plans to alter their percentage, but perhaps they will reconsider the matter as well. They held open that option of reconsidering it when they made their initial decision.

I am almost at the end of my history and summary. The granting councils were very aware of the disappointment of researchers, particularly some of the most active researchers and the major research universities, with the minimal return to the university by way of an incentive scheme. They were aware, too, that there was considerable adverse reaction from the private sector. The private sector had been led to expect that this was a matching incentive scheme. That is, the funds would be available to match and support areas of research that they thought were significant, not specific research products. We in the university were very careful to say to the government that we did not feel that this matching fund program should be used as a device for the private sector to lever down what would be contributions to projects. We had worked out a scheme that would minimize the likelihood of levering down. Let us take as an example a private sector firm wishing to support a project involving $100,000 a year learning that it only had to donate $50,000 because there was not the $50,000 to match. We wanted the whole $100,000 and we wanted the firm to then, perhaps, support us to the tune of another $100,000, knowing that there would be matching money coming forth to support that general area of research, be it advance materials, lasers, high-speed computations, what-have-you.

So the private sector discovered when the rules were announced that there was virtually zero incentive for them. In fact, as the program emerged and was implemented by the granting councils, the notion of an incentive-oriented matching funds scheme, virtually disappeared and has disappeared. The scheme as it now exists, does not provide in any meaningful way an incentive to encourage more university-industry interaction. I have a qualification to that statement and it is: Partly in reaction to the concern of the private sector and some of the large research universities, NSERC did explicitly add to its budget for cooperative industry-university programs, and that program entails a varying match that now averages a little over 100 per cent. That program genuinely provides an incentive for greater cooperation between industry and university. It is rather project specific, which is a draw back, but that can be coped with, and it is certainly one of the elements that we support.

As well, SSHRC designed a fellowship program to address what they felt was a major need in the country, the need to bridge young humanities academics especially and, to some extent, social science academics through to a period in the 1990s and beyond when retirements in those areas increase and jobs open up more than they have in the recent past. That bridging scheme is essentially a 100 per cent match to be paid

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for on the SSHRC side by their matching funds. This program has served to generate interest in the private sector. Certainly, when we go out and see private-sector support for our SSHRC fellows at the University of Toronto, the fact that SSHRC as an agent of the government is matching that money is a helpful thing to say in order to generate additional support.

So specific programs were designed, programs that carried an element of peer adjudication, as all granting programs do, but that did have an incentive effect. However, the overall program, the generic program, does not have an incentive effect as it has been implemented. It could have been implemented with an incentive effect, but to do so would have meant that the granting councils would not have that matching money as supplementary money for their core budgets. I certainly would be the last to say that they made a wrong choice, because core budget needs are important to all of us in universities. They are in desperate shape and they need to be repaired. They have done the best they can in taking a project that clearly did have two objectives—supporting core needs of granting councils and encouraging university-private sector incremental cooperative research. The second component has been minimal because of the project design. The first component has been maximized, but it still provides granting councils with a level of funding which will barely keep up with inflation over the next four or five years and is much less than, I think, any minimally reasonable case that can be made for the granting councils.

In closing, I would like to say a few words that are not directly related to the matching fund scheme but that spring from it. The history and analysis I have just given you, I hope, will be quite consistent with the history and analysis of just about every witness you hear. I do not think anyone misunderstands the programs, the motivations for them and the reasons different actors have made the decisions they have. I am not sure how much more you are going to be able to say about the program. It will be hard for you to decide whether it is successful or not, because, as I said, the goals were very ambiguous for the program. What I think you can do is use this program as a springboard for some useful conceptual comment on the support, perhaps through granting councils, but on government support for university-based research.

Throughout the world, not just the Western world,—this is happening in Japan and China as well—governments are increasingly viewing universities, especially research universities, as an integral part in a strategy that will improve the social and economic well-being of these countries. In virtually all Western countries, infrastructure block grant core funding has diminished over the last ten or 12 years in terms of the additional research responsibilities we are now being asked to take on by governments everywhere.

