CANADIAN COMMITTEE ON
FINANCING OF
UNIVERSITY RESEARCH

Survey of Funding of University Research

A report prepared jointly by
- The Council of Education Ministers, Canada
and
Ministry of State for Science and Technology

February 1979

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SCIENCE AND TECHNOLOGY
SCIENCES ET TECHNOLOGIE

FOREWORD

This report presents an overview of the support of the direct costs of university research from provincial and federal sources. It represents an important initial step by the Canadian Committee on Financing of University Research (CCFUR) to fulfill its mandate to provide for an exchange of information on policies, programs and procedures affecting university research.

There are necessarily both quantitative and qualitative differences in the information available from the numerous parties to this exercise. This is because science policy structures and activities have evolved at different rates in the governments involved.

The report nevertheless, is a major compilation of information. It presents a comprehensive picture of the scale of government sponsorship of university research, of the growing importance of this research to all sectors, and of some emerging trends.

(This report is also available in French)

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INTRODUCTION

The Canadian Committee on Financing University Research (CCFUR) was established jointly by the Council of Ministers of Education, Canada (CMEC) and the Ministry of State for Science and Technology (MOSST) with the concurrence of the two levels of government concerned. The first meeting of the Committee was held in January 1977 and its purpose was adopted as proposed in the April 1976 proposal, that is, *"to exchange information and develop recommendations on policies, programs and procedures affecting university research"*.

At its meeting of February 28, 1978, CCFUR considered how best to obtain and exchange information on activities and financing related to university research. It was decided, as a first step, to request from the federal and provincial governments information regarding their own activities in this area. The Secretary of MOSST was to contact appropriate departments and agencies of the federal government on behalf of CCFUR, while CMEC's Secretariat was to do the same with respect to the provinces.

The purpose of this report is to provide overviews and some detailed information on the funding that the federal and provincial governments make available to university researchers for scientific activities, based on information provided. Definitions, as used by Statistics Canada in its surveys of these activities by both levels of government, are provided as a technical note in Appendix 1.

Part I of the report is a summary review of the sources of funding for R&D in the universities from 1970-71 to 1977-78 and provides a backdrop against which the detailed information given in the following sections can be viewed.

Part II deals with the federal science programs and expenditures on scientific activities. It is divided into three sections:

Section I summarizes the most recent policy thrusts of the government in the area of research and development. It provides the overall perspective of the federal science programs, their composition in terms of R&D and related science activities (RSA)*, and the relative importance of natural and human sciences. It also delineates the proportion of the total federal science budget that is available

* Defined in Appendix I.

for support of scientific activities in universities.

Section 2 shows federal expenditures by departments and agencies (excluding the granting research councils) for scientific activities in Canadian universities and the mechanisms whereby these activities are funded.

Section 3 provides an outline of historical as well as current programs and budgetary information on the three Granting Councils prior to their reorganization in 1977.

Part III presents the provincial contributions to this exercise in the form of summaries concerning the science policy structure and funding of university research as provided by individual provinces. The summaries are presented from West to East.

PART I

OVERVIEW OF SOURCES OF DIRECT SUPPORT FOR RESEARCH IN CANADIAN UNIVERSITIES

Sources of funds for "sponsored research" in Canadian universities have been surveyed for a number of years by Statistics Canada. For sources other than the federal government, the survey relies upon data provided on a confidential basis by the Canadian Association of University Business Officers (CAUBO). There are, of course, some limitations to the coverage of the CAUBO data, since all institutions do not report all research funds received every year. This requires some extrapolation by Statistics Canada; however, with this reservation in mind, the data represent a good indication of these funding sources and can usefully serve as an introduction to a more detailed study of federal and provincial sources.

Table 1 presents a summary of the sources of funding for R&D[1] in the universities, including funds from non-federal sources. This table is based on the R&D series provided by CAUBO and Statistics Canada for non-federal sources, and R&D expenditure data from the research councils and federal departments for the federal sources. It does not include funds for related scientific activities, such as research training (e.g. graduate students) or research related activities (conferences, symposia, travel grants to attend scientific meetings, etc.).

As shown in Table 1, the federal government's share of total university research funding has declined from 77 percent in 1970-71 to 60 percent in 1976-77. Most of this decline occurred in funding derived from federal departments. Research Councils' funding has increased at a lower annual rate (7 percent) than the total funding

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[1] These funds provide direct support of research activities by investigators in the form of various grants and special awards (incl. postdoctoral fellows) which are considered as personnel support.

TABLE 1

SOURCES OF ASSISTED RESEARCH FUNDS TO CANADIAN UNIVERSITIES*

		Research Councils (1)	Federal Departments (1)	Provincial Governments (2)	Others (2) (3)	Total
FUNDS (MIL $)	1970-71	88.6	30.3	13.2	23.4	155.5
	1971-72	92.9	30.5	12.2	34.2	169.8
	1972-73	98.3	31.3	18.6	37.5	185.7
	1973-74	104.6	33.5	26.1	38.9	203.1
	1974-75	109.1	34.0	31.4	51.7	226.2
	1975-76	124.6	35.7	41.4	53.0	254.7
	1976-77	135.3	27.8	48.1	61.7	272.9
	1977-78	152.2	34.4	-	-	-
PERCENTAGE DISTRIBUTION	1970-71	57.0	19.5	8.5	15.0	100.0
	1971-72	54.7	18.0	7.2	20.1	100.0
	1972-73	52.9	16.9	10.0	20.2	100.0
	1973-74	51.5	16.5	12.9	19.2	100.0
	1974-75	48.2	15.0	13.9	22.9	100.0
	1975-76	48.9	14.0	16.3	20.8	100.0
	1976-77	49.6	10.2	17.6	22.6	100.0
	1977-78	-	-	-	-	-
AVERAGE ANNUAL GROWTH RATE		8.0	-	24.0	17.5	9.8

SOURCE:

(1) DATA OBTAINED FROM STATISTICS CANADA HISTORICAL SERIES (1977 SURVEY); THESE FIGURES REPORTED REFER TO PAYMENTS TO CANADIAN UNIVERSITIES FOR R&D

(2) DATA PROVIDED BY THE CANADIAN ASSOCIATION OF UNIVERSITY BUSINESS OFFICERS (CAUBO)

(3) IN THE LATEST YEAR FOR WHICH DATA WERE AVAILABLE, THE LARGEST COMPONENT OF "OTHER" WAS GIFTS, NON-GOV'T GRANTS ($54 M); FOLLOWED BY INVESTMENT INCOME ($3 M); INTERFUND TRANSFERS($2.2 M); MISCELLANEOUS ($2.2 M) AND MUNICIPAL GOV'T GRANTS ($.2 M).

NOTE: THE NUMBER OF INSTITUTIONS REPORTING FINANCIAL INFORMATION TO CAUBO IN ANY ONE YEAR IS NOT CONSTANT

*Payments of contributions to TRIUMF (hereafter refered to as payments to TRIUMF) have been excluded from all tables in this report and are shown separately on page 50.

- Not available

from all sources to universities (10 percent). The largest rates of increase in university research funding were recorded for provincial and "other" sources, some 24 percent and 18 percent per year, respectively.

The regional distribution of federal, provincial and "other" sources of funds for R&D in universities is shown in Table 2. (These data originate from CAUBO and for various reasons, including differing fiscal years, do not balance exactly with the data shown in Table 1). As Table 2 makes clear, the level of federal participation in university R&D varies significantly by region, ranging from 85 percent of funding in the Atlantic region to about 56 percent in Ontario and Quebec in 1976-77. It is also evident that the federal share has declined in all regions since the start of the decade, but most sharply in Ontario, where the federal share of research funding declined from 74 percent (1970-71) to 56 percent (1976-77).

Provincial and "Other" (see Note 3, Table 1) sources of financing have increased in importance during the early 1970s rising in the aggregate from 26 percent to 40 percent of the total.

REGIONAL DISTRIBUTION OF ASSISTED RESEARCH FUNDS TO UNIVERSITIES

REGION		MILLIONS OF DOLLARS			PERCENTAGE DISTRIBUTION		
		1970-71	1975-76	1976-77	1970-71	1975-76	1976-77
ATLANTIC	FEDERAL FUNDS	6.4	12.0	13.6	90.1	83.9	85.0
	PROVINCIAL FUNDS	0.1	0.4	0.7	1.4	2.8	4.4
	OTHER	0.6	1.9	1.7	8.5	13.3	10.6
	TOTAL	7.1	14.3	16.0	100.0	100.0	100.0
QUEBEC	FEDERAL FUNDS	24.8	41.9	40.8	67.8	61.2	55.7
	PROVINCIAL FUNDS	6.4	14.2	17.1	17.5	20.7	23.4
	OTHER	5.4	12.4	15.3	14.8	18.1	20.9
	TOTAL	36.6	68.5	73.2	100.0	100.0	100.0
ONTARIO	FEDERAL FUNDS	42.1	58.1	63.1	73.9	57.3	56.1
	PROVINCIAL FUNDS	3.7	17.2	19.3	6.5	17.0	17.2
	OTHER	11.2	26.1	30.0	19.6	25.7	26.7
	TOTAL	57.0	101.4	112.4	100.0	100.0	100.0
WESTERN	FEDERAL FUNDS	31.2	43.0	46.6	77.2	65.8	64.5
	PROVINCIAL FUNDS	3.0	9.7	11.0	7.4	14.9	15.2
	OTHER	6.2	12.6	14.7	15.3	19.3	20.3
	TOTAL	40.4	65.3	72.3	100.0	100.0	100.0

SOURCE: CANADIAN ASSOCIATION OF BUSINESS OFFICERS (CAUBO), ANNUAL REPORTS 1970-71, 1975-76 AND 1976-77.

TABLE 2

PART II

FEDERAL GOVERNMENT EXPENDITURES ON SCIENTIFIC ACTIVITIES

Section 1 - Overview

OVERVIEW

Introductory Remarks

The support of university research is provided through two main avenues: the Granting Councils and the government departments and agencies. The Granting Councils have, in the past, allocated the greater part of their funds for R&D in the form of research grants awarded on a project basis rather than on an institutional basis. Support by government departments include contracts as well as grants and contributions. Both government departments and the Granting Councils offer programs in support of research training.

Federal Science Expenditures in Perspective

Over the decade since 1970, federal science expenditures, and especially those to the universities, have grown at a substantially lower rate than the federal budget. Table 3 shows that federal support to the universities rose over this period from $138 million in 1970-71 to $242 million in 1978-79. In terms of growth, this is a 7 percent annual rate, which compares with a rate of 10 percent for total federal science expenditures, and 16 percent for the federal budget.[1] As a consequence, funding of university science as a proportion of the federal budget dropped to almost half over this period, from .93 to .50 percent.

TABLE 3

FEDERAL EXPENDITURES ON SCIENTIFIC ACTIVITIES
IN RELATION TO GNE AND THE FEDERAL BUDGET

		$ MILLIONS		PER CENT OF GNE		PER CENT OF FED. BUD.	
		1970-71	1978-79	1970-71	1978-79	1970-71	1978-79
GNE		$5,700.0	235.100.0	-	-	-	-
FEDERAL BUDGET		14,800.0	48,300.0	17.27	20.54	-	-
FEDERAL EXPENDITURES ON SCIENTIFIC ACTIVITIES	TOTAL	911.1	1,939.0	1.06	0.82	6.20	4.01
	TO UNIVERSITIES	138.0	241.9	0.16	0.10	0.93	0.50

SOURCE: UNIVERSITY BRANCH, MOSST

NOTE: TRIUMF PAYMENTS EXCLUDED

[1] All annual rates of growth for federal expenditures have been calculated on an average compounded rate basis unless otherwise specified.

Federal science expenditures for recent years are shown in Table 4. Nearly two-thirds of the federal science budget is allocated to research and development, while just over a third is devoted to related scientific activities (RSA) such as education support and the collection and dissemination of scientific information. Between 1970-71

TABLE 4

FEDERAL EXPENDITURES ON SCIENTIFIC ACTIVITIES
BY TYPE OF ACTIVITY

		HUMAN AND NATURAL SCIENCES		
		R&D	RSA	TOTAL
EXPENDITURES (MIL $)	1970-71	626.7	284.4	911.1
	1976-77	1,020.2	642.9	1,663.1
	1977-78	1,105.5	688.2	1,793.7
	1978-79	1,207.4	731.3	1,938.8
PERCENTAGE DISTRIBUTION	1970-71	68.8	31.2	100.0
	1976-77	61.3	38.7	100.0
	1977-78	61.6	38.4	100.0
	1978-79	62.3	37.7	100.0

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976/77 TO 1978/79

NOTE: THESE FIGURES INCLUDE NON-PROGRAM COSTS

EXPENDITURES EXCLUDE PAYMENTS FOR TRIUMF

and 1976-77, federal expenditures increased at an annual rate of 11 percent, with RSA growing more rapidly (15 percent per year) than R&D (8 percent per year). Between 1976-77 and 1978-79, federal expenditures on scientific activities increased by 8 percent per year to $1.9 billion in 1978-79. Both R&D and RSA grew at about 8 percent per year over this same two year period.

In terms of type of science, federal funding is allocated largely to the natural sciences[1] (about 75 percent), totalling some $1.2 billion in 1976-77. Scientific activities in the human sciences assumed about one-quarter of the federal science program, or $419 million in 1976-77 (Table 5). Between 1976-77 and 1978-79, expenditures on the natural sciences increased by 17 percent to $1.5 billion and expenditures on human sciences increased by 15 percent to $482 million. It should be noted that human science activities have increased substantially, from 15 percent of the federal science program in 1970-71 to 25 percent in recent years.

Regarding federal science expenditures by funder, Table 6 shows the originators of expenditures within the government. Departmental science programs account for the major proportion of expenditures, and their share has increased since

[1] "Natural Sciences" includes the health sciences and engineering throughout this report unless specified otherwise.

TABLE 5

FEDERAL EXPENDITURES ON SCIENTIFIC ACTIVITIES
BY TYPE OF SCIENCE

		HUMAN AND NATURAL SCIENCES		
		HUMAN SCIENCES	NATURAL SCIENCES	TOTAL
EXPENDITURES (MIL $)	1970-71	140.4	770.6	911.1
	1976-77	419.0	1,244.1	1,663.1
	1977-78	446.0	1,347.7	1,793.7
	1978-79	482.3	1,456.4	1,938.8
PERCENTAGE DISTRIBUTION	1970-71	15.4	84.6	100.0
	1976-77	25.2	74.8	100.0
	1977-78	24.9	75.1	100.0
	1978-79	24.9	75.1	100.0

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976/77 TO 1978/79

NOTE: THESE FIGURES INCLUDE NON-PROGRAM COSTS

EXPENDITURES EXCLUDE PAYMENTS FOR TRIUMF

1970-71 from 87.2 percent to 89.5 percent of the total in 1978-79. The share of the Granting Councils for university research declined from 12.8 percent in 1970-71 to 9.8 percent in 1976-77, but has risen slightly since then to 10.5 percent in 1978-79.

Total federal science funding available to universities through the Granting Councils and government departments, is shown in Table 6. In the fiscal year 1978-79, Canadian

TABLE 6

FEDERAL EXPENDITURES ON SCIENTIFIC ACTIVITIES
BY FUNDER

		1970-71	1976-77	1977-78	1978-79
Expenditures (MIL $)	TOTAL	911.1	1,663.1	1,793.7	1,938.8
	Federal Departments	794.8	1,499.8	1,610.8	1,734.8
	Granting Councils	116.3	163.3	182.9	204.0
	Canada Council	20.1	29.2	31.4	34.2
	NRC - Universities	61.7	82.2	93.4	105.4
	MRC	34.5	51.9	58.1	64.4
Percentage Distribution	TOTAL	100.0	100.0	100.0	100.0
	Federal Departments	87.2	90.2	89.8	89.5
	Granting Councils	12.8	9.8	10.2	10.5
	Canada Council	2.2	1.8	1.8	1.8
	NRC - Universities	6.8	4.9	5.2	5.4
	MRC	3.8	3.1	3.2	3.3

Source: MOSST: Federal Science Expenditures and Manpower, 1976-77 to 1978-79

NOTE: These figures include non-program costs

Expenditures exclude payments for TRIUMF.

universities performed $242 million in federally-funded scientific activities, an increase of 27 percent since 1976-77. In comparison, federal intramural scientific activities increased by 18 percent between 1976-77 and 1978-79 amounting to $1.3 billion in 1978-79. In terms of the total, universities performed about 13 percent of the federal science program in 1978-79, compared with 15 percent in 1970-71, and 12 percent in 1976-77.

