Federal Scientific Resources

1972 to 1974

Natural and Human Sciences

December 1973

Ministry of State Science and Technology

Ministère d'État Sciences et Technologie

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Ministry of State for Science and Technology

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This report is also available in French.

Cette publication existe aussi en version française.

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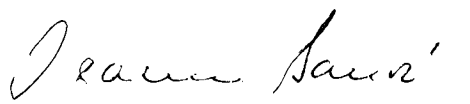
FOREWORD

This report is the third in an annual series that presents statistical information on current and historical trends in federal support of research, development, and related scientific activities in the natural and human sciences. Data are examined by scientific activity, sector of performance, departmental source of support, field and application of science, geographical distribution of funds, and manpower resources.

We extend our appreciation to Statistics Canada and members of the Interdepartmental Committee on Scientific Expenditures, without whose assistance the preparation of this report would not have been possible.



The Honourable Jeanne Sauvé
Minister of State
for Science and Technology.

SYMBOLS

– nil or zero
–– amount too small to be expressed
. . . figures not appropriate or applicable

NOTES

1. Totals in this report may not add due to rounding. Percentages were calculated using unrounded figures.
2. Expenditure data cover the federal government fiscal year beginning April 1 of one year and ending March 31 of the following year; thus, fiscal year 1974 began on April 1, 1973 and will end March 31, 1974.
3. The source of all data in this report is Statistics Canada unless otherwise indicated.

CONTENTS

ABBREVIATIONS

AECB	Atomic Energy Control Board
AECL	Atomic Energy of Canada Limited
AGR	Department of Agriculture
CBC	Canadian Broadcasting Corporation
CC	Canada Council
CIDA	Canadian International Development Agency
CMHC	Central Mortgage and Housing Corporation
DIP	Defence Industry Productivity Program
DIR	Defence Industrial Research Program
DND	Department of National Defence
DOC	Department of Communications
DOE	Department of the Environment
EC	Economic Council of Canada
ED&PNP	Educational & Non-Profit Institutions
EMR	Department of Energy, Mines and Resources
IDRC	International Development Research Centre
INA	Department of Indian and Northern Affairs
IRAP	Industrial Research Assistance Program
IRDIA	Industrial Research and Development Incentives Act
ITC	Department of Industry, Trade and Commerce
MI	Department of Manpower and Immigration
MOSST	Ministry of State for Science and Technology
MOSUA	Ministry of State for Urban Affairs
MOT	Ministry of Transport
MRC	Medical Research Council
NL	National Library
NRC	National Research Council
PA	Public Archives
PAIT	Program for the Advancement of Industrial Technology
PCO	Privy Council Office
PSC	Public Service Commission
R&D	Research and Development
REE	Department of Regional Economic Expansion
RSA	Related Scientific Activities
SC	Statistics Canada

HIGHLIGHTS

In 1974, federal expenditures on science are expected to reach $1,294.5 million; this figure represents an 11.6% ($134 million) increase over the $1,160.3 total for 1973. The natural sciences will receive 80% of the total and the human sciences 20%.

Support of R&D will account for 64% of the science budget, related scientific activities for the remainder.

It is expected that approximately 65% of federal scientific expenditures ($838 million) will be directed to work in federal establishments; the share for universities and non-profit institutions is estimated at 16% ($212 million) and Canadian industry 15% ($195 million).

DOE will account for one-quarter of the in-house budget of $838 million; Statistics Canada, AGR, DND, NRC, AECL, and EMR, each with intramural expenditures between $74 and $84 million, will represent 55% of the total.

In 1974, intramural spending on the natural sciences is expected to grow at a slower rate than the previous year: 7% as compared to 15%; expenditures on the human sciences will rise more rapidly: 19% compared to 8%.

The growth in federal science spending in 1974 is expected to be highest in the industrial sector: it is anticipated that 17.4% ($29 million) more federal funds will be directed to this performer than in 1973; an increase of 9.6% ($73 million) is predicted for intramural expenditures; and a rise of 8.6% ($17 million) is estimated for the universities and non-profit institutions.

A full-time equivalent of 34,739 persons conducted natural and human science activities in federal establishments in 1973: 53% were assigned to R&D work, 46% to related scientific activities and 1% to the administration of extramural programs.

INTRODUCTION

This edition of *Federal Scientific Resources*[1] is divided into three parts. The first, coded in the colour ORANGE, is an overview of the federal government's resource allocations to both the natural and human sciences channelled through 54 departments and agencies during the fiscal years ending in 1972, 1973 and 1974. Data reported in this section are examined solely in terms of types of scientific activities, sectors of performance, departmental sources of support, budgetary function, and percentage of total federal resources.

Part two, coded in the colour GREEN, relates specifically to the federal resources provided for natural science activities. Information is broken into four major sub-groups: expenditures on total scientific activities, expenditures on research and development (R&D), expenditures on related scientific activities (RSA), and manpower resources. Some historical information from 1965 onward is included in the expenditure data.

Part three, coded in the colour BLUE, deals with federal expenditures and manpower assigned to activities in the human sciences. Its division is similar to that of part two with the exception that it covers only the years 1972 to 1974.

In addition, tabulated statistical data related to these three parts can be found in Appendices I, II, and III; Appendix IV contains data on university research which complements the information presented in the body of the report; and Appendix V deals mainly with the definitions and limitations of data included in the report. All data are comparable to those found in the following Statistics Canada publications: *Federal Government Activities in the Natural Sciences, 1972-1974,* catalogue 13-202, and *Federal Government Activities in the Human Sciences, 1972-1974,* catalogue 13-205.

Definitions for research and development, related scientific activities, and all other concepts are identical in the three reports, and unless otherwise indicated, the source of the data is Statistics Canada's annual surveys of federal scientific activities. All expenditure data include the non-program or "indirect" costs of scientific activities, that is, the value of services provided by other departments, accommodation provided by the reporting agency, and administration program costs attributable to scientific activities; these apply only to the intramural activities of departments and agencies.

This report provides a broad view of federal support of science in Canada. Although its coverage does not include the funding of science by the university, industrial and other sectors,[2] it is hoped to be useful to science policy makers within and outside the federal government, and to all others interested in Canadian science.

[1] Previously entitled *Scientific Activities, Federal Government Expenditures and Costs.*

[2] Appendix II, Table 2-14, provides an estimate of the total funds available for R&D in Canada and their distribution among performers.

PART ONE

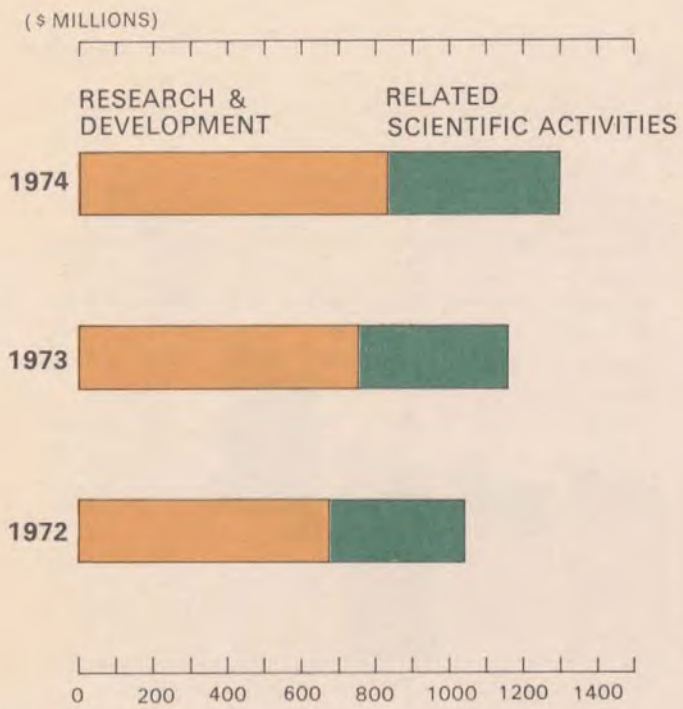
NATURAL AND HUMAN SCIENCES

CHART PAGE

EXPENDITURES

MANPOWER

1. Federal Expenditures on Scientific Activities, by Activity, 1972-74



($ MILLIONS)

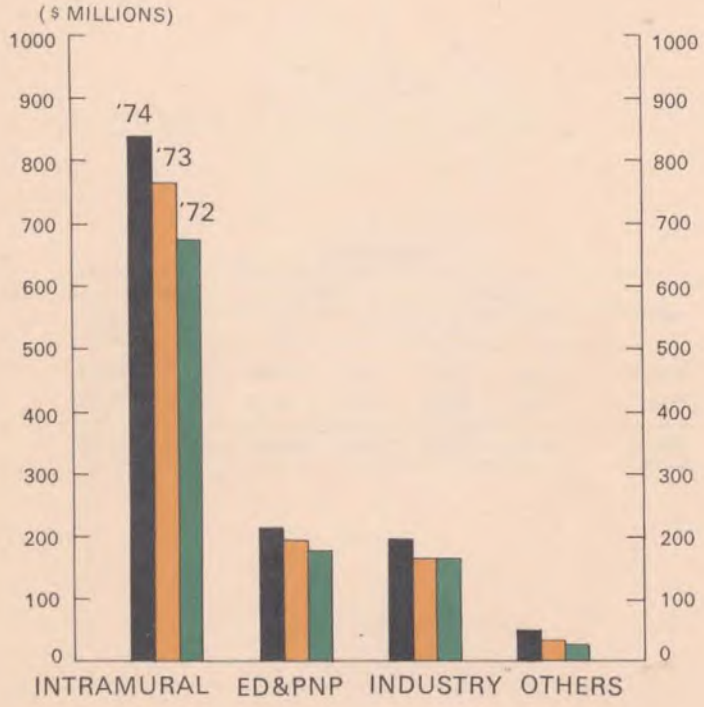
ACTIVITY	1972		1973		1974	
	$	%	$	%	$	%
R & D	672.5	(64.6)	751.8	(64.8)	829.8	(64.1)
RSA	369.1	(35.4)	408.5	(35.2)	464.7	(35.9)
TOTAL	1,041.6	(100.0)	1,160.3	(100.0)	1,294.5	(100.0)

1.1 Federal expenditures on the natural and human sciences are expected to reach $1,294.5 million in 1974, an increase of $134.2 million over the previous year.

1.2 Support of research and development is estimated at $829.8 million, a 10.4% rise over 1973, while the value of related scientific activities will grow 13.8% and equal $464.7 million.

1.3 The percentage of funds allocated to R&D will decline slightly in 1974, from 64.8 to 64.1% of the total science budget; concomitantly, the share of dollars devoted to related scientific activities will increase from 35.2 to 35.9%.

2. Federal Expenditures on Scientific Activities, by Performer, 1972-74



($ MILLIONS)

PERFORMER	1972 $	1972 %	1973 $	1973 %	1974 $	1974 %
Intramural	673.9	(64.7)	765.3	(66.0)	838.4	(64.8)
ED & PNP	177.5	(17.0)	195.1	(16.8)	211.8	(16.4)
Industry	163.5	(15.7)	165.8	(14.3)	194.6	(15.0)
Other						
Canadian	12.2	(1.2)	15.1	(1.3)	25.2	(1.9)
Foreign	14.5	(1.4)	19.0	(1.6)	24.6	(1.9)
TOTAL	1,041.6	(100.0)	1,160.3	(100.0)	1,294.5	(100.0)

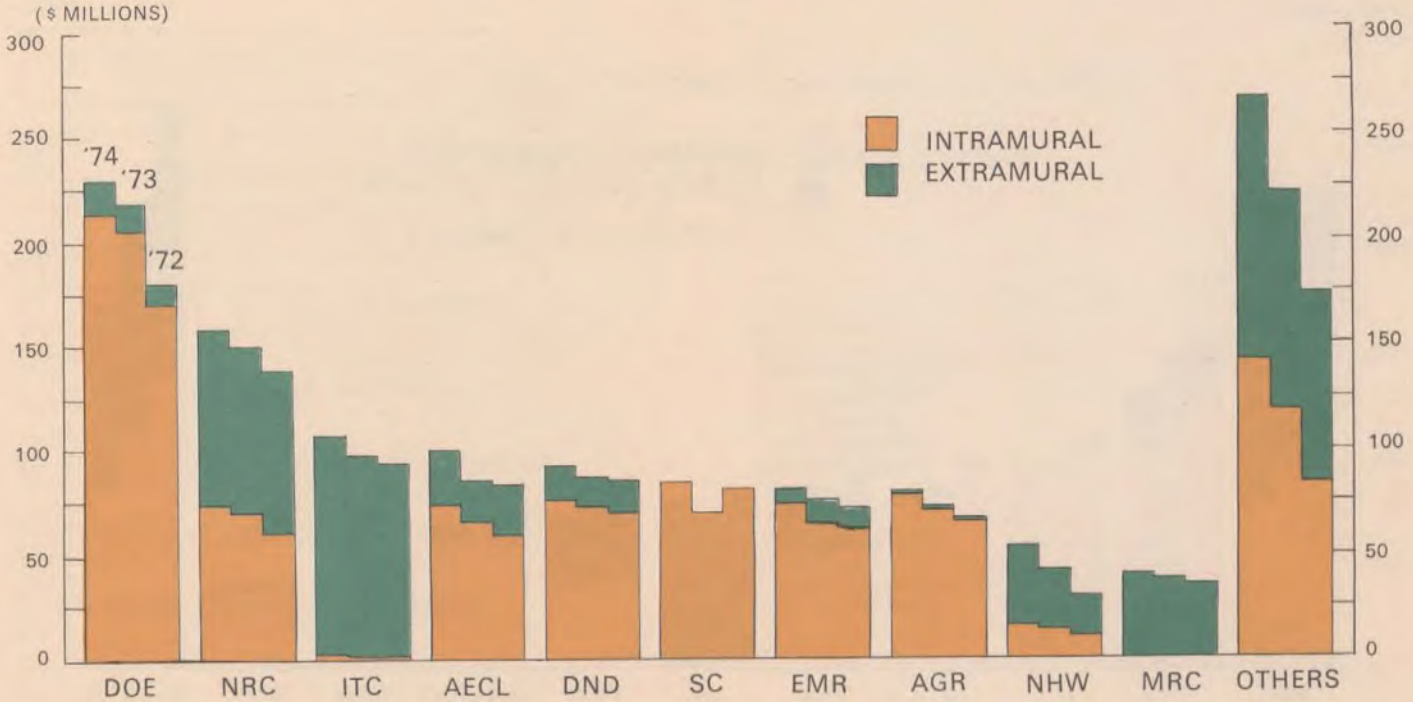
2.1 It is estimated that 11.6% more federal funds will be spent on the natural and human sciences in 1974 than during the previous year. The 1972 to 1973 increase was 11.4%.

2.2 Expenditures within federal establishments will continue to grow, but at a slower pace than in 1973: 9.6 compared to 13.6%. The percentage of funds allocated to activities conducted in these establishments is expected to decrease from 66.0 to 64.8% during the same period.

2.3 Forecast growth of the value of payments to industry in 1974 is 17.4% or 8.8% more than the rise predicted for universities and non-profit institutions.

2.4 Canadian industry's share of the federal science budget is expected to equal 15.0%, that of Canadian universities and non-profit institutions 16.4%.

3. Federal Intramural and Extramural Expenditures on Scientific Activities by Department or Agency, 1972-74



3.1 DOE will retain the leading position among federal science spenders in 1974, with an expected budget of $229.3 million. Its average share of total federal expenditures on the natural and human sciences is 17.9% for the 1972-74 period. NRC follows with forecast expenditures of $158 million or 12.2% of the total, in 1974.

3.2 Ten departments and agencies account for just over 80% of the government's science budget for the 1972 to 1974 period: DOE (17.9%), NRC (12.8%), ITC (8.6%), AECL (7.8%), DND (7.6%), Statistics Canada (6.7%), EMR (6.6%), AGR (6.3%), NHW (3.6%), and MRC (3.3%).

3.3 Of the $1,294.5 million to be spent on science in 1974, intramural expenditures will account for $838.4 million (65%), extramural expenditures for $456.1 million (35%). Comparative figures for 1973 indicate that in-house performance amounted to 66%, extramural to 34%.

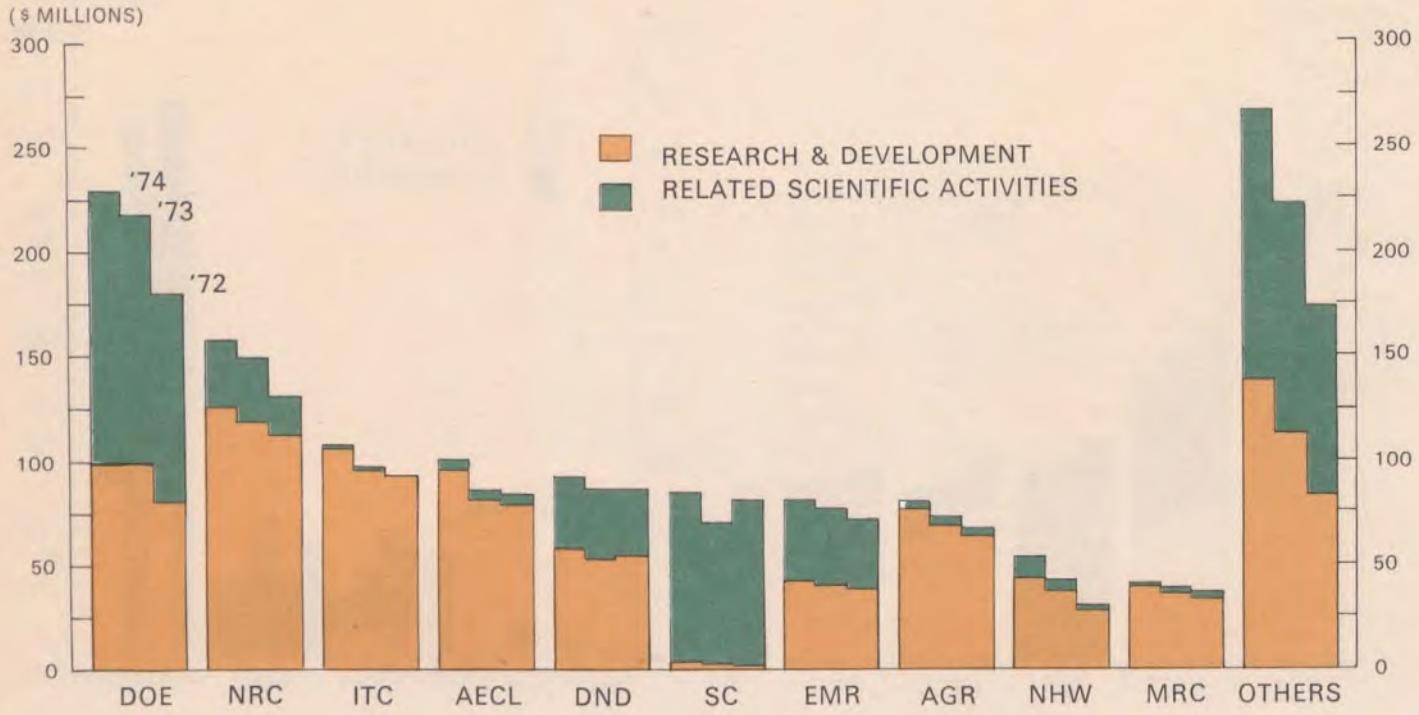
3.4 DOE's 1974 intramural expenditures of $213 million are equal to one quarter of the government's in-house budget. This spending represents a 3.5% increase over 1973; the growth recorded between 1972 and 1973 equalled 20.8%.

3.5 Statistics Canada, AGR, DND, NRC, AECL, and EMR are each expected to spend between $74 and $84 million for in-house activities in 1974, for a combined total of $463 million. Together with DOE they will account for 81% of intramural expenditures.

3.6 The growth rates of intramural and extramural science spending are expected to reverse in 1974: whereas these expenditures grew at respective rates of 13.6 and 7.4% in 1973, their equivalents for 1974 are estimated at 9.6 and 15.5%.

3.7 The most significant source of funds for extramural activities is ITC, with estimated expenditures of $105 million or 23% of the total, in 1974. NRC, MRC, and NHW account for an additional third, and thirty-seven departments and agencies for the remainder.

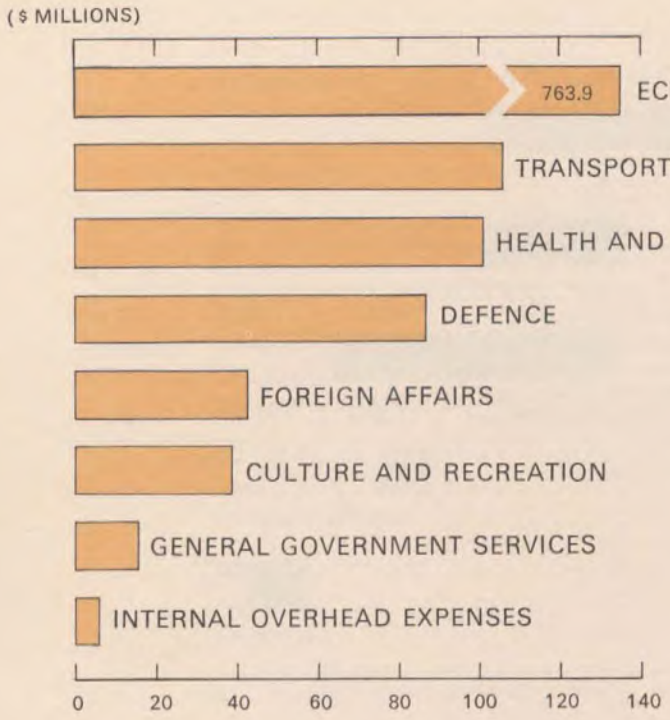
4. Federal Expenditures on Scientific Activities, by Department or Agency, 1972-74



4.1 As in recent years, NRC will spend more dollars on R&D in 1974 than any other federal department or agency. Its estimated expenditures of $127 million are equal to 15% of the government's total R&D budget. Other major supporters of R&D are ITC ($106 million), DOE ($100 million), AECL ($97 million), and AGR ($76 million); together with NRC, they account for 61% of the total.

4.2 Federal spending on related scientific activities in 1974 will be mainly attributable to DOE and Statistics Canada: their estimated expenditures of $129 and $82 million respectively, represent almost half of the federal total allocated to these activities.