Governments are asking themselves how to address this problem. The activity in the research universities is not the only necessary element of success in a strategy leading to better social and economic well being for Canada or for any other country, but most governments and many arm's length reviewers believe it is one of the necessary elements. How are we going to repair the infrastructure so as to produce what we, as a country, want the universities to produce? Block grant funding seems to be too expensive an answer for many governments, as desirable as it is from our point of view.

Many governments have decided to turn towards various forms of strategic or targeted funding, the most popular recent form being university-based centres of research, centres of excellence. This is a form that has been adopted in the United States, and that has been turned to with a vengeance in the United Kingdom at the moment. All of the incremental funds for universities that are being asked for both by the granting body and by the joint research council's board is in the form of university-based interdisciplinary research centres.

We see this throughout the world, east and west, as a way of providing some coherence to the support of research programs in universities, but there are two attitudes you can have towards that kind of approach to improved support for university-based research. One is to view it as a quick fix to bridge a time when the private sector will somehow take over the support of this enhanced activity; the other is to recognize that this is a long-haul change in our strategy towards the support of universities, and, in particular, research-oriented universities.

I think that to the extent we view these programs, whether they are matching funds or centres of excellence or networks of excellence, as short-term fixes, we make entirely the wrong design decisions about those programs. If we view these as short-term fixes, we get our sunset horizon wrong. We think that a four or five-year injection of funds is enough, and at that point the private sector or outside interests should have taken over the support. We must understand the nature of intellectual property that is being produced and tend to focus on the proprietary intellectual property rather than the public intellectual property, so we spend inordinate amounts of time working out schemes for ensuring the ownership and the ability to transfer ownership of proprietary intellectual property. We tend to ignore the fact that for long-haul programs, one has to pay the full cost of those programs.

There is an indirect as well as a direct cost of mounting those programs. They are not just increments on some satisfactory infrastructural base, blips of bridge funding to be supported by others later on; we are talking about the need for a coherent strategy of support that must acknowledge the full cost. The difference is that there is a strategy to that funding which is different from block grant funding. I think most of us

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in universities are prepared to accept, although we may rail against it at times, that the wind has shifted and that we are going to have to deal with strategic targeted funding for coherent areas of research. But we must encourage people—and I think your committee, Mr. Chairman, can do this perhaps based a little on the experience of the Matching Grants Program—to say something about the conceptual basis of targeted programs in support of coherent areas of research.

What the universities can produce best is public intellectual knowledge, and private sector firms, those that have major research enterprises, understand that. Firms like IBM, GM, Northern Telecom and AT&T encourage their core researchers to publish. When the IBM researchers in Geneva discovered that peculiar mixture of vitrium, barium and copper oxide, they did not keep it confidential, they published it. Why did IBM publish it? There is the potential for a lot of economic benefit from high temperature super-conducting materials. They published it because the researchers did not have the slightest idea of why high temperature super-conductivity occurred, and being new in those labs in Geneva, they were not going to be able to discover it either. It had to get out into the community of peer review, of argument, of tension, of public debate, which is the style of quality adjudication that universities have developed over the centuries.

You cannot buy known quality by keeping the results confidential. You may be able to buy a piece of an invention or an owned piece of property or, in the case of a firm, a trade secret, but you have no idea or a minimal idea of whether what you have bought is worth anything; and how do you decide the quality of what you have produced in universities? Not by keeping it a secret, but by publishing it, by opening it up, by letting people challenge it. That is the way in universities we develop and preserve our quality control, and that is a very important dimension to this whole idea of support of the universities.

To produce this public intellectual property requires support of core programs, it requires full cost funding, and it requires support horizons that are closer to ten years than five years. We cannot develop either the machine, the space, or the people resource base to help the country unless we have more stable funding than the typical five-year funding program, whether it is matching funds or centres of excellence.

That is probably enough, Mr. Chairman, by way of introduction.

The Chairman: Thank you. Senator Hicks will start the questioning, followed by Senator Stewart.

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Senator Hicks: Thank you Professor Nowlan for a very interesting and succinct historical summary of the Matching Grants Program. You have answered a number of the questions that I had contemplated asking you, but I have some areas where I would like a little elaboration just the same.