TABLE 7

FEDERAL EXPENDITURE ON SCIENTIFIC ACTIVITIES
BY PERFORMER

		1970-71	1976-77	1977-78	1978-79
EXPENDITURES (MIL $)	TOTAL	911.1	1,663.1	1,793.7	1,938.8
	. INTRAMURAL	589.5	1,102.5	1,191.9	1,300.1
	. EXTRAMURAL	321.6	560.6	601.7	638.7
	. INDUSTRY	151.2	268.2	269.1	275.4
	. UNIVERSITIES	137.8	190.2	218.8	241.9
	. CAN. NON-PROFIT	15.6	21.9	23.6	26.1
	. OTHER CANADIAN	3.1	32.7	46.9	48.6
	. FOREIGN	13.8	47.1	43.3	46.7
PERCENTAGE DISTRIBUTION	TOTAL	100.0	100.0	100.0	100.0
	. INTRAMURAL	64.7	66.3	66.4	67.1
	. EXTRAMURAL	35.3	33.7	33.5	32.9
	. INDUSTRY	16.6	16.1	15.0	14.2
	. UNIVERSITIES	15.1	11.5	12.2	12.5
	. CAN. NON-PROFIT	1.7	1.3	1.3	1.3
	. OTHER CANADIAN	0.3	2.0	2.6	2.5
	. FOREIGN	1.5	2.8	2.4	2.4

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976/77 TO 1978/79

NOTE: THESE FIGURES INCLUDE NON-PROGRAM COSTS

EXPENDITURES EXCLUDE PAYMENTS FOR TRIUMF

The above comparisons between intramural and extramural expenditures on scientific activities do not fairly represent the situation with respect to the funding of R&D in the extramural sector. This is because federal intramural expenditures on scientific activities as shown in Tables 6 and 7 include about 40 percent for the support of Related Scientific Activities (RSA). In contrast, the Granting Councils allocate only 10 percent of their budgets to these activities. A better appreciation of the respective expenditures by funder and performer can be obtained by looking exclusively at expenditures on R&D, which is more closely related to the purpose of this paper (Table 8).

TABLE 8

FEDERAL EXPENDITURES ON R&D BY FUNDER

		1970-71	1976-77	1977-78	1978-79
Expenditures (MIL $)	TOTAL	583.8	1,020.2	1,105.5	1,207.9
	Federal Departments	490.7	874.0	941.9	1,029.1
	Granting Councils	93.1	146.2	163.6	178.3
	Canada Council	6.6	14.4	14.9	17.3
	NRC - Universities	53.7	81.3	92.5	101.6
	MRC	32.8	50.5	56.2	59.4
Percentage Distribution	TOTAL	100.0	100.0	100.0	100.0
	Federal Departments	84.1	85.7	85.2	85.2
	Granting Councils	15.9	14.3	14.8	14.8
	Canada Council	1.1	1.3	1.3	1.4
	NRC - Universities	9.2	8.0	8.4	8.4
	MRC	5.6	5.0	5.1	5.0

Source: MOSST: Federal Science Expenditures and Manpower, 1976-77 to 1978-79

NOTE: These figures include non-program costs

Expenditures exclude payments for TRIUMF

Table 8 shows clearly that, as far as R&D itself is concerned, the relative shares of departments and Granting Councils have remained fairly stable over the whole period.

Total federal funding of R&D allocated to different performers, including universities, is shown in Table 9. In the fiscal year 1978-79, Canadian universities performed $210 Million in federally-funded R&D, an increase of 29 percent since 1976-77. In comparison, federal intramural expenditures on R&D increased by only 22 percent over the same period. Over the whole period 1970-71 to 1978-79, federal funding of R&D in Canadian universities increased by 63.5 percent, as opposed to 143 percent intramurally.

TABLE 9

FEDERAL EXPENDITURES ON R&D
BY PERFORMER

		1970-71	1976-77	1977-78	1978-79
	TOTAL	583.8	1,020.2	1,105.5	1,207.4
Expenditures (MIL $)	Intramural	280.1	556.5	615.1	681.5
	Extramural	303.7	463.7	490.4	525.9
	Industry	150.1	229.0	224.4	228.5
	Universities	128.4	163.1	186.6	209.9
	Can. Non-Profit	17.0	15.3	16.5	19.3
	Other Canadian	2.7	17.8	28.8	28.1
	Foreign	8.5	38.5	34.1	40.1
Percentage Distribution	Intramural	48.0	54.5	55.6	56.4
	Extramural	52.0	45.5	44.4	43.6
	Industry	26.7	22.4	20.3	18.9
	Universities	22.0	16.0	16.9	17.4
	Can. Non-Profit	2.4	1.5	1.5	1.6
	Other Canadian	0.5	1.7	2.6	2.3
	Foreign	1.5	3.8	3.1	3.3

Source: MOSST: Federal Science Expenditures and Manpower, 1976-77 to 1978-79

NOTE: These figures include non-program costs

Expenditures exclude payments for TRIUMF

Recent Policy Announcements

On June 1, 1978 the government announced a new national priority for research and development, and several new long-term policies and immediate measures in order to increase the level of R&D, particularly industrial R&D.

This announcement was part of a sequence of steps, beginning with the identification of R&D for special attention by First Ministers' meeting in February 1978. In April, the federal budget introduced a special tax allowance of 50 percent for new R&D expenditures and a $5.5 million science and technology employment program (STEP) for graduate scientists and technicians hired by firms for R&D. In the June announcement this was extended by $3 million to create employment in industrial research undertaken in universities (STEPEX). In October, the Enterprise Development Program was expanded to encourage ventures in research, development and design. In November, following a Ministerial Federal Provincial Conference on Industrial R&D, MOSST was given a mandate to develop a program of action to stimulate industrial R&D, and the investment tax credit for R&D expenditures was doubled in the federal budget with an additional credit of 25 percent for small firms.

These steps are generally focussed on improving the climate and opportunities for industrial R&D, but will also affect university research considerably, by creating employment opportunities for research-trained graduates and by involving university researchers more closely in a concerted national effort in Canadian R&D.

Several policies and measures were also designed specifically for university research. The June announcement provided for up to five university-based Industrial Innovation Centres (IICs) to be established. These will be chosen in response to proposals submitted by universities and subject to the concurrence of the province concerned. These centres will provide a focus for technical, market, legal and patent advice on invention and innovation to university researchers and businessmen in the region and will provide industrial access to university expertise and facilities. The IICs will also assist in combining the appropriate marketing, management and financial skills necessary to effect transfer of technology, and to establish the entrepreneurial activity needed to spin-off new business based on technology developed in, or with the assistance of university laboratories.

A policy to assist in the establishment of Centres of Excellence responsive to national needs was also included. Its implementation will require close consultation with the provinces, industry and universities in the context of the opportunity and problem areas the centres are to address. The Centres of Excellence policy was discussed at a Federal-Provincial Conference of Ministers on Industrial R&D in November, 1978. It was agreed to pursue the policy in detailed discussions with interested provinces, an initiative later endorsed by First Ministers. One of the main objectives of these centres will be to achieve better integration of government, university and industrial capability. They will be based on the natural and human resources of each area and should assist in the development of the industrial capacity of the region. A sum of $6.8 million was provided in 1978-79 to establish six such centres.

In accordance with the policy of encouraging further efforts in the universities in areas of national concern, the Natural Sciences and Engineering Research Council (NSERC) received an additional $5 million; the Medical Research Council (MRC) $3 million; and the Social Sciences and Humanities Research Council (SSHRC) $2 million; for the purposes of such research in 1978-79. These sums are in addition to the $194 million already provided for in the estimates.

Section 2 - Expenditures by Departments and Agencies on R&D in Canadian Universities (excluding the Granting Research Councils).

FEDERAL DEPARTMENTS AND AGENCIES (EXCLUDING COUNCILS)

The funding mechanisms used by Federal departments and agencies generally take the following forms:

- Contracts, to solve specific problems and obtain well identified results within restricted time and quality limits.
- Grants and contributions, to support more systematic research which is allied to problem areas rather than specific problems which are of interest to a department; this research may be basic as well as applied.
- Block grants, in support of centres of specialization. The intention of block grants is to make a concerted effort to promote the calibre of university research and enhance qualified manpower in selected areas of importance to the departments.
- Personnel support programs are a further mechanism to develop qualified manpower. These programs usually involve graduate students, and are either for training or career development, in which case the programs involve post-doctoral students and more senior researchers.

Although most Federal Departments and Agencies provide general assistance to the universities through these mechanisms, not all have separate or designated university support programs. Summary details on expenditures for research and development and related scientific activities by department are shown below.

It should be noted that although the Canadian International Development Agency and the International Development Research Centre are major funders of the university sector, they have been excluded because the objectives of their support are directed internationally rather than domestically.

Table 10 summarizes the details of departmental university funding. The information is broken down between Research and Development (R&D) and Related Scientific Activities (RSA). Definitions of these two categories are included in Appendix 1. R&D is further broken down between grants and contracts. Funding by the research councils is shown in this table for comparison.

TABLE 10

FEDERAL GOVERNMENT EXPENDITURES ON SCIENTIFIC ACTIVITIES
IN CANADIAN UNIVERSITIES - 1978-79

DEPARTMENTS AND AGENCIES ($ MILLIONS)

	TOTAL	TOTAL R&D	GRANTS (1)	CONTRACTS	RSA
* NATIONAL HEALTH AND WELFARE	16.8	13.6	13.5	0.1	3.2
* AGRICULTURE	3.8	3.8	1.8	2.0	-
* ENVIRONMENT	3.3	3.0	2.0	1.0	0.3
* TRANSPORT	2.8	2.6	1.0	1.6	0.2
* ENERGY, MINES AND RESOURCES	2.7	2.5	1.3	1.3	0.1
* INDUSTRY, TRADE AND COMMERCE	1.2	0.6	0.6	-	0.6
* CENTRAL MORTGAGE AND HOUSING	1.4	0.1	0.0	0.1	1.3
* COMMUNICATIONS	0.8	0.7	-	0.7	0.1
* INDIAN AND NORTHERN AFFAIRS	1.0	0.9	0.4	0.5	0.1
* JUSTICE	0.0	-	-	-	0.0
URBAN AFFAIRS	1.9	0.2	-	0.2	1.7
ATOMIC ENERGY CONTROL BOARD	0.3	0.3	-	0.3	-
SECRETARY OF STATE	1.1	0.6	0.2	0.4	0.5
* NATIONAL RESEARCH COUNCIL	1.2	1.2	-	1.2	-
SUPPLY AND SERVICES	1.2	1.0	-	1.0	0.2
NATIONAL DEFENCE	1.7	1.7	0.7	1.0	-
SOLICITOR GENERAL	0.8	0.8	0.3	0.5	0.0
OTHER DEPARTMENTS AND AGENCIES	6.4	1.6	1.3	0.4	4.8
SUB TOTAL	48.5	35.3	23.2	12.1	13.2
NSERC	105.4	96.7	96.7	-	8.7
SSHRC	26.4	18.2	18.2	-	8.2
MRC	60.8	59.0	59.0	-	1.8
SUB TOTAL	192.6	173.9	173.9	-	18.7
TOTAL	241.1	209.2	197.1	12.1	31.9

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79, UPDATED TO INCLUDE THRUST FUNDS ANNOUNCED JUNE 1, 1978.

(1) SUM OF GRANTS AND RESEARCH FELLOWSHIPS

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

*Short descriptions of funding activities are given for these departments and agencies.

TABLE 10 Concl'd

FEDERAL GOVERNMENT EXPENDITURES ON SCIENTIFIC ACTIVITIES
IN CANADIAN UNIVERSITIES - 1972-73

DEPARTMENTS AND AGENCIES ($ MILLIONS)

	TOTAL	TOTAL R&D	GRANTS (1)	CONTRACTS	RSA
* NATIONAL HEALTH AND WELFARE	15.7	14.1	14.1	0.0	1.6
* AGRICULTURE	0.9	0.9	0.9	0.0	-
* ENVIRONMENT	3.1	3.0	2.0	1.0	0.0
* TRANSPORT	1.2	0.8	0.2	0.6	0.5
* ENERGY, MINES AND RESOURCES	1.1	1.0	0.5	0.5	0.1
* INDUSTRY, TRADE AND COMMERCE	1.0	0.5	0.5	-	0.5
* CENTRAL MORTGAGE AND HOUSING	0.6	0.3	0.3	-	0.3
* COMMUNICATIONS	0.7	0.6	-	0.6	0.2
* INDIAN AND NORTHERN AFFAIRS	1.2	1.1	0.3	0.8	0.1
* JUSTICE	-	-	-	-	-
URBAN AFFAIRS	0.7	0.7	-	0.7	0.0
ATOMIC ENERGY CONTROL BOARD	2.6	2.6	2.6	-	-
SECRETARY OF STATE	1.3	0.5	0.4	0.2	0.8
* NATIONAL RESEARCH COUNCIL (2)	-	-	-	-	-
SUPPLY AND SERVICES	3.3	3.3	3.0	0.3	0.0
SOLICITOR GENERAL	0.1	0.1	-	0.1	0.1
OTHER DEPARTMENTS AND AGENCIES	3.2	1.8	0.9	0.9	1.4
SUB TOTAL	36.8	31.3	25.7	5.5	5.5
NSERC	63.8	57.0	56.6	0.4	6.8
SSHRC	15.0	7.6	7.6	0.0	7.4
MRC	35.3	33.8	33.8	-	1.5
SUB TOTAL	114.0	98.3	97.9	0.4	15.7
TOTAL	150.8	129.6	123.7	5.9	21.2

Source: Data obtained from Statistics Canada Historical Series (1976 series)

(1) Sum of grants and research fellowships (2) Comparable figures not available for NRC in 1972-73.

Note: TRIUMF payments excluded

*Short descriptions of funding activities are given for these departments and agencies.

The bulk of the federal science support to universities is in the form of grants. The entire support program of the granting councils is in this category. The proportion of departmental funding in the form of grants has decreased from 70 per cent in 1972-73 to 48 per cent in 1978-79. Federal contracts for R&D and the support of RSA have risen in relative importance over this period: from 15 to 25 per cent for contracts, and from 15 to 27 per cent for RSA, expressed as a percentage of total departmental funding of university scientific activities. In absolute terms, the amount allocated to contracts in the total federal support for university research is still small. It has grown from $5.9 million out of a total of $151 million in 1972-73, to $12.1 million out of a total of $241.1 million in 1978-79, increasing from 3.9 to 5.0 percent of the total over this period.

Brief comments follow on the departments and agencies appearing as significant sponsors of university research in Table 10.

National Health and Welfare (Table 11)

The Department of National Health and Welfare is unique among government departments and agencies with respect to the extent of its reliance on extramurally-performed, especially university-performed, scientific activities. This is primarily due to the high degree of concentration of Canada's health and social sciences research capability in the university sector.

Almost one half of the Department's 1978-79 science budget will be spent in support of extramural activities. The corresponding figure for all federal science expenditures is less than one third (Table 7). As shown in Table 10, National Health and Welfare is also the largest single departmental sponsor of scientific activities in universities.

The largest of the Department's four science funding programs is the National Health Research and Development Program, which funds projects relevant to the promotion, protection and maintenance of the health of the residents of Canada. This program, also offering a variety of research personnel training and career awards, was reduced by budgetary restrictions in 1978.