5. Federal Expenditures on Scientific Activities, by Function, 1973



($ MILLIONS)

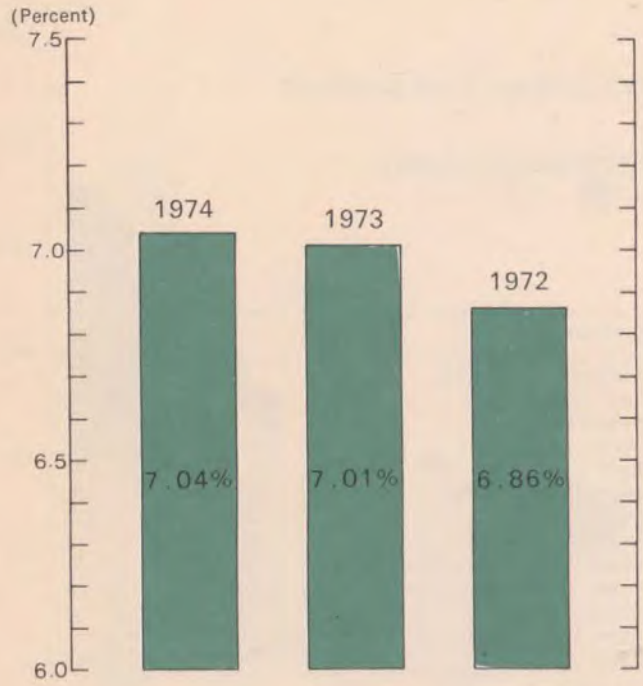
FUNCTION	$	%
Economic Development and Support	763.9	(65.9)
Transportation and Communications	105.9	(9.1)
Health and Welfare	101.0	(8.7)
Defence	86.7	(7.5)
Foreign Affairs	42.6	(3.7)
Culture and Recreation	38.6	(3.3)
General Government Services	15.5	(1.3)
Internal Overhead Expenses	5.8	(0.5)
Education Assistance	0.3	(- -)
TOTAL	1,160.3	(100.0)

5.1 Federal expenditures are classified under eleven budgetary functions:

1. General Government Services
2. Foreign Affairs
3. Defence
4. Transportation and Communications
5. Economic Development and Support
6. Health and Welfare
7. Education Assistance
8. Culture and Recreation
9. Fiscal Transfer Payments
10. Public Debt
11. Internal Overhead Expenses

In 1973, federal expenditures on scientific activities totalling $1,160 million fell under nine of the above functions. Most science spending applied to the Economic Development Support function: $763.9 million or 65.9% of the total. Transportation and Communications received $105.9 million (9.1%); Health and Welfare $101.0 million (8.7%); and Defence $86.7 million (7.5%); Foreign Affairs Culture and Recreation, General Government Services, and Internal Overhead expenses accounted for a combined total of 8.8%.

6. Federal Expenditures on Scientific Activities, as a Percentage of Total Federal Expenditures, 1972-74



($ MILLIONS)

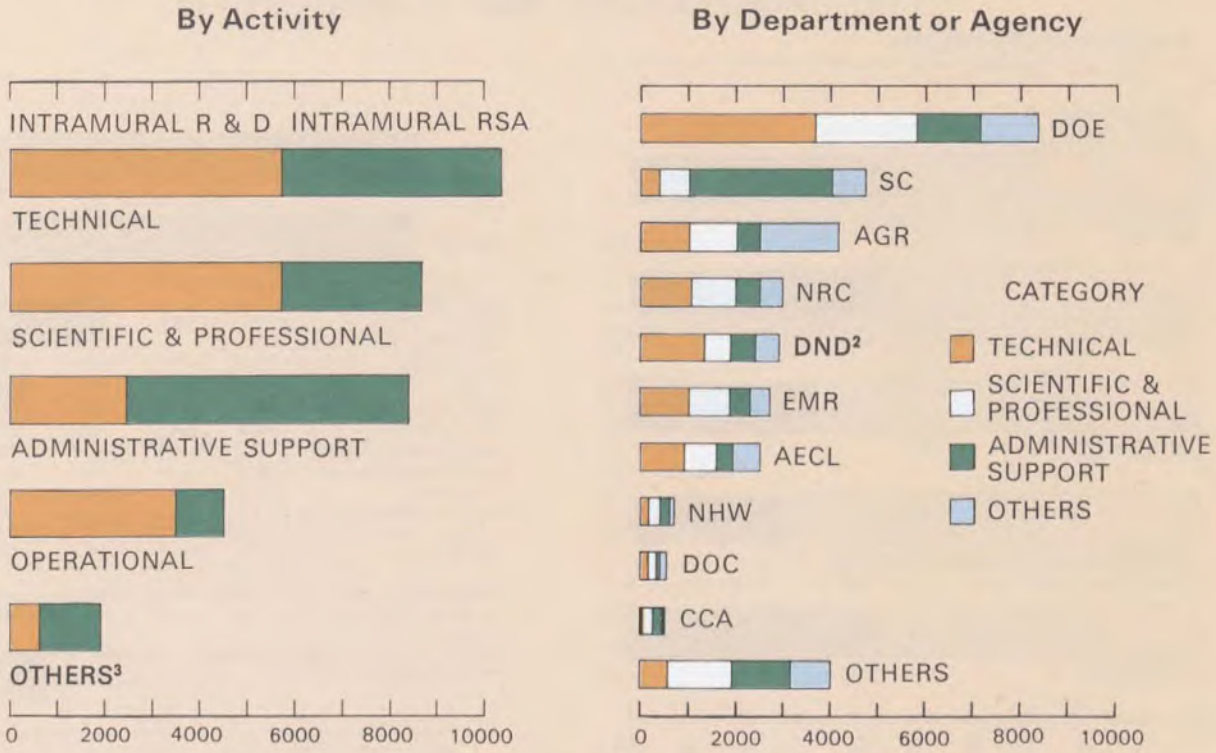
	1972	1973	1974
Federal Science Budget	1,041.6	1,160.3	1,294.5
Total Federal Budget[1]	15,178.2	16,541.1	18,393.1
Science as a Percentage of Total Federal Budget	6.86%	7.01%	7.04%

[1] Source: ESTIMATES for the fiscal year ending March 31, 1974 ("Blue Book").

6.1 Federal expenditures on the natural and human sciences are expected to equal 7.04% of the government's total budget for 1974; similar percentages of 7.01 and 6.86 were recorded for 1973 and 1972 respectively.

6.2 The average annual growth of science spending for the 1972-74 period is estimated at 11.5%, that of total federal spending at 10.1%.

7. & 8. Federal Manpower Engaged in Scientific Activities, 1973[1]



[1] *Expressed in full-time equivalent includes continuing, term, casual and seasonal employees as of September 30, 1972.*
[2] *Excludes 622 DND military personnel unassignable by these categories.*
[3] *Includes administrative and foreigh service and executive personnel.*

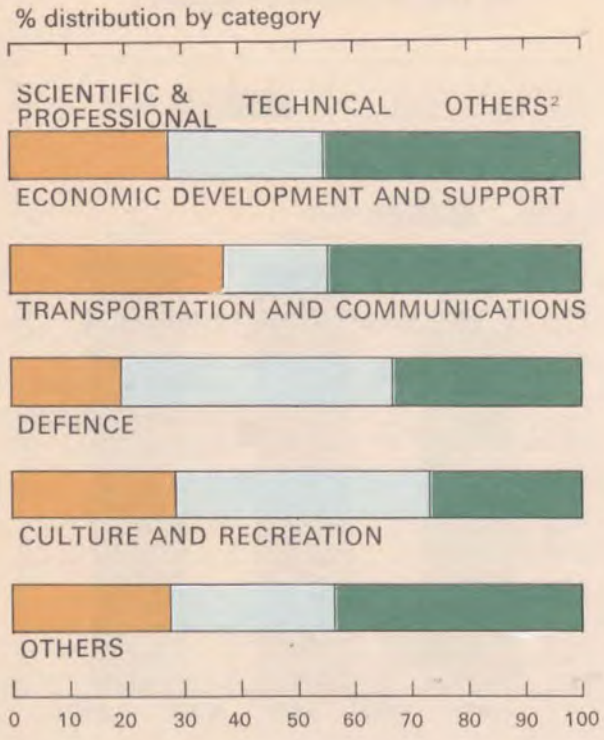
7.1 The federal government employed a full-time equivalent of 34,729 persons in natural and human science activities in 1973: 53% were assigned to R&D work; 46% to related scientific activities; the remaining 1% administered extramural programs.

7.2 Technical employees accounted for the largest group among the various personnel categories: they numbered 10,373 or 29.9% of the total; scientific and professional employees totalled 8,783 (25.3%); administrative support 8,296 (23.9%); operational 4,530 (13.0%); administrative and foreign service 1,978 (5.7%); unassignable military personnel 622 (1.8%); and executive 158 (0.5%).

7.3 The distribution of employees among certain manpower categories was significantly different within each activity: for example, the number of scientific and professional employees was equal to 32% of the R&D total and 19% of the RSA total; in the administrative support group, the percentages were 14 and 38; and in the operational category, 19 and 6% respectively.

8.1 Environment Canada employed a full-time equivalent of 8,359 persons engaged in scientific activities in 1973—24.5% of the federal total. Two other departments each employed more than four thousand personnel: Statistics Canada (4,733) and Agriculture (4,147). Another four each employed more than two thousand: DND (3,533), NRC (2,980), EMR (2,718), and AECL (2,509). These seven departments and agencies accounted for 83% of the total. Employees of forty-seven other departments and agencies occupied the remaining 5,760 positions.

9. Federal Manpower Engaged in Scientific Activities, by Function, 1973[1]



FUNCTION	Scientific & Profes-sional	Technical	Others[2]	Total	%
Economic Development & Support	5,796.5	6,062.5	9,179.5	21,038.5	(69.6)
Transportation & Communications	923.4	1,437.3	870.1	3,230.8	(10.7)
Defence	562.2	1,330.3	942.1	2,834.6	(9.4)
Culture & Recreation	463.0	227.0	552.5	1,242.5	(4.1)
Health & Welfare	380.9	230.1	346.7	957.7	(3.2)
General Government Services	152.0	50.0	265.0	467.0	(1.6)
Internal Overhead Expenses	101.0	76.0	94.8	271.8	(0.9)
Foreign Affairs	36.0	—	144.0	180.0	(0.6)
Education Assistance	1.0	—	1.0	2.0	(- -)
TOTAL	8,416.0	9,413.2	12,395.7	30,224.9	(100.0)

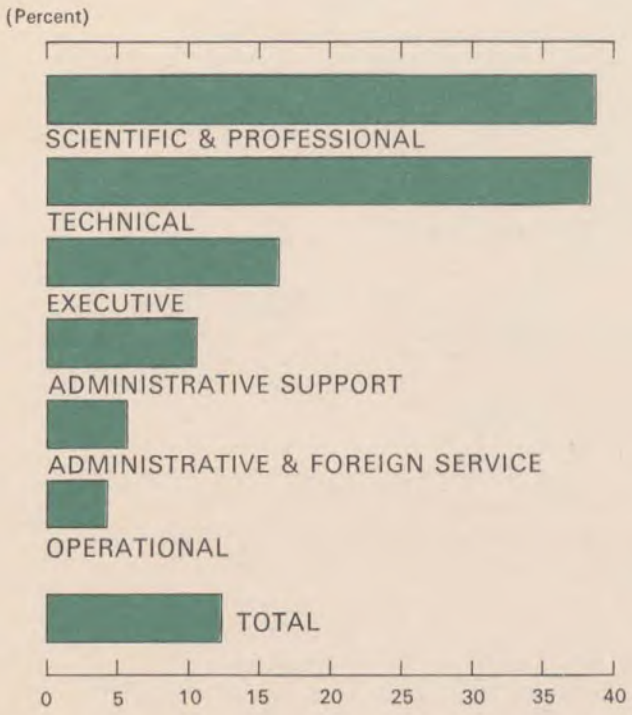
[1]Expressed in full-time equivalent; includes continuing personnel as of September 30, 1972 but excludes term, casual, and seasonal employees as well as military and R.C.M.P. personnel.
[2]Includes executive, administrative support, administrative and foreign service, and operational personnel.

9.1 The analysis of federal scientific manpower data by budgetary function reveals that 21,039 permanent employees, or more than two thirds of the total, were assigned to the Economic Development and Support function in 1974; 28% of this number belonged to the scientific and professional category.

9.2 Continuing employees conducting scientific activities related to Transportation and Communications numbered 3,231 or 10.7%; scientists and professionals accounted for 29% of this total. A total of 2,835 personnel were assigned to the Defence function; almost half of these belonged to the technical category.

9.3 The remaining 10.3% of permanent scientific manpower supported such budgetary functions as Culture and Recreation, Health and Welfare, General Government Services, Internal Overhead Expenses, and Foreign Affairs.

10. Federal Manpower Engaged in Scientific Activities as a Percentage of Total Federal Manpower, 1973[1]



CATEGORY	Scientific Activities Only	Total Federal Manpower[3]	Science as a % of Total
Technical	9,413.2	24,599.0	(38.3)
Scientific and Professional	8,416.0	21,725.0	(38.7)
Administrative Support	6,717.3	63,300.0	(10.6)
Operational	3,638.5	85,024.0	(4.3)
Administrative and Foreign Service	1,881.5	33,018.0	(5.7)
Executive	158.4	964.0	(16.4)
Unallocated		17,305.0[2]	(. . .)
TOTAL	30,224.9	245,935.0	(12.3)

[1] Expressed in full-time equivalent. Includes continuing personnel, as of September 30, 1972, but excludes term, casual and seasonal employees.
[2] Includes primarily personnel in CBC, MOT, and CMHC.
[3] Compiled by MOSST from ESTIMATES for the fiscal year ending March 31, 1974 ("Blue Book").

10.1 It is estimated that 12.3% of all federal employees were engaged in research and development or related scientific activities in 1973.

10.2 Thirty-nine percent of federal personnel in the scientific and professional category worked on projects in the natural or human sciences; a slighlty smaller percentage of all technical employees was also assigned to scientific activities.

PART TWO

NATURAL SCIENCES

CHART PAGE

EXPENDITURES

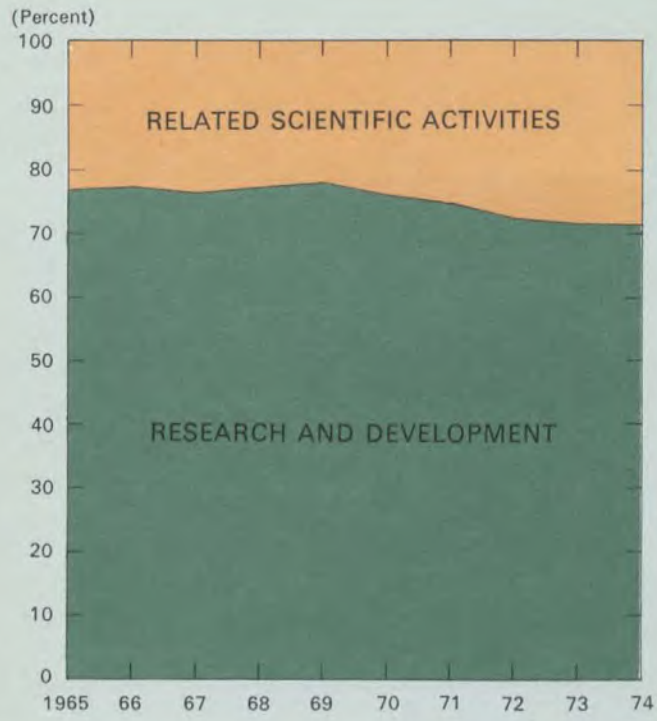
SCIENTIFIC ACTIVITIES (Research & Development and Related Scientific Activities)

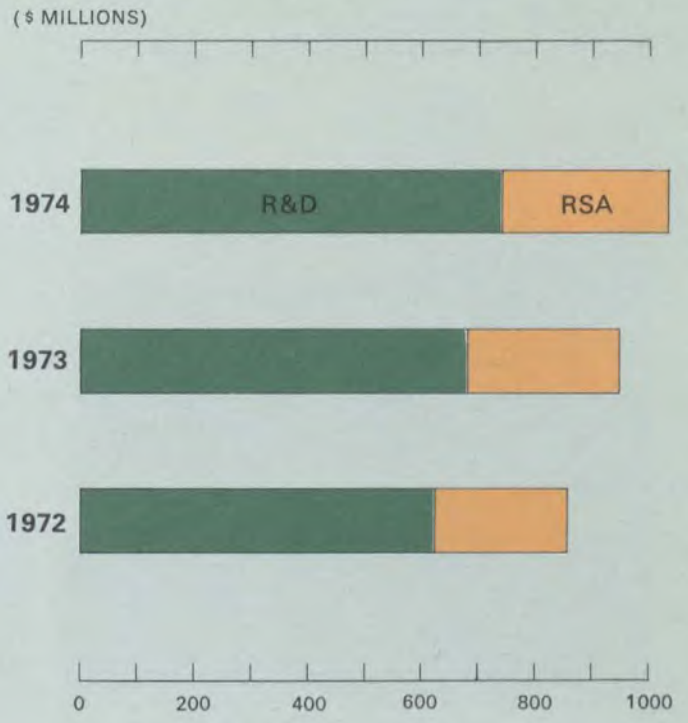
RESEARCH & DEVELOPMENT

RELATED SCIENTIFIC ACTIVITIES

MANPOWER

11. Federal Expenditures on Scientific Activities, by Activity





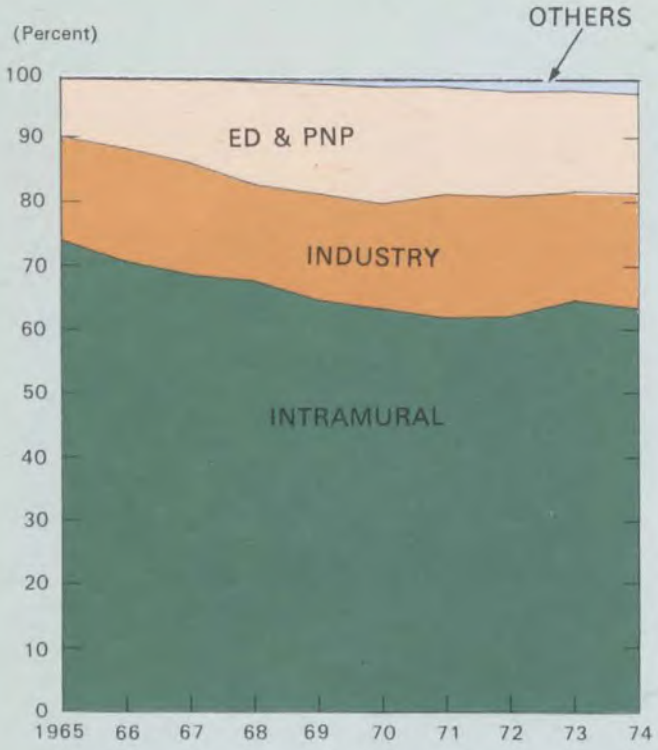
11.1 It is estimated that federal funding of the natural sciences in all sectors will reach $1,030 million in 1974, up $85 million from the previous year.

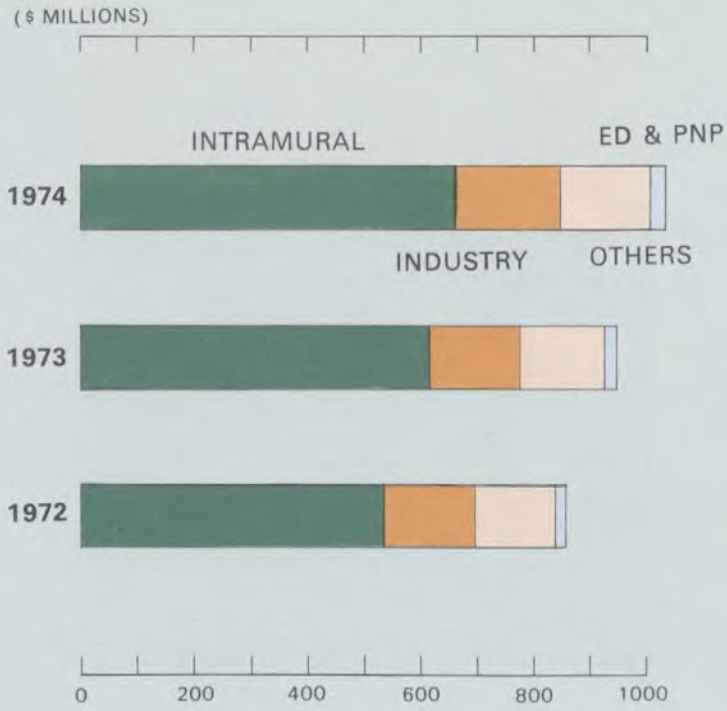
11.2 Research and development will account for $739 million, an 8.7% rise over 1973, while the value of related scientific activities will increase 9.7% and equal $291 million.

11.3 While R&D activities have received over three-quarters of federal science dollars during most of the past decade, their share of the science budget will decrease to 72% of the total in 1974; it has dropped yearly since 1969 when it represented 78%.

11.4 Concomitantly, the percentage of funds allocated to related scientific activities has grown consistently since 1969 when it equalled 22% of the natural science budget; it should surpass 28% in 1974.

12. Federal Expenditures on Scientific Activities, by Performer





12.1 Federal expenditures on the natural sciences in all sectors are expected to climb 9% above the 1973 total. This increase is lower than each of the average annual growth rates recorded for the 1965-70, 1970-72, and 1972-73 periods.

12.2 Spending within government establishments will continue to increase, but at a much slower pace than in 1973: 7.3% compared to 15.0%.

12.3 Forecast growth of the value of payments to industry in 1974 is 15.7%, a substantially higher rate than the 6.7% predicted for educational and non-profit institutions.

12.4 From 1965 to 1971, the percentage of federal funds allocated to intramural scientific activities dropped yearly; a moderate rise has been recorded since then. In-house expenditures amounted to 74% of the total in 1965, compared to 62% in 1971, and 64% in 1974.

12.5 The proportion of federal funds earmarked for educational and non-profit institutions rose annually from 1965 to 1970; since then, declines have been recorded yearly. Payments to this sector increased from 9% of the total in 1965 to 18% in 1970; they are expected to equal less than 16% this year.

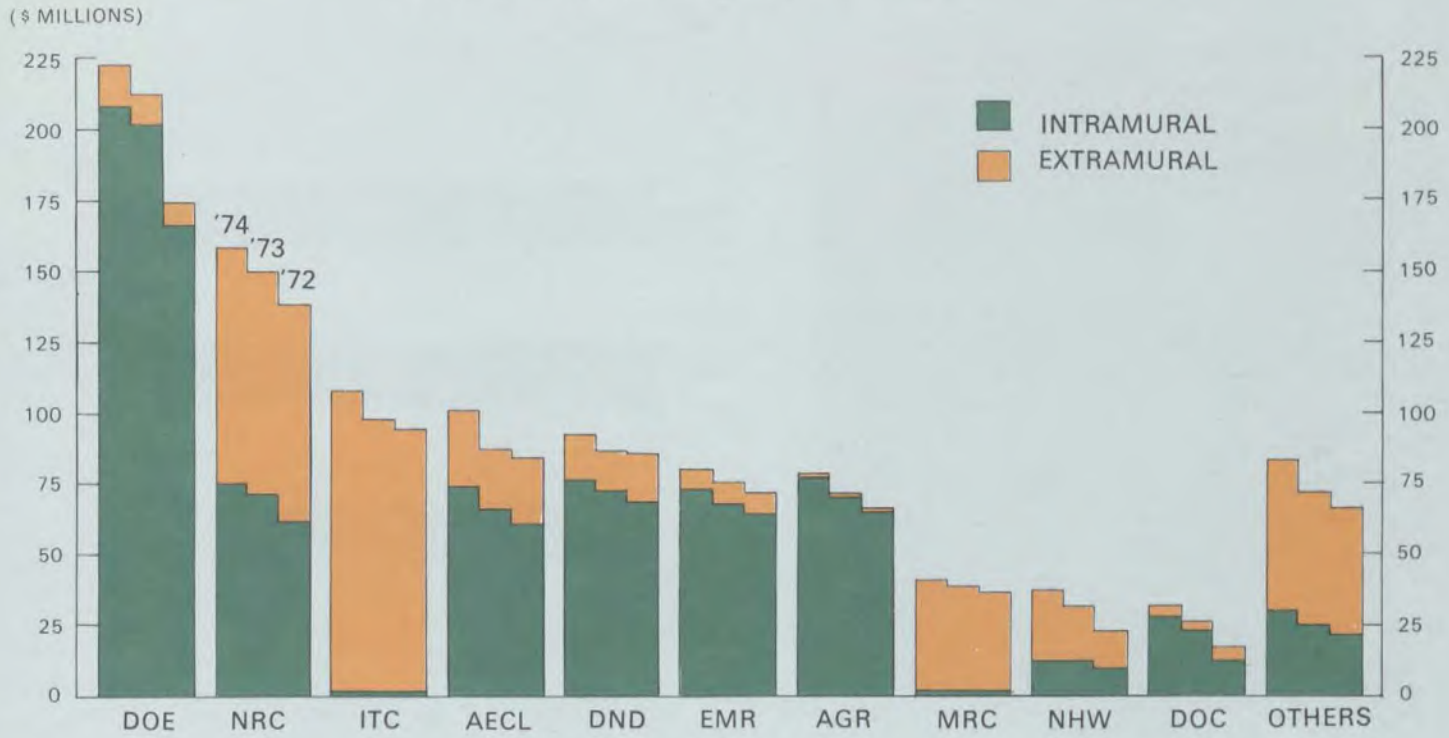
12.6 Canadian industry's share of the federal natural science budget has shown the least fluctuation in the past decade: from a low of 15% in 1968, it rose to a peak of 19% in 1971. It is estimated that it will approximate 18% this year.