When this program was announced it seemed very strange to me that we were trying to induce the private sector, including companies and foundations and even including university endowments, to give money to universities; and then the government would match, under certain conditions which you have explained, those amounts and give the money not to the universities but to the granting councils. The granting councils would then have more money to give to the universities largely unrelated to the machinery which had resulted in the granting councils getting more money from the matching grants and so on. You have dealt with that, and you have said that NSERC was going to return 10 per cent, 20 per cent and 30 per cent, and the Social Sciences and Humanities Research Council 20 per cent, and MRC zero per cent.

I did not see how there was a sufficient motivation for the private sector under this arrangement, and you have answered that by saying that the motivation has not developed. Do we know whether companies, for example, have increased the amounts of money that they have given to universities? I know they have increased them some, but have they increased them as a result of this program or only as they would have done in relation to the economy and the association that they would normally have with universities?

Professor Nowlan: I feel quite confident in saying that I have not experienced at the University of Toronto any single instance in which a company or a foundation or an outside supporter has increased support because of the generic elements of this program. The incentives at the current level are simply too slight to have that effect.

So that I am not misunderstood, let me acknowledge again that the use of the matching funds, in one case to develop SSHRC, in the other case to enhance cooperative matching programs or fellowships, has had an incentive effect. However, the matching side is much greater. It is in the order of 100 per cent.

Those programs which have been supported by the matching funds have had an effect. I would not go so far as to say the matching program has had no effect, because through those programs it clearly has been effective. Through the generic aspect of the program—that is the 10 per cent, the 20 per cent and the zero per cent—I know of no instance where those numbers have served to generate additional support that would not otherwise occur.

Senator Hicks: Indeed, quite a lot of money from certain sources that enables the granting councils to claim a matching grant is money that was being paid anyway. For example, the portions of university endowments that qualify.

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Professor Nowlan: That is correct. It is also correct in another sense, and that is by the time the details of the program were stabilized the whole of the first matching period had passed. Everything that was to be reported had occurred. That was at the end of the 1986-87 period.

I think it is worth pointing out that we have really only had the experience of reporting that first year. I may be forced to eat my words if it turns out that some person comes forward at the end of this year and says, "We would not have made this contribution or entered into that project without 10 per cent from NSERC or 20 per cent from SSHRC".

Senator Hicks: I do not expect that we can be that specific at this stage, as you have pointed out.

Would you elaborate on the effect now and the likely effect in the future on the limits of the amounts which the government will match in these grants? Thus far, the stipulated amounts by the government have been large enough to match all the payments to the universities.

Professor Nowlan: The amounts that the universities have reported and that have been declared eligible have greatly exceeded the cap on the first year matching amount and will almost certainly exceed the cap on the second year amount.

Senator Hicks: I did not state my question correctly. That was the point I made. What will happen in the future? Do you think that the limits set by government may not be attained because the private sector will not produce enough money to match them or to qualify for the total matching?

Professor Nowlan: If the program does continue as designed there is every possibility that, in the third and fourth years, universities will not find themselves able to report an eligible amount that is as much as the cap. In other words, the cap rises rapidly. The likelihood of our reporting rising amounts of eligible funds is very small. I suspect that next year's reported amount will be very similar to this years', and may be less because there were a couple of unusual features about the first year.

I should make the point that the modest return to the universities is helpful to those that are reporting private sector support. One wonders whether the amounts that universities report would be as great as they now are if the incentives in all cases dropped to zero. In other words, this incentive fee in the eyes of some people is more like a finder's fee. It is not serving to create additional private sector university interaction, but it does give some encouragement to universities to beat the bushes to ensure they have found all eligible money. That is not a trivial amount.

My colleague with me, Carol Gillin, who is Director of the Office of Research Administration at the University of Toronto, has been responsible for submitting the details of our eligible matching amounts. Perhaps she alone knows just how complicated the task was of reaching for foundations, grants in

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kind, equipment and so on, all of which were to be counted as eligible. We do not normally keep those in our books all in one place, and we do not keep records in exactly the way the government wants us to report. It was a task within universities to assemble the information that would encourage the maximum appearance of success of this program.

Senator Lorna Marsden (*Acting Chairman*) assumed the Chair.