TABLE 11

NATIONAL HEALTH AND WELFARE EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	36,501	61,089	100.0	100.0
	R&D	27,273	37,909	74.7	62.1
	INTRAMURAL	10,310	15,523	28.2	25.4
	EXTRAMURAL	16,963	22,386	46.5	36.6
	GRANTS	16,480	20,461	45.1	33.5
	CONTRACTS	139	1,215	0.4	2.0
	RESEARCH FELLOWSHIPS	344	710	0.9	1.2
	RSA	9,228	23,180	25.3	37.9
	INTRAMURAL	4,932	16,562	13.5	27.1
	EXTRAMURAL	4,296	6,618	11.8	10.8
TO CANADIAN UNIVERSITIES	TOTAL	15,741	16,847	43.1	27.6
	R&D	14,141	13,644	38.7	22.3
	GRANTS	13,789	12,984	37.8	21.3
	CONTRACTS	8	110	0.0	0.2
	RESEARCH FELLOWSHIPS	344	550	0.9	0.9
	RSA	1,600	3,203	4.4	5.2

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

In addition to those programs directly supporting university research, contributions from the Health Resources Fund also underwrite the construction, acquisition, renovation and equipping of education and research facilities for health personnel. Expenditures from this fund are conditional upon equivalent amounts being provided from non-federal sources.

Agriculture Canada (Table 12)

The Research Program of the Department of Agriculture is the major vehicle for support of university research and offers three types of grants. These are Extramural Research Grants for projects initiated by the Department for which expertise and facilities are not available internally; Operating Grants for proposals by university researchers applicable to Agriculture; and small grants to Deans of Agriculture and Veterinary Medicine for use on projects of their own choice.

Other major programs of the Department which provide support to university researchers include the Food Production and Marketing Program, the Health of Animals Program and the Market and Product Research Program of the Canadian Dairy Commission.

TABLE 12

AGRICULTURE
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	73,992	134,661	100.0	100.0
	R&D	71,080	129,210	96.1	96.0
	INTRAMURAL	70,123	123,812	94.8	91.9
	EXTRAMURAL	957	5,398	1.3	4.0
	GRANTS	945	2,376	1.3	1.8
	CONTRACTS	12	3,022	0.0	2.2
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	2,912	5,451	3.9	4.0
	INTRAMURAL	2,912	5,378	3.9	4.0
	EXTRAMURAL	-	73	-	0.1
TO CANADIAN UNIVERSITIES	TOTAL	889	3,813	1.2	2.8
	R&D	889	3,813	1.2	2.8
	GRANTS	877	1,826	1.2	1.4
	CONTRACTS	12	1,987	0.0	1.5
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	-	-	-	-

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

Fisheries and Environment (Table 13)

The Science Subvention Program is the major university support program of Fisheries and Environment (the Government has introduced Bill C-35 to split this department through the creation of a new Department of Fisheries and Oceans.) This program has four components: the Water Resource Research Support Program for innovative research in the natural and social sciences into water resources, with emphasis on water management; the University Research Support Fund providing financial assistance to graduate students in the field of wildlife; the Atmospheric Research Program to promote atmosphere and ice research to improve economic, environmental or social conditions; and the Fisheries and Marine Program to promote management for the conservation and development of fisheries and the understanding required to predict the effects of natural and human disturbances to the environment. University Forestry faculties are also provided with special assistance under a Program of Block Grants.

Transport (Table 14)

The Department of Transport administers university support programs through the Transport Canada Research And Development Centre. The Centre provides grants for the purpose of increasing the number of Canadian graduates with expertise in transportation problem solving and improving the quality

TABLE 13

FISHERIES AND ENVIRONMENT
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	194,597	308,564	100.0	100.0
	R&D	87,311	125,632	44.9	40.7
	INTRAMURAL	82,471	112,931	42.4	36.6
	EXTRAMURAL	4,840	12,701	2.5	4.1
	GRANTS	2,047	3,380	1.1	1.1
	CONTRACTS	2,736	9,261	1.4	3.0
	RESEARCH FELLOWSHIPS	57	60	0.0	0.0
	RSA	107,286	182,932	55.1	59.3
	.INTRAMURAL	102,796	176,099	52.8	57.1
	.EXTRAMURAL	4,490	6,833	2.3	2.2
TO CANADIAN UNIVERSITIES	TOTAL	3,050	3,270	1.6	1.1
	R&D	3,003	2,970	1.5	1.0
	GRANTS	1,984	1,917	1.0	0.6
	CONTRACTS	962	993	0.5	0.3
	RESEARCH FELLOWSHIPS	57	60	0.0	0.0
	RSA	47	300	0.0	0.1

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

TABLE 14

TRANSPORT
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	8,588	40,672	100.0	100.0
	R&D	6,177	17,362	71.9	42.7
	INTRAMURAL	3,621	3,870	42.2	9.5
	EXTRAMURAL	2,556	13,492	29.8	33.2
	GRANTS	16	2,202	0.2	5.4
	CONTRACTS	2,340	11,015	27.2	27.1
	RESEARCH FELLOWSHIPS	200	275	2.3	0.7
	RSA	2,411	23,310	28.1	57.3
	INTRAMURAL	891	13,063	10.4	32.1
	EXTRAMURAL	1,520	10,247	17.7	25.2
TO CANADIAN UNIVERSITIES	TOTAL	1,249	2,831	14.5	7.0
	R&D	784	2,631	9.1	6.5
	GRANTS	6	756	0.1	1.9
	CONTRACTS	578	1,600	6.7	3.9
	RESEARCH FELLOWSHIPS	200	275	2.3	0.7
	RSA	465	200	5.4	0.5

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

of university research. Transportation Centres at the University of British Columbia, the University of Manitoba, the Universities of Toronto and York (joint ventures), the Université de Montréal and the Canadian Marine Transportation Centre at Dalhousie University are supported under this program. The Transport Canada Research and Development Centre also provides Negotiated Research Contributions in which research requirement proposals are circulated to universities and selected projects are funded directly by the Department. All Canadian universities are eligible.

A Fellowship Program provides annual awards to post-graduate students for studies in transportation research, as well as senior fellowships from time to time to post-doctoral students and eminent academics for the pursuit of research.

The Road Safety Branch of the Department also supports university research through its Countermeasures Development Program and data acquisition contracts to Accident Investigation Teams.

Energy, Mines and Resources (Table 15)

Although no specific university support program exists in the Department of Energy, Mines and Resources, university research

TABLE 15

ENERGY, MINES AND RESOURCES
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	74,756	124,128	100.0	100.0
	R&D	39,566	79,801	52.9	64.3
	INTRAMURAL	34,820	50,390	46.6	40.6
	EXTRAMURAL	4,746	29,411	6.3	23.7
	GRANTS	3,427	17,243	4.6	13.9
	CONTRACTS	1,319	12,168	1.8	9.8
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	35,190	44,327	47.1	35.7
	INTRAMURAL	32,377	37,219	43.3	30.0
	EXTRAMURAL	2,813	7,108	3.2	5.7
TO CANADIAN UNIVERSITIES	TOTAL	1,051	2,687	1.4	2.2
	R&D	996	2,544	1.3	2.0
	GRANTS	504	1,265	0.7	1.0
	CONTRACTS	492	1,279	0.7	1.0
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	55	143	0.1	0.1

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

is encouraged through a Research Agreements Program. A circulated guide of research requirements invites proposals from universities and other institutions. Selections of acceptable proposals are principally based on their relevance to departmental mandates and priorities.

Industry, Trade and Commerce (Table 16)

The Department of Industry, Trade and Commerce administers five programs directly related to the support of university research. Since 1967 IT&C has sponsored ten university-based research institutes under its Industrial Research Institute Program, through grants for the administrative cost of an institute during its formative years when income from contracts is insufficient to meet start-up expenditures. By December 1977, nine industrial institutes were operating, seven of which were self-supporting. Two institutes were still receiving financial support in 1978.

In 1970, IT&C introduced the Centres of Advanced Technology Program to encourage universities and others with research capabilities to develop self-supporting centres of expertise in specific technologies. Ten Centres of Advanced Technology have been established, five at Canadian universities and five at Provincial Research Organizations. Five centres are no longer receiving financial support from the Department.

TABLE 16

INDUSTRY, TRADE AND COMMERCE
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	93,166	61,917	100.0	100.0
	R&D	92,210	59,943	99.0	96.8
	INTRAMURAL	2,481	77	2.7	0.1
	EXTRAMURAL	89,729	59,866	96.3	96.7
	GRANTS	89,676	59,710	96.3	96.4
	CONTRACTS	53	156	0.1	0.3
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	956	1,974	1.0	3.2
	INTRAMURAL	200	603	0.2	1.0
	EXTRAMURAL	756	1,371	0.8	2.2
TO CANADIAN UNIVERSITIES	TOTAL	1,024	1,231	1.1	2.0
	R&D	523	631	0.6	1.0
	GRANTS	523	631	0.6	1.0
	CONTRACTS	-	-	-	-
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	501	600	0.5	1.0

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

Through the Technological Innovation Studies Program the Department solicits proposals from universities on topics relevant to the Department's programs and policies to promote the innovative performance of Canadian industries and to encourage continued academic interest in technological innovation.

The Management Advancement Program has resulted in the establishment of two university-based management advisory institutes. One institute is located at the University of Alberta, the other at Laval University. The major objective of these institutes is to meet business needs with university expertise. This Program also provides grants for university studies in international business. The Centres of International Business Studies Program has as its major objective the strengthening of the long-term competitiveness of Canadian industry through the improvement of the quality of international business management. There are four centres in existence funded for a five-year period.

Central Mortgage and Housing (Table 17)

This Corporation supports university research through two major programs. The Institutional Support Program provides funding to university-based institutes for research on housing and related issues. The Educational Support Program provides scholarships for full-time study in fields relating to housing and housing development. Students apply through the universities for support in a graduate study program or in an open competition for support of an individually designed study program. Through the Policy Research Program, contracts are awarded for specific research projects through a tendering process in which universities are eligible to compete.

TABLE 17

CENTRAL MORTGAGE AND HOUSING
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	4,328	13,648	100.0	100.0
	R&D	3,261	6,612	75.3	48.4
	INTRAMURAL	495	2,301	11.4	16.9
	EXTRAMURAL	2,766	4,311	63.9	31.6
	GRANTS	2,122	51	49.0	0.4
	CONTRACTS	644	4,260	14.9	31.2
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	1,067	7,036	24.7	51.6
	INTRAMURAL	324	2,687	7.5	19.7
	EXTRAMURAL	743	4,349	17.2	31.9
TO CANADIAN UNIVERSITIES	TOTAL	551	1,409	12.7	10.3
	R&D	263	88	6.1	0.6
	GRANTS	263	6	6.1	0.0
	CONTRACTS	-	82	-	0.6
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	288	1,321	6.7	9.7

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

TABLE 18

COMMUNICATIONS
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	26,221	52,300	100.0	100.0
	R&D	25,393	48,035	96.8	91.8
	.INTRAMURAL	11,806	16,719	45.0	32.0
	.EXTRAMURAL	13,587	31,316	51.8	59.9
	. GRANTS	-	600	-	1.1
	. CONTRACTS	12,341	30,716	47.1	58.7
	. RESEARCH FELLOWSHIPS	1,246	-	4.8	-
	RSA	828	4,265	3.2	8.2
	.INTRAMURAL	573	2,975	2.2	5.7
	.EXTRAMURAL	255	1,290	1.0	2.5
TO CANADIAN UNIVERSITIES	TOTAL	744	751	2.8	1.4
	R&D	573	700	2.2	1.3
	. GRANTS	-	-	-	-
	. CONTRACTS	573	700	2.2	1.3
	. RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	171	51	0.7	0.1

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

(a) NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

Communications (Table 18)

The University Research Contract Program is the major activity directed towards university research in the Department of Communications. All research proposals are processed by the Department and the contract is then negotiated under normal guidelines by the Department of Supply and Services (DSS).

Indian and Northern Affairs (Table 19)

The Department of Indian and Northern Affairs administers a program of training grants to Universities through the Northern Social Research Division. On the advice of a Committee with representatives drawn from appropriate government departments and research councils, grants are made to institutes and committees for northern research at approximately a dozen universities across Canada. These grants provide northern experience to scientists in training, with the intention of developing a commitment to northern work. When a grant is made to an institute or committee, it becomes that institute's responsibility to allocate funds to support specific students. The Northern Scientific Training Grants Committee provides some guidance for the establishment of priorities in fields of training.

Support is also provided through the Specified Grants Program, wherein grants are provided for areas of research identified as department priorities.

TABLE 19

INDIAN AND NORTHERN AFFAIRS
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	6,667	13,043	100.0	100.0
	R&D	5,070	10,033	76.0	76.9
	INTRAMURAL	3,294	7,697	49.4	59.0
	EXTRAMURAL	1,776	2,336	26.6	17.9
	GRANTS	430	490	6.4	3.8
	CONTRACTS	1,346	1,846	20.2	14.2
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	1,597	3,010	24.0	23.1
	INTRAMURAL	1,342	2,408	20.1	18.5
	EXTRAMURAL	255	602	3.8	4.6
TO CANADIAN UNIVERSITIES	TOTAL	1,210	1,041	18.1	8.0
	R&D	1,107	933	16.6	7.2
	GRANTS	311	419	4.7	3.2
	CONTRACTS	796	514	11.9	3.9
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	103	108	1.5	0.8

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

Department of Justice (Table 20)

The Department of Justice supports only one major program related to university research. The Duff-Rinfret Scholarship Program provides assistance for masters students in Canadian law schools for one year on the basis of academic ability and the relevance of the proposed project.

TABLE 20

JUSTICE
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	2,384	5,798	100.0	100.0
	R&D	2,060	4,141	86.4	71.4
	INTRAMURAL	1,828	2,019	76.7	34.8
	EXTRAMURAL	232	2,122	9.7	36.6
	GRANTS	20	1,415	0.8	24.4
	CONTRACTS	212	707	8.9	12.2
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	324	1,657	13.6	28.6
	INTRAMURAL	324	728	13.6	12.6
	EXTRAMURAL	-	929	-	16.0
TO CANADIAN UNIVERSITIES	TOTAL	-	11	-	0.2
	R&D	-	-	-	-
	GRANTS	-	-	-	-
	CONTRACTS	-	-	-	-
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	-	11	-	0.2

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

National Research Council (Table 21)

The NRC, from which the Office of Grants and Scholarships has been separated to become NSERC, provides support to university research in the form of contracts under its Energy Program and through its Associate Committee on Scientific Criteria for Environmental Quality. Several university staff also participate directly in the activities of the Space Research Facilities Branch. It also maintains

the Canadian Journals of Research and the Canadian Institute for Scientific and Technical Information, and is the adhering body to the International Council of Scientific Unions, all of which represent for the academic community important vehicles for dissemination of R&D information.

TABLE 21

NATIONAL RESEARCH COUNCIL[1]
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		EXPENDITURES ($ 000'S) 1978-79	PERCENTAGE DISTRIBUTION 1978-79
TOTAL EXPENDITURES	TOTAL	183,383	100.0
	R&D	156,280	85.2
	INTRAMURAL	101,342	55.3
	EXTRAMURAL	54,938	30.0
	GRANTS	18,563	10.1
	CONTRACTS	36,375	19.8
	RESEARCH FELLOWSHIPS	-	-
	RSA	27,103	14.8
	INTRAMURAL	26,355	14.4
	EXTRAMURAL	748	0.4
TO CANADIAN UNIVERSITIES	TOTAL	1,160	0.6
	R&D	1,160	0.6
	GRANTS	-	-
	CONTRACTS	1,160	0.6
	RESEARCH FELLOWSHIPS	-	-
	RSA	-	-

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79.

[1] Expenditures shown are for the Engineering and Natural Sciences Research Program and the Scientific and Technical Information Program. Comparable figures for 1972-73 are not available. These expenditures do not include: Administration of extramural activities, non-program costs and payments for TRIUMF.