13. FEDERAL INTRAMURAL AND EXTRAMURAL EXPENDITURES ON SCIENTIFIC ACTIVITIES BY DEPARTMENT OR AGENCY, 1972-74

13.1 DOE will retain the leading position among federal science spenders in 1974, with an estimated budget of $222.5 million. Over the 1972-74 period, it has averaged 22% of total federal expenditures on the natural sciences. NRC's forecast expenditures of $158 million or 15% of the total place it in second position.

13.2 Seven departments and agencies account for just over 80% of the government's natural science budget for the 1972-74 period: DOE (22%), NRC (15%), ITC (10%), AECL (10%), DND (9%), EMR (8%), and AGR (8%).

13. Federal Intramural and Extramural Expenditures on Scientific Activities by Department or Agency, 1972-74



13.3 From 1972 to 1974, growth within DOE has expanded at a rate of 13.1% per annum. Expenditures of the other major departments and agencies have increased by the following annual percentages: AECL—9.5, AGR—8.9, NRC—7.0, ITC—6.9, EMR—5.7, and DND—3.8.

13.4 Of the $1,030 million to be spent on the natural sciences in 1974, intramural expenditures will account for $658 million, extramural expenditures for $372 million.

13.5 DOE's 1974 intramural expenditures of $209 million are equal to one-third of the government's in-house natural science budget. Growth within DOE is expected to drop off substantially in 1974 : whereas average annual increases for 1970-72 and 1973 equalled 12.7 and 21.2%, respectively, the increase in 1974 is estimated at 3.5%.

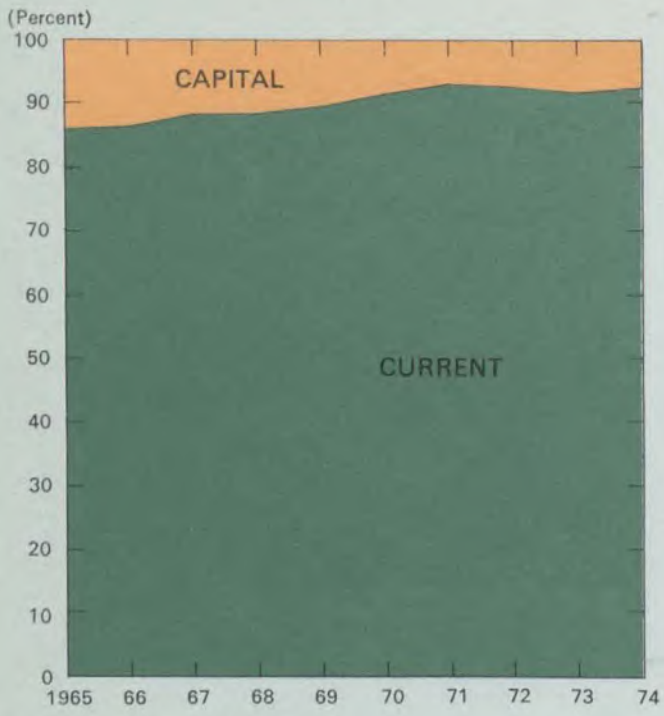
13.6 AGR, DND, NRC, AECL, and EMR are each expected to spend between $74 and $77 million for in-house activities this year, for a combined total of $375 million. Together with DOE they will account for 89% of intramural expenditures.

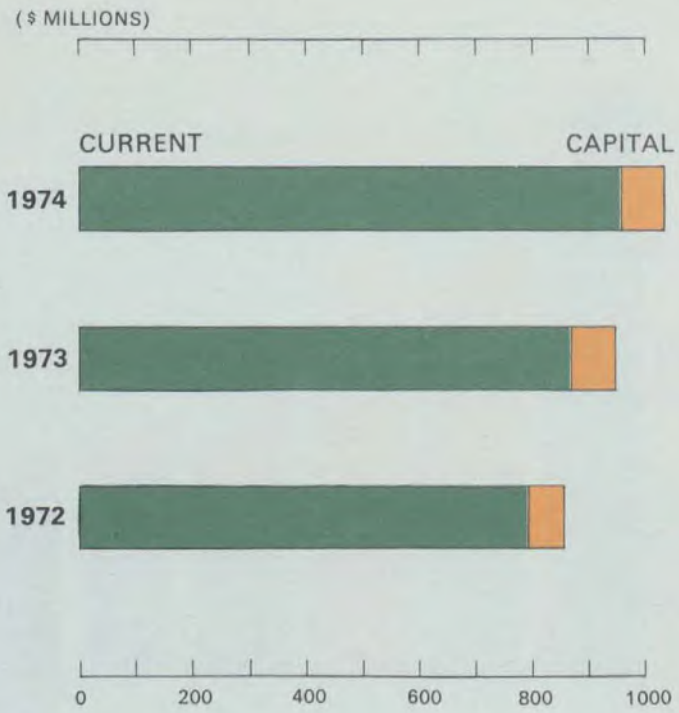
13.7 Of the major in-house performers, AECL and AGR will register the most significant budget increases: 11.8 and 10.6%, respectively.

13.8 The growth rates of intra- and extramural science spending are expected to reverse in 1974: whereas these expenditures grew at respective rates of 15.0 and 3.2% in 1973, their equivalents for 1974 are estimated at 7.1 and 12.3%.

13.9 ITC is the major source of federal funds for extramural activities owing to the department's grant programs in support of industrial research and development. Its extramural expenditures will equal $105 million or 28% of the total 1974 extramural budget. Combined with NRC, and MRC whose expenditures are almost exclusively extramural, it accounts for 61% of total extramural funding.

14. Federal Current and Capital Expenditures on Scientific Activities



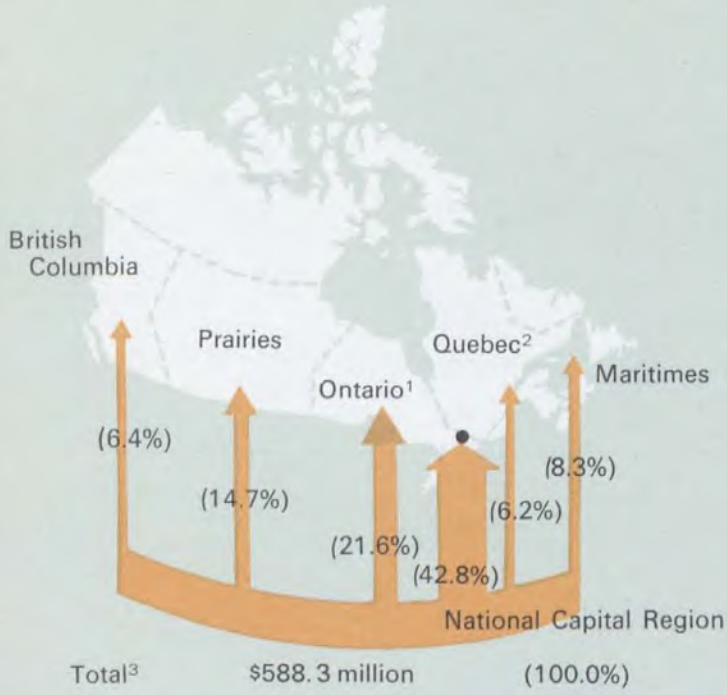


14.1 Ninety-three percent of the 1974 natural science budget will support the current activities of federal departments and agencies; capital projects will account for the remaining 7%.

14.2 The percentage of funds allocated to current expenditures increased yearly between 1965 and 1971, climbing from 86 to 93% of the total budget; since then, they have averaged slightly under 93%.

14.3 Over the 1965-74 period, current expenditures have more than tripled in value, while capital costs have increased by 50%.

15. Federal Intramural Expenditures on Scientific Activities
Geographical Distribution, 1973



PROVINCE OR REGION	$ MILLIONS	%
National Capital Region	251.5	(42.8)
Ontario[1]	127.0	(21.6)
Alberta	40.1	(6.8)
British Columbia	37.8	(6.4)
Manitoba	36.7	(6.2)
Quebec[2]	36.3	(6.2)
Nova Scotia	31.9	(5.4)
New Brunswick	10.7	(1.8)
Saskatchewan	9.8	(1.7)
Newfoundland	5.2	(0.9)
Prince Edward Island	1.3	(0.2)
Sub-Total	588.3	(100.0)
Unallocated[3]	17.5	
TOTAL	605.8[4]	

[1] *Excluding Ottawa.*
[2] *Excluding Hull*
[3] *An additional $17.5 million is unallocated, making a grand total of $605.8 million. This $17.5 million includes expenditures of $2.0 million in the Yukon and N.W.T., $7.5 million budgeted for AGR's Research Program, $5.3 million for EMR's Earth Sciences Program, and $2.6 million for DOE's Environmental Management Service.*
[4] *Excludes the administration of extramural programs.*

15.1 Forty-three percent of the federal government's budget for intramural spending on the natural sciences was allocated to activities in the National Capital Region in 1973. This was equal to expenditures of $251.5 million.

15.2 Of the remaining $354.3 million allocated to research and development and related activities, 36% was spent in Ontario; 35% in the Western provinces; 14% in the Atlantic provinces; and 10% in Quebec.

16. Federal Payments to Universities and Non-Profit Institutions for Scientific Activities by Department or Agency, 1972-74

($ MILLIONS)

DEPARTMENT OR AGENCY	1972		1973		1974	
	$	%	$	%	$	%
NRC	66.5	(47.1)	65.2	(43.7)	66.9	(42.0)
MRC	33.8	(23.9)	35.3	(23.7)	37.1	(23.3)
NHW	12.6	(8.9)	19.3	(13.0)	24.0	(15.1)
CIDA	5.7	(4.0)	8.1	(5.4)	8.4	(5.3)
AECB	11.7	(8.3)	7.9	(5.3)	7.2	(4.5)
Others [1]	11.0	(7.8)	13.4	(9.0)	15.7	(9.9)
TOTAL	141.3	(100.0)	149.2	(100.0)	159.3	(100.0)

[1] Includes primarily DOE, IDRC, EMR, and ITC.

16.1 Federal payments to Canadian universities and private non-profit institutions will reach $159 million in 1974. This level of support is equal to a 7% ($10 million) increase over the previous year. The corresponding increase in the total natural science budget is estimated at 9%.

16.2 NRC, MRC, and NHW will account for 80% of total federal payments to universities and non-profit institutions, with NRC contributing 42%, MRC 23%, and NHW 15%.

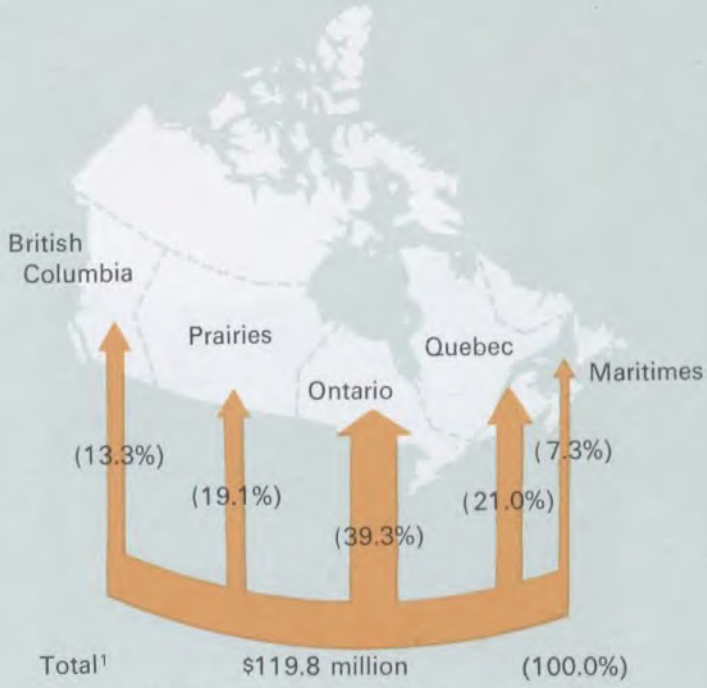
16.3 NRC continues to be the major source of assistance to universities and non-profit institutions, with estimated expenditures of $67 million for 1974. Its funding has increased at a moderate annual rate of 1% between 1970 and 1974, compared to a 3% yearly average for the 1965 to 1970 period.

16.4 MRC and NHW, the other major sources of support, will make payments of $37 and $24 million, respectively. NHW assistance has doubled since 1972, while MRC's has grown at an average annual rate of 5%.

17. Federal Payments to Universities for Scientific Activities, Geographical Distribution 1973

PROVINCE	$ MILLIONS	%
Ontario	47.1	(39.3)
Quebec	25.2	(21.0)
British Columbia	15.9	(13.3)
Alberta	11.2	(9.3)
Manitoba	6.6	(5.5)
Saskatchewan	5.1	(4.3)
Nova Scotia	3.7	(3.1)
Newfoundland	3.5	(2.9)
New Brunswick	1.5	(1.3)
Prince Edward Island	0.1	(0.1)
Sub-Total	119.8	(100.0)
Unallocated	22.6	
TOTAL	142.4[1]	

[1] Note that this total does not include private non-profit institutions.

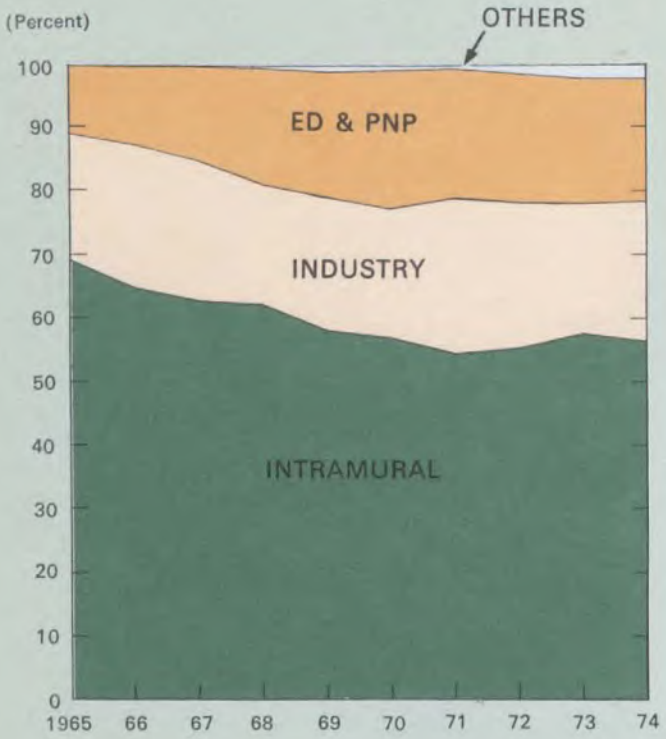


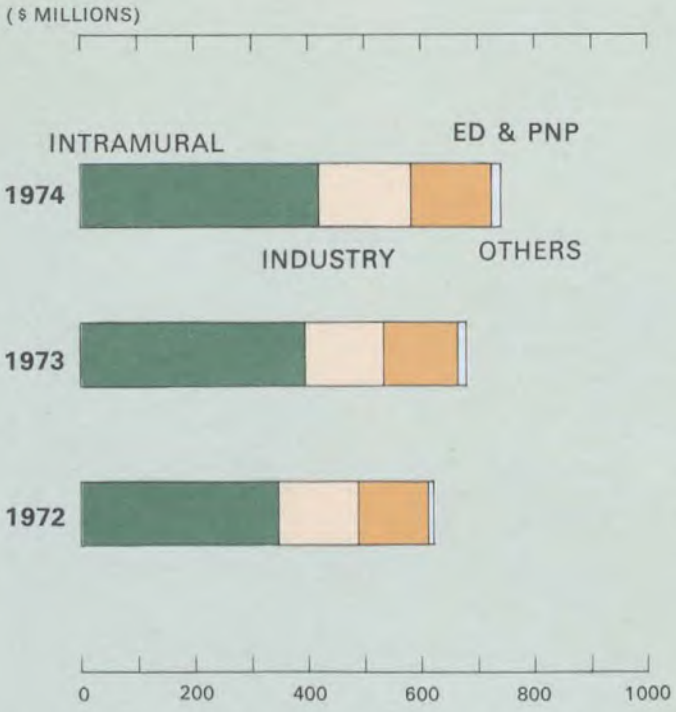
[1]An additional $22.6 million is unallocated, making a grand total of 142.4 millions.

17.1 Three provinces—Ontario, Quebec, and British Columbia—received three-quarters of all federal payments to universities for natural science activities in 1973: Ontario was allocated the largest share with $47 million; Quebec obtained $25 million; and British Columbia $16 million.

17.2 The Prairie provinces were awarded 19% of the total, while the remaining 7% went to the Atlantic provinces.

18. Federal Expenditures on Research & Development, by Performer





18.1 Federal expenditures on R&D in the natural sciences will reach $739 million in 1974, an 8.8% increase over the previous year.

18.2 R&D spending within government establishments will total $417 million or 56% of the total federal R&D budget.

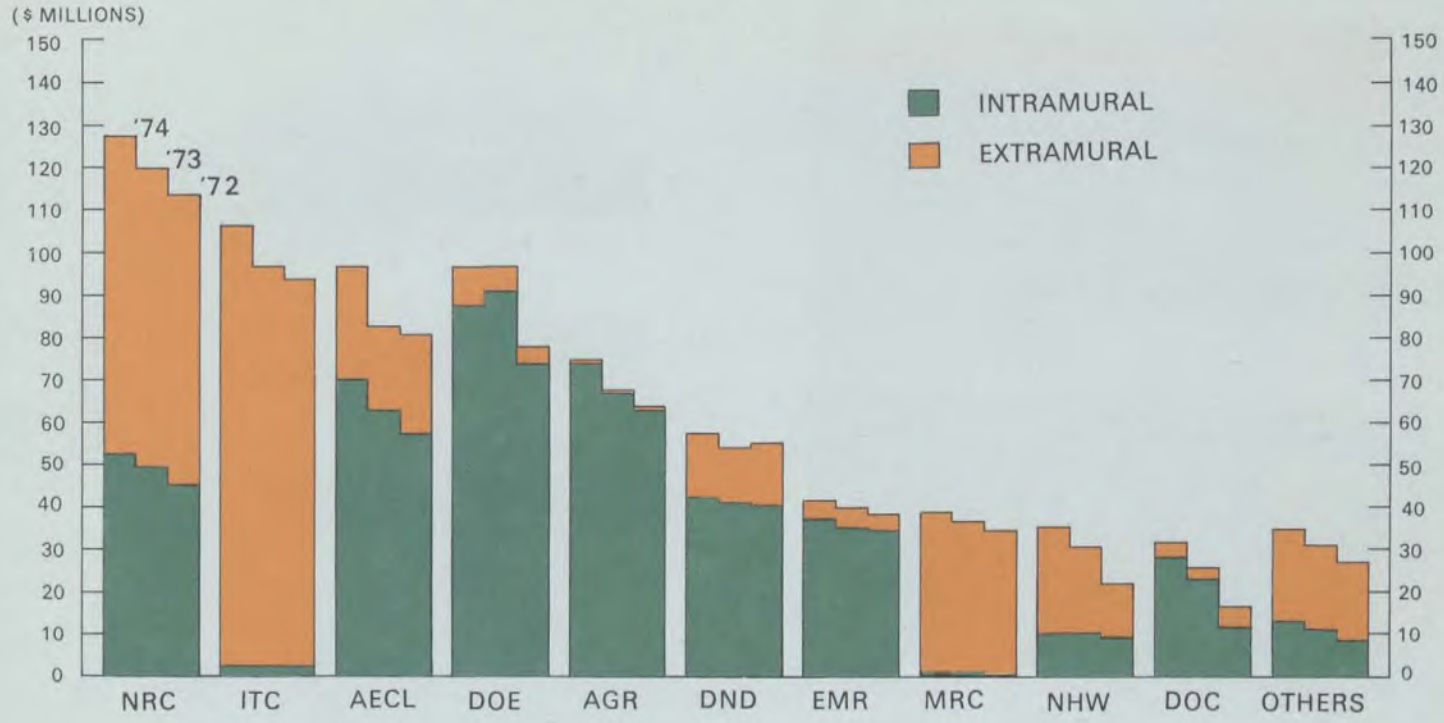
18.3 From 1965 to 1971, the proportion of funds allocated to in-house R&D declined yearly; it has remained fairly constant since then. Intramural expenditures amounted to 69% of the total in 1965, compared to 55% in 1971, and 56% in 1974.

18.4 The declining proportion of intramural spending in the late sixties was paralleled by a major increase in the support of R&D in the educational and non-profit institution sector. Payments in this sector almost quadrupled in value between 1965 and 1970, climbing from $30 to $117 million or from 11 to 22% of the federal R&D budget.

18.5 Over the same period, support of industrial R&D doubled from $56 to $110 million; its share of the total federal funds for R&D averaged 20% yearly.

18.6 Of the $322 million to be spent extramurally on R&D in 1974, industry will receive 51% ($164 million); 44% ($141 million) will go to educational and non-profit institutions; and 5% ($17 million) to other Canadian and foreign performers. The industrial total represents a 17% increase over 1973; educational and non-profit institution payments will be 7% higher.

19. Federal Intramural and Extramural Expenditures on Research & Development by Department or Agency, 1972-74



19.1 NRC will continue to spend more dollars on R&D in 1974 than any other federal department or agency. Its estimated expenditures of $127 million represent 17% of the government's R&D budget; $52 million of this total will support activities within its establishments, while $75 million will be paid to extramural performers.