Senator Hicks: I think I understand that. Have you encountered some resentment and resistence on the part of researchers that they do not get reimbursed by the matching grants program for what they have done? For example, at the University of Toronto, one of your departments undertakes to do research and obtains a grant of $100,000 from an external agency. As a result of that, if it is an eligible project or amount, one of the granting councils gets an additional $100,000. Do they give the 10 per cent, which you have referred to, back to the University of Toronto? Is it as specific as 10 per cent of that $100,000 item?

Professor Nowlan: Ten per cent was the National Sciences and Engineering Research Council's number this past year. It was calculated by our submitting a detailed list—project by project—of what we believed were eligible private sector support. NSERC scrutinized that. There were one or two projects over which there was some dispute and they were ultimately deemed ineligible. We got back a replay of our list, project by project, of items that the government considered eligible. We then got 10 per cent of the total, which is the same as 10 per cent on each project.

Senator Hicks: Next year you would expect to get 20 per cent and so on?

Professor Nowlan: If NSERC does not change the program, yes.

Senator Hicks: Yes, if they stick to their expressed intentions. When that 10 per cent comes to the University of Toronto, what do you do with it?

Professor Nowlan: The program is designed in such a way that that 10 per cent is returned to the institution as a whole, not to the individual researchers. Each institution handles it somewhat differently.

At the University of Toronto we return the 10 per cent in total to the researcher or research group that has generated the matching funds. In some cases where there has been support from an endowment or where there has been generic support in an area such that we cannot identify a researcher or research group, then that is kept for the central support of research. The vast majority—all but a few percentage points—can be identified with a researcher or research project, and we return that directly for the support of that group's research.

Senator Hicks: The researcher who gets the $100,000 from XYZ Company does have the satisfaction of receiving personally an additional $10,000 from NSERC through the University of Toronto, does he?

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Professor Nowlan: That is correct. Some universities prefer to retain the whole of the amount and use it for more general discretionary research purposes. We felt that, if we were to encourage the view that as a matching program the incentives needed to be larger rather than smaller, we had better be consistent with our thinking and return the money directly to the researcher.

The Acting Chairman: I believe Mr. Greenberg would like to ask a question of clarification.

Mr. Jeff Greenberg, Director of Research, Standing Senate Committee on National Finance: Professor Nowlan, my understanding is that NSERC provides 10 per cent up to the maximum amount they receive from the federal government. The amounts that you receive exceed the federal contribution, and the reality is that it is approximately three to four per cent.

Professor Nowlan: That is correct. Thank you for the clarification. As the computer scientists would say, the 10 per cent is a virtual 10 per cent. As has been announced, what happens is that this year, at least with the program overprescribed, the percentage is reduced proportionately so that the actual percentage return is around 4 per cent—in fact, in both NSERC and in SSHRC, as it happens, coincidentally.

Senator Hicks: This would be different in other universities, of course?

Professor Nowlan: No, the percentage return would be the same in all universities.

Senator Hicks: You are saying that it would be determined by the en bloc amount?

Professor Nowlan: That is correct. The cap on the eligible maximum for NSERC for the first year was approximately $20 million. Let us say that they got $40 million—they got something in excess, but let us say that the eligible amounts were $40 million and the percentage return would be 5 per cent, rather than 10 per cent.

Senator Hicks: Thank you, Madam Chairman.

Senator Stewart (Antigonish-Guysborough): Thank you, Madam Chairman. I have three or four questions, and perhaps not all of them are on topic. First of all, I want to ask about the time expended and the distraction involved in the case of serious researchers in this matter of finding money for their future research. How serious is that, or is it something that can be imposed upon servants of the servants?

Professor Nowlan: That is a good question, senator. It goes well beyond the matching-grants program. It really is a question, in my view, on the research environment at the university. It is certainly the case that the research environment at the university is a very competitive one, and many of the most successful researchers are those who have been the most successful entrepreneurs; who have been best able to hussle research funds—not necessarily from the private sector but also from granting agencies and foundations. A top-flight researcher in life sciences especially may well spend the equivalent of a fifth

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or more of his or her research time preparing and thinking about research-grant applications. In other areas, it may be something less, but it is still a significant portion.