NOTE: Former activities in support of university natural sciences and engineering are now transferred to NSERC.

Other Departments and Agencies

Many other federal departments and agencies provide significant funding to Canadian universities but do not have specific programs designed to support university researchers. The expenditure patterns of these departments are shown in tables 22-27 below.

TABLE 22

ATOMIC ENERGY CONTROL BOARD
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	2,628	1,635	100.0	100.0
	R&D	2,628	1,635	100.0	100.0
	INTRAMURAL	-	-	-	-
	EXTRAMURAL	2,628	1,635	100.0	100.0
	GRANTS	2,595	-	98.7	-
	CONTRACTS	33	1,635	1.3	100.0
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	-	-	-	-
	INTRAMURAL	-	-	-	-
	EXTRAMURAL	-	-	-	-
TO CANADIAN UNIVERSITIES	TOTAL	2,595	278	98.7	17.0
	R&D	2,595	278	98.7	17.0
	GRANTS	2,595	-	98.7	-
	CONTRACTS	-	278	-	17.0
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	-	-	-	-

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

TABLE 23

NATIONAL DEFENCE
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	95,658	94,503	100.0	100.0
	R&D	53,835	88,782	56.3	93.9
	INTRAMURAL	38,914	61,437	40.7	65.0
	EXTRAMURAL	14,921	27,345	15.6	28.9
	GRANTS	7,213	743	7.5	0.8
	CONTRACTS	7,708	26,539	8.1	28.1
	RESEARCH FELLOWSHIPS	-	63	-	0.1
	RSA	41,823	5,721	43.7	6.1
	INTRAMURAL	41,736	5,721	43.6	6.1
	EXTRAMURAL	87	-	0.1	-
TO CANADIAN UNIVERSITIES	TOTAL	3,283	1,698	3.4	1.8
	R&D	3,267	1,698	3.4	1.8
	GRANTS	3,000	743	3.1	0.8
	CONTRACTS	267	955	0.3	1.0
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	16	-	0.0	-

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

TABLE 24

SECRETARY OF STATE
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	2,487	9,597	100.0	100.0
	R&D	638	4,148	25.7	43.2
	INTRAMURAL	76	2,713	3.1	28.3
	EXTRAMURAL	562	1,430	22.6	14.9
	GRANTS	412	945	16.6	9.8
	CONTRACTS	150	485	6.0	5.1
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	1,849	5,449	74.3	56.8
	INTRAMURAL	446	2,802	17.9	29.2
	EXTRAMURAL	1,403	2,647	56.4	27.6
TO CANADIAN UNIVERSITIES	TOTAL	1,319	1,108	53.0	11.5
	R&D	516	616	20.7	6.4
	GRANTS	366	171	14.7	1.8
	CONTRACTS	150	445	6.0	4.6
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	803	492	32.3	5.1

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

TABLE 25

SOLICITOR GENERAL
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	692	2,795	100.0	100.0
	R&D	102	1,769	14.7	63.3
	INTRAMURAL	49	349	7.1	12.5
	EXTRAMURAL	53	1,420	7.7	50.8
	GRANTS	-	370	-	13.2
	CONTRACTS	53	975	7.7	34.9
	RESEARCH FELLOWSHIPS	-	75	-	2.7
	RSA	590	1,026	85.3	36.7
	INTRAMURAL	253	169	36.6	6.0
	EXTRAMURAL	337	857	48.7	30.7
TO CANADIAN UNIVERSITIES	TOTAL	141	798	20.4	28.6
	R&D	53	765	7.7	27.4
	GRANTS	-	240	-	8.6
	CONTRACTS	53	450	7.7	16.1
	RESEARCH FELLOWSHIPS	-	75	-	2.7
	RSA	88	33	12.7	1.2

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

TABLE 26

SUPPLY AND SERVICES
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	-	12,000	-	100.0
	R&D	-	8,337	-	69.5
	INTRAMURAL	-	-	-	-
	EXTRAMURAL	-	8,337	-	69.5
	GRANTS	-	-	-	-
	CONTRACTS	-	8,337	-	69.5
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	-	3,663	-	30.5
	INTRAMURAL	-	-	-	-
	EXTRAMURAL	-	3,663	-	30.5
TO CANADIAN UNIVERSITIES	TOTAL	-	1,226	-	10.2
	R&D	-	996	-	8.3
	GRANTS	-	-	-	-
	CONTRACTS	-	996	-	8.3
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	-	230	-	1.9

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

TABLE 27

URBAN AFFAIRS
EXPENDITURES ON SCIENTIFIC ACTIVITIES

		THOUSANDS OF DOLLARS		PERCENTAGE DISTRIBUTION	
		1972-73	1978-79	1972-73	1978-79
TOTAL EXPENDITURES	TOTAL	3,770	8,678	100.0	100.0
	R&D	2,394	1,603	63.5	18.5
	INTRAMURAL	1,551	403	41.1	4.6
	EXTRAMURAL	843	1,200	22.4	13.8
	GRANTS	-	400	-	4.6
	CONTRACTS	843	800	22.4	9.2
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	1,376	7,075	36.5	81.5
	INTRAMURAL	827	1,537	21.9	17.7
	EXTRAMURAL	549	5,538	14.6	63.8
TO CANADIAN UNIVERSITIES	TOTAL	734	1,923	19.5	22.2
	R&D	718	200	19.0	2.3
	GRANTS	-	-	-	-
	CONTRACTS	718	200	19.0	2.3
	RESEARCH FELLOWSHIPS	-	-	-	-
	RSA	16	1,723	0.4	19.9

SOURCE: MOSST: FEDERAL SCIENCE EXPENDITURES AND MANPOWER, 1976-77 TO 1978-79

NOTE: EXPENDITURES DO NOT INCLUDE: (1) ADMINISTRATION OF EXTRAMURAL ACTIVITIES, (2) NON-PROGRAM COSTS AND (3) PAYMENTS FOR TRIUMF

Funding of TRIUMF

In 1968 the Atomic Energy Control Board (AECB) began payments for construction and design of TRIUMF (Tri-University Meson Facility), near the University of British Columbia in Vancouver. Funding by AECB continued until 1975-76. In 1976-77 responsibility for such payments was transferred to the Office of Grants and Scholarships (NRC). As of 1977-78, the responsibility has been located at NRC under their general science and engineering programs. Payments to TRIUMF are kept out of all expenditure tables in this report because responsibility for this program has been transferred several times and such accounting changes, if not removed, would introduce discontinuities in the various components of expenditure. Payments to TRIUMF for the years 1968-69 to 1978-79 are shown separately in the following table:

FEDERAL PAYMENTS OF CONTRIBUTIONS TO TRIUMF FOR CONSTRUCTION AND OPERATION

Year	$'000 (current)	Year	$'000 (current)
1968-69	975	1974-75	7,650
1969-70	2,900	1975-76	4,650
1970-71	4,600	1976-77	6,780
1971-72	9,125	1977-78	7,062
1972-73	5,300	1978-79	8,695
1973-74	4,650		

PART II

Section 3 - Expenditures of the Granting Research Councils for R&D in Canadian Universities.

INTRODUCTORY REMARKS

Each of the Councils has slightly different objectives but their programmes have common features which can be used as a framework for analysis of their activities. Each of them:

- provides direct support of research activities by senior investigators in the form of various grants and through special awards referred to as personnel support;
- provides awards to post-graduate students registered for a degree and to recent holders of a doctorate or professional degree who need further research training;
- supports various activities related to the performance of research, such as conferences, symposia, seminars, travel grants to attend scientific meetings, etc., all grouped under "Research Related Activities".

The foregoing statistical data on funding of university research by departments and agencies has been that of Statistics Canada. For the Granting Councils, however, data have been compiled from Annual Reports and organized according to the format above.

RESEARCH COUNCILS

In accordance with Bill C-26, the granting councils were reorganized in the spring of 1978. The analysis presented here relates mainly to the time prior to this reorganization, which established the Social Sciences and Humanities Research Council (SSHRC) and the Natural Sciences and Engineering Research Council (NSERC) as separate Crown Corporations.

The support of university research in the health sciences has been the only responsibility of the Medical Research Council (MRC) since its establishment in 1969. By contrast, support for university research in the natural sciences and engineering and in the human sciences evolved as part of the activities of much larger organizations: the National Research Council through its Office of Grants and Scholarships and the Canada Council through its Humanities and Social Sciences Branch.

The constituencies for which these three Councils were responsible differ considerably in their size, geographical concentration, and their reliance on Council support. In addition, the research areas which each Council addresses reflect distinctive characteristics. It was natural therefore that each developed programs tailored to the needs of their respective constituency.

The Medical Research Council (Table 28)

The primary aim of the Canadian medical research community is the understanding and improvement of human health. For this there is a well-focussed and integrated environment of sixteen universities with faculties of medicine, dentistry and/or pharmacy and their affiliated hospitals and institutions. This constituency, whose responsibilities include service as well as research and education, numbers approximately 4,500 full-time faculty. Nearly 1,600 of these participate in MRC's programming.

R&D

The largest proportion of R&D expenditures are for grants-in-aid of research. These grants rose slightly from 76 percent of total expenditures in 1970-71 to 80 percent in 1976-77. R&D grants are awarded to assist in defraying the running costs of research programs including grants for specific items of equipment. Applications from investigators on staff at Canadian universities and affiliated institutions are considered on two occasions each year. The basis for consideration is peer assessment. Each application is reviewed by external referees, expert in the field involved, and then considered by one of seventeen grants committees composed of eight to ten senior investigators drawn from universities, government and industry.

The recommendations by these committees are then forwarded to the Council. Awards are approved to the extent that funds permit.

The R&D portion of MRC's expenditure also includes awards for career investigators in the form of associateships, scholarships and visiting scientists. These expenditures accounted for 9 percent of the total MRC payments in 1976-77, and have historically been in roughly the same proportion.

Research Training

The second major area of support is research training. It accounted for 10 percent of the total expenditures in 1976-77. Under this component, awards are provided to post-graduate students registered for a degree as well as to recent holders of a doctorate degree in need of further research training. There are programs of studentships, summer scholarships, fellowships, and Centennial Fellowships.

Research Related Activities

The third component, Research Related Activities, accounted for only a small proportion of expenditures. It provides support for various activities related to the performance of research, such as conferences, visiting professors, symposiums, travel grants to attend scientific meetings, seminars, etc.

TABLE 28

MEDICAL RESEARCH COUNCIL LEVEL OF SUPPORT
(SELECTED YEARS)

PROGRAMS		PAYMENTS IN THOUSANDS OF DOLLARS			PERCENTAGE DISTRIBUTION		
		1970-71	1973-74	1976-77	1970-71	1973-74	1976-77
R&D	GRANTS	25,731	30,804	40,763	75.8	76.4	80.1
	FELLOWSHIPS	3,639	4,449	4,823	10.7	11.0	9.5
	SUB-TOTAL	29,370	35,253	45,586	86.5	87.4	89.6
RESEARCH TRAINING		4,464	4,935	5,083	-	-	-
RESEARCH RELATED ACTIVITIES		128	172	179	0.4	0.4	0.4
TOTAL		33,962	40,360	50,848	100.0	100.0	100.0

SOURCE: MEDICAL RESEARCH COUNCIL ANNUAL REPORTS.

REGIONAL DISTRIBUTION (Table 29)

A breakdown of the regional distribution of payments by MRC towards R&D is provided in Table 29. Ontario received the largest proportion of R&D grants, (36 percent), followed by Quebec (33 percent), the Western Provinces (24 percent) and the Atlantic Provinces (5 percent) in 1976-77.

TABLE 29

MRC EXPENDITURES ON SCIENTIFIC ACTIVITIES
REGIONAL DISTRIBUTION OF PAYMENTS TOWARDS R&D

REGION	1975-76		1976-77	
	($'000)	(%)	($'000)	(%)
ATLANTIC PROVINCES	2,052	4.7	2,163	4.6
QUEBEC	14,973	34.5	15,804	33.3
ONTARIO	15,187	35.0	17,000	35.9
WESTERN PROVINCES	10,000	23.0	11,260	23.7
CANADIAN NON-UNIVERSITIES	38	0.1	182	0.4
OUTSIDE CANADA	1,150	2.6	1,005	2.1
TOTAL	43,400	100.0	47,414	100.0

SOURCE: BASED ON MEDICAL RESEARCH COUNCIL TABULATIONS

Regional shifts in support in the last decade are due in large part to the growth of new medical schools established in the late 60's in Newfoundland, Alberta, Ontario and Quebec.

NATIONAL RESEARCH COUNCIL (Table 30)

In contrast to the well focussed and integrated membership of the MRC's constituency centred on professional health faculties in sixteen universities, the natural science and engineering community includes some 9,000 professors from over 60 universities who undertake research in a wide variety of disparate disciplines. NRC (now NSERC) supported about 60 percent of this population, but this varied with discipline. The increasing specialization of the natural sciences, together with the practice of the NRC of apportioning funds to disciplinary committees, resulted in the development of natural science and engineering research in Canada in programs adjudicated within disciplines on the basis of excellence and productivity alone. Support for more problem-oriented research has been available from other government sources and industry.

In 1976-77 total expenditure by NRC totalled $86 million. This amounted to a 5 percent annual increase since 1970-71 as shown in Table 30.

TABLE 30

NRC (NSERC) LEVEL OF SUPPORT
(SELECTED YEARS)

		PAYMENTS IN THOUSANDS OF DOLLARS			PERCENTAGE DISTRIBUTION		
		1970-71	1973-74	1976-77 (1)	1970-71	1973-74	1976-77
R&D	PEER ADJUDICATED GRANTS	49,904	51,224	67,020	77.0	74.7	77.9
	DEVELOPMENT GRANTS AND SENIOR AWARDS	5,700	9,343	8,916	8.8	13.6	10.4
	SUB-TOTAL	55,604	60,567	75,936	85.8	88.3	88.2
RESEARCH TRAINING		8,046	6,863	8,916	12.4	10.0	10.4
RESEARCH RELATED ACTIVITIES		1,145	1,162	1,212	1.8	1.7	1.4
TOTAL		64,795	68,592	86,063	100.0	100.0	100.0

SOURCE: NRC ANNUAL REPORTS

(1) PAYMENTS TO TRIUMF EXCLUDED

This included the transfer of some responsibilities for the funding of nuclear physics and plasma physics installations from AECB to NRC. When this program transfer is taken into account, the net increase in the expenditures of the NRC program of grants and scholarships over the period from 1970-71 to 1976-77 amounts to an average annual rate of 3.7%.

R&D

Research and Development programs accounted for the largest proportion of expenditures in 1976-77 (86 percent). This relative proportion has remained constant since 1970-71.

The R&D activities were funded under two major sub-programs: Peer-adjudicated Grants and Development Grants[1]. Peer-adjudicated grants have accounted for the largest percentage of NRC's expenditures, representing about 78 percent of the total expenditures in 1976-77. These grants are provided to both individuals and groups with most of the funds distributed to individuals. In 1975-76, for example, $53 million was distributed as grants to individuals and $3.1 million to groups.

[1] As already noted, a new Natural Sciences and Engineering Research Council (NSERC) was established in 1978 to assume these responsibilities, including a program of Strategic Grants in areas of National concern initiated in 1977.

Grants to individuals included operating grants, equipment grants (from $5,000 to $50,000) and major equipment grants (from $50,000 to $150,000). Grants to groups included nuclear physics grants, high energy physics grants, institute grants and International Biological Program grants.

Development grants are the other major component of R&D expenditures. Included in this category are Negotiated Development Grants and Special Assistance Grants to small universities. A major portion of the development grants is awarded to groups; for example, in 1976-77, 4.0 M$ were awarded as such under Negotiated Development Grants. For the purposes of this report, postdoctoral fellowships and other senior fellowships have been included under development grants. In 1973-74, developmental grants amounted to 14% of the total which had decreased to 10% in 1976-77 because of a moratorium imposed by NRC on Negotiated Development Grants pending a review of this program which eventually led to a decision to progressively phase it out.