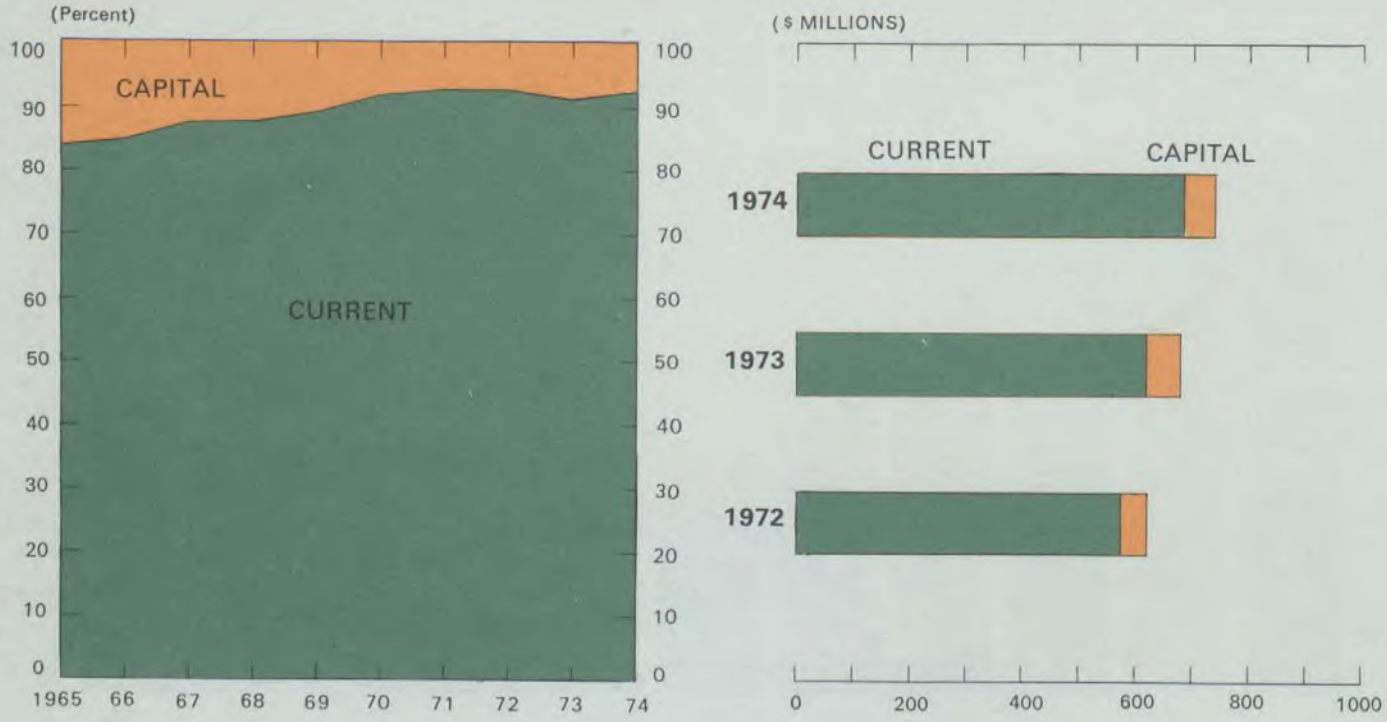
19.2 The largest budget for in-house R&D belongs to DOE: it will equal $87 million or 21% of the total, a 3.6% drop from 1973. AGR and AECL are also expected to incur large expenditures: $74 and $70 million, respectively; these totals represent increases of 10.8 and 12.2% over 1973.

19.3 ITC's grant programs in support of R&D in Canadian industry make it the largest funder of extramural activities: its payments of $104 million are equal to one-third of the extramural budget. NRC and MRC together account for another third.

19.4 Five departments and agencies—NRC, ITC, AECL, DOE, and AGR—are expected to share two-thirds of the total federal R&D budget in 1974.

19.5 The expected growth in the 1974 intramural budget is 6.3%; that of the extramural budget is 12.1%.

20. Federal Current and Capital Expenditures on Research & Development



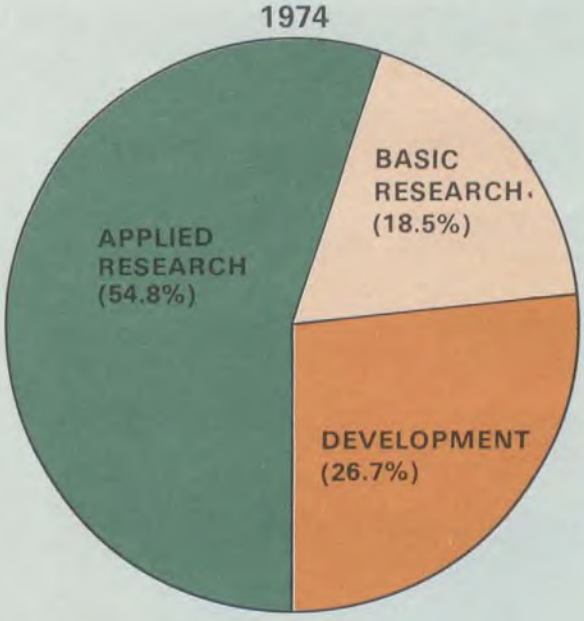
20.1 Of the total R&D budget of $739 million in 1974, it is estimated that 93% will cover current expenditures; capital costs will account for the remainder.

20.2 The proportion of funds devoted to current costs increased yearly between 1965 and 1971, from 84% of the total to 93%. Conversely, the share of capital costs dropped from 16 to 7%.

20.3 Comparing 1974 to 1965, current expenditures on R&D have almost tripled in value, whereas dollars spent on capital projects have increased by less than 27%.

20.4 Current expenditures are expected to be 10% higher in 1974 than in 1973, while capital costs should be 6% lower.

21. Federal Current Intramural Expenditures on Research & Development by Category of Research & Development, 1972-74



($ MILLIONS)

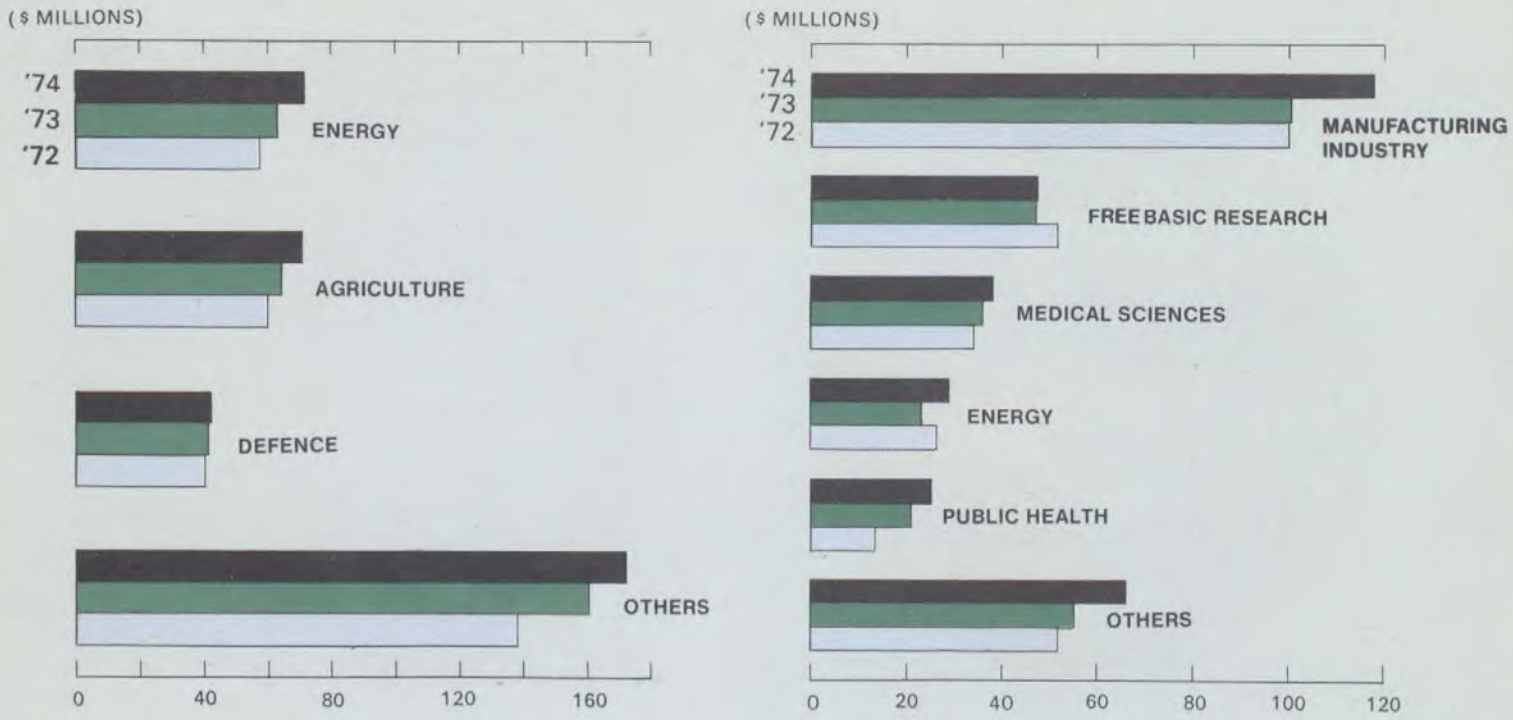
CATEGORY	1972	1973		1974	
	$	$	% Change	$	% Change
RESEARCH	212.6	240.3	13.0	258.6	7.6
Basic	55.8	62.9	12.6	65.2	3.8
Applied	156.8	177.4	13.2	193.4	9.0
DEVELOPMENT	79.4	85.1	7.1	94.3	10.8
TOTAL	292.0	325.3	11.4	352.8	8.4

21.1 Of the estimated $353 million to be spent on current intramural R&D in 1974, 54.8% will be devoted to applied research, 26.7% to development, and 18.5% to basic research.

21.2 Over the past three years, the proportional distribution of funds between basic and applied research, and experimental development, has remained generally the same.

21.3 Current intramural expenditures on research in 1974 will be 7.6% above the previous year's level; an increase of 13.0% was recorded between 1972 and 1973. The growth of current intramural expenditures on experimental development will rise more sharply this year than last: 10.8% compared to 7.1%.

22.& 23. Principal Application of Federal Current Expenditures on Research & Development 1972-74



22.1 More money will be applied to current intramural R&D work on energy in 1974 than to any other field of application. A total of $71.2 million has been budgeted for this area, or 14% more than in 1973, mostly by AECL (93%); EMR will support 6% of the effort and NRC 1%.

22.2 Current in-house agricultural R&D will be supported at almost the same level as energy: it will receive $70.5 million, of which 98% is in AGR's budget, and 2% in NRC's. This total is 10% higher than the funding of agriculture in 1973.

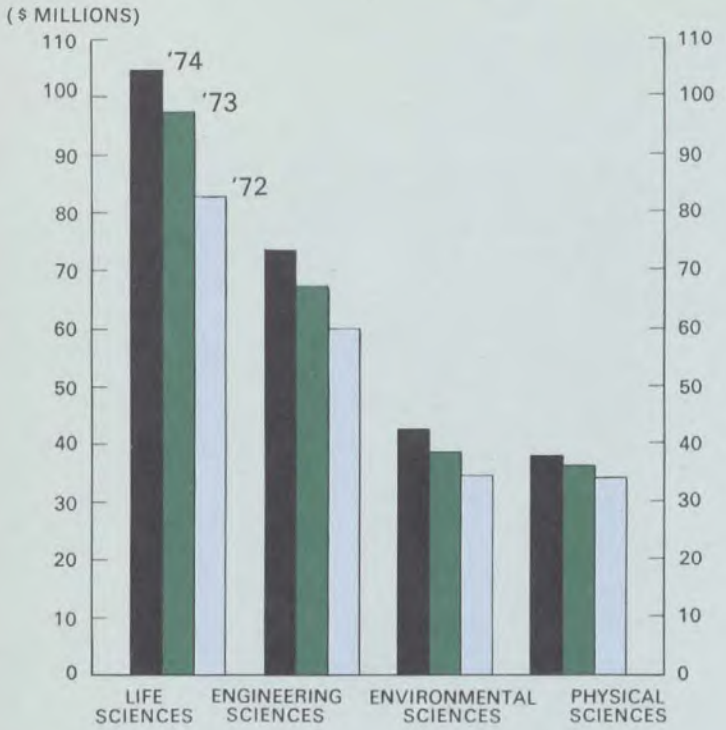
22.3 Slightly more than half of the federal allocations to current intramural R&D will be applied to energy, agriculture, and defence in 1974. The same distribution prevailed in 1972 and 1973.

23.1 Of a total of $322 million to be allocated to current extramural R&D by the federal government in 1974, more than a third or $118 million will be applied to work in the manufacturing industry. ITC's budget will cover 88% of this total, NRC's the balance.

23.2 Other major areas of application will include free basic research (15%), medical sciences (12%), energy (9%), and public health (8%), to be funded by NRC, MRC, AECL, and NHW, respectively.

23.3 Funds for R&D applied to public health are expected to double their 1972 level: they will climb from $13 to $25 million.

24. Federal Current Intramural Expenditures on Research by Field of Science, 1972-74[1]



($ MILLIONS)

FIELD	1972		1973		1974	
	$	%	$	%	$	%
Life Sciences	82.8	(38.9)	97.2	(40.4)	104.3	(40.3)
Engineering Sciences	59.7	(28.1)	67.1	(27.9)	73.1	(28.3)
Environmental Sciences	34.5	(16.2)	38.5	(16.0)	42.3	(16.4)
Physical Sciences	34.2	(16.1)	36.2	(15.1)	37.8	(14.6)
Mathematical Sciences	1.5	(0.7)	1.3	(0.5)	1.1	(0.4)
TOTAL	212.6	(100.0)	240.3	(100.0)	258.6	(100.0)

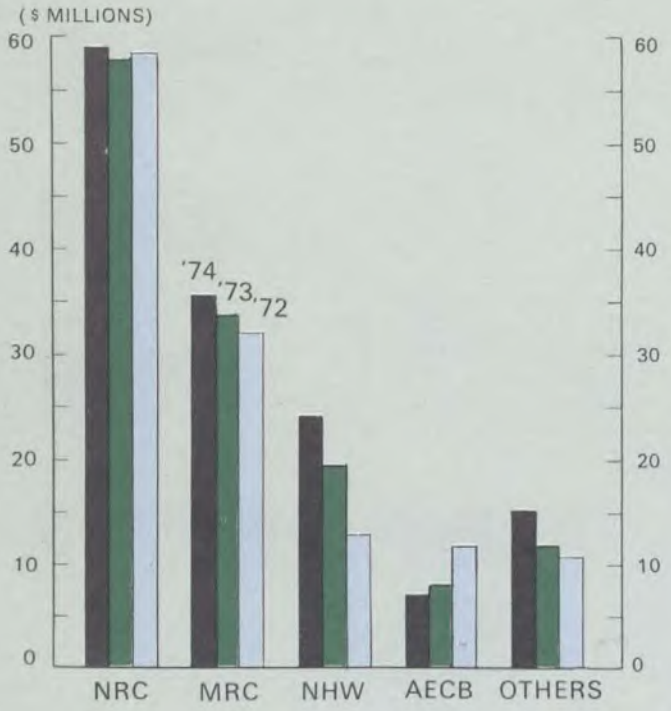
[1]The breakdown does not include experimental development which is more suitably classified by application rather than by discipline.

24.1 Current intramural expenditures on basic and applied research will reach $258.6 million in 1974, an increase of 8% over the previous year.

24.2 Since 1972, the life sciences have accounted for the largest portion of intramural basic and applied research expenditures. Estimated expenditures for 1974 are $104.3 million or 40.3% of the total.

24.3 The percentage distribution of spending by field of science has been fairly constant in the last three years. The proportional share of each of the sciences has remained within 1% of the previous year's distribution. The life sciences have generally accounted for 40% of current intramural basic and applied research expenditures; the engineering sciences for 28%; the environmental sciences for 16%; the physical sciences for 15%; and the mathematical sciences for 1%.

25. Federal Support of Research & Development in Canadian Universities and Non-Profit Institutions, by Department or Agency, 1972-74



($ MILLIONS)

DEPARTMENT OR AGENCY	1972 $	1972 % Change	1973 $	1973 % Change	1974 $	1974 % Change
NRC	58.5	(5.4)	58.0	(-0.9)	59.2	(2.2)
MRC	32.0	(4.0)	33.7	(5.5)	35.6	(5.4)
NHW	12.6	(2.0)	19.3	(53.4)	24.0	(23.9)
AECB	11.7	(65.1)	7.9	(-32.6)	7.2	(-8.2)
Others[1]	10.6	(. . .)	13.0	(. . .)	15.1	(. . .)
TOTAL[2]	125.4	(5.3)	131.9	(5.2)	141.1	(7.0)

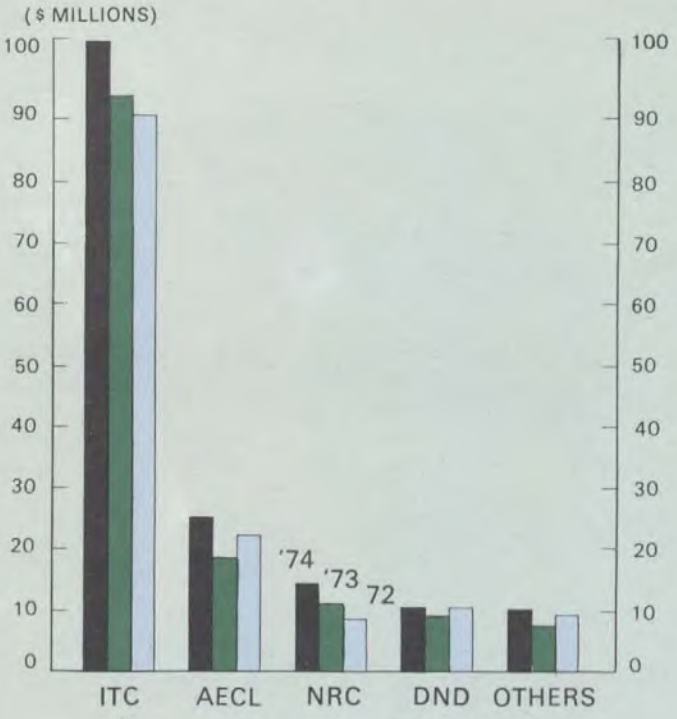
[1] Includes DOE, DND, ITC, EMR, INA, MOT, AGR, DOC and AECL.
[2] Includes grants, contracts and research fellowships. The latter totaled $3.0 million in 1972, $3.7 million in 1973 and will equal $4.0 million in 1974.

25.1 Federal assistance to natural science R&D in Canadian universities will reach $141.1 million in 1974, a 7.0% increase over the previous year. From 1972 to 1974, support has increased at an average rate of 6.1% per year.

25.2 NRC, with estimated expenditures of $59.2 million in 1974, is the largest funder of R&D in universities. This is an increase of 2.2% over the previous year. MRC follows with an expected total of $35.6 million. From 1972 to 1974, MRC spending has grown 5.4% annually.

25.3 Three departments and agencies—NRC, MRC, and NHW—will account for 84% of total federal support of R&D in Canadian universities and non-profit institutions in 1974.

26. Federal Support of Research & Development in Canadian Industry by Department or Agency, 1972-74



($ MILLIONS)

DEPARTMENT OR AGENCY	1972 $	1972 % Change	1973 $	1973 % Change	1974 $	1974 % Change
ITC	90.6	(31.7)	93.5	(3.2)	102.5	(9.6)
AECL	22.4	(-47.8)	19.0	(-14.9)	25.5	(34.2)
NRC	8.6	(24.8)	11.1	(28.5)	14.5	(30.9)
DND	10.6	(6.6)	9.1	(-14.1)	11.0	(20.6)
Others[1]	9.3	(. . .)	7.4	(. . .)	10.1	(. . .)
TOTAL	141.5	(- 1.7)	140.1	(- 1.0)	163.6	(16.8)

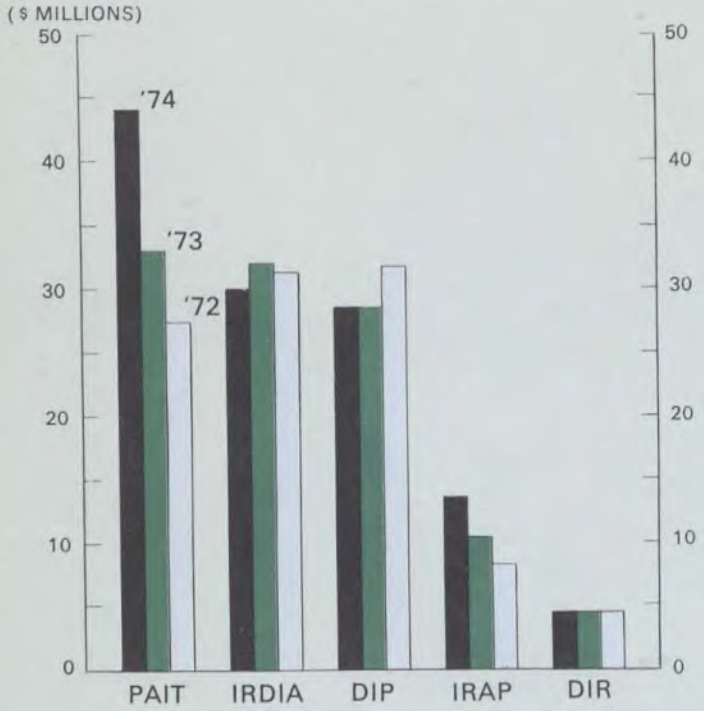
[1]Includes primarily DOC, EMR, DOE, MOT and NHW.

26.1 Canadian industry will receive $163.6 million from the federal government in support of its R&D activities in 1974. This represents a 16.8% increase over 1973.

26.2 ITC's estimated payments of $102.5 million, or 63% of the 1974 total, make it the major funder of industrial R&D. Other sources of support are: AECL $25.5 million (15%); NRC, $14.5 million (9%); and DND $11.0 million (7%).

26.3 NRC shows the highest average annual growth rate for the 1972 to 1974 period: 29.7% compared with 6.8, 6.3, and 1.8% for AECL, ITC, and DND, respectively.

27. Federal Programs in Support of Research & Development in Canadian Industry 1972-74



($ MILLIONS)

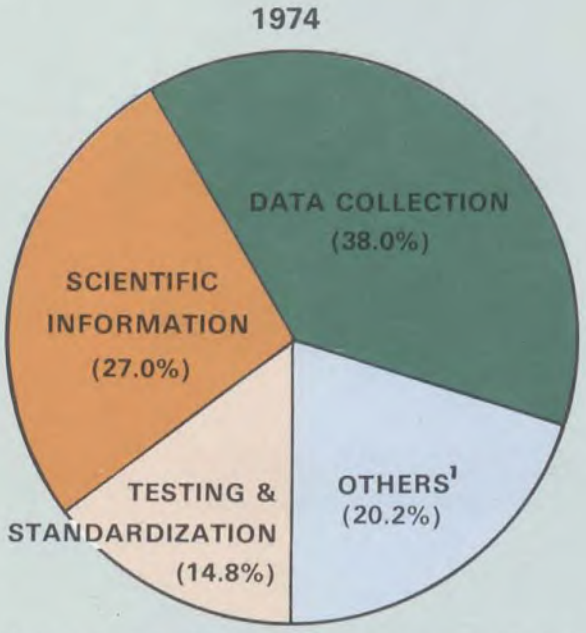
PRO-GRAM	1972		1973		1974	
	$	%	$	%	$	%
PAIT	27.4	(26.5)	33.0	(30.4)	44.0	(36.5)
IRDIA	31.3	(30.2)	32.0	(29.5)	30.0	(24.9)
DIP	31.9	(30.8)	28.5	(26.2)	28.5	(23.6)
IRAP	8.4	(8.1)	10.6	(9.8)	13.7	(11.3)
DIR	4.5	(4.4)	4.5	(4.1)	4.5	(3.7)
TOTAL	103.5	(100.0)	108.6	(100.0)	120.7	(100.0)

27.1 The federal government administers five major programs in support of R&D activities in Canadian industry—PAIT, IRDIA, DIP, IRAP and DIR. Payments through these programs will equal $120.7 million in 1974.