This is in very distinct contrast with the fundamental research operations in some of the large companies, such as the ones that I have mentioned that have research enterprises where individuals are provided with some base support that allows them to conduct a research program over a period of years. In the university environment, the successful researchers will also tend to be entrepreneurs. It is a qualification that does not necessarily correlate directly with their research talent.

Senator Stewart (Antigonish-Guysborough): I am surprised at the comment you just now make, because I should have thought that the great profit-motivated corporations would finance research on a much shorter timespan than seems to be the situation in the universities. It is, in fact, the reverse of what I would have expected. Did you mean to imply that?

Professor Nowlan: Indeed I did, senator. Those corporations, whose names you would recognize—namely the large automobile companies, the large computer companies, the large chemcial companies—all have substantial research enterprises where their researchers are working on fundamental research. Companies generally allow these reseach results to be published and the researchers work often for long periods on following trails down which their own discoveries take them, whether or not the company sees an immediate payback.

There is, of course, a great deal of applied, developmental-style research in the private sector. That is where most of it is done. However, we at the universities are finding it increasingly difficult to keep the best researchers at universities when they have the alternative of pursuing their fundamental research interests in the private sector. We are behind in our equipment; we require of researchers that they find their own money. Universities have no money to give to researchers. We pay their salary; we try to find them what is often inadequate space and out-dated equipment, and we saddle them with students and administrative responsibilities.

Senator Atkins: Perhaps I could ask a supplementary question here. Is that also true in the United States?

Professor Nowlan: Yes, although it is very hard to generalize about any university system, and particularly the American one. However, the large American universities are also finding that their competitive position for some of the researchers in some of the hottest fields is deteriorating relative to the corporate research labs. Salary is only one component, but it is not a trivial component.

Senator Stewart (Antigonish-Guysborough): One of the aims of the matching-grant program was to attract private-sector support. Yet, when it was being decided what would be matched, you succeeded in having foundation money included. Would I not be correct in thinking that the government's

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intention—at least its initial intention—was to obtain more money from the industrial, profit-motive private sector. Is that correct?

Professor Nowlan: That, too, is a very interesting question. We have had experience with matching-grant programs in other jurisdictions in Canada and we know of the experience in other countries, and they have tended to be just what you suggest; in other words, a focus on industrial, high technology research. To the best of my knowledge, from the very first announcement in the Minister of Finance's February, 1986 budget, this has been a program that has been divided equally among the granting councils in proportion to their base budgets.

One of the reasons that we sought to ensure that foundations were included was because much of the support for the social science and humanities research in particular comes not from private-sector industry but from foundations and somewhat unusual private-sector sources, such as gifts.

However, with respect to the design of this program, I do not think that the government, from the outset, had any intention other than that there would be a division of resources among the granting councils, and I think it is to their credit that they did adopt that attitude and recognize the signficance and the importance of private-sector support for social sciences and humanities, and also the significance for the country of research in that area. It would be nice, Mr. Chairman, if all of the councils had a lot more support but that was an element that, as far as I know, was contained in the program from the outset.

Senator Stewart (Antigonish-Guysborough): However, when you say "private-sector support", you are now including the foundations?

Professor Nowlan: Yes. They are private sector.

Senator Stewart (Antigonish-Guysborough): Yes. I realize that, but we are talking about very different donors in the case of some of these foundations, as opposed to profit-motivated businesses.

Professor Nowlan: Yes.

Senator Stewart (Antigonish-Guysborough): My question, then, is: If the Social Sciences and Humanities Research Council had been dealt with in some other way and did not have to be included in the umbrella, could you have come up with a formula or an approach which would have concentrated on the motivation of assistance to university research from profit-motivated persons?