Research Training

In 1976-77 NRC allocated $9 million towards Research Training. This represented 10 percent of the total expenditures, a relatively constant proportion since 1970-71. The major component of this activity has been the Research Training

Awards which included Post-Graduate Level Awards.

Research Related Activities (RRA) included such items as Publication Grants, General Promotion Grants, Conference Grants and Grants for International Activities such as Exchange programs. In 1976-77 these activities represented 1.4 percent of the total expenditures, down slightly from the 1970-71 level of 1.8 percent.

Regional Distribution (Table 31)

Table 31 shown the regional distribution of NRC operating grants, the largest proportion of total expenditures. In 1976-77, in round figures, Ontario received 45 percent, Quebec 17 percent, Alberta and British Columbia each 12 percent, Saskatchewan and Manitoba each 4 percent and the Atlantic Provinces together 7 percent. The proportion of the total number of awards in each province parallels the percentage of expenditures, except that Ontario, Alberta and British Columbia had somewhat higher than average awards per researcher and the other provinces somewhat lower. Since 1971-72 the percentage distributions by region of both awards and expenditures have remained remarkably constant.

TABLE 31

NRC(NSSRC) - DISTRIBUTION OF OPERATING GRANTS(1) BY PROVINCE

PROVINCE	(PERCENTAGE DISTRIBUTION)			
	1975-76		1976-77	
	AWARDS	EXPENDITURES	AWARDS	EXPENDITURES
ATLANTIC PROVINCES	9.1	7.1	9.0	6.9
QUEBEC	19.3	16.6	19.6	16.9
ONTARIO	42.4	45.7	42.3	45.4
MANITOBA	4.7	4.3	4.5	4.0
SASKATCHEWAN	3.6	3.3	3.4	3.4
ALBERTA	10.0	10.8	10.2	10.9
BRITISH COLUMBIA	11.0	12.3	10.9	13.4
TOTAL (2)	5,124.0	48,880.0	5,228.0	52,103.0

SOURCE: DATA OBTAINED FROM THE OFFICE OF GRANTS AND SCHOLARSHIPS OF NRC.

(1) INCLUDES FUNDS DISTRIBUTED AS SPECIAL COMPUTING GRANTS.

(2) TOTALS FOR EXPENDITURES ARE IN THOUSANDS OF DOLLARS.

CANADA COUNCIL (Table 32)

The constituency supported by the humanities and social science branch of the Canada Council (now SSHRC) appears to be the least structured of the three. The Social Science Research Council of Canada, created in 1940 as an autonomous organization, became more representative of its constituency when its constitution was modified and it became, in April 1977, the Social Science Federation of Canada, an umbrella organization for relevant disciplinary oriented learned societies. Similarly, the Humanities Research Council of Canada created in 1943, became the Humanities Federation of Canada in 1978. The potential clientele under these two Federations numbers over 16,000 but the participation rate

in the Canada Council's two main research support programs for the support of research, the Research Grants Program and the Leave Fellowship Program, was only about 10 percent of this number.

Total support of university scientific activities by the Canada Council was nearly $28 million in 1976-77, representing a 7.2 percent average annual increase in support from 1970-71. Supporting data are shown in Table 32.

TABLE 32

CANADA COUNCIL (SSHRC) LEVEL OF SUPPORT
(SELECTED YEARS)

PROGRAMS		PAYMENTS IN THOUSANDS OF DOLLARS			PERCENTAGE DISTRIBUTION		
		1970-71	1973-74	1976-77	1970-71	1973-74	1976-77
R&D	GRANTS	4,588	5,641	10,548	25.2	27.1	37.9
	FELLOWSHIPS	1,269	3,200	3,813	7.0	15.4	13.7
	SUB-TOTAL	5,857	8,841	14,361	32.1	42.5	51.7
RESEARCH TRAINING		11,316	9,627	10,486	62.0	46.2	37.7
RESEARCH RELATED ACTIVITIES		1,065	2,351	2,956	5.8	11.3	10.6
TOTAL		18,238	20,819	27,803	100.0	100.0	100.0

SOURCE: CANADA COUNCIL ANNUAL REPORTS

R&D

Payments towards costs of research became increasingly more prominent in Canada Council funding activities through the seventies, growing from 32 percent of total expenditures in 1970-71 to 52 percent in 1976-77.[1] This growth, from $5.9 million to $14.4 million, represents an average annual rate of 16 percent.

The largest component of the Council's grants towards Research and Development are referred to as Research Grants. Included in this category are Negotiated Grants, General Research Grants, Explorations Program Grants and the Special Grants and Studies Program. In the six years since 1970-71, Research Grants have increased from $4.6 million to $10.5 million or by some 14.7 percent per year. Their share of total expenditures has increased from 25 percent to 38 percent over this period.

Also included in the R&D category is the Leave Fellowships Program. Expenditures on this program have increased substantially since 1970-71 totalling nearly $4 million in 1976-77 and accounting for nearly 14 percent of the total expenditures.

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[1]As already noted, these activities were assumed by a new Social Sciences and Humanities Research Council (SSHRC) in 1978.

Research Training

The second category of support is Research Training. Research Training has been funded through Doctoral Fellowships to students in a PhD program and Special MA Scholarships to students studying for a MA degree or equivalent. There has been a major relative decline in the level of this type of expenditure. In 1970-71 it accounted for 62 percent of the Council's expenditures, whereas in 1976-77 it was only 38 percent, reflecting the proportionate growth in research support.

Research Related Activities

The third group of activities, the RRA, includes Publication Grants, Conference and Travel Grants and Research Support Services. These accounted for 11 percent of the total Council expenditures in 1976-77, up from 6 percent in 1970-71.

Regional Distribution (Table 33)

Table 33 shows the regional distribution of payments towards R&D and Research Training, the largest components of the Council's expenditure. In both categories Ontario received the largest proportion, 48 percent; followed by Quebec with 27 percent; the Western Provinces with 21 percent; and the Atlantic with 5 percent. This has been the pattern since

1971-72. Over this period shown, Ontario and Quebec received approximately two-thirds of all expenditures, with Ontario receiving twice as much as Quebec. Among the Western Provinces, British Columbia has been the main recipient. The main recipient in the Atlantic Provinces was Nova Scotia.

TABLE 33

CANADA COUNCIL - DISTRIBUTION OF FUNDS BY REGION
PERCENTAGES - 1976 AND 1977

REGIONS	PAYMENTS TOWARDS COSTS OF R&D (1)		RESEARCH TRAINING (2)	
	1976	1977 (3)	1976	1977 (3)
ATLANTIC PROVINCES	6.4	6.4	4.7	4.7
QUEBEC	28.5	24.6	27.6	26.6
ONTARIO	43.6	46.0	48.1	48.1
WESTERN PROVINCES	21.5	23.0	19.6	20.6

SOURCE: CANADA COUNCIL ANNUAL REPORTS AND INTERNAL DOCUMENTS.

(1) INCLUDES RESEARCH GRANTS AND LEAVE FELLOWSHIPS.

(2) DOCTORAL FELLOWSHIPS AND SPECIAL MA SCHOLARSHIPS (DISTRIBUTION OF FUNDS CALCULATED FROM THAT OF AWARDS RECIPIENTS AND THE NATIONAL AVERAGES OF AWARDS LEVELS).

(3) CALCULATED ACCORDING TO REAL DISTRIBUTION OF FUNDS BY PROVINCE.

NOTE: FIGURES IN COLUMNS DO NOT ADD TO 100.0% DUE TO FUNDS ALLOCATED OUTSIDE UNIVERSITIES.

PART III

PROVINCIAL EXPENDITURES ON

SCIENTIFIC ACTIVITIES IN UNIVERSITIES

PROVINCIAL SUMMARIES

Introductory Remarks

In response to the survey initiated by the Canadian Committee for the Financing of University Research, provinces have responded to a request from the Council of Ministers of Education of Canada for information on their research expenditures in the university sector, and on provincial science policy structures and/or objectives.

In this paper the data submitted by the provinces have been summarized as much as possible through a common format. Expenditure data refer to the direct support of research by the provinces, that is "sponsored research". Provinces also contribute indirectly to the performance of research in universities through their operating grants to institutions and through their support of capital investments. It should be equally well recognized that the federal government also contributes indirectly, though to an unknown actual level, to provincial expenditures on university research through the fiscal transfer agreements on health and post-secondary education.

BRITISH COLUMBIA

Science Policy and Summary of

Provincial Expenditures on R&D

BRITISH COLUMBIA

I. Science Policy

The focus for science policy is the recently established Research Secretariat and Science Council of B.C.

One of the first tasks of the Secretariat is to prepare an inventory of all research in B.C. universities, government departments and industries.

Funding of university research by provincial departments may be by grant or contract, although there does not seem to be a clear distinction between the two. The Internal Research Advisory Committee, made up of representatives from government departments, will attempt to standardize these procedures.

The objectives of the research grants or contracts from government departments are numerous and varied, but generally the research is mission-oriented and involves work which the funding department is unable to carry out internally because of staff and/or facility limitations.

II. Provincial Current Expenditures on R&D (Table 34, p. 69)

Direct support by the government of British Columbia for research and development performed in universities increased by 15.1 per cent from $1,069 to $1,231 million over the last two years. The distribution of this support by area of activity shown in Table 34 below indicates that social sciences, applied sciences and health sciences received the largest support in 1978, although it must be recognized that such figures fluctuate from year to year as projects start up or terminate. Over the two years, the proportion directed to the natural sciences remained fairly constant at about 66 per cent.

The largest university, the University of British Columbia, received the major portion of government support for research projects, slightly over $1.0 million in 1977-78. Two hundred and ninety-five thousand dollars ($295,000) of this was from the provincial Department of Health. Support by the provincial government for health sciences proper was only $215 thousand in 1977-78, but this represented an increase of 108.7 per cent from the previous year's $103 thousand.

Other provincial departments providing funds of over $100 thousand to the University of British Columbia were Agriculture, Economic Development, Energy, Transport and Communications, and Environment.

The $1.2 million support for research in universities in 1977-78 compares to some $5.3 million of government in-house research and development. Thus, the university component is somewhat less than 18.8 per cent of the total government expenditure on research and development, a slight decrease from the previous year.

Additional information should be sought from:

Dr. William M. Armstrong
Executive Director
Research Secretariat
Province of British Columbia
7451 Elmbridge Way
Richmond, British Columbia
V6X 1B8

Table 34

BRITISH COLUMBIA

Provincial Government Current Expenditures on R&D
($000)

Performer/Field	1976-77	1977-78
IN-HOUSE	4,424 (80.5)[1)]	5,309 (81.2)
UNIVERSITIES	1,069 (19.5)	1,231 (18.8)
Health Sciences	103	215
Applied Sciences	500	431
Other Natural Sciences	137	151
Sub-total Natural Sciences	740	797
Social Sciences	329	426
Humanities	--	8
Sub-total Human Sciences	329	434
TOTAL EXPENDITURES	5,493(100.0)	6,540(100.0)

1) In parentheses: percentages.

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ALBERTA

Science Policy and Summary of Objectives and

Current Expenditures on Scientific Activities

ALBERTA

I. Science Policy

The development of a science and research policy is a relatively recent activity on the part of the government of Alberta. Formal examination from a governmental perspective began approximately three years ago under the guidance of a Cabinet Committee on Science and Research Policy.

In order to provide assistance to the Cabinet Committee in the development of a science and research policy, an Advisory Committee on Science and Research Policy was created in 1976, composed of representatives from government departments, universities, and the public at large.

There are five major Albertan research "authorities" funded by the provincial government: (a) the Alberta Research Council; (b) the Alberta Oil Sands Technology Research Authority (AOSTRA); (c) the Alberta Oil Sands Environmental Research Programme (AOSERP); (d) the Vegreville Environmental Laboratory; and (e) the universities. Of course, a number of other research agencies (as well as government departments themselves) conduct research which is sponsored, in whole or in part, by the provincial government.

II. Provincial Expenditures on Scientific Activities

The support of scientific activities in universities has grown rapidly in recent years, from $696 thousand in 1973-74 to $1,977 thousand in 1976-77, an increase of 64.8 per cent. Current expenditures on R&D followed a generally similar pattern, with an increase of 83.2 per cent, an indication of the growing importance of R&D within scientific activities. These trends are shown in Table 35.

Payments to universities for scientific activities in the Natural Sciences have fluctuated considerably as compared to overall government expenditures on these activities, as shown in Table 36. Similar fluctuations are shown for R&D. The percentage drop in the share accorded to universities observed in 1976-77 was due to major increases in funds directed at industry. In the Human Sciences, similar trends can be observed, with the greatest increase of funds in 1976-77 being directed at non-profit institutions (Table 37).

The distribution of Scientific Activities by type of activity is given in Tables 38 and 39, for Natural and Human Sciences respectively, for the last two years for which complete data were available, that is 1975-76 and 1976-77. In the Natural Sciences, major changes have taken place from 1975-76 to 1976-77. R&D grants and scientific data collection represented 82.8 per cent of the funds allocated in 1975-76. In 1976-77, 86.8 per cent of the funds were allocated for R&D through contracts. In both years most of the funds for Human Sciences were also for R&D through contracts, while most of the funds for RSA were allocated for Operation and Policy Studies. Together, these two types of activities were allocated, on average, 60.2 per cent of the funds.

Tables 40 and 41 provide a breakdown of the areas of funding of scientific activities. In the two years surveyed, most of the funds for Natural Sciences were allocated for Energy, Natural Resources and Environment, and those for the Human Sciences, in the areas of education and law.

Additional details of provincial government support of university research projects can be obtained from the following contact persons within the various government departments:

Mr. R. Burkin, Director
Workers' Compensation Board
Head Office
9912 - 107 Street
Edmonton, Alberta.
T5K 1G5 (423-6202)

Mr. M. Fenske, Director
Planning and Research Branch
Alberta Education
Devonian Building
11160 Jasper Avenue
Edmonton, Alberta
T5K OL1 (427-5613)

Mr. L. Conrad,
Senior Planner
Systems and Economic Analysis
Planning and Allocation Division
Alberta Housing and
Public Works - Housing
College Plaza, 20th Floor
8215 - 112 Street
Edmonton, Alberta.
T6G 2C8 (427-3928)

Mr. J.A. Cornell
Acting Executive Director
Planning Secretariat
Alberta Advanced Education
and Manpower
Devonian Building, 10th Floor
11160 Jasper Avenue
Edmonton, Alberta.
T5K OL1 (427-2223)

Mr. G.T. Gordon, Director
Finance Division
General Administration
Attorney General
Madison Building
9919 - 105 Street
Edmonton, Alberta
T5K 2E8 (427-4977)

Mr. J. Dolinsky
Assistant Deputy Minister
Planning and Research
Alberta Transportation
305 Transportation Bldg.
9630 - 106 Street
Edmonton, Alberta.
T5K 2B8 (427-7058)

Mr. L.G. Hurd
Executive Director
Scientific and Engineering
Services and Research
Alberta Energy and Natural
Resources
N. Petroleum Plaza, 6th Floor
9915 - 108 Street
Edmonton, Alberta.
T5K 2C9 (427-8042)

Mr. D. Junk
Assistant Deputy Minister
Research and Planning Division
Social Sciences and
Community Health
Seventh Street Plaza
10030 - 107 Street
Edmonton, Alberta.
T5J 3E4 (427-2621)

Dr. W. MacDonald, Chairman
Research Secretariat
Alberta Environment
Oxbridge Place, 12th Floor
9820 - 106 Street
Edmonton, Alberta.
T5K 2J6 (427-6254)

Mr. J.H. Ross, Director
Research and Systems
Recreation, Parks and Wildlife
Sun Building
10363 - 108 Street
Edmonton, Alberta.
T5J 1L8

Mr. G.A. Villett, Registrar
Alberta Oil Sands Technology
and Research Authority
Petroleum Plaza, S. - 7th Floor
9915 - 108 Street
Edmonton, Alberta
T5K 2C9