27.2 PAIT, IRDIA, and DIP, each of which is administered by ITC, will account for 84% of the total: their expenditures will equal $44.0, $30.0, and $28.5 million, respectively.

27.3 The funding of the five programs will remain much the same as last year, except for PAIT and IRAP: the former's budget will increase by 33% in 1974; the latter's by 27%.

28. Federal Expenditures on Related Scientific Activities, by Activity, 1972-74



[1] *Includes Feasibility Studies, Scholarship Programs, and Capital Expenditures.*

($ MILLIONS)

ACTIVITY	1972		1973		1974	
	$	%	$	%	$	%
Current Expenditures						
Data Collection	87.3	(37.3)	101.1	(38.1)	110.7	(38.0)
Scientific Information	63.5	(27.1)	70.5	(26.5)	78.8	(27.0)
Testing & Standardization	36.6	(15.6)	40.0	(15.0)	43.1	(14.8)
Feasibility Studies	14.3	(6.1)	17.7	(6.7)	20.4	(7.0)
Scholarship Programs	15.6	(6.7)	17.2	(6.5)	18.0	(6.3)
Capital Expenditures	16.8	(7.2)	19.1	(7.2)	20.2	(6.9)
TOTAL	234.0	(100.0)	265.6	(100.0)	291.3	(100.0)

28.1 Federal expenditures on related scientific activities in the natural sciences will reach $291.3 million in 1974, a 9.7% increase over the previous year.

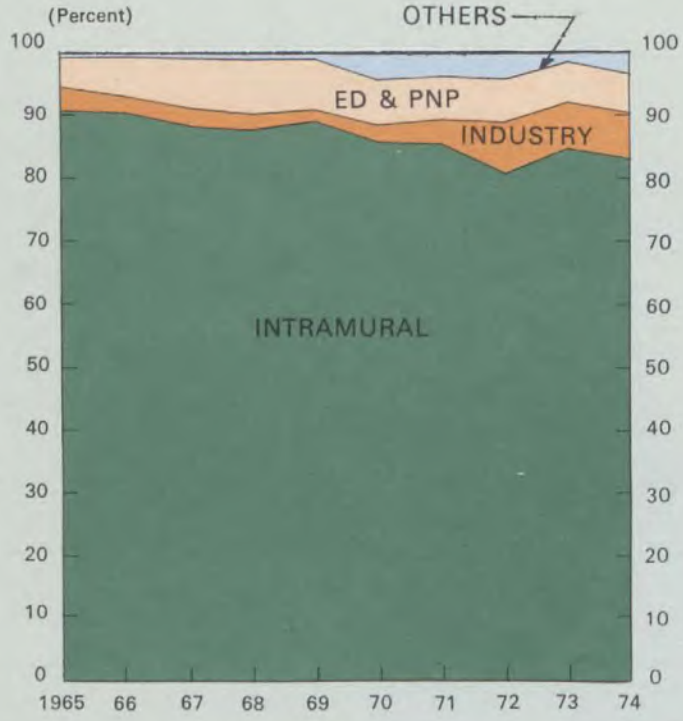
28.2 The percentage of funds allocated to related scientific activities has grown consistently since 1969 when it equalled 22% of the natural science budget; it should surpass 28% in 1974.

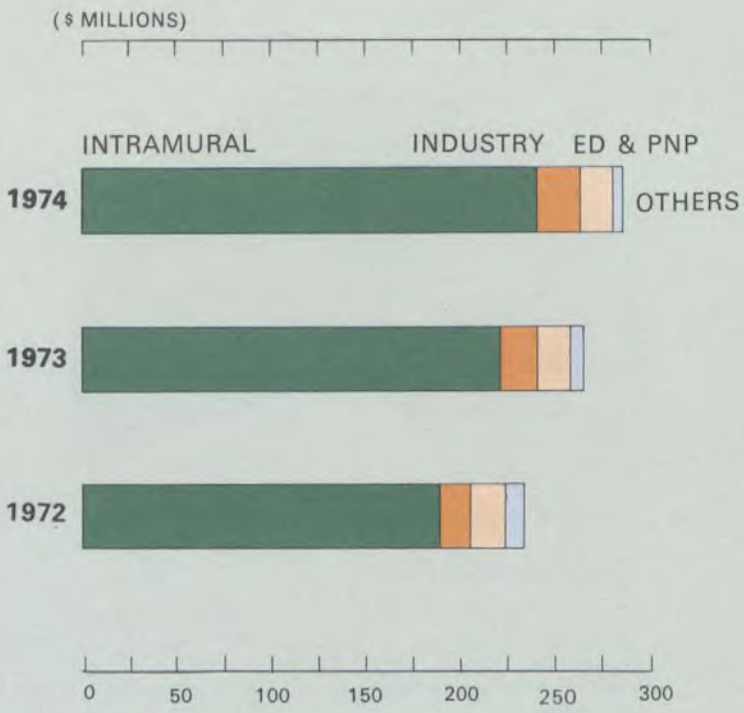
28.3 As in recent years, a major although decreasing portion of current RSA expenditures is devoted to scientific data collection: 38% of the total in 1974, compared to 42% in 1969, and 50% in 1965. Scientific information claims an increasingly important share: 27% in 1974, up from a constant 18% between 1965 and 1969.

28.4 Expressed in dollar terms, total expenditures on related scientific activities have more than tripled within the past decade: in particular, spending on feasibility studies has increased by a factor of 30; scientific information by a factor of 5.

28.5 Capital expenditures associated with RSA are exclusively intramural; they will equal $20.2 million in 1974, up from less than $5 million in 1965.

29. Federal Expenditures on Related Scientific Activities By Performer





29.1 Eighty-three percent of federal expenditures on related scientific activities will be allocated to in-house work in 1974; the remainder will be shared between Canadian industry (7%), educational and non-profit institutions (6%), and other Canadian and foreign performers (4%). In 1969, the distribution was 89% intramural, 2% Canadian industry, 8% Canadian educational and non-profit institutions, and 1% other Canadian and foreign performers.

29.2 Intramural activities will receive $241 million in 1974, Canadian industry $21 million, educational and non-profit institutions $18 million, and other Canadian and foreign performers $10 million.

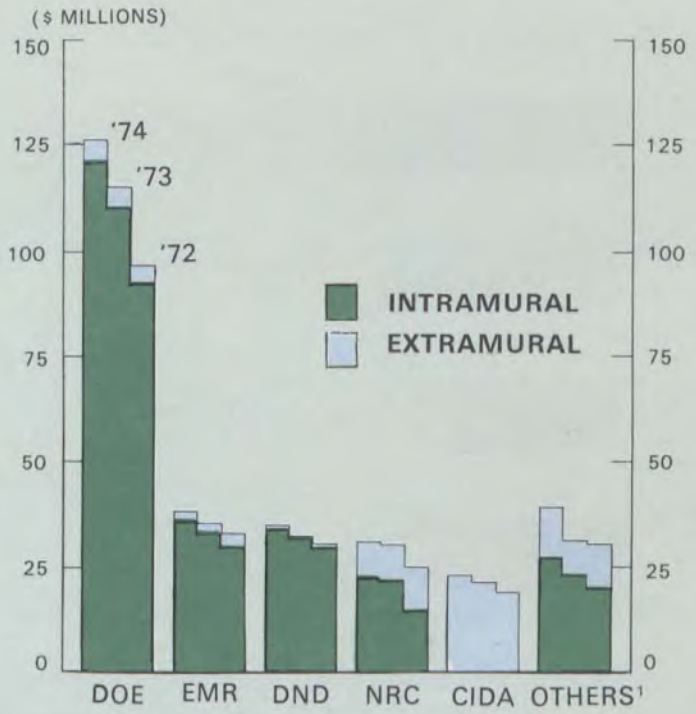
29.3 The funding of in-house RSA is expected to rise 9% over last year's level.

30. Federal Expenditures on Related Scientific Activities By Department or Agency, 1972-74

($ MILLIONS)

DEPARTMENT OR AGENCY	1972			1973			1974		
	Intramural	Extramural	Total	Intramural	Extramural	Total	Intramural	Extramural	Total
DOE	93.0	3.7	96.7	111.2	4.3	115.5	121.4	4.7	126.1
EMR	30.0	2.9	32.9	33.2	2.2	35.3	36.0	2.0	38.0
DND	29.7	0.7	30.4	31.6	0.5	32.1	34.0	0.8	34.8
NRC	16.2	8.7	24.8	22.2	7.9	30.1	22.5	8.4	30.9
CIDA	0.3	18.8	19.0	0.3	21.2	21.4	0.3	22.4	22.7
Others[1]	20.2	9.8	30.2	23.2	7.8	31.2	27.2	11.6	38.8
TOTAL	189.4	44.6	234.0	221.7	43.9	265.6	241.4	49.8	291.3

[1]Includes primarily CCA, REE, AECL, AGR, IDRC, National Museums, NHW, MRC, INA and External Affairs.



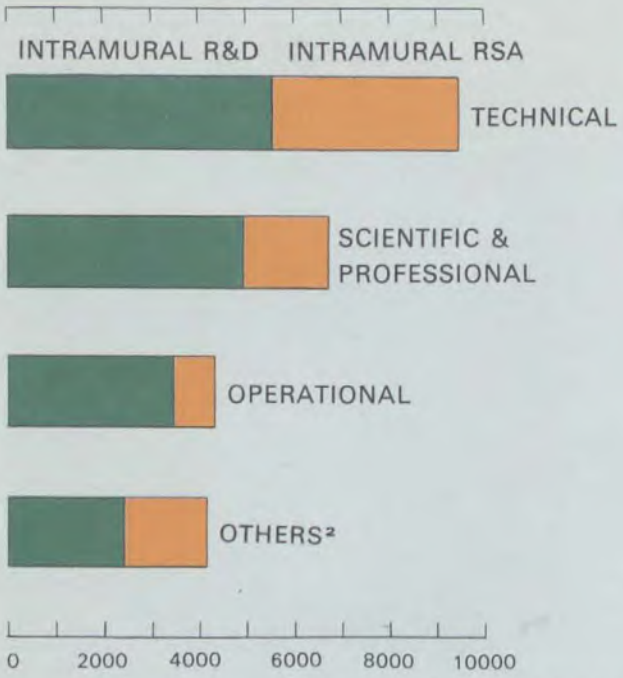
30.1 DOE will be the largest spender on related scientific activities in 1974, with an estimated budget of $126 million or 43% of the total; it has held this position since its creation in 1970. From 1965 to 1970, EMR was the major spender, accounting for approximately one-third of the RSA total.

30.2 It is estimated that expenditures by DOE, EMR, DND, NRC, and CIDA will amount to over 86% of the 1974 federal budget for related scientific activities; this remains unchanged from 1972.

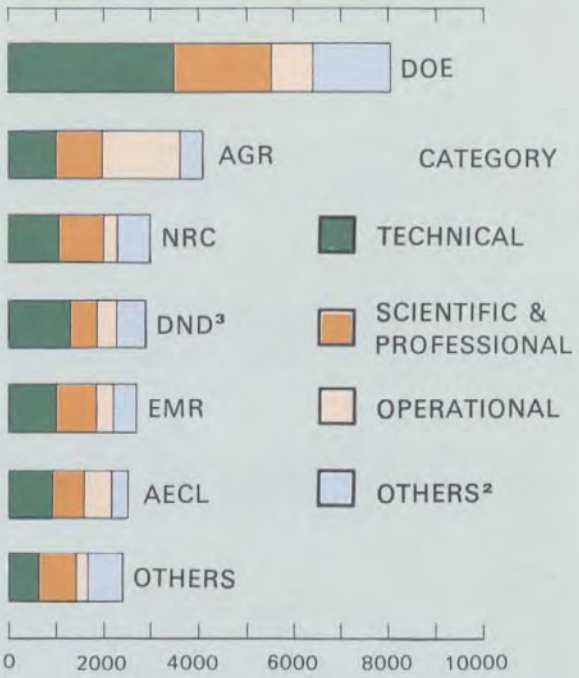
30.3 Ninety-six percent of the combined RSA expenditures of DOE, EMR, and DND will fund intramural activities in 1974; the same percentage prevailed in 1972 and 1973.

30.4 It is expected that 96% of EMR's current expenditures on RSA will be shared between scientific data collection and scientific information; 92% of DOE's budget will be divided between the same two activities; over 90% of the DND allocation will be applied to testing and standardization; scientific information, scholarship programs, and testing and standardization will account for 94% of the NRC total; and 86% of CIDA's spending will cover feasibility studies and scholarship programs.

31. Federal Manpower Engaged in Intramural Scientific Activities By Activity, 1973[1]



32. Federal Manpower Engaged in Scientific Activities By Department or Agency, 1973[1]



[1] *Expressed in full-time equivalent. It includes continuing, term, casual and seasonal employees as of September 30, 1972.*
[2] *Includes administrative support, administrative and foreign service, and executive personnel.*
[3] *Excluding 622 DND Military personnel unassignable by the above categories.*

31.1 The federal government employed a full-time equivalent of 26,190 persons in natural science activities in 1973: 64% were assigned to R&D work; 35% to related scientific activities; and the remaining 1% administered extramural programs.

31.2 Technical employees accounted for the largest group among the various personnel categories: they numbered 9,473 or 36% of the total; scientific and professional employees totalled 6,760 (26%); operational 4,342 (17%); administrative support 4,062 (15%); administrative and foreign service 871 (3%); unassignable military personnel 622 (2%); and executive 59 (0.2%).

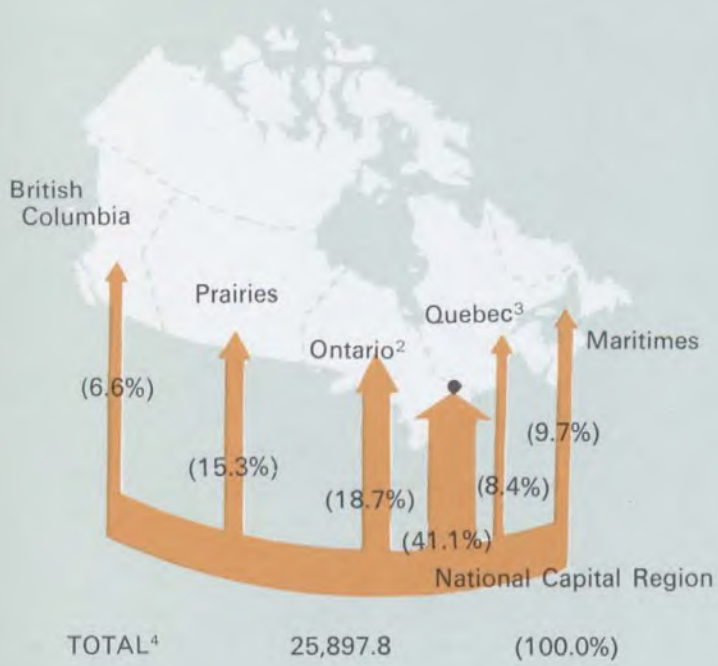
31.3 The distribution of employees among certain manpower categories was significantly different within each activity: for example, the number of technical employees was equal to 34% of the R&D total and 44% of the RSA total; in the scientific and professional group the percentages were 30 and 20; in the operational category 21% and 10%; and in administrative support 12% and 22%, respectively.

32.1 Slightly more than eight thousand scientific personnel were employed by DOE in 1973; this equalled 31% of the total federal scientific manpower. Totals for other major departments and agencies were: AGR 4,078 (16%); DND 3,500 (13%); NRC 2,980 (11%); EMR 2,686 (10%); and AECL 2,509 (10%).

32.2 Almost one quarter of all personnel conducting R&D were employees of AGR; 22% worked for DOE. The number of personnel engaged in related scientific activities within DOE was just over half the federal total.

32.3 In 1973, the ratio of scientists and professionals to supporting personnel was equal to 1.06 in EMR, the highest of any department or agency; other comparable ratios were: NHW .80; DOE and NRC. 46; DOC. 43; AECL. 37; DND. 36; and AGR .30.

33. Federal Manpower Engaged in Scientific Activities, Geographical Distribution, 1973[1]



PROVINCE OR REGION	MANPOWER	%
National Capital Region	10,640.00	(41.1%)
Ontario[2]	4,844.15	(18.7%)
Quebec[3]	2,164.85	(8.4%)
Alberta	2,024.40	(7.8%)
British Columbia	1,709.50	(6.6%)
Nova Scotia	1,430.25	(5.5%)
Manitoba	1,371.75	(5.3%)
New Brunswick	746.00	(2.9%)
Saskatchewan	564.90	(2.2%)
Newfoundland	222.00	(0.9%)
Prince Edward Island	94.00	(0.4%)
Yukon and N. W. T.	86.00	(0.3%)
Sub-total	25,897.80	(100.0%)
Unallocated	292.00	
Total	26,189.80	

[1]Expressed in full-time equivalent; includes continuing, term, casual and seasonal employees as well as military personnel, as of September 30, 1972.
[2]Excluding Ottawa.
[3]Excluding Hull.
[4]An additional 292 personnel are unallocated, making a grand total of 26,189.8 personnel.

33.1 Forty-one percent of all federal personnel engaged in natural science activities worked in the National Capital Region in 1973. This is equal to a full time labour force of 10,640.

33.2 Of the more than fifteen thousand other federal employees conducting R&D and related activities, 37% worked in the Western provinces; another 31% were located in Ontario; 16% in the Atlantic provinces; and 14% in Quebec.

PART THREE

HUMAN SCIENCES

CHART PAGE

EXPENDITURES

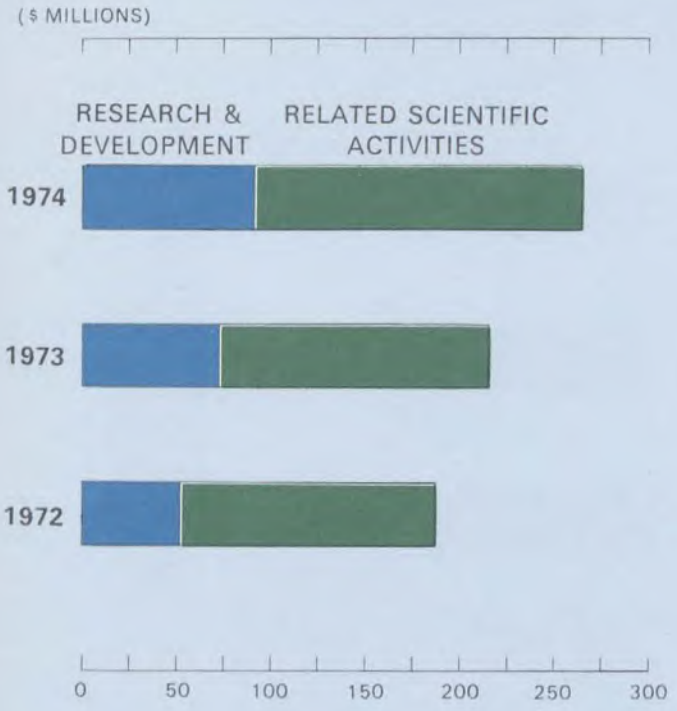
SCIENTIFIC ACTIVITIES (Research & Development and Related Scientific Activities)

RESEARCH & DEVELOPMENT

RELATED SCIENTIFIC ACTIVITIES

MANPOWER

34. Federal Expenditures on Scientific Activities By Activity, 1972-74



($ MILLIONS)

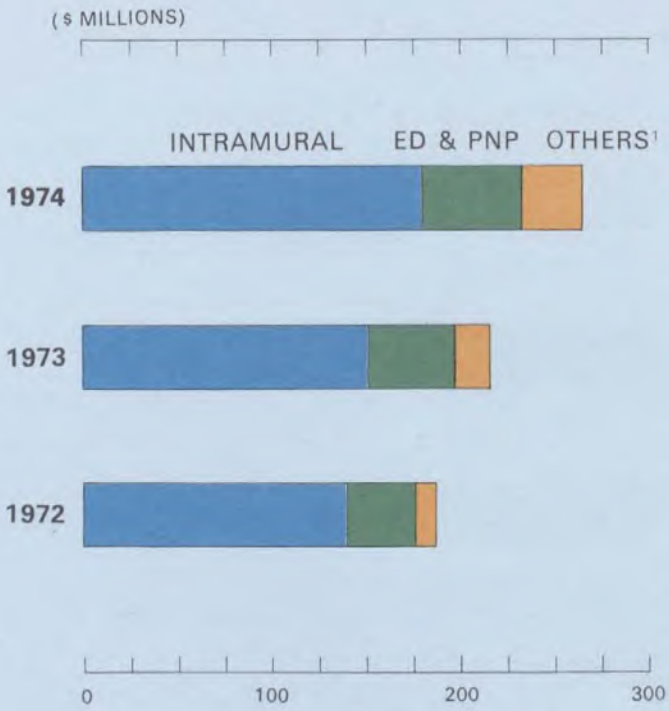
ACTIVITY	1972		1973		1974	
	$	%	$	%	$	%
R&D	51.9	(27.8)	72.4	(33.7)	90.8	(34.4)
RSA	135.1	(72.2)	142.9	(66.3)	173.5	(65.6)
TOTAL	186.9	(100.0)	215.3	(100.0)	264.3	(100.0)

34.1 Federal spending on the human sciences is expected to reach $264.3 million in 1974, an increase of $49 million over the previous year.

34.2 Support of R&D is estimated at $90.8 million, a 25% rise over 1973, while the value of related scientific activities will grow 21% and equal $173.5 million.

34.3 The proportion of expenditures allocated to R&D activities in the human sciences is increasing: it will represent 34.4% of the total in 1974, up 7% since 1972; concomitantly, the share of dollars going to related scientific activities is expected to drop from 72.2 to 65.6% over the same period.

35. Federal Expenditures on Scientific Activities By Performer, 1972-74



($ MILLIONS)

PER-FORMER	1972		1973		1974	
	$	%	$	%	$	%
Intramural	139.8	(74.8)	151.3	(70.3)	179.9	(68.1)
ED & PNP	36.2	(19.3)	45.9	(21.3)	52.5	(19.9)
Others[1]	10.9	(5.8)	18.1	(8.4)	31.9	(12.0)
TOTAL	186.9	(100.0)	215.3	(100.0)	264.3	(100.0)

[1]Includes provincial and municipal governments, foreign performers, and industry.