Professor Nowlan: I think the key to doing that would be the same simple key, and that is to have a larger proportionate match. That key operates as the motivation for both the profit-seeking sector and the philanthropic sector, namely the foundation. I should say, because it is a very interesting phenomenon and your question stimulates my thoughts, that there is an increasing amount of private-sector profit-oriented support of the humanities and social sciences research. In fact, the largest single eligible item that we put forward to the Social Sciences

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and Humanities Council was a match for a gift of computer equipment from IBM for humanities. The humanities scholars increasingly are interacting with private-sector people, often in computer-related areas—but not only there. Ph.D. graduates from the humanities departments are now explicitly seeking careers in the private sector which follow their disciplinary interests. Working with natural language processing, with concordances of large data bases, all these things are emerging. It is a fascinating trend to watch.

Senator Stewart (Antigonish-Guysborough): Last week we had as a witness Dr. Hugh Wynne-Edwards from Alcan. I do not want to put words in his mouth by trying to summarize too tersely what he said in a very enlightening presentation, but let me now do that. His argument was that we are confusing two kinds of research in Canada. He contended that the Swedish model is one that we should at least consider very seriously. It is a model in which the universities do basic research with the kinds of goals that you referred to earlier, while business persons more interested in making profit proceed to do research which is more or less directly related to their business. The implication was that by trying to recruit the universities to do profit-motivated research, we are almost certain to fail economically in the competitive world in which we now find ourselves. In other words, we are trying to use race horses as draft horses and draft horses as race horses. We are mixing things up. I think he would contend that this program, well-motivated though it is, is almost a perfect example of the kind of means which is devised to achieve what is really a misconceived end.

I know that you have not had a chance to read what he told us, but I wonder if you would react to my summary of what he told us?

Professor Nowlan: I would be glad to. I took instruction from Hugh Wynne-Edwards for a good many years when I was a geology student at Queen's in 1956. He was my lab instructor as a graduate student taking his doctorate of geology. I thing Hugh Wynne-Edwards' notion that there is a mixing up of goals is entirely accurate. I might describe the problem a little differently from the way he would describe it. However, it does get—perhaps more precisely than I was able to—at the point I was making toward the end of my remarks. I hope that your thinking about the matching grant program will encourage you to reflect a little more on this conceptual tangle.

What we are discovering is that the use of the words "basic" and "applied"—and in some cases even thinking about "basic" and "applied"—is not the most helpful way to think about the conceptual problem, that in a great many areas of interest there has emerged such an enormous synergism to the formerly applied and basic end as to make that distinction less helpful than it might have been. For example, when one thinks of protein engineering, there is almost an immediate application of the most fundamental basic results in applied areas. The same is true with information technology. The major computer companies hang over our shoulders looking at the latest fundamental renditions of images on computers which spring

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from the most recent mathematics. I suppose we all know, having read our books on chaos and whatnot in recent years, just how recent the science of nonlinear dynamical systems is and of the significance they have had for the generation of computer-based imagery. Those results, which spring from the mathematical work of the 1970s, are now in commonplace use in the most applied areas. So what we are discovering at the university—and it is something that I profoundly believe in and try to encourage—is the profitable interaction of applied and basic areas. What I think is getting tangled is this notion of proprietary and owned property that should spring for the profitable benefit of the private sector from universities. I think the best private firms, Alcan included, understand very well how significant for their own work is the fundamental research we are doing. We work very closely with Alcan on the most fundamental areas you could imagine. Why do they work with us? Because they think the things we are doing will be beneficial to them at some point in the not-too-distant future.

What we need to do is to recognize that many of the results of that research are not going to be appropriable by just a single firm. That is, the things that Alcan, IBM, General Motors and Northern Telecom are supporting us for will be most beneficial if they can be examined, presented, published and made public in a standard disciplinary milieu. Those companies that are in on the research early will gain the advantage of understanding earlier than others. The best companies recognize that the type of research they should be supporting are these core areabased research activities. By and large, when the "Northern Telecoms" get at the applied side, the development side, they will start taking it out of universities. There is a whole different confidentiality that surrounds developments as they get closer and closer to the market, and there is a long gap between our fundamental activity and actually having a commercial product. Most of that gap is plugged by the things they do in the private sector, not by things we do in the universities. Increasingly, because of the closeness of basic work and applied work, the best firms want to work with us at the universities in these core areas.