TABLE 35

ALBERTA

Provincial Government Current Expenditures on Scientific Activities in Canadian Universities ($'000)

	1973-1974	1974-1975	1975-1976	1976-1977
Natural Sciences	517	786	1,492	1,591
Social Sciences and Humanities	179	99	487	386
T o t a l	696	885	1,979	1,977

Provincial Government Current Expenditures on R&D in Canadian Universities

	1973-1974	1974-1975	1975-1976	1976-1977
Natural Sciences	170	581	1,105	1,516
Social Sciences and Humanities	127	83	299	253
T o t a l	297	664	1,404	1,769
Percent Expenditures on R&D	42.7	75.0	70.9	89.5

Province of ALBERTA

Provincial Government Current Expenditures on Scientific Activities in the Natural Sciences by Performer 1973-1974 to 1976-1977

($'000)

Performer	1973-1974	1974-1975	1975-1976	1976-1977
Intramural	3,854	2,991	5,847	7,186
Canadian Industry	848	1,978	2,991	12,373
Canadian Universities	517	786	1,492	1,591
Canadian non-profit Institutions	183	338	247	492
Other Performers	184	985	1,452	4,718
Total	5,586	7,078	12,029	26,360
Percent to Universities	9.2	11.1	12.4	6.0

Provincial Government Current Expenditures on R&D in the Natural Sciences by Performer 1973-1974 to 1976-1977

($'000)

Performer	1973-1974	1974-1975	1975-1976	1976-1977
Intramural	2,546	452	1,013	2,644
Canadian Industry	306	747	2,652	11,681
Canadian Universities	170	581	1,105	1,516
Canadian non-profit Institutions	183	338	233	342
Other Performers	184	103	108	2,566
Total	3,389	2,221	5,111	18,749
Percent to Universities	5.0	26.2	21.6	8.0

Province of ALBERTA

Provincial Government Current Expenditures on Scientific Activities in the Social Sciences and Humanities by Performer 1973-1974 to 1976-1977

Performer	1973-1974	1974-1975	1975-1976	1976-1977
		($'000)		
Intramural	4,176	6,977	7,629	8,752
Canadian Business Enterprises	385	2,157	2,400	1,337
Canadian Universities	179	99	487	386
Canadian Non-Profit Institutions	75	234	734	1,857
Other Performers	1,057	1,742	1,393	756
Total	5,872	11,209	12,643	13,088
Percent to Universities	3.0	0.8	3.8	2.9

Provincial Government Current Expenditures on R&D in the Social Sciences and Humanities by Performer 1973-1974 to 1976-1977

Performer	1973-1974	1974-1975	1975-1976	1976-1977
		($'000)		
Intramural	1,327	1,633	1,188	2,946
Canadian Business Enterprises	246	393	1,302	605
Canadian Universities	127	83	299	253
Canadian Non-Profit Institutions	--	34	267	1,040
Other Performers	766	895	972	575
Total	2,466	3,038	4,028	5,419
Percent to Universities	5.1	2.7	7.4	4.7

TABLE 38

Province of ALBERTA

Provincial Government Current Expenditures on Scientific Activities in the Natural Sciences in Canadian Universities by Type of Activity 1975-1976 and 1976-1977

Activity	1975-1976		1976-1977	
Research and Development				
Contracts	201[1]	(13.5)[2]	1,381	(86.8)
Grants	899	(60.3)	85	(5.3)
Research Fellowships	5	(0.3)	50	(3.1)
Sub-total	1,105	(74.1)	1,516	(95.3)
Related Scientific Activities				
Education Support	51	(3.4)	55	(3.4)
Scientific Data Collection	336	(22.5)	20	(1.3)
Sub-total	387	(25.9)	75	(4.7)
Total	1,492	(100.0)	1,591	(100.0)

1) In $'000

2) In Percent of Total

Source: Scientific Activities of the Government of Alberta, 1975-1976 and 1976-1977 Survey Results, Statistics Canada, Science Statistics Section.

TABLE 39

Province of ALBERTA

Provincial Government Current Expenditures on Scientific Activities in the Social Sciences and Humanities in Canadian Universities, by Type of Activity 1975-1976 and 1976-1977

Activity	1975-1976		1976-1977	
Research and Development:				
Contracts	207[1]	(42.6)[2]	166	(43.0)
Grants	90	(18.5)	87	(22.5)
Sub-total	297	(61.2)	253	(65.5)
Related Scientific Activities:				
Education Support	33	(6.8)	--	--
General Purpose Data Collection	6	(1.2)	52	(13.5)
Information Services	14	(2.8)	--	--
Economic & Feasibility Studies	45	(9.3)	18	(4.7)
Operations & Policy Studies	90	(18.5)	63	(16.3)
Sub-total	188	(38.3)	133	(34.5)
Total	485	(100.0)	386	(100.0)

1) $'000

2) Percent of Total

Source: Scientific Activities of the Government of Alberta, 1975-1976 and 1976-1977 Survey Results, Statistics Canada, Science Statistics Section.

TABLE 40

Province of ALBERTA

Provincial Government Current Expenditures on Scientific Activities in the Natural Sciences at Canadian Universities by Funding Agency 1975-1976 and 1976-1977

Department	1975-1976		1976-1977	
Energy & Natural Resources	835[1]	(55.9)[2]	--	--
Environment	487	(32.6)	738	(46.3)
Recreation, Parks & Wildlife	165	(11.1)	60	(3.8)
Transportation	5	(0.4)	2	(0.2)
Alberta Oil Sands Technology and Research Authority	--	--	791	(49.7)
T o t a l	1,492	(100.0)	1,591	(100.0)

[1] $'000

[2] Percent of Total

Source: Scientific Activities of the Government of Alberta, 1975-1976 and 1976-1977 Survey Results, Statistics Canada, Science Statistics Section,

TABLE 41

Province of ALBERTA

Provincial Government Current Expenditures on Scientific Activities in the Social Sciences and Humanities in Canadian Universities by Funding Agency 1975-1976 and 1976-1977

Department	1975-1976		1976-1977	
Advanced Education & Manpower	120[1]	(24.6)[2]	80	(20.7)
Attorney General	75	(15.4)	75	(19.4)
Education	199	(40.9)	181	(46.8)
Environment	3	(0.6)	6	(1.6)
Hospital Services Commission	15	(3.1)	7	(1.8)
Housing and Public Works	45	(9.2)	5	(1.3)
Recreation, Parks & Wildlife	15	(3.1)	--	--
Social Services and Community Health	3	(0.6)	4	(1.2)
Solicitor General	--	--	9	(2.3)
Transportation	2	(0.4)	--	--
Workers' Compensation Board	10	(2.1)	19	(4.9)
T o t a l	487	(100.0)	386	(100.0)

1) $'000

2) Percent of Total

Source: Scientific Activities of the Government of Alberta, 1975-1976 and 1976-1977 Survey Results, Statistics Canada, Science Statistics Section.

SASKATCHEWAN

Support of R&D in Universities

SASKATCHEWAN

I. Science Policy

The Saskatchewan Science Council, to which the Science Policy Secretariat provides a support function, was appointed in early 1977. The Council has held only two formal meetings, so that its status might be termed "developing". During its first years of incorporation, the Council will be engaged in a process of self-education and goal setting. As part of this, the Council will explore a variety of areas which show some potential for in-depth study.

One of the suggested areas is that of university research funding, for which responsibility rests with the Department of Continuing Education.

II. Expenditures on R&D in Universities

The direct provincial support for research in universities is almost all in the area of agriculture, with a grant of $2,285,000 out of a total university support of $2,475,000 in 1978-79.

These research grants in agriculture (of which $900,000 is for capital expenditures) represent almost the entire R&D budget of the Department of Agriculture. This is contrary to other provincial government departments where direct support of university research is a small proportion of their R&D budget.

Table 42 below shows the details of these expenditures. Persons to contact for further information are listed below:

Mr. Ernie Spencer
Executive Director of Planning and Special Projects
Department of Agriculture
Room 102
Administration Building
REGINA, Saskatchewan

Mr. O.D. Larmer
Administrative Officer & Personnel
Administration Branch
Department of Environment
1855 Victoria Avenue
REGINA, Saskatchewan

Mr. Bill Culley
Research Engineer
Research Branch
Department of Highways and Transportation
1855 Victoria Avenue
REGINA, Saskatchewan

Mr. F. Wist
Executive Assistant
Department of Mineral Resources
1914 Hamilton Street
REGINA, Saskatchewan

Mr. R.E. Melvin
Administrative Officer
Saskatchewan Research Council
30 Campus Drive
SASKATOON, Saskatchewan

Mr. Kang
Income Security Planning Chief
Planning and Evaluation Branch
Department of Social Services
1920 Broad Street
REGINA, Saskatchewan

SASKATCHEWAN

Section 1 - 1978-79 provincial support of research activities ($'000)

Gov't. Dept. or Agency	University of Regina				University of Saskatchewan				T o t a l			
	Contract	Agreement	Grant	Total	Contract	Agreement	Grant	Total	Contract	Agreement	Grant	Total
Dept.of Agriculture	-	-	-	-	60	-	2,225*	2,285	60	-	2,225	2,285
Dept.of Environment	2	-	-	2	-	-	-	-	2	-	-	2
Dept.of Highways & Transportation	-	-	-	-	-	-	12	12	-	-	12	12
Dept.of Mineral Resources	70	-	-	70	20	-	-	20	90	-	-	90
Dept.of Social Services	44	-	-	44	-	-	-	-	44	-	-	44
Saskatchewan Research Council	-	-	3	3	-	-	39	39	-	-	42	42
Total	$116	-	$3	$119	$80	-	$2,276	2,356	$196	-	$2,279	2,475

* includes $900,000 capital grant

Section 2 - University research as a proportion of total government research ($'000)

Gov't. Dept. or Agency	Direct support of University Research	Total R&D Budget of Dept. or Agency	Direct support of University Research as % of total R&D
Dept.of Agriculture	$2,285	$2,299	99.5%
Dept.of Environment	2	Not available	Not available
Dept.of Highways & Transp.	12	220	5.5%
Dept.of Min. Resources	90	2,609	3.5%
Dept.of Social Services	44	757	5.8%
Sask.Research Council	42	3,258	1.3%
Total (excluding Environment)	2,475	$9,143	27.1%

Table 42

MANITOBA

Expenditures on University Research

MANITOBA

I. Science Policy

There is no provincial science secretariat or official science policy in Manitoba.

In one field, agriculture, the province uses the Faculty of Agriculture of the University of Manitoba as its research arm and funds research there. There appears to be no other direct funding of university research except on an ad hoc, task-oriented basis. There is a Manitoba Research Council but it does not fund university research except for special tasks.

II. Expenditures on R&D in Universities

The total direct support to university research by the Government of Manitoba was $1.184 million in 1977-78. This amount has declined slightly over the three year period from 1975-76 to 1977-78 (see Table 43, section 1).

Of the 1977-78 total, $366 thousand was in the form of contracts or agreements, and $818 thousand in the form of grants, including a grant of $725 thousand from the department of Agriculture to the University of Manitoba. Figures for 1977-78 and the two earlier years are shown in sections 2, 3, and 4 of Table 43.

At the University of Manitoba, the agricultural research grant was the largest single amount. Other large financial support of research include research on:

- electrical current transducers
- precambrian geology
- insect control
- teacher training
- northern housing
- anthropology

Support for research at other institutions include approximately $450 thousand over the four years from 1974-75 to 1977-78 for the study of French language education in Manitoba carried out at St. Boniface College; and $150 thousand in 1975-76 for research by the Archaeological Research Centre at the University of Winnipeg.

More information can be obtained from the appropriate officer at each institution:

Brandon University: Mr. Greg J. Coates,
Executive Assistant to the President

The University of Manitoba: Mr. Henry Jacobs,
Faculty of Graduate Studies

St. Boniface College: Mr. Georges Damphousse, Bursar

The University of Winnipeg: Dr. B.G. Hogg, Dean of Research

Other information can be obtained from Dr. W.J. Condo, Chairman, University Grants Commission, 11-395 Berry Street, Winnipeg, Manitoba. R3J 1N6

TABLE 43

Manitoba

1. Provincial support of sponsored research ($'000)

Institution supported	1975-76	1976-77	1977-78
Brandon University	28	5	6
University of Manitoba	$1,094	$1,026	$998
St. Boniface College	103	142	148
University of Winnipeg	229	29	32
	$1,454	$1,202	$1,184

2. 1977-78 Provincial support by type ($'000)

	Contract	Agreement	Grant	Total
Brandon University	0	0	6	6
University of Manitoba	$182	$ 4	$812	$998
St. Boniface College	144	4	0	148
University of Winnipeg	32		0	32
	$366		$818	$1,184

3. 1976-77 Provincial support by type ($'000)

Brandon University	0	0	5	5
University of Manitoba	$178	$ 23	$825	$1,026
St. Boniface College	127	15	0	142
University of Winnipeg	29		0	29
	$372		$830	$1,202

4. 1975-76 Provincial support by type ($'000)

Brandon University	0	0	$ 28	$ 28
University of Manitoba	$285	$102	707	1,094
St. Boniface College	101	2	0	103
University of Winnipeg	226		3	229
	$716		$738	$1,454

ONTARIO

Expenditures on Scientific Activities

in Universities

I. Science Policy

The Provincial Secretary for Resources Development was designated in 1974 as the minister responsible for science policy formulation. To assist him, an Advisory Committee on Science Policy was established, consisting of three deputy provincial secretaries, the secretary of Management Board, the Deputy Minister of the Treasury, and the Deputy Minister of Colleges and Universities, under the chairmanship of the Provincial Secretary for Resources Development, with the general mandate of dealing with scientific issues relating to interested groups inside and outside the government. The Advisory Committee reports annually on provincial government spending on the sciences, but does not review individual ministerial programs unless specifically requested to do so.

The working arms of the Advisory Committee are two subcommittees concerned with two facets of science policy: one, mainly with resources and economic science policies; the other, mainly with social affairs and justice, largely following on the policy field system.

The objectives of Ontario science policies are four-fold:

First, to assist in support of the economy of Ontario by providing an adequate research base by management and organization of existing and potential scientific capital in the province.

Second, to provide an adequate research base for public programs for which the province is primarily responsible in the justice and Social Policy fields.

Third, to provide the most effective cooperation between the provincial government, the universities and industry in the province in the development of research programs which will serve the province's long and short term objectives.

Fourth, to provide for the coordination of the province's policies and programs in all areas of research and development with those of other provinces, federal government when necessary, and other jurisdictions.

Priorities for provincial research and development are as follows:

Determination and comment on the total level of provincial funds being devoted to research and development.

Investigation of methods for improving the management of research and the research funds within the government.

Identification of gaps in the funding of research in the province and recommendation of ways to close these gaps.

Provision of an efficient information system on research and development to be carried out in the province.

Provision of a focal point for dialogue with the province's scientific community.

The Advisory Committee has no funds to sponsor actual research projects but has funds to carry out studies.

Concerning basic research it is the province's view that this should be funded through general unconditional support grants to universities and any other specially identified and approved program. It is further stated that research conducted by and for government should be mission-oriented, and that research and development services are to be purchased from outside government unless a clear case for the alternative can be substantiated. The province attempts to ensure that research information is made available for publicly financed services and for government policy-making as well as being shared with those outside government, wherever possible.

The Advisory Committee has to date centred its activities on heightening the level of concern within the government on matters related to science and technology and particularly to the application of research findings to improve the delivery of government programs.

II. Expenditures on Scientific Activities

Direct support of scientific activities performed in universities increased by 28.4 per cent between 1973-74 and 1976-77, from $18.8 to $26.2 million. During the same period, support of R&D increased by close to the same percentage (28.2), from $14.9 to $20.9 million. The figures are shown in Table 44 and indicate a similar evolution for both Natural and Human Sciences.