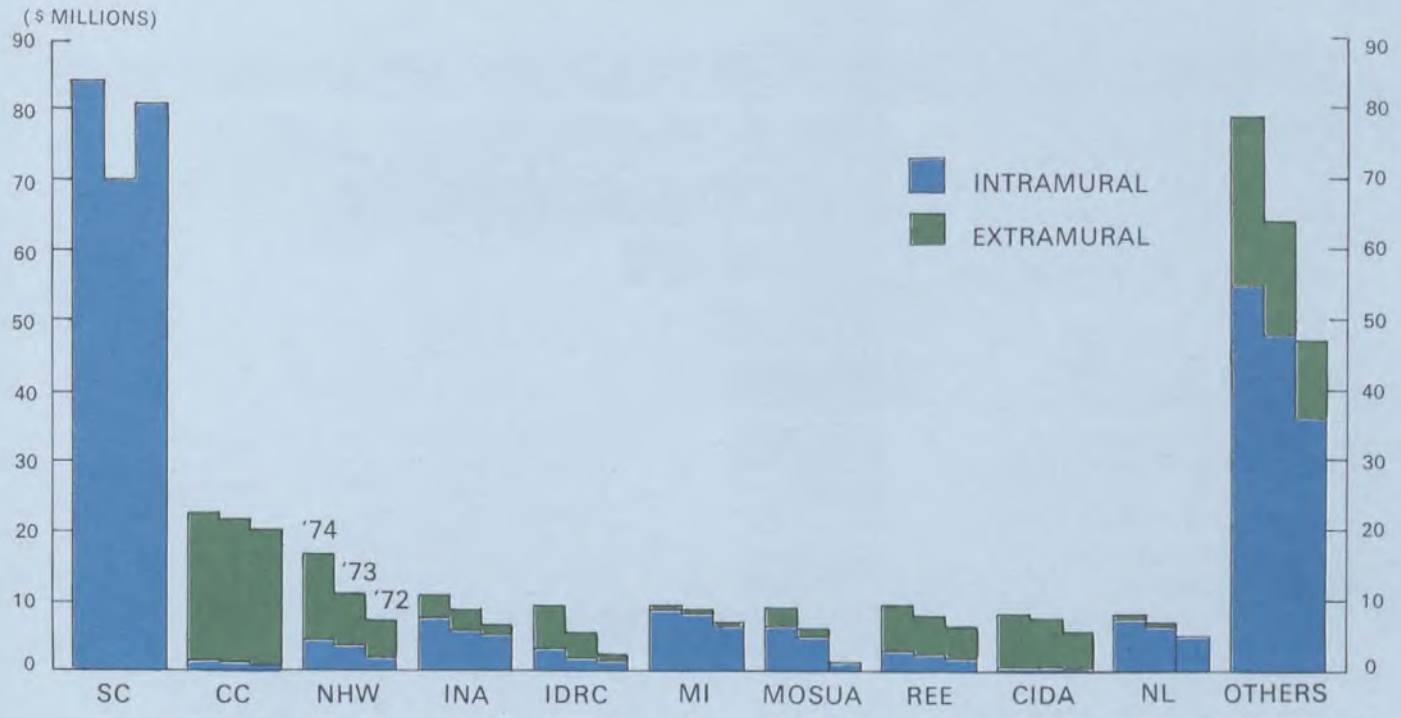
35.1 It is estimated that 23% more federal funds will be spent on human science activities in 1974 than during the previous year. The 1972 to 1973 increase was 15%.

35.2 Spending within federal establishments will increase at a more rapid pace than in 1973: 18.9% compared to 8.2%. However, the percentage of dollars allocated to activities within these establishments is expected to decrease to 68.1%, a drop of almost 7% since 1972.

35.3 The educational and non-profit institutions share of federal funds is expected to equal one-fifth of the total; contributions to this sector will be 14% higher than in 1973.

35.4 The most significant shift in the distribution of payments for human science activities has favoured provincial and municipal governments, Canadian industry, and foreign performers; they will receive three times more federal assistance thfs year than in 1972: $32 compared to $11 million.

36. Federal Intramural and Extramural Expenditures on Scientific Activities By Department or Agency, 1972-74

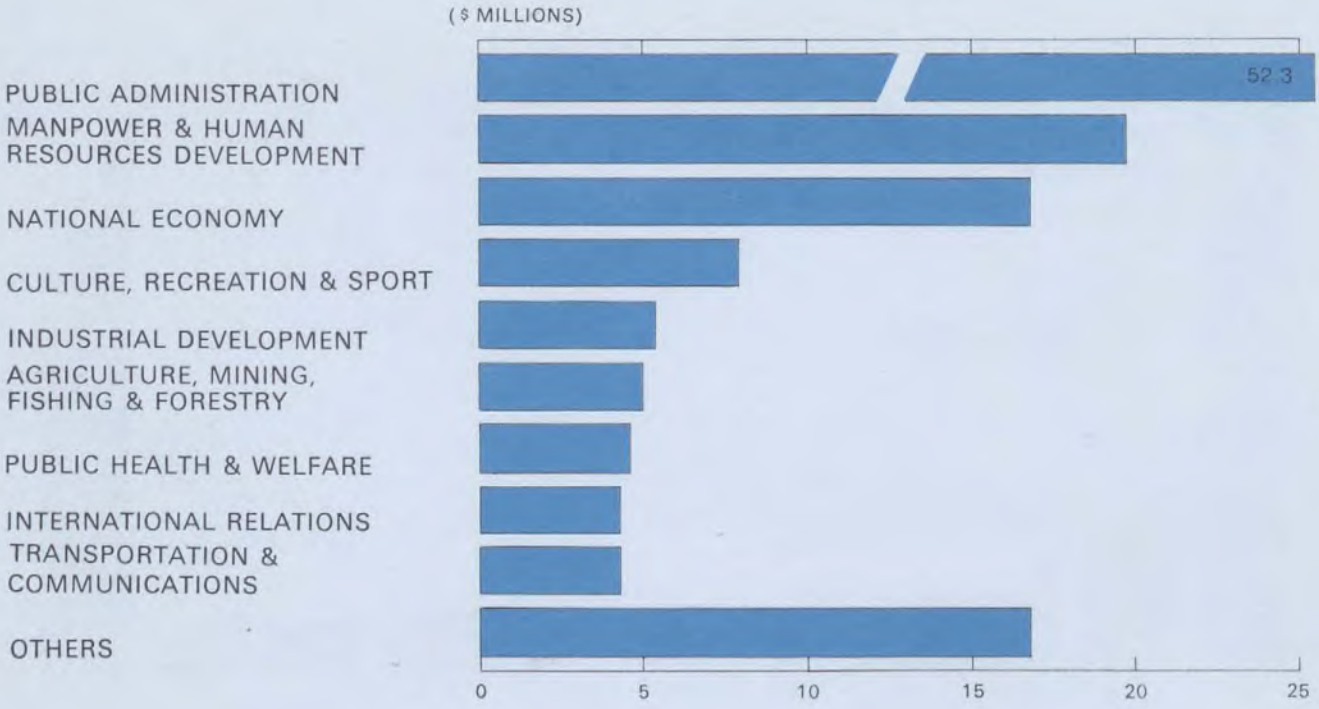


36.1 Statistics Canada will retain the leading position among federal spenders on the human sciences, with an estimated 1974 budget of $84.3 million, 4% above the 1972 level. Its small annual average growth between 1972 and 1974 parallels its declining share of total federal human science expenditures: 32% in 1974, compared to 43% in 1972. As in recent years, its expenditures will be exclusively intramural.

36.2 Canada Council's forecast expenditures of $22.5 million, or 8.5% of the total, rank it behind Statistics Canada, but ahead of 44 other federal departments; 26 of these each account for less than 1% of the total.

36.3 Of the $264 million to be spent on the human sciences in 1974, intramural expenditures will account for $180 million (68%); extramural expenditures for $84 million (32%). Comparative figures for 1973 indicate that in-house performance amounted to 70% and extramural performance 30%.

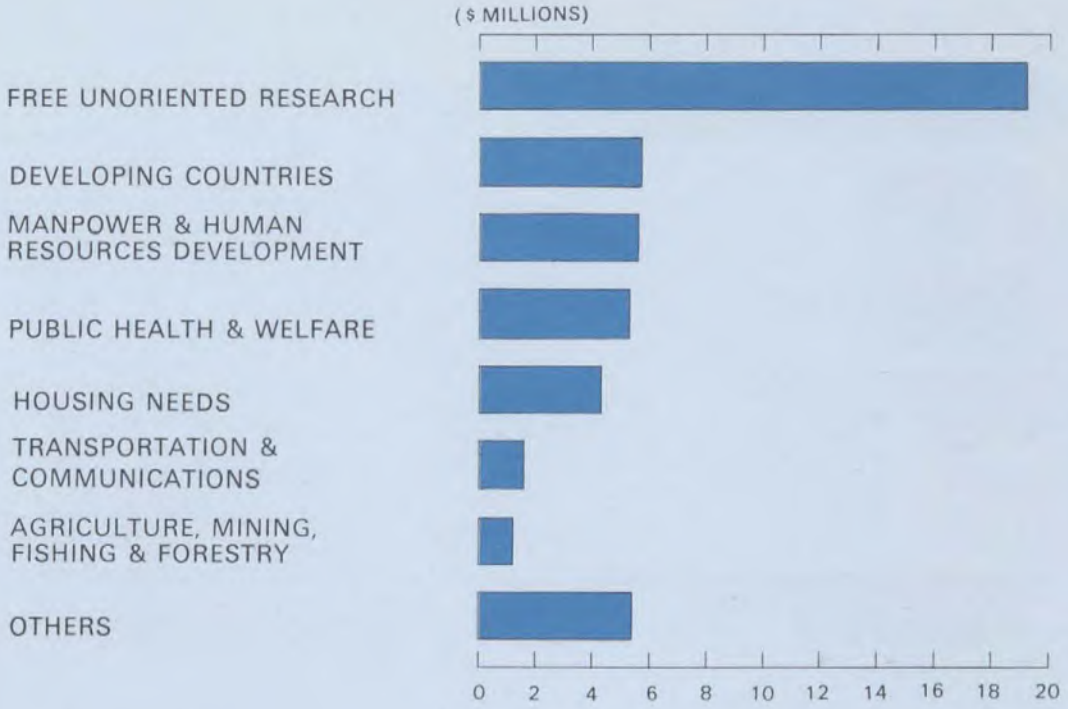
37. Application of Current Intramural Expenditures on Scientific Activities, 1972



37.1 More human science funds were devoted to current intramural activities related to public administration in 1972, than to any other field of application. A total of $52.3 million or 38% of the total was spent in this area primarily by Statistics Canada (92%).

37.2 The development of manpower and human resources received $19.7 million, while expenditures applied to the national economy accounted for $16.8 million. Added to public administration, these applications represented two thirds of the total.

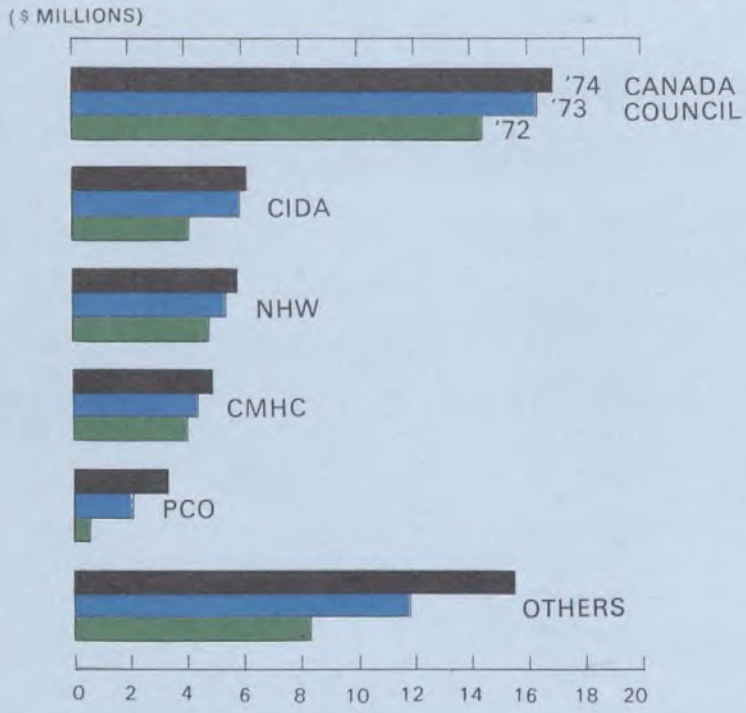
38. Application of Current Extramural Expenditures on Scientific Activities, 1972



38.1 Of a total of $48.5 million allocated to current extramural human science activities in 1972, $19.2 million (40%) was applied to work classified as unoriented research; all of these expenditures were incurred by Canada Council.

38.2 Three other areas of application each accounted for expenditures representing more than 10% of the total: developing countries ($5.9 million), manpower and human resources development ($5.6 million), and public health and welfare ($5.3 million); they were primarily funded by CIDA, REE and NHW respectively.

39. Federal Payments to Canadian Universities and Non-Profit Institutions For Scientific Activities By Department or Agency, 1972-74



($ MILLIONS)

DEPARTMENT OR AGENCY	1972		1973		1974	
	$	%	$	%	$	%
Canada Council	14.4	(39.7)	16.3	(35.4)	16.9	(32.2)
CIDA	4.1	(11.3)	5.9	(12.9)	6.1	(11.6)
NHW	4.8	(13.2)	5.4	(11.7)	5.8	(11.0)
CMHC	4.0	(11.2)	4.4	(9.7)	4.9	(9.3)
PCO	0.6	(1.7)	2.1	(4.6)	3.3	(6.3)
Others[1]	8.3	(22.9)	11.8	(25.7)	15.5	(29.5)
TOTAL	36.2	(100.0)	45.9	(100.0)	52.5	(100.0)

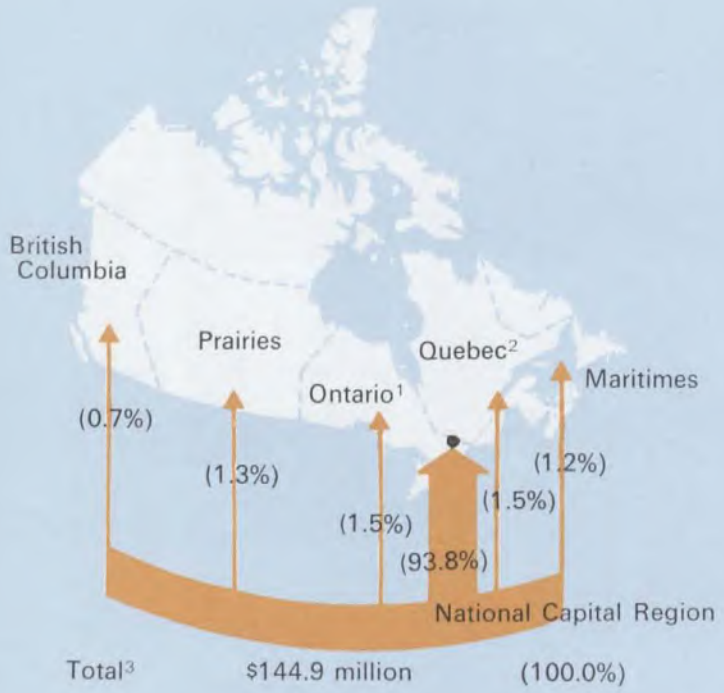
[1]Includes primarily INA, MOT, DOE, MOSUA, IDRC and Secretary of State.

39.1 Federal assistance to human science activities in Canadian universities and non-profit institutions will reach $52.5 million in 1974. This level of support is a 14% rise over the previous year. The corresponding increase in the total human science budget is estimated at 23%.

39.2 With expected expenditures of $16.9 million, Canada Council will account for one third of total federal payments in this sector; CIDA will contribute 12%; NHW 11%; and CMHC 9%.

39.3 One third of the federal allocations will be supported by twenty-five other departments and agencies, ten of which will each represent more than 1% of the total.

40. Federal Intramural Expenditures on Scientific Activities, Geographical Distribution 1973



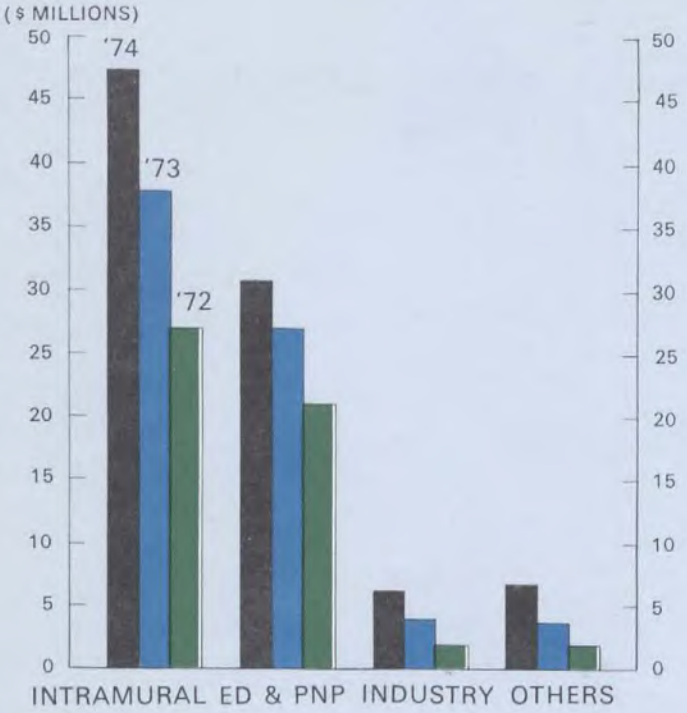
PROVINCE OR REGION	$ MILLIONS	%
National Capital Region	136.0	(93.8)
Quebec[2]	2.2	(1.5)
Ontario[1]	2.2	(1.5)
Nova Scotia	1.2	(0.8)
British Columbia	1.0	(0.7)
Manitoba	0.8	(0.6)
Alberta	0.7	(0.5)
Newfoundland	0.3	(0.2)
Saskatchewan	0.3	(0.2)
New Brunswick	0.1	(0.1)
Prince Edward Island	0.1	(0.1)
Sub-Total	144.9	(100.0)
Unallocated	2.3	
TOTAL	147.2	

[1]Excluding Ottawa.
[2]Excluding Hull.
[3]An additional $2.3 million is unallocated, making a grand total of $147.2 million.

40.1 Ninety-three percent of the federal government's budget for intramural spending on the human sciences was allocated to activities in the National Capital Region in 1973. This was equal to expenditures of $136.0 million.

40.2 The remaining $11.2 million was spent in the Western provinces (25%), Quebec and Ontario (20% each), and the Atlantic provinces (15%); 20% was unallocated.

41. Federal Expenditures on Research and Development By Performer, 1972-1974



($ MILLIONS)

PERFORMER	1972		1973		1974	
	$	%	$	%	$	%
Intramural	27.0	(52.1)	37.8	(52.1)	47.3	(52.0)
ED & PNP	21.0	(40.4)	27.0	(37.3)	30.7	(33.8)
Industry	1.9	(3.6)	3.9	(5.4)	6.1	(6.8)
Provincial and Municipal Governments	0.9	(1.7)	1.9	(2.7)	3.3	(3.7)
Foreign	1.1	(2.2)	1.8	(2.4)	3.4	(3.7)
TOTAL	51.9	(100.0)	72.4	(100.0)	90.8	(100.0)

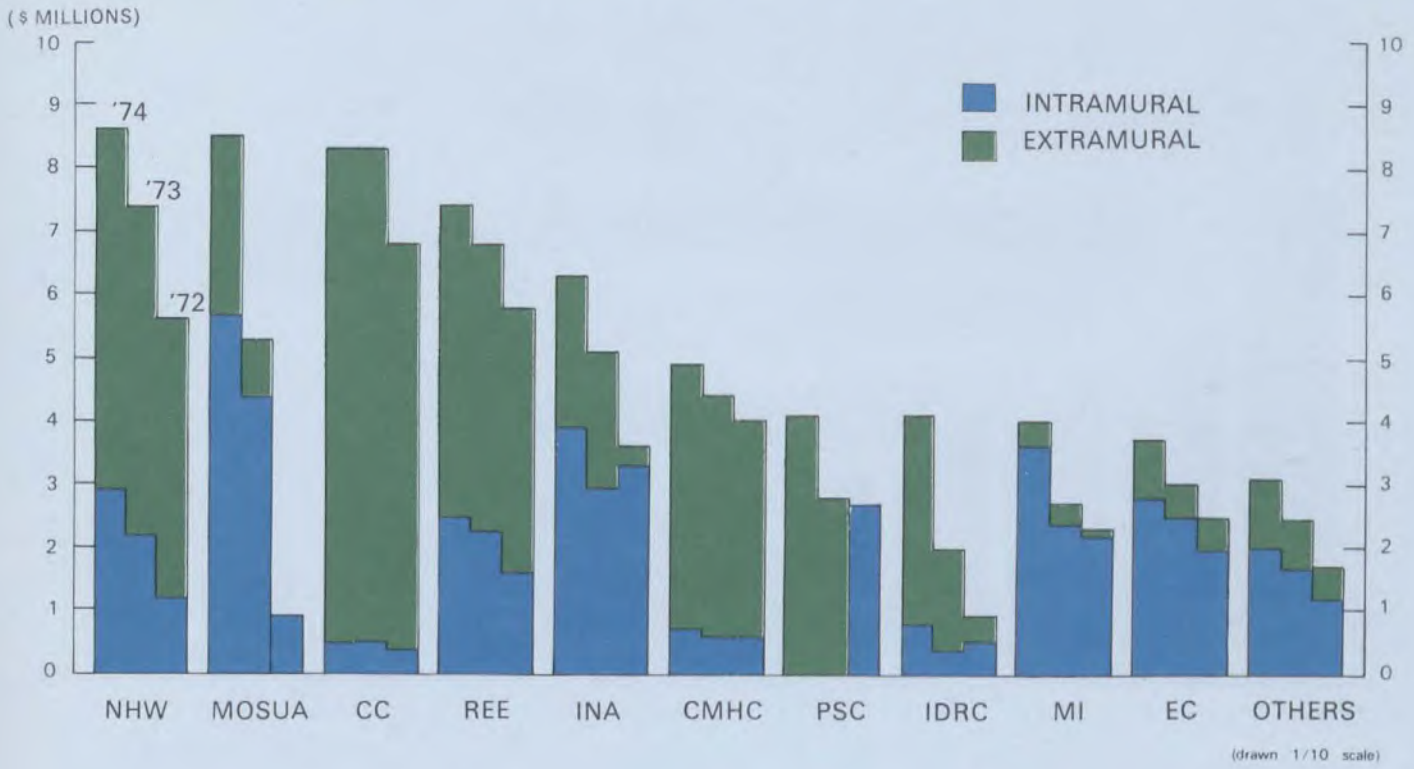
41.1 Federal expenditures on R&D in the human sciences will reach $90.8 million in 1974, a 25% increase over the previous year.

41.2 Spending on R&D within federal establishments will equal $47.3 million, or 25% more than in 1973. In-house activities have been allocated the largest share of the federal human science budget in recent years: a consistent 52% annually since 1972.

41.3 Educational and non-profit institutions will receive $30.7 million in support of their activities—a sum equal to 34% of the total; their share has declined since 1972 when it represented 40% of federal allocations.

41.4 Although Canadian industry, provincial and municipal governments, and foreign performers conduct a small percentage of the human science R&D budgeted for by the federal government, their 1974 share will be double that of 1972: 14 compared to 7%; for the same period, payments to them will more than triple, from $4 to $13 million.