However, we must recognize that we need the help of the government, because this knowledge has public good as well. The private sector will support reasonably only those things it feels it can appropriate to its private benefit. The private sector will not support the whole cost of that fundamental research. The government programs have to give us some stability and, in essence, provide for the funding of the portion that goes to the public good. The governments of President Reagan in the United States and Prime Minister Thatcher in the United Kingdom are supporting increasingly on a stable basis core basic research at universities and recognizing that typically the kind of research we are talking about in universities will never be fully paid for by the private sector. It is just not to their economic advantage. That is why I say that these quick-fix programs that somehow see themselves as a short-term bridge to something that will be private-sector supported are wrong-headed. I expect that what I am saying is something very close

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to what Dr. Hugh Wynne-Edwards was saying, but maybe in a slightly different way.

Senator Stewart (Antigonish-Guysborough): The follow-up question I have in mind is somewhat confused by what you said earlier about some of the major corporations paying people and financing their activities on research, which sounds very much like what used to be called "Ivory Tower research".

Would it be a fair extrapolation, from what you have said about proprietary or copyrighted control on the one hand and generally-owned goods on the other hand, that the basic distinction we are talking about here is one of researcher motivation? In one case the researcher is motivated by curiosity perhaps or for the acclaim of his or her peers; whereas in the other instance the motivation is to make a profit. There is nothing wrong with that provided it is in its proper place. Is that a useful line of distinction?

Professor Nowlan: It can be. Again, I would describe it a little differently, but I think you are getting at something that is quite important, namely, that the research is driven by questions. I do not like the use of the words "curiosity-motivated research" because it tends to suggest something that is directionless. No good researcher is directionless. They know what it is they are trying to answer, but they may not be able to answer it. Sometimes they are driven by questions that their peers or their disciplines pose. There are some profound problems, whether it is membrane chemistry or protein engineering, that people around the world recognize as unsolved questions, and the best researchers in universities will be those who are working on those unsolved questions. They are real questions.

In other cases, the questions may be posed by the private sector, by companies, because they have a question that may well have to do with their business, with their ultimate product and their profitability. The questions may be just as profound, just as basic, but they come, as you say, from different motivations.

I saw early on as an economist an example of the significance of not placing too much importance on this distinction between basic and applied research. One of the best economists still living, Kenneth Arrow, who won a Nobel Prize for his work some time ago, won his Nobel Prize for work that was motivated by a very applied problem. He was hired to work on rent control by the City of New York and he could not solve some of the problems he was faced with, working for the Housing Agency in New York City, with the tools that we had in the 1940s and early 1950s in economics; so he was stimulated by that to design new approaches to economic problems, and that was so basic to the discipline, as I said, that that fundamentally was what won him the Nobel Prize. That was a complete interaction. He was stimulated by one kind of problem to work in an area that, in a sense, other people might be stimulated for quite different reasons, and I see that happening all the time in the sciences.

I see our most basic physics researchers right now working on high temperature super-conductivity materials, and they are in constant touch with what one might have thought of as

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being the most applied physicists, even to the point of people who mix up materials and heat them and then just test whether or not they are getting super-conductivity. They are working in hand in glove because something strange happens to the experimenter that sends the theoretician back to produce some new computer simulation models trying to figure out what is going on.

Senator Stewart (Antigonish-Guysborough): Thank you, Madam Chairman.

The Acting Chairman: Senator Cogger, do you have a question?

Senator Cogger: I do not want to prolong the debate. Would it be fair to say, in connection with centres of excellence—you touched on those, and I am particularly interested in those issues, as you well know because the government announced that program back in January—that provided one does not look at them as a quick fix, but more from the point of view of the British model or the U.S. model, and made a commitment to support them in the long haul that that was the direction to go?

Professor Nowlan: I think the secret of the centre of excellence program lies entirely in the design. As a general concept, I think it is very workable and one that can be very productive for this and other countries; but they need to be designed as long-haul enterprises, having the attributes that I described, such as proper stability, proper funding, and proper recognition of the maximum likely role of the private sector in them.

Senator Cogger: That may be an unfair question, but maybe it is answerable. I suspect we would not know what the quick fix is. What is a long-haul cycle? Is it a forever proposition?