With respect to performers, Tables 45 and 46 show that government departments allocate more of their extra-mural expenditures to universities than to other external performers, for both Natural and Human Sciences. Moreover, in both of these areas more of the R&D needs are filled by universities than requirements for Related Scientific Activities.

For the year 1976-77, Tables 47 and 48 show that R&D in Natural Sciences is allocated to universities primarily in the form of contracts (83.8 per cent), while most of the R&D in Human Sciences (75.9 per cent) is allocated through grants. Another difference between the two areas is that most of the funds for Related Scientific Activities in Natural Sciences, that is 98.9 per cent,

are for Testing and Standardization, while in Human Sciences, the bulk of the funds (83.9 per cent) is for Education Support.

Finally, with respect to the areas of funding in Natural Sciences in 1976-77, as identified by the sources of funds, agriculture is by far the largest with 80.4 per cent, followed by health with 11.2 per cent and environment with 5.2 per cent (from figures of Table 49). In Human Sciences, education is by far the largest beneficiary (79.2 per cent) of departmental funds to universities from the ministries of Colleges and Universities and of Education, followed by health with 11.7 per cent, (from figures of Table 50).

This information is a brief summary of the information contained in a report prepared by Statistics Canada entitled "Scientific activities of the Government of Ontario - 1976-77 Survey Results". The full report, which is available, contains additional detail but does not provide information by institution or by research project.

Additional details of provincial government support of university research can be obtained from Mr. Gordon Stokell, Provincial Secretariat for Resources Development, Government of Ontario, Toronto, Ontario. Telephone (416) 965-6366.

TABLE 44

Province of ONTARIO

A. Provincial Government Current Expenditures on Scientific Activities in Universities

($000)

	1973-1974	1974-1975	1975-1976	1976-1977
Natural Sciences	11,878	12,628	15,388	15,087
Social Sciences & Humanities	6,891	6,597	8,585	11,130
Total	18,769	19,225	23,973	26,217

B. Provincial Government Current Expenditures on R&D in Universities

	1973-1974	1974-1975	1975-1976	1976-1977
Natural Sciences	10,778 (90.0)[1)]	11,473 (90.9)	14,088 (91.6)	13,659 (90.5)
Social Sciences and Humanities	4,150 (60.2)	4,242 (64.3)	5,833 (67.9)	7,123 (64.0)
Total	14,928 (79.5)	15,715 (81.7)	19,921 (83.1)	20,782 (79.3)

1) R&D as a percentage of Scientific Activities.

Province of ONTARIO

Current Expenditures on Scientific Activities in the Natural Sciences by Performer

1973-1974 to 1976-1977

Performer	1973-1974	1974-1975	1975-1976	1976-1977
			($'000)	
Intramural	21,715	30,446	27,907	32,369
Canadian Industry	183	728	1,195	1,498
Canadian Universities	11,878	12,628	15,388	15,087
Canadian Non-Profit Institutions	301	381	865	504
Other Performers	5,915	8,472	8,560	8,750
Total	39,992	52,655	53,915	58,208
Percent to Universities	29.7	24.0	28.5	25.9

Current Expenditures on R&D in the Natural Sciences by Performer

1973-1974 to 1976-1977

Performer	1973-1974	1974-1975	1975-1976	1976-1977
			($'000)	
Intramural	10,153	12,808	13,976	15,152
Canadian Industry	127	311	931	961
Canadian Universities	10,778	11,473	14,088	13,659
Canadian Non-Profit Institutions	301	381	849	335
Other Performers	5,812	8,462	8,560	8,650
Total	27,171	33,435	38,404	38,757
Percent to Universities	39.7	34.3	36.7	35.2

Province of ONTARIO

Current Expenditures on Scientific Activities in the Social Sciences and Humanities by Performer 1973-1974 to 1976-1977

Performer	1973-1974	1974-1975	1975-1976	1976-1977
		($'000)		
Intramural	15,666	19,774	29,355	31,003
Canadian Business Enterprises	2,099	1,773	2,493	2,351
Canadian Universities	6,891	6,597	8,585	11,130
Canadian Non-Profit Institutions	312	902	1,254	6,790
Other Performers	1,573	1,632	1,569	1,000
Total	26,541	30,678	43,256	52,274
Percent to Universities	25.9	21.5	19.8	21.3

Current Expenditures on R&D in the Social Sciences and Humanities by Performer 1973-1974 to 1976-1977

Performer	1973-1974	1974-1975	1975-1976	1976-1977
		($'000)		
Intramural	3,103	4,409	5,038	5,539
Canadian Business Enterprises	346	182	512	666
Canadian Universities	4,150	4,242	5,833	7,123
Canadian Non-Profit Institutions	142	902	1,198	4,524
Other Performers	516	1,151	1,002	577
Total	8,257	10,886	13,603	18,429
Percent to Universities	50.3	39.0	42.9	38.7

Province of ONTARIO

Total Government Expenditures on Scientific Activities in the Natural Sciences by Activity and Sector of Performance 1976-1977

ACTIVITY	Intramural	Canadian Industry	Canadian Universities	Canadian Non-Profit Institutions	Other Performers	Total
			($'000)			
Research and Development:						
In-house	15,076	--	--	--	--	15,076
Contracts	54	702	11,447	96	90	12,389
Grants	19	259	2,212	239	8,239	10,968
Fellowships	3	--	--	--	321	324
Related Scientific Activities:						
Education Support	18	--	--	--	--	18
Scientific Data Collection	8,055	482	10	147	--	8,694
Information Services	2,013	--	--	--	--	2,013
Testing and Standardization	4,892	--	1,412	--	--	6,304
Feasibility Studies	222	55	6	22	100	405
Capital:						
Research & Development	1,386	--	--	--	--	1,386
Related Scientific Activities	631	--	--	--	--	631
Total Expenditures	32,369	1,498	15,087	504	8,750	58,208

TABLE 47

Province of ONTARIO

Total Government Expenditures on Scientific Activities in the Social Sciences and Humanities by Activity and Sector of Performance 1976-1977

Activity	Intramural	Canadian Business Enterprises	Canadian Universities	Canadian Non-Profit Institutions	Other Performers	Total
			($'000)			
Research and Development:						
In-house	5,498					5,498
Contracts	25	666	1,717	480	225	3,113
Grants	15	--	5,406	4,044	269	9,734
Fellowships	1	--	--	--	83	84
Related Scientific Activities:						
Education Support	--	--	3,363	792	--	4,155
General Purpose Data Collection	3,262	30	4	72	175	3,543
Information Services	3,828	12	--	1,102	--	4,942
Economics and Feasibility Studies	3,011	676	421	22	200	4,330
Operations and Policy Studies	15,323	967	219	278	48	16,835
Capital:						
Research and Development	40	--	--	--	--	40
Related Scientific Activities	--	--	--	--	--	--
Total Expenditures	31,003	2,351	11,130	6,790	1,000	52,274

TABLE 48

Province of ONTARIO

Total Government Expenditures on Scientific Activities in the Natural Sciences

by Source and Sector of Performance 1976-1977

Ministry	Intramural	Canadian Business Enterprises	Canadian Universities	Canadian Non-Profit Institutions	Other Performers	Total
			($'000)			
Agriculture and Food	6,506	--	12,127	--	--	18,633
Consumer & Commercial Relations	75	--	50	--	--	125
Culture & Recreation						
Royal Botanical Gardens	541	--	--	--	--	541
Royal Ontario Museum	984	--	--	--	--	984
Energy	155	6	6	22	20	209
Environment	11,848	358	778	243	126	13,353
Health	1,204	--	1,691	239	5,274	8,408
Industry & Tourism	540	308	100	--	3,260	4,208
Natural Resources	6,559	449	60	--	--	7,068
Solicitor General	100	90	--	--	70	260
Transportation and Communications	3,857	287	275	--	--	4,419
Total	32,369	1,498	15,087	504	8,750	58,208

TABLE 49

Province of ONTARIO

Total Government Expenditures on Scientific Activities in the Social Sciences and Humanities

Source and Sector of Performance 1976-1977

Ministry	Intramural	Canadian Business Enterprises	Canadian Universities	Canadian Non-Profit Institutions	Other Performers	Total
				($'000)		
Agriculture and Food	1,062	--	--	--	--	1,062
Attorney General	672	349	317	--	211	1,549
Civil Service Commission	--	62	--	30	--	92
Colleges and Universities	518	186	4,990	--	89	5,783
Community and Social Services	468	--	124	359	113	1,064
Consumer and Commercial Relations	70	280	--	--	--	350
Correctional Services	732	80	63	--	--	875
Culture and Recreation	1,922	10	59	4,285	74	6,350
Royal Ontario Museum	1,001	--	--	--	--	1,001
Education	3,497	194	3,831	1,722	--	9,244
Energy	261	174	--	--	12	447
Government Services	1,880	--	--	--	--	1,880
Health	2,383	--	1,305	394	478	4,560
Housing	250	60	--	--	--	310
Industry and Tourism	1,790	664	421	--	--	2,875
Labour	1,277	10	20	--	23	1,330
Management Board Secretariat	175	75	--	--	--	250
Solicitor General	295	--	--	--	--	295
Transportation and Communications	1,219	207	--	--	--	1,426
Treasury, Economics and Intergovernmental Affairs	11,531	--	--	--	--	11,531
Total	31,003	2,351	11,130	6,790	1,000	52,274

TABLE 50

QUEBEC

Research Policy and

Expenditures on R&D in Universities

QUEBEC

I. Science Policy

In 1972 the Province of Québec created a ministerial committee on science policy, assisted by a Cabinet secretariat. In 1975, the ministerial committee was abolished and the secretariat became the Bureau de la science et de la technologie(Office for Science and Technology), then under the minister responsible for higher education, in fact the Ministry of Education.

A council on science policy reporting to the ministerial committee was also established in 1972, which today reports to the Ministry of Education.

These bodies were not created by legislation but by orders-in-council.

The components of a policy on scientific research have been the object of a study which is expected to result in the publication of a green paper. The study will examine the following areas: research by government, industry, and the universities.

University Research

The direction générale de l'Enseignement supérieur has been active in the area of university research for several years, particularly through its program entitled "Formation de chercheurs et actions concertées" (Researchers' Training and Joint Research Projects), with a budget allocation of $9.7 million for the year 1977-78.

The programs of university research support will be reviewed in light of the outcome of the above-mentioned policy study as well as steps taken by a number of other ministries.

The Council of Universities also plays an active role as advisory body to the minister in the area of university research and for this specific purpose has been provided with a standing committee on university research.

2. Expenditures on R&D

The last year for which complete data were available was 1975-76. In that year, the provincial government allocated $13.5 million to universities for R&D, an increase of 27.9 per cent over the previous year. This amount represents 20.9 per cent of all sponsored research funds received by the universities.

Of this amount, $1.8 million or 13.3 percent was allocated in the form of contracts, and $11.7 million or 86.7 percent in the form of grants.

With respect to research areas, the funds were allocated as shown in Table 51 below:

TABLE 51

QUEBEC

Current Provincial Expenditures on University Research by area of Science

Area	($'000)	Percentages
Natural Sciences:	7,139.5	52.8
Health *	617.7	4.6
Other	6,521.8	48.2
Human Sciences:	5,221.8	38.6
Other	1,154.9	8.5
TOTAL	13,516.2	100.0

* Most of the funds allocated to university researchers by the Department of Social Affairs are administered by University Hospital Centres or other hospitals. This amount corresponds to the funds administered by the universities.

This information is a brief summary of a survey published in 1978 in a report by the "Direction générale de l'enseignement supérieur", under the title "La recherche subventionnée et commanditée dans les universités du Québec".

This document contains information on funds from all sources as well as from the provincial government. These data are summarized below in Table 52.

TABLE 52

Direct Support of Research in Quebec Universities by Source

Source	$ Million	Percentages
Canadian:	61.8	96.1
Provincial Government	13.5	21.0
Federal Government	35.8	55.7
Other	12.5	19.4
Non-Canadian:	2.5	3.9
TOTAL	64.3	100.0

Finally, the survey has shown that total direct funding of sponsored research was distributed as follows (Table 53) with respect to source and type of funding. It can be seen that, whatever the source, funds are mostly provided as grants.

TABLE 53

Direct Support of Research in Quebec Universities

by Source and Type of Support

Sources	Contracts	Grants	Total
		($ Million)	
Canadian:	6.4	55.4	61.8
Provincial Government	1.8	11.7	13.5
Federal Government	3.0	32.8	35.8
Other	1.6	10.9	12.5
Non-Canadian:	0.7	1.8	2.5
TOTAL	7.1	57.2	64.3

The detailed survey results are available from the CMEC's Secretariat, or a copy, as well as other relevant documents, may be obtained from Mr. Michel Slivitzky, Directeur Général, Bureau de la science et de la technologie, Ministère de l'Education, 1035, rue da Lachevrotière, Québec G1R 5A5.

MARITIME PROVINCES

Support of Research in Universities

MARITIME PROVINCES

I. Science Policy

- New Brunswick

The Province of New Brunswick has an Advisory Committee on Science and Technology which was appointed by the Premier of the Province of New Brunswick in September of 1973 for two basic purposes:

1. to serve as government's liaison agency with the Ministry of State for Science and Technology; and

2. to advise the Cabinet Committee on Policy and Priorities on matters related to science policies.

The Committee consists of five persons and is chaired by Mr. Barry Toole, Director of Intergovernmental Affairs, Cabinet Secretariat of New Brunswick. Two of the members of this committee including its chairman are employees of the provincial government and three are non-governmental members.

- Nova Scotia and Prince Edward Island

No formal body or policies in this field.

II. Support of Research in Universities

- New Brunswick

In the Table 54 below, it can be seen that 95.6 percent of the funds identified for research came from external sources (sponsored research). Of this amount of sponsored research ($3,708.5 th.), the province contributed 20.8 percent, the federal government 69.2 percent and "Others" 10.0 percent.

TABLE 54

NEW BRUNSWICK

Expenditures on Research in Universities by Sources of Funds - 1977-78

($'000)

Sponsored Research[1]		Percentage	
Federal Government	2,565.3	66.1	69.2
Provincial Government[2]	771.2	19.9	20.8
Others	372.0	9.6	10.0
(Sub-total)	(3,708.5	(95.6)	(100.0
Internal Funds	171.2	4.4	--
T O T A L	3,879.7	100.0	--

[1] Of the total amount of Sponsored Research, $569 th., or 15.3% was in the form of contracts or from unidentified sources.

[2] As determined by the editor from lists provided.

Table 55 provides a breakdown by disciplinary areas. The bulk of the research activity (91.2%) was in the natural sciences and was funded externally to a level of 97 percent. In education, humanities, social sciences and related subjects, the external funding provided for a slightly lower share, that is 80.6 percent.

TABLE 55

NEW BRUNSWICK

Expenditures on Research by Disciplinary Area - 1977-78

($'000)

Area	External Funds	Internal Funds	Total	Percentage
Education	11.6	5.2	16.8	(0.4)
Human Sciences and Related Subjects	263.9	60.9	324.8	(8.4)
Natural Sciences[1]	3,433.0	105.0	3,538.0	(91.2)
T O T A L	3,708.5	171.1	3,879.6[2]	(100.0)

[1]Excluding Health Sciences.

- Prince Edward Island

Total funds identified for R&D represented $122,993 of which $81,177 is from external sources (sponsored research). This means that a rather large proportion of these funds (34 percent) came from the institution's own budget. Of the $81,177 from external sources, the province provided 5.5 percent, the balance ($76,677) being provided by the federal government. Finally, of the total R&D funds, $84,760 or 68.9 percent was for R&D in natural sciences (excluding health)

and was supported from external sources to a level of 73.0 percent, while the balance ($38,233) was for R&D in education, humanities, social sciences and related subjects and was supported from external sources to a level of 50.4 percent.

- Nova Scotia

In Nova Scotia, direct provincial government support for university research is on an ad hoc basis. Most research is performed at Dalhousie University, where in 1977-78 total expenditures earmarked for research amounted to $5.6 million, or 72 percent of all university research in the province. Of this $5.6 million, 95 percent was from external sources (assisted research).