42. Federal Intramural and Extramural Expenditures on Research and Development By Department or Agency, 1972-1974



42.1 Three departments and agencies will each spend over $8 million in support of R&D in the human sciences in 1974: NHW, MOSUA, and Canada Council have budgeted $8.6, $8.5, and $8.3 million respectively for this activity; their combined expenditures will equal 28% of the federal total.

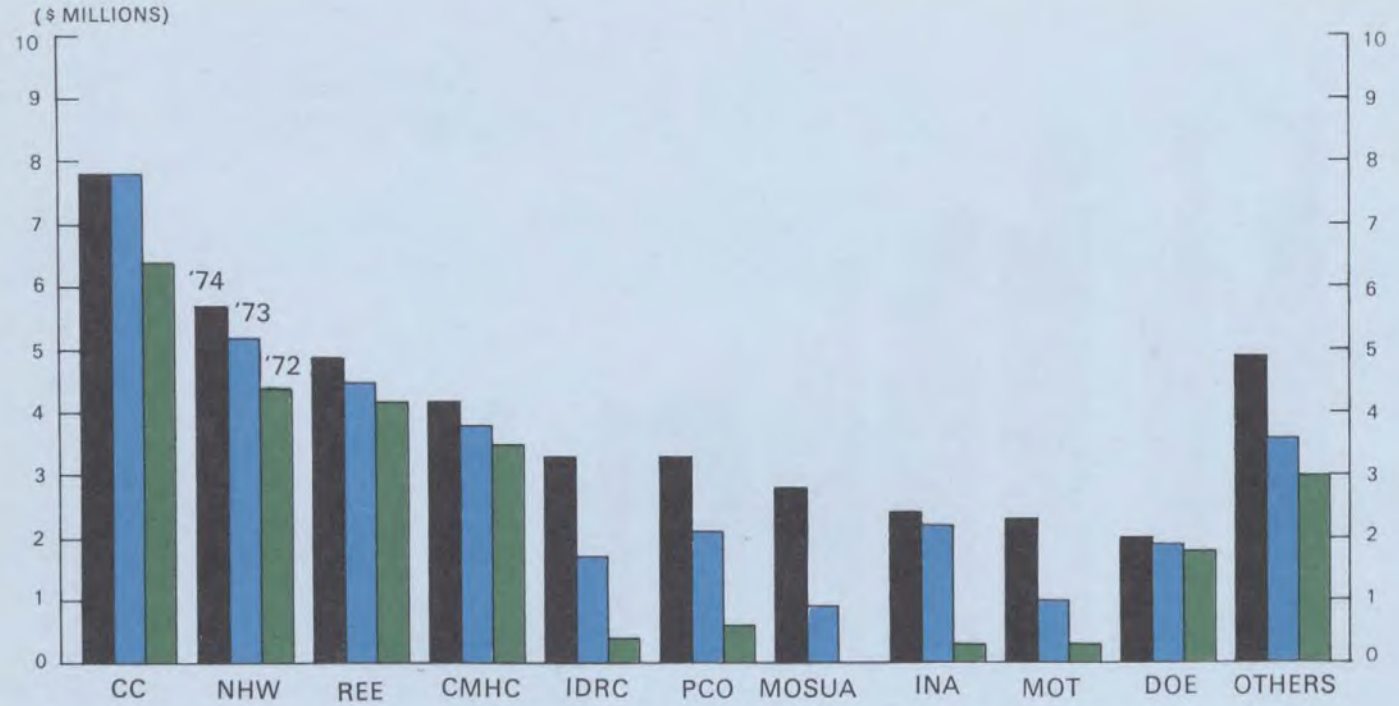
42.2 Of the remaining thirty-three departments and agencies having budgeted for human science R&D, only three will account for more than 5% each of the total: REE (8.1%), INA (7.0%), and CHMC (5.4%).

42.3 Since 1972, the most significant expenditure increases among major funders have been registered by MOSUA ($7.6 million), IDRC ($3.2 million), and NHW ($3.0 million).

42.4 Canada Council's grant programs of $7.8 million make it the major supporter of extramural activities; NHW, REE, and CMHC follow with extramural expenditures of $5.7, $4.9, and $4.2 million, respectively. These four agencies will account for over half the total.

42.5 Extramural expenditures are expected to equal 48% of all federal spending on human science R&D in 1974; the same figure prevailed in 1972 and 1973.

43. Federal Payments in Support of Extramural Research & Development By Department or Agency, 1972-74



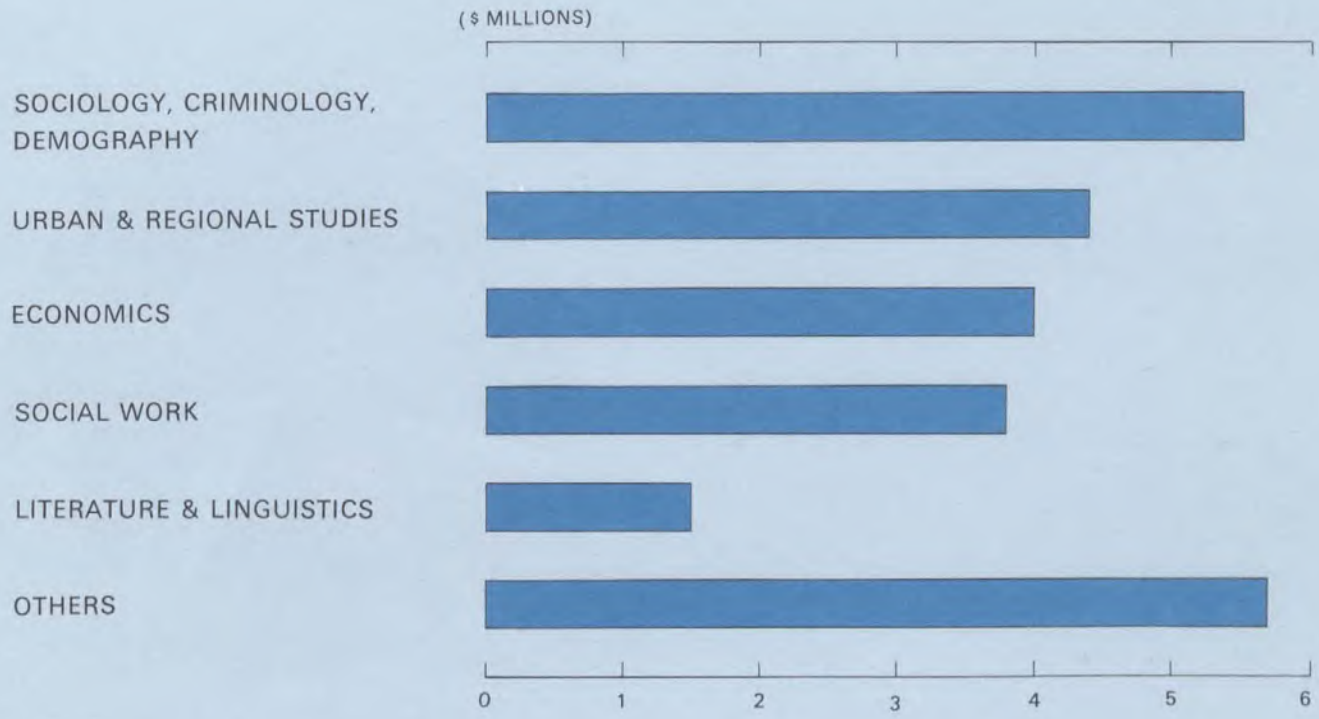
43.1 It is estimated that the federal government will make payments of $44 million for extramural performance of human science R&D in 1974, 26% more than the previous year; 70% of the total will fund activities carried out in Canadian educational and non-profit institutions.

43.2 Expenditures of $7.8 million by Canada Council make it the largest contributor to extramural research in the social sciences and humanities. Its share of the total budget is expected to decline to 18% of the total in 1974, an 8% drop from 1972.

43.3 NHW, REE, and CMHC, which are also major sponsors of extramural research—contributing $5.7, $4.9, and $4.2 million, respectively—will account for a reduced portion of federal allocations in 1974 : 34% compared to 49% in 1972.

43.4 Some of the departments and agencies expected to represent a larger share of R&D funding, include IDRC, PCO, MOSUA, INA, and MOT.

44. Federal Current Extramural Expenditures on Research, By Field of Research, 1972



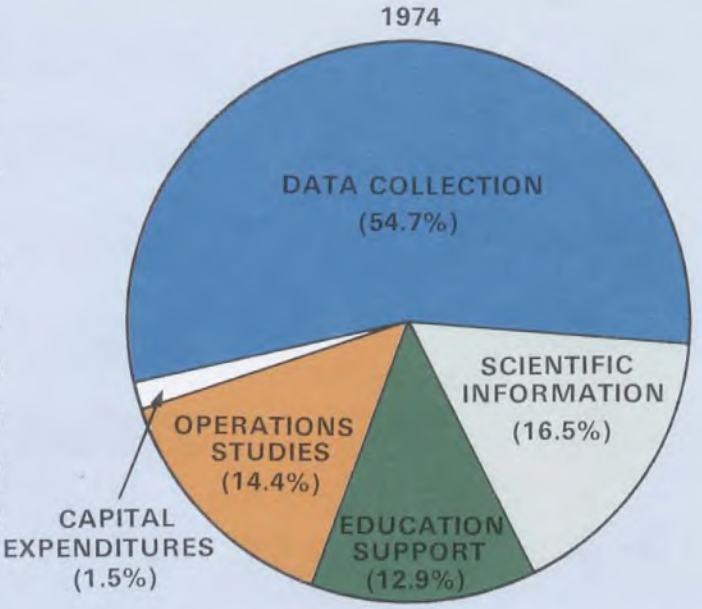
44.1 Federal payments of $25 million were distributed among extramural performers of human science research in 1972. Research in sociology, criminology, and demography, which accounted for expenditures of $5.5 million, received more than a fifth of the federal assistance. Allocations to urban and regional studies, economics, and social work, accounted for 18, 16, and 15% of the total, respectively.

44.2 The remaining $7 million was divided among at least a dozen other fields of research in the social sciences and humanities; half of it went to literature and linguistics, history, and psychology.

45. Federal Expenditures on Related Scientific Activities, by Activity, 1972-74

($ MILLIONS)

ACTIVITY	1972		1973		1974	
	$	%	$	%	$	%
Current Expenditures						
Data Collection	88.0	(65.2)	81.7	(57.1)	94.9	(54.7)
Scientific Information	14.4	(10.6)	20.3	(14.2)	28.7	(16.5)
Education Support	17.7	(13.1)	19.9	(13.9)	22.3	(12.9)
Operations Studies	13.0	(9.6)	19.7	(13.8)	24.9	(14.4)
Capital Expenditures	2.0	(1.5)	1.4	(1.0)	2.6	(1.5)
TOTAL	135.1	(100.0)	142.9	(100.0)	173.5	(100.0)

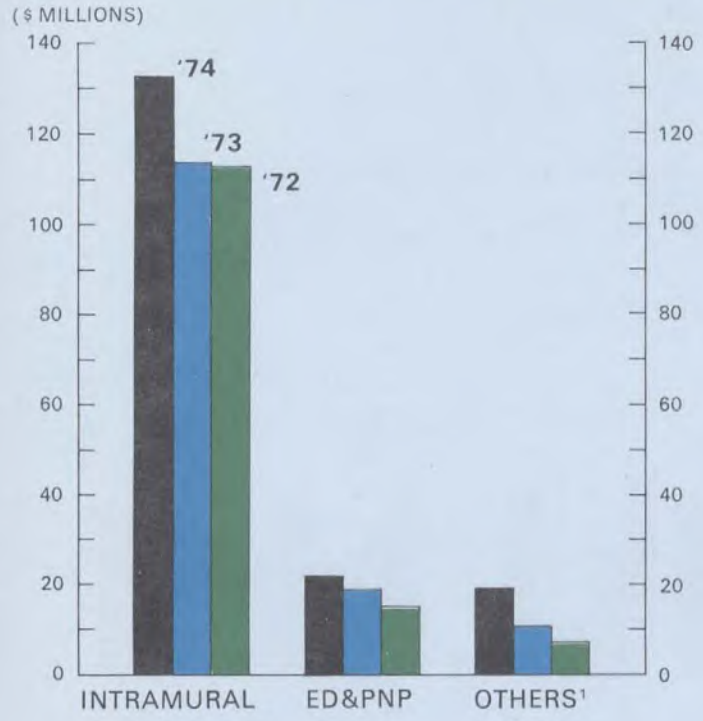


45.1 Federal expenditures on related scientific activities in the human sciences will reach $173.5 million in 1974, a 21% increase over the previous year.

45.2 The percentage of funds allocated to related scientific activities is expected to decrease to 66% of the human science budget; it represented 72% in 1972.

45.3 As in recent years, a major, although decreasing portion of current RSA expenditures will be devoted to scientific data collection: 54.7% of the total in 1974, compared to 65.2% in 1972. Scientific information will claim an increasingly important share: 16.5% in 1974, up from 10.6% two years ago; expenditures on this activity have doubled during the same period, from $14.4 to $28.7 million.

46. Federal Expenditures on Related Scientific Activities, by Performer, 1972-74



[1]Includes provincial and municipal governments, foreign performers, and industry.

($ MILLIONS)

PERFORMER	1972		1973		1974	
	$	%	$	%	$	%
Intramural	112.8	(83.5)	113.6	(79.5)	132.6	(76.4)
ED & PNP	15.2	(11.2)	18.9	(13.2)	21.8	(12.6)
Foreign	5.3	(4.0)	6.0	(4.2)	7.1	(4.1)
Others[1]	1.7	(1.3)	4.5	(3.1)	11.9	(6.9)
TOTAL	135.1	(100.0)	142.9	(100.0)	173.5	(100.0)

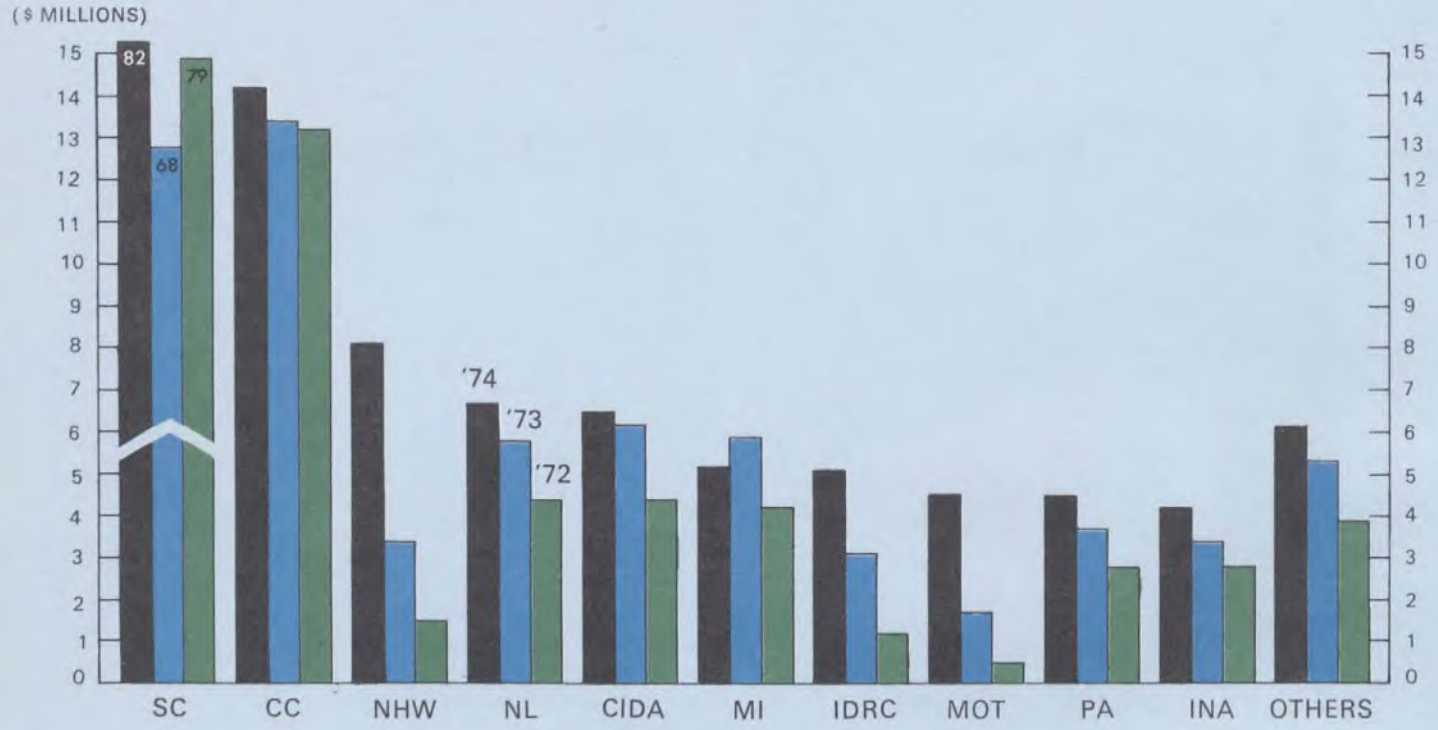
[1] Includes provincial and municipal governments and industry.

46.1 Activities within federal establishments will account for 76.4% of the total spent on RSA in 1974; educational and non-profit institutions will receive 12.6%; provincial and municipal governments 4.9%; foreign performers 4.1%; and Canadian industry 2.0%.

46.2 Although intramural spending will assume a lesser share of the total RSA budget than in 1972 or 1973, it is expected to rise 17% above the 1973 level.

46.3 It is estimated that federal payments to provincial and municipal governments in 1974, will more than triple the previous year's total: $8.4 million compared to $2.4 million.

47. Federal Expenditures on Related Scientific Activities, by Department or Agency 1972-74

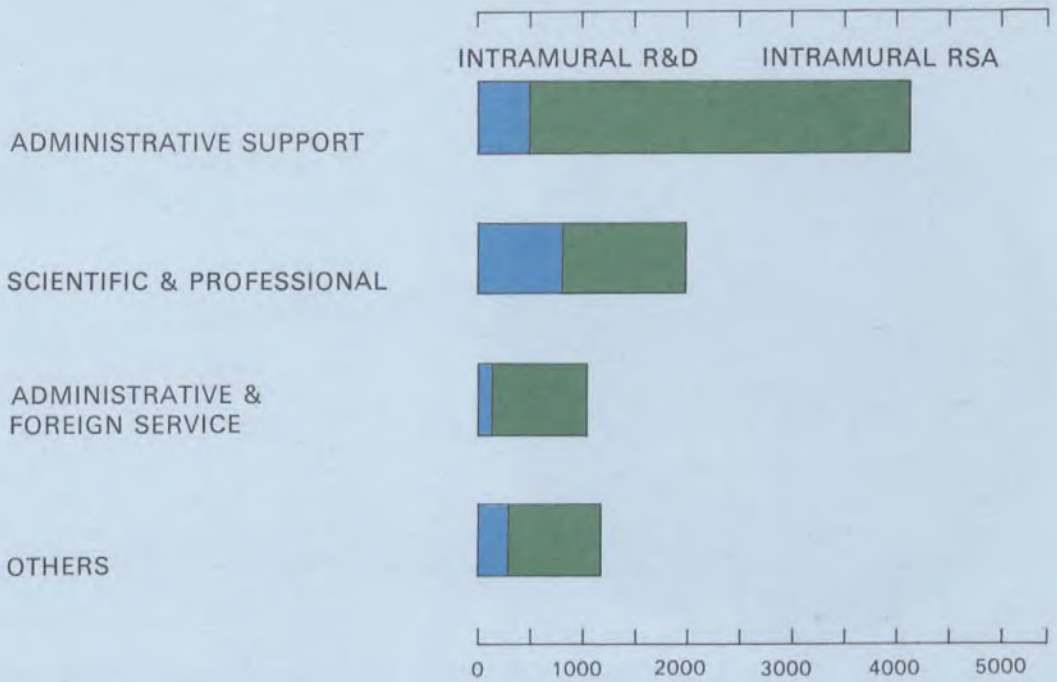


47.1 Statistics Canada will be the largest spender on related scientific activities in 1974, with an estimated budget of $82 million or 47% of the federal total in this area. Canada Council follows with expected expenditures of $14 million or 8% of the total. Thirty-eight other departments and agencies will share the remaining $78 million.

47.2 Intramural activities will account for a smaller share of the total than in recent years; they will represent 75%, compared to 78% in 1973, and 82% in 1972.

47.3 By activity, the major spenders in 1974 are expected to be: Statistics Canada — $79 million on data collection; Canada Council — $12 million on educational support; IDRC — $5 million on scientific information and MOSST — almost $3 million on operations studies.

48. Federal Manpower Engaged in Scientific Activities, by Activity, 1973[1]



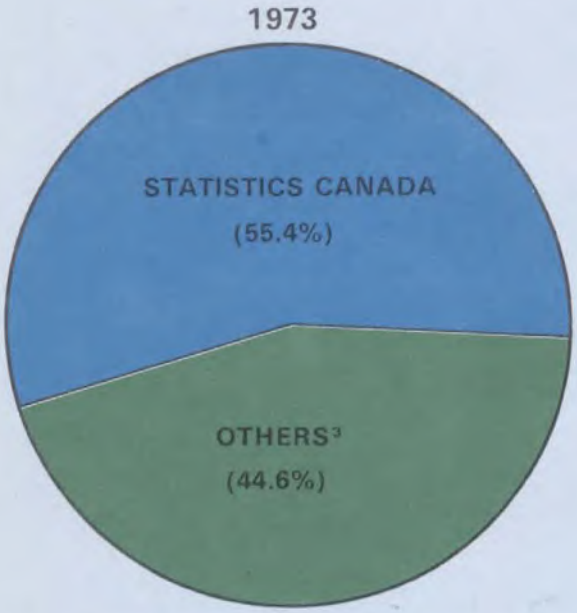
[1] *Expressed in full-time equivalent. It includes continuing, term, casual and seasonal employees as of September 30, 1972.*

48.1 The federal government employed a full-time equivalent of 8,549 persons in human science activities in 1973: 20% were assigned to R&D work; 77% to related scientific activities; and the remaining 3% administered extramural programs.

48.2 Administrative support employees accounted for the largest group among the various personnel categories; they numbered 4,233 or 50% of the total; scientific and professional employees totalled 2,023 (24%); administrative and foreign service, 1,107 (13%); technical, 899 (10%); operational, 187 (2%); and executive, 99 (1%).

48.3 The distribution of employees among certain manpower categories was significantly different within each activity: for example, the number of scientific and professional employees was equal to 47% of the R&D total and 18% of the RSA total; in the administrative support group, the percentages were 29 and 55% respectively.

49. Federal Manpower Engaged in Scientific Activities, by Department or Agency, 1973[1]



[3]*Includes Manpower and Immigration (4.5%), Environment (3.8%) and National Library (3.8%). Forty-two other departments and agencies account for the remaining 32.5%.*

DEPARTMENT	Employees	%
Statistics Canada	4,733.0	(55.4)
Manpower & Immigration	382.0	(4.5)
DOE	324.0	(3.8)
National Library	323.0	(3.8)
INA	217.0	(2.5)
Public Service Commission	209.3	(2.4)
Public Archives	198.0	(2.3)
Labour	180.0	(2.1)
NHW	171.5	(2.0)
Bank of Canada	130.0	(1.5)
Others[2]	1,681.2	(19.7)
TOTAL	8,549.0	(100.0)

[1]Expressed in full-time equivalent as of September 30, 1972.
[2]Thirty-six other departments account for the remaining 19.7%.