Professor Nowlan: No; I do not think that is reasonable either. I think if one is accepting the fact that support for centres of excellence is different in kind from block grant funding, then one has to accept the fact that there are strategic reasons for attempting to focus in some coherent way on this area of research rather than that; and I think that once that is accepted, you have to accept too that there needs to be an opportunity for review and a redirection if necessary. I think that the areas that we would define for coherent work, new materials, space technology, information technology, robotics, are so fundamental that they are not going to change over five or ten years. They may change over 15 years. Researchers within those areas change direction as well.

I think a centres of excellence program should be designed with periodic reviews and a possible sunset provision about year seven or year eight with a major review and a decision whether to proceed or not. If a decision is made not to proceed, then there should be a two or three-year winding down period. That gives problems to universities trying to build up a permanent faculty because universities, if a program even after ten years has wound down, has to have some way of maintaining

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continuity of staff to whom they have a career commitment. Five years is too short for that: so we are finding that although the Ontario Centre of Excellence is in many ways a well-designed program, the five-year horizon is giving us difficulty because it inhibits the buildup of core staff. We cannot give them career opportunities; we can only give them very short-term appointments. I think that practically one has to choose some horizon, and I would choose it closer to ten years rather than five.

Senator Cogger: Thank you.

The Acting Chairman: The committee is actually out of time. May I just ask a few brief questions, with almost "yes" or "no" answers, to get them on the record. Perhaps I could ask Carole Gillin a question about the implementation of the program. We asked Dr. May from NSERC what he had added to his staff in order to implement the Matching Grants Program. He told us he had added 16 person-years. How many people has the University of Toronto added?

Ms. Carole Gillin, Director, Office of Research Administration, University of Toronto: Zero.

The Acting Chairman: So the work is spread among the existing human resources.

Ms. Gillin: Yes.

The Acting Chairman: We asked SSHRC about the same question, and we were told, in addition to the number, that this is a very labour-intensive program. Professor Nowlan has also said it is labour intensive. Is that your experience also?

Ms. Gillin: Yes. As an example of this, most of the work to produce the reports was done through two offices in the university. One is the Business Information Systems Group which had to produce a new computer program to generate the reports, and the other is in the accounting section. It is estimated that it took six people 300 hours to produce the reports for the University of Toronto for the 13-month period.

The Acting Chairman: And presumably this is the case in all other universities that are involved in this.

Ms. Gillin: Proportionately, yes.

The Acting Chairman: Yet none of the bonus or incentive that is paid back from the granting councils can be used for overheads—that is, support staff, accounting programs, and so on. Is that correct?

Ms. Gillin: That is correct.

The Acting Chairman: Thank you very much. I think that is important information in analyzing this.

May I come back to you, Professor Nowlan, and ask if you think that what you have described as the ambiguous goals of this program bear any relationship to the Eureka Program in the European community which is not their fundamental research block granting program, but their implementation in industry program.

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Professor Nowlan: My knowledge of the Eureka Program, and of the British counterpart program, is somewhat sketchy. As I understand those programs, they are much less ambiguous in their motivation: that is, they are designed directly to stimulate cooperative research among private sector firms as well as between the private sector and universities.

The Acting Chairman: Finally, you have talked about the redistributive function of this program as one of its ambiguous goals. The councils redistribute money in some senses and the universities redistribute money. You have described the University of Toronto's plan, but other universities may do it in other ways.

Do you believe that one of the real purposes of the Matching Grants Program was to generate funds, by putting additional funds in the granting councils, which would then go to universities which might not otherwise have funds?

Professor Nowlan: The purpose was certainly to provide more money for university research generally, whether it came through the granting councils' core programs or through the matching fund by means of an incentive payback to universities. Particularly ambiguous was whether the program was meant to supplement funds for the core programs of the granting councils, or whether it was meant to stimulate the cooperative university industry program.

The Acting Chairman: That is very helpful. On behalf of the members of the committee, I would like to thank you both for coming here today.

Senator Cogger: Madam Chairman, I move that we conclude this portion of our review of the main estimates and prepare an interim report for presentation to the Senate.

The Acting Chairman: Is it agreed, honourable senators?

Hon. Senators: Agreed.

The committee continued *in camera*.