Total expenditures earmarked for research in the province's universities amounted to $7.8 million in 1977-78, of which $7.3 million or 94 percent was from external sources (assisted research).

Table 56 shows the distribution of these expenditures by disciplinary areas. Three quarters of these expenditures were in natural sciences, 93 percent of which were externally funded. Similarly, 95 percent of the expenditures for

education, humanities, social sciences and related subjects were also externally funded. In natural sciences, 40 percent of the expenditures were for health sciences research, which represented 29 percent of total expenditures. Natural sciences other than health represented 62 percent of all non-health expenditures.

It was not possible to provide a proper breakdown of externally funded expenditures by source, since such breakdown was reported by institutions for only 20 percent of these expenditures.

TABLE 56

NOVA SCOTIA

EXPENDITURES ON RESEARCH IN UNIVERSITIES

BY DISCIPLINARY AREA - 1977-78

($ 000)

Area	External Funds	Internal Funds	Total	(Percentage)
Education	82.2	2.2	84.4	(1.1)
Human Sciences and Related Subjects	1,886.5	103.6	1,990.1	(25.5)
Natural Sciences[1]	5,345.1	375.6	5,720.7	(73.4)
T O T A L	7,313.8	481.4	7,795.2	(100.0)

[1]Include Health Sciences serving the three Maritime provinces.

Further information for the Maritime provinces can be obtained from H.J. Schweiger, Ph.D., Director of Research and Academic Planning, Maritime Provinces Higher Education Commission, King's Place, P.O. Box 6000, Fredericton, New Brunswick, E3B 5H1.

NEWFOUNDLAND AND LABRADOR

I. Science Policy

There are no formal body or policies in this field.

II. Support of Research in Universities

Up to 1977-78, the provincial government's direct support for research in universities in Newfoundland was in the form of grants and contracts for specific research projects. Up to September 1978 in 1978-79, however, only contracts were awarded, as shown in Table 57.

TABLE 57

Direct Provincial Support of University Research by Type of Support

	1978-79*	1977-78	1976-77
Grants	nil	$131,932	$ 6,000
Contracts	$129,432	193,509	127,181
T O T A L	$129,432	$325,441	$133,181

*Up to September 1978.

Memorial University is associated with the Institute for Educational Research and Development which receives some grants from the university for research undertaken. This institute can also contract to undertake research for the public or the private sector.

More detailed information can be obtained from N.J. Gogan, Director, Office of Research, Memorial University, St. John's, Newfoundland A1C 5S7.

APPENDIX 1

Definitions of Expenditures with Respect to Sources, Performers and Categories of Scientific Activities

DEFINITIONS[1]

Departments and agencies are requested to identify the resources reported in their Main Estimates submissions that are to be applied to scientific and technological activities in the natural and human sciences. The basic reporting unit is the budgetary program.

Definitions of, and explanatory notes on, natural sciences, human sciences, scientific and technological activities, performance sectors, and other terms used in the publication are given below.

The natural sciences consist of disciplines concerned with understanding, exploring, developing or utilizing the natural world. Included are the engineering, mathematical, life and physical sciences.

The term human sciences is to be regarded as synonymous with social sciences and humanities and thus embraces all disciplines involving the study of human actions and conditions and the social, economic and institutional mechanisms affecting humans. The human sciences include such disciplines as anthropology, business administration and commerce, communications, criminology, demography, economics, geography, history, languages, literature and linguistics, law, library science, philosophy, political science, psychology, religious studies, social work, sociology, and urban and regional studies.

For some programs it will be difficult to distinguish between the natural and human sciences. However, some allocation must be made and in determining this allocation, the respondent was advised to consider the dominant orientation of the projects and the area of expertise of the personnel involved.

NATURAL SCIENCE ACTIVITIES

Actual and planned expenditures on scientific and technological activities are classified according to the type of scientific activity and the performance sector in which the activities were or will be conducted.

Scientific and technological activities involve the generation, dissemination and initial application of scientific and technological knowledge. The two main categories are research and experimental development (R&D) and related scientific activities (RSA). In the natural sciences, the RSA group includes scientific data collection, scientific information services, testing and standardization, feasibility studies, education support, and museum services. Such activities are related to research and generally complement and extend R&D.

Expenditures on construction, acquisition or preparation of land, buildings, machinery and equipment are capital expenditures. All other expenditures are current expenditures.

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[1] Source: MOSST Federal Science Expenditures and Manpower, 1976/77 - 1978/79, p. 131, March 1978.

Research and experimental development (R&D) - creative work undertaken on a systematic basis to increase the stock of scientific and technical knowledge or to discover new applications for existing knowledge.

The central characteristic of R&D is an appreciable element of novelty and of uncertainty. The work is normally performed by, or under the supervision of, persons with postgraduate degrees in the natural sciences or engineering.

R&D is generally carried out by specialized R&D units. However, an R&D project may also involve the use of non-R&D facilities (e.g. testing grounds), the purchase or construction of specialized equipment and materials, and the assistance of other units. Costs of such items, attributable to the project, are considered R&D costs.

R&D units may also be engaged in non-R&D activities such as technical advisory services, testing, and construction of special equipment for other units. So far as is practical, the effort devoted to such operations is excluded from R&D.

On the other hand, R&D may be carried out by units normally engaged in other functions (e.g. a marine survey ship used for hydrological research, a geological survey team may be directed to work in a certain area in order to provide data for a geophysical research project). Such effort is part of an R&D project and, again, so far as is practical, the costs are assigned to R&D expenditures.

Examples:

1. Routine autopsy on the causes of death is not research, but special investigation of a particular mortality in order to establish the side effects of certain treatments is research. Similarly, routine tests, such as blood and bacteriological tests, are not research, but a special program of blood tests in connection with the introduction of a new drug is applied research.

2. The keeping of daily records of temperature or of atmospheric pressure is data collection and not research. The investigation of new methods of measuring temperature is research as is the study and development of new systems and techniques for interpreting the data.

In-house R&D - R&D performed by personnel of the reporting program. It may include R&D carried out on behalf of another program on a cost recovery basis.

R&D contracts - payments to organizations or individuals outside the federal government for the conduct of R&D and intended to directly benefit the reporting program. A contract is considered as being intramural when the activity is performed within facilities provided by the reporting program.

Contracts for related scientific activities (RSA) are reported for the appropriate activity and performance sector.

R&D grants and contributions - awards to organizations or individuals for the conduct of R&D and intended to benefit the recipients rather than provide the program with goods, services or information. These funds are normally identical to that portion of the budgetary "grants and contributions" line object of expenditure which is devoted to R&D activities.

Grants and contributions for related scientific activities (RSA) are reported in the appropriate activity and performance sector.

Research fellowships - awards to individuals for advances in research training and experience. Awards intended primarily to support the education of the recipients are reported as education support.

Scientific data collection - the gathering, processing, collating and analyzing of data on natural phenomena. These data are normally the results of surveys, routine laboratory analyses or compilations of operating records.

Data collected as part of an existing or proposed research project are costed against research. Similarly the costs of analyzing existing data as part of a research project are R&D costs, even when the data were originally collected for some other purpose. The development of new techniques for data collection is also considered a research activity.

Examples of scientific data collection are routine geological, hydrographic, oceanographic and topographic surveys; routine astronomical observations; maintenance of meteorological records; and wildlife and fisheries surveys.

Scientific Information services - all work directed to recording, classifying, and disseminating scientific and technological information. Included are the operations of scientific and technical libraries, S&T information and advisory services, the Patent Office, the publication of scientific journals and bibliographies, and the organizing of scientific conferences. Grants for the publication of scholarly works are also included.

General purpose information services or information services directed primarily towards the general public are excluded, as are teaching activities.

Testing and standardization - work directed towards the establishment of national and international standards for materials, devices, products and processes, the calibration of secondary standards

and non-routine quality testing. The development of new measures for standards, or of new methods of measuring or testing, is R&D and is reported as such. Excluded is routine testing such as monitoring radioactivity levels or soil tests before construction.

Feasibility studies - technical investigations of proposed innovative engineering projects to provide necessary additional information for decisions on implementation. Exclude routine work such as selection of road routes and bridge sites unless there are conditions which impose innovative solutions.

Educational support - grants to individuals or institutions intended to support the post-secondary education of students in technology and the natural sciences. General purpose grants to educational institutions are excluded. The activity includes the support of foreign students in their studies of S&T at Canadian or foreign institutions.

Grants intended primarily to support the research of individuals at universities are either R&D grants or research fellowships.

Museum services - the collecting, cataloguing, and displaying of specimens of the natural world or of representations of natural phenomena. The scientific activities of natural history museums, zoological and botanical gardens, aquaria, planitaria and nature reserves are included.

The activity represents a systematic attempt to preserve and display items from the natural world; in some ways it could be considered an extension of scientific information services. Parks which are not primarily restricted reserves for certain fauna or flora are excluded.

Where practical, efforts of such institutions devoted to R&D or to other activities such as S&T information are excluded from museum services and assigned to those activities.

The costs of providing entertainment and recreation to visitors is excluded (e.g. restaurants, children's gardens and nurseries).

Administration of extramural programs - the costs of identifiable units engaged in the administration of contracts and grants and contributions for scientific activities that are to be performed outside the federal government. These expenditures are broken down by the type of scientific activity supported, e.g., R&D or RSA.

HUMAN SCIENCE ACTIVITIES

Actual and planned expenditures on scientific and technological activities are classified according to the type of scientific activity and the performance sector in which the activities were or will be conducted.

Scientific and technological activities involve the generation, dissemination and initial application of scientific and technological knowledge. The two main categories are research and experimental development (R&D) and related scientific activities (RSA). In the human sciences, the RSA group includes general purpose data collection, information services, economic and feasibility studies, operations and policy studies, education support, and museum services. Such activities are related to research and generally complement and extend R&D.

Expenditures on construction, acquisition or preparation of land, buildings, machinery and equipment are capital expenditures. All other expenditures are current expenditures.

Research and experimental development (R&D) - creative work undertaken on a systematic basis towards the acquisition of new knowledge about man, his actions and his institutions, and the application of this knowledge in new ways.

R&D requires the acquisition of knowledge and not just information. New knowledge involves the integration of newly acquired information into existing hypotheses, the formulation and testing of new hypotheses or the re-evaluation of existing observations.

An R&D project generally has three characteristics:

- a substantial element of uncertainty, novelty and innovation;
- a well-defined project design;
- a report on the procedures and results of the project.

Examples:

1. Investigation of the factors determining regional variations in economic growth.
2. Studies of the effects of an urban development scheme on family group cohesiveness.
3. Investigation of the variables effecting the educational performance of children drawn from different social and ethnic groups.
4. Development of reward systems which take into account the differing motives, attitudes and perceptions of management and workers.

Both "research" and "development" are often used with different meanings in the government. For example, it is increasingly common to hear that a person is "researching" something (i.e. the person is looking for information about something). Similarly, there are many units with either research or development or both terms in their titles which are concerned primarily with information gathering, speech writing, preparation of position papers or departmental organization. These are excluded from the scientific activity for R&D.

In-house R&D - R&D performed by personnel of the reporting program. It may include R&D carried out on behalf of another program on a cost recovery basis.

R&D contracts - payments to organizations or individuals outside the federal government for the conduct of R&D and intended to directly benefit the reporting program. A contract is considered as being intramural when the activity is performed within facilities provided by the reporting program.

Contracts for related scientific activities (RSA) are reported for the appropriate activity and performance sector.

R&D grants and contributions - awards to organizations or individuals for the conduct of R&D and intended to benefit the recipients rather than provide the program with goods, services or information. These funds are normally identical to that portion of the budgetary "grants and contributions" line object of expenditure which is devoted to R&D activities.

Grants and contributions for related scientific activities (RSA) are reported in the appropriate activity and performance sector.

Research fellowships - awards to individuals for advanced research training and experience. Awards intended primarily to support the education of the recipients are reported as education support.

General purpose data collection - the routine gathering, processing, collating, analysis and publication of information on human phenomena using surveys, regular and special investigations and compilations of existing records. It excludes data collected primarily for internal administrative purposes (e.g. departmental personnel statistics) as well as the collection of data as part of an R&D project.

Data collected as part of an existing or proposed research project are costed against research. Similarly the costs of analyzing existing data as part of a research project are R&D costs, even when the data were originally collected for some other purpose. The development of new techniques for data collection is also considered a research activity.

Examples of general purpose data collection are the quinquennial censuses, and surveys of employment and production.

Scientific Information services - the recording, classifying and disseminating activities of units concerned primarily with providing information for scientific activities in the social sciences and humanities.

Included are the operations of specialized libraries or national archives, the publication of scholarly journals and bibliographics, grants for the publication of scholarly works and the support of scientific and academic conferences.

General purpose information services or information services directed primarily towards the general public are excluded, as are teaching activities.

Economic and feasibility studies - investigations of the socio-economic characteristics and implications of specific situations. Such studies are generally limited to a specific problem and involve the application of established human science techniques and methodologies. Examples are a study of the viability of an iron foundry in a foreign country, or a cost-benefit study of a proposed paper manufacturing centre in Manitoba.

Operations and policy studies -- the analysis and assessment of departmental programs, policies and operations, the activities of units concerned with the continuing analysis and monitoring of external phenomena (e.g. foreign economic statistics, defence and security information) as well as studies to provide an information base for policy development. The work is carried out by specialized units in some government departments, by consultants, by royal commissions and by task forces.

Education support - grants to individuals or institutions intended to support the post-secondary education of students in the social sciences and humanities. General purpose grants to educational institutions are excluded. The activity includes the support of foreign students in their studies of the social sciences at Canadian or foreign institutions.

Grants intended primarily to support the research of individuals at universities are either R&D grants or research fellowships.

Museum services - the collecting, cataloguing and displaying of specimens and representations relating to the history, social organization and creation of man.

The activity represents a systematic attempt to preserve and display the works of man and to provide information on his works, history, and nature. The scientific activities of historical museums, archeological displays, and art galleries are included.

The costs of providing entertainment and recreation to visitors are excluded (e.g. restaurants, children's gardens and museums).

Administration of extramural programs - the costs of identifiable units engaged in the administration of contracts and grants and contributions for scientific activities that are to be performed outside the federal government. These expenditures are broken down by the type of scientific activity supported, i.e., R&D or RSA.

PERFORMERS

The performer is the sector in which the planned scientific activity will be conducted. The basic distinction is between intramural and extramural performance. Extramural payments are classified on the basis of the performance sectors to which they are made. The five extramural performers selected are Canadian industry, Canadian universities, Canadian non-profit institutions, foreign performers, and other performers.

Intramural performance includes:

- scientific activities carried out by personnel of units assigned to the programs;
- the acquisition of land, buildings, machinery and equipment for scientific activities;
- the administration of scientific activities by program employees;
- the purchase of support services such as EDP and travel.

The intramural expenditures reported for scientific activities are those direct costs associated with scientific programs. These costs include that portion of a program's contribution to employee benefit plans (e.g., superannuation) which is applicable to the scientific manpower within the program. Non-program ("indirect") costs, such as the value of services provided by other departments without charge and accommodation provided by the reporting program are excluded.

Canadian industry - business and government enterprises including public utilities and government-owned firms. Industrial research institutes located at Canadian universities are considered to be in the university sector.

Canadian universities - including affiliated institutes owned, administered or staffed by universities.

Canadian non-profit institutions - charitable foundations, voluntary health organizations, scientific and professional societies, and other organizations not established to earn profits. Non-profit institutions primarily serving or controlled by another sector should be included in that sector (e.g. the Pulp and Paper Research Institute is in Canadian Industry).

Foreign performers - all foreign governments, foreign companies (including foreign subsidiaries of Canadian firms), international organizations, non-resident foreign nationals and Canadians studying or teaching abroad.

Other performers - individuals or organizations not belonging to any of the above sectors. This includes provincial or municipal governments, provincial research councils and foundations.

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