49.1 Statistics Canada employed a full-time equivalent of 4,733 persons in human science activities in 1973—55.4% of the federal total. Three other departments each employed more than three hundred personnel: Manpower and Immigration (382), Environment (324), and the National Library (323).

49.2 Employees of forty-two other departments and agencies accounted for the remaining 2,787 positions, an average of 66 persons per department.

APPENDIX I

PART ONE

NATURAL AND HUMAN SCIENCES

TABLE 1-1

Federal Intramural and Extramural Expenditures on Scientific Activities by Department or Agency, 1972-74
($ millions)

DEPARTMENT OR AGENCY	1972			1973			1974		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
DOE	170.3	10.0	180.3	205.7	12.8	218.6	212.8	16.5	229.3
NRC	61.3	76.8	138.1	71.7	78.1	149.8	74.8	83.2	158.1
ITC	2.2	91.8	94.0	2.2	95.3	97.6	2.3	105.1	107.4
AECL	60.8	23.2	84.0	66.3	20.0	86.3	74.2	26.6	100.8
DND	70.5	15.3	85.8	72.9	13.7	86.6	76.5	16.0	92.5
Statistics Canada	80.9	—	80.9	69.9	—	69.9	84.3	—	84.3
EMR	65.1	6.9	71.9	69.2	7.2	76.4	74.4	6.5	81.0
AGR	66.1	0.9	67.0	71.4	1.0	72.3	78.9	1.0	79.9
NHW	11.7	18.1	29.8	15.3	27.0	42.3	16.4	37.2	53.6
MRC	0.6	35.6	36.2	0.7	37.5	38.2	0.9	39.4	40.2
Others	84.4	89.1	173.6	120.0	102.4	222.3	142.9	124.6	267.4
TOTAL	673.9	367.7	1,041.6	765.3	395.0	1,160.3	838.4	456.1	1,294.5

TABLE 1-2

Federal Expenditures on Scientific Activities by Activity, 1972-74
($ millions)

DEPARTMENT OR AGENCY	1972			1973			1974		
	R&D	RSA	TOTAL	R&D	RSA	TOTAL	R&D	RSA	TOTAL
DOE	80.8	99.5	180.3	100.0	118.6	218.6	99.9	129.3	229.3
NRC	113.3	24.8	138.1	119.7	30.1	149.8	127.2	30.9	158.1
ITC	93.5	0.5	94.0	96.7	0.9	97.6	106.0	1.4	107.4
AECL	80.4	3.7	84.0	82.4	3.9	86.3	96.6	4.1	100.8
DND	55.0	30.8	85.8	54.1	32.5	86.6	57.3	35.2	92.5
Statistics Canada	1.5	79.4	80.9	2.0	67.9	69.9	2.7	81.6	84.3
EMR	38.8	33.1	71.9	40.7	35.7	76.4	42.6	38.4	81.0
AGR	64.5	2.6	67.0	68.9	3.4	72.3	76.3	3.6	79.9
NHW	27.4	2.5	29.8	37.7	4.6	42.3	43.7	9.9	53.6
MRC	34.3	1.9	36.2	36.5	1.7	38.2	38.5	1.7	40.2
Others	83.0	90.3	173.6	113.1	109.2	222.3	139.0	128.6	267.4
TOTAL	672.5	369.1	1,041.6	751.8	408.5	1,160.3	829.8	464.7	1,294.5

TABLE 1-3

Federal Manpower Engaged in Scientific Activities[1] By Activity, 1973

CATEGORY	ACTIVITY	Intramural R&D	Intramural RSA	Administration of Extramural Programs	TOTAL
Technical	Continuing	5,098.8	4,300.4	14.0	9,413.2
	Others[2]	632.8	326.6	—	959.4
	Sub-Total	5,731.6	4,627.0	14.0	10,372.6
Scientific and Professional	Continuing	5,428.4	2,878.1	109.5	8,416.0
	Others[2]	289.7	74.8	2.0	366.5
	Sub-Total	5,718.1	2,952.9	111.5	8,782.5
Administrative Support	Continuing	2,210.2	4,629.2	237.9	6,717.3
	Others[2]	251.7	1,306.6	19.9	1,578.2
	Sub-Total	2,461.9	5,935.8	257.8	8,295.5
Operational	Continuing	2,878.3	742.2	18.0	3,638.5
	Others[2]	617.4	270.4	—	891.0
	Sub-Total	3,495.7	1,012.6	18.0	4,529.5
Administrative and Foreign Service	Continuing	493.0	1,191.9	196.6	1,881.5
	Others[2]	49.4	43.0	4.4	96.8
	Sub-Total	542.4	1,234.9	201.0	1,978.3
Executive	Continuing	79.6	59.2	19.6	158.4
	Others[2]	—	—	—	—
	Sub-Total	79.6	59.2	19.6	158.4
TOTAL	Continuing	16,188.3	13,801.0	595.6	30,224.9
	Others[2]	1,841.0	2,021.4	26.3	3,891.9
	Grand Total	18,029.3	15,822.4	621.9	34,738.8[3]

[1] *Expressed in full-time equivalent.*

[2] *Includes term, casual, and seasonal employees as of September 30, 1972.*

[3] *Includes 622 DND Military personnel unassignable by the above categories and activities.*

TABLE 1-4

Federal Manpower Engaged in Scientific Activities, by Department or Agency 1973

DEPARTMENT OR AGENCY / CATEGORY	Executive	Scientific and Professional	Administrative and Foreign Service	Technical	Administrative Support	Operational	TOTAL	% of Total
DOE	10.0	2,142.5	315.0	3,662.5	1,340.2	889.0	8,359.2	(24.5)
Statistics Canada	12.0	622.0	666.0	394.0	3,007.0	32.0	4,733.0	(13.9)
AGR	2.5	1,001.6	40.0	1,023.0	437.3	1,642.6	4,147.0	(12.2)
NRC	7.0	921.1	166.0	1,070.4	515.9	299.4	2,979.8	(8.7)
DND[1]	4.8	558.9	87.0	1,329.0	513.4	418.0	2,911.1	(8.5)
EMR	8.0	870.0	70.0	1,015.0	415.0	340.0	2,718.0	(8.0)
AECL	12.0	665.0	0.0	928.0	349.0	555.0	2,509.0	(7.4)
NHW	7.4	245.7	38.5	166.3	195.5	51.0	704.4	(2.1)
DOC	1.0	163.0	15.0	174.0	81.0	108.0	542.0	(1.6)
CCA	4.0	239.0	15.0	25.0	216.5	12.0	511.5	(1.5)
Others	89.7	1,353.7	565.8	585.4	1,224.7	182.5	4,001.8	(11.7)
Total	158.4	8,782.5	1,978.3	10,372.6	8,295.5	4,529.5	34,116.8	(100.0%)
% of Total	(0.5%)	(25.7%)	(5.8%)	(30.4%)	(24.3%)	(13.3%)	(100.0%)	

[1] *Excludes 622 DND military personnel unassignable by the above categories.*

APPENDIX II

PART TWO

NATURAL SCIENCES

TABLE PAGE

EXPENDITURES

SCIENTIFIC ACTIVITIES (Research & Development and Related Scientific Activities)

RESEARCH & DEVELOPMENT

RELATED SCIENTIFIC ACTIVITIES

MANPOWER

TABLE 2-1

Federal Expenditures on Scientific Activities, By Activity, 1965-74
($ millions)

	Research & Development		Related Scientific Activities		Total	
	$	%	$	%	$	%
1965	281.6	(77.1)	83.8	(22.9)	365.5	(100.0)
1966	339.8	(77.5)	98.7	(22.5)	438.5	(100.0)
1967	381.9	(76.6)	116.7	(23.4)	498.6	(100.0)
1968	450.8	(77.5)	130.7	(22.5)	581.4	(100.0)
1969	524.6	(78.2)	146.1	(21.8)	670.6	(100.0)
1970	540.1	(76.3)	167.6	(23.7)	707.7	(100.0)
1971	590.8	(75.0)	197.1	(25.0)	787.9	(100.0)
1972	620.6	(72.6)	234.0	(27.4)	854.6	(100.0)
1973	679.4	(71.9)	265.6	(28.1)	945.0	(100.0)
1974	739.0	(71.7)	291.3	(28.3)	1030.2	(100.0)

TABLE 2-2

Federal Expenditures on Scientific Activities By Performer, 1965-74
($ millions)

	Intramural		Industry		ED & PNP		Others[1]		TOTAL	
	$	%	$	%	$	%	$	%	$	%
1965	271.0	(74.2)	59.1	(16.2)	33.7	(9.2)	1.6	(0.4)	365.5	(100)
1966	310.3	(70.8)	78.2	(17.8)	47.9	(10.9)	2.1	(0.5)	438.5	(100)
1967	343.4	(68.9)	87.2	(17.5)	65.1	(13.1)	2.9	(0.5)	498.6	(100)
1968	395.8	(68.1)	87.5	(15.0)	93.9	(16.1)	4.3	(0.8)	581.4	(100)
1969	436.1	(65.0)	111.6	(16.6)	115.4	(17.2)	7.5	(1.2)	670.6	(100)
1970	450.8	(63.7)	115.2	(16.3)	130.4	(18.4)	11.3	(1.6)	707.7	(100)
1971	490.7	(62.3)	151.8	(19.3)	132.6	(16.8)	12.8	(1.6)	787.9	(100)
1972	534.0	(62.5)	160.4	(18.8)	141.3	(16.5)	18.8	(2.2)	854.6	(100)
1973	614.0	(65.0)	159.8	(17.0)	149.2	(15.8)	21.9	(2.2)	945.0	(100)
1974	658.5	(63.9)	185.0	(18.0)	159.3	(15.5)	27.5	(2.6)	1030.2	(100)

[1] *Includes other Canadian and foreign performers.*

TABLE 2-3

Federal Intramural and Extramural Expenditures on Scientific Activities By Department or Agency, 1972-74
($ millions)

DEPARTMENT OR AGENCY	1972			1973			1974		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
DOE	166.4	7.7	174.1	201.7	10.3	212.0	208.7	13.8	222.5
NRC	61.3	76.8	138.4	71.7	78.1	149.8	74.8	83.2	158.1
ITC	2.2	91.8	94.0	2.2	95.3	97.6	2.3	105.1	107.4
AECL	60.8	23.2	84.0	66.3	20.0	86.3	74.2	26.6	100.8
DND	70.2	15.2	85.4	72.5	13.6	86.1	76.1	15.9	92.0
EMR	64.2	6.8	71.0	68.0	7.1	75.1	73.2	6.3	79.4
AGR	65.2	.8	66.0	70.0	.8	70.8	77.4	.8	78.2
MRC	.6	35.6	36.2	.7	37.5	38.2	.9	39.4	40.2
NHW	9.8	12.9	22.7	11.5	20.0	31.5	12.0	24.9	36.9
DOC	11.8	5.1	16.9	23.4	2.5	25.9	28.2	3.4	31.6
Others	21.5	44.7	66.2	26.0	45.8	71.5	30.7	52.3	83.1
TOTAL	534.0	320.6	854.6	614.0	331.0	945.0	658.5	371.7	1,030.2

TABLE 2-4

Federal Expenditures on Scientific Activities, By Department or Agency

Average Annual % Change, 1965-74

	DOE	NRC	ITC	AECL	DND	Total
Intramural						
1965-70	(1)	12.8	19.6	3.8	3.9	10.7
1970-72	12.7	3.2	5.3	2.7	7.3	8.9
1972-73	21.2	17.0	0.5	9.0	3.3	15.2
1973-74	3.5	4.3	2.1	11.8	4.9	7.1
Extramural						
1965-70	(1)	29.6	20.7	16.8	-1.6	22.2
1970-72	23.2	3.1	32.1	-17.8	-9.9	11.7
1972-73	33.9	1.6	3.9	-13.8	-10.3	3.2
1973-74	34.2	6.6	10.3	32.9	17.0	12.3

(1) DOE was created in December 1970.

TABLE 2-5

Federal Current and Capital Expenditures on Scientific Activities, 1965-74 ($ millions)

	Current		Capital		Total	
	$	%	$	%	$	%
1965	315.4	(86.3)	50.1	(13.7)	365.5	(100)
1966	380.3	(86.7)	58.2	(13.3)	438.5	(100)
1967	441.3	(88.5)	57.3	(11.5)	498.6	(100)
1968	515.4	(88.6)	66.1	(11.4)	581.4	(100)
1969	601.0	(89.6)	69.7	(10.4)	670.6	(100)
1970	650.4	(91.9)	57.3	(8.1)	707.7	(100)
1971	733.8	(93.1)	54.1	(6.9)	787.9	(100)
1972	792.2	(92.7)	62.4	(7.3)	854.6	(100)
1973	866.8	(91.7)	78.2	(8.3)	945.0	(100)
1974	954.6	(92.7)	75.6	(7.3)	1030.2	(100)

TABLE 2-6

Federal Expenditures on Research and Development By Performer, 1965-74 ($ millions)

	Intramural		Industry		ED & PNP		Others[1]		Total	
	$	%	$	%	$	%	$	%	$	%
1965	194.9	(69.2)	55.8	(19.8)	30.0	(10.7)	0.8	(0.3)	281.6	(100)
1966	221.1	(65.1)	75.5	(22.2)	41.9	(12.3)	1.3	(0.4)	339.8	(100)
1967	240.5	(63.0)	83.7	(21.9)	56.0	(14.7)	1.7	(0.4)	381.9	(100)
1968	281.3	(62.4)	84.4	(18.7)	82.2	(18.2)	2.9	(0.7)	450.8	(100)
1969	305.9	(58.3)	108.9	(20.8)	103.1	(19.7)	6.6	(1.3)	524.6	(100)
1970	307.9	(57.0)	109.8	(20.3)	117.0	(21.7)	5.4	(1.0)	540.1	(100)
1971	322.5	(54.6)	144.0	(24.4)	119.1	(20.2)	5.2	(0.9)	590.8	(100)
1972	344.6	(55.5)	141.5	(22.8)	125.4	(20.2)	9.0	(1.4)	620.6	(100)
1973	392.3	(57.7)	140.1	(20.6)	132.0	(19.4)	15.0	(2.2)	679.4	(100)
1974	417.1	(56.4)	163.6	(22.1)	141.1	(19.0)	17.2	(2.3)	739.0	(100)

[1] *Includes other Canadian and foreign performers.*

TABLE 2-7

Federal Expenditures on Research & Development By Department or Agency, 1972-74 ($ millions)

	1972			1973			1974		
DEPARTMENT OR AGENCY	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
NRC	45.1	68.2	113.3	49.5	70.1	119.7	52.3	74.8	127.2
ITC	2.2	91.2	93.5	2.2	94.4	96.7	2.3	103.7	106.0
AECL	57.3	23.0	80.4	62.6	19.9	82.4	70.2	26.4	96.6
DOE	73.5	4.0	77.5	90.5	6.0	96.5	87.3	9.1	96.4
AGR	62.7	0.8	63.5	66.6	0.8	67.4	73.8	0.8	74.6
DND	40.5	14.5	55.0	40.9	13.1	54.0	42.1	15.1	57.2
EMR	34.2	3.9	38.1	34.8	4.9	39.7	37.1	4.3	41.4
MRC	0.5	33.8	34.3	0.7	35.8	36.5	0.8	37.7	38.5
NHW	8.9	12.9	21.8	10.3	20.0	30.3	10.3	24.9	35.1
DOC	11.3	5.1	16.4	23.0	2.5	25.5	27.9	3.4	31.3
Others	8.4	18.6	26.8	11.2	19.6	30.7	13.0	21.7	34.7
TOTAL	344.6	276.0	620.6	392.3	287.1	679.4	417.1	321.9	739.0

TABLE 2-8

Federal Expenditures on Research and Development By Department or Agency, 1965-74

Average Annual % Change

	NRC	ITC	AECL	DOE	AGR	Total
Intramural						
1965-70	10.6	19.6	3.2	(1)	13.0	9.6
1970-72	-2.2	5.2	2.9	7.2	0.8	5.8
1972-73	9.8	0.5	9.2	23.2	6.3	13.8
1973-74	5.6	2.1	12.2	-3.6	10.8	6.3
Extramural						
1965-70	29.8	20.7	16.8	(1)	(2)	21.8
1970-72	3.9	31.9	-17.8	-3.6	(2)	9.0
1972-73	2.9	3.5	-13.8	49.8	(2)	4.0
1973-74	6.7	9.8	32.9	53.2	(2)	12.1

[1] *DOE was created in December 1970.*

[2] *Expenditures too small for growth rate calculation.*

TABLE 2-9

Federal Current and Capital Expenditures on Research & Development, 1965-74
($ millions)

	CURRENT		CAPITAL		TOTAL	
	$	%	$	%	$	%
1965	236.1	(83.8)	45.5	(16.2)	281.6	(100.0)
1966	288.4	(84.9)	51.5	(15.1)	339.8	(100.0)
1967	334.1	(87.5)	47.8	(12.5)	381.9	(100.0)
1968	395.4	(87.7)	55.4	(12.3)	450.8	(100.0)
1969	467.2	(89.1)	57.3	(10.9)	524.6	(100.0)
1970	496.0	(91.8)	44.1	(8.2)	540.1	(100.0)
1971	547.4	(92.7)	43.4	(7.3)	590.8	(100.0)
1972	575.0	(92.7)	45.6	(7.3)	620.6	(100.0)
1973	620.4	(91.3)	59.0	(8.7)	679.4	(100.0)
1974	683.5	(92.5)	55.4	(7.8)	739.0	(100.0)

TABLE 2-10

Federal Current Intramural and Extramural Expenditures on Research & Development By Field of Application, 1972-74
($ millions)

FIELD OF APPLICATION	1972			1973			1974		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
Manufacturing Industry	17.6	99.8	117.4	18.8	105.2	124.0	19.2	117.7	136.9
Energy	56.8	26.1	83.0	62.5	23.0	85.5	71.2	28.7	99.8
Agriculture	59.6	1.1	60.7	64.0	1.2	65.1	70.5	1.2	71.6
Free Basic Research	7.1	51.5	58.6	10.4	47.2	57.6	11.9	47.2	59.1
Defence	39.8	14.5	54.3	40.7	13.1	53.7	41.8	15.1	57.0
Medical Sciences	2.1	33.8	35.9	2.4	35.8	38.2	4.5	38.0	42.6
Public Health	6.2	13.2	19.3	7.8	20.8	28.6	5.6	25.0	30.6
Pollution	16.0	1.0	17.0	21.0	1.8	22.8	23.2	1.9	25.1
Mineral Location & Extraction	16.9	.6	17.4	17.6	1.5	19.1	18.6	2.0	20.5
Forestry	16.0	.5	16.5	16.2	1.3	17.5	16.1	3.2	19.3
Fisheries	9.5	.4	9.9	10.6	.4	11.0	13.3	.8	14.1
Transportation	7.4	.8	8.2	8.8	1.6	10.4	9.5	2.9	12.4
Space	7.2	4.8	12.0	7.9	1.6	9.5	8.4	2.1	10.4
Telecommunication	7.7	.6	8.3	8.2	1.0	9.2	8.7	1.4	10.2
Construction	6.5	.2	6.6	6.6	.2	6.8	7.4	.2	7.5
Developing Countries	—	2.5	2.5	—	4.3	4.3	—	7.0	7.0
Water Resources	3.3	1.3	4.5	3.7	1.3	5.1	3.8	1.2	5.0
Meteorology	3.5	.5	4.0	4.0	.7	4.6	4.1	.8	4.8
Northern Development	1.4	.9	2.3	1.8	1.4	3.1	1.9	1.5	3.5
Others	9.1	22.1	31.3	14.2	23.9	38.0	15.2	24.1	39.4
TOTAL	293.7	276.0	596.6	327.2	287.0	614.2	354.8	321.9	676.7

Federal Current Intramural Expenditures on Research[1] By Field of Science, 1972-74

($ millions)

	1972	1973	1974
Life Sciences	82.8	97.2	104.3
Biology	78.4	92.1	98.4
Clinical Medical	.8	1.1	1.3
Other	3.6	4.1	4.6
Engineering Sciences	59.7	67.1	73.1
Aero and Astro	2.9	3.2	3.6
Agriculture & Forestry	1.6	1.3	2.3
Architecture	1.3	1.9	.7
Bio-Engineering	.4	.6	.7
Chemical	5.3	5.4	6.4
Civil & Surveying	3.3	3.9	3.8
Electrical	8.1	9.7	11.4
Engineering Physics	6.7	6.7	6.1
Industrial	1.7	1.7	2.0
Materials	1.6	2.3	1.3
Mechanical	3.9	3.8	3.5
Mining	.8	.8	.9
Ocean Engineering	3.2	3.3	3.0
Other	18.8	22.4	27.4
Environmental Sciences	34.5	38.5	42.3
Atmospheric	4.1	5.5	5.6
Geology	16.8	16.6	18.9
Biological Oceanography	4.6	5.1	5.3
Physical Oceanography	6.0	7.2	8.2
Other	3.0	4.1	4.3
Physical Sciences	34.2	36.2	37.8
Astronomy & Astrophysics	4.0	4.4	4.7
Chemistry	9.2	10.4	11.2
Physics	11.8	13.2	12.5
Other	9.3	8.2	9.5
Mathematical Sciences	1.5	1.3	1.1
TOTAL	212.6	240.3	258.6

[1] *The breakdown does not include experimental development, which is more suitably classified by application rather than by discipline.*

TABLE 2-12

Federal Support of Research & Development in Canadian Universities and Non-Profit Institutions, By Department or Agency, 1972-74
($ millions)

DEPARTMENT OR AGENCY	1972			1973			1974		
	Grants	Con-tracts	Total[1]	Grants	Con-tracts	Total[1]	Grants	Con-tracts	Total[1]
NRC	57.5	.3	57.9	57.0	.3	57.3	58.1	.3	58.4
MRC	30.2	—	30.2	31.9	—	31.9	33.7	—	33.7
NHW	12.1	—	12.1	18.2	.2	18.4	22.6	.4	22.9
AECB	11.7	—	11.7	7.9	—	7.9	7.2	—	7.2
DOE	2.1	.6	2.7	2.3	1.3	3.6	3.6	1.7	5.2
DND	3.0	.4	3.4	3.0	.3	3.3	3.0	.4	3.4
ITC	.6	—	.6	.8	—	.8	1.2	—	1.2
EMR	.4	.2	.7	.5	.5	1.0	.7	.4	1.1
INA	.3	.5	.8	.3	.7	1.1	.3	.7	1.0
MOT	—	.1	.1	.2	.1	.3	.2	.4	.6
AGR	.8	—	.8	.8	—	.8	.8	—	.8
DOC	—	.4	.4	—	.6	.6	—	.7	.7
AECL	—	.5	.5	—	.5	.5	—	.6	.6
Others	.6	—	.6	.7	—	.7	.2	—	.2
TOTAL	119.4	3.1	122.5	123.6	4.6	128.2	131.5	5.7	137.1

[1]*Totals do not include research fellowships given by NRC, MRC, NHW, DOE, EMR and MOT, which amounted to $3.0 million in 1972, $3.7 million in 1973, will equal $4.0 million in 1974.*

TABLE 2-13

Federal Support of Research & Development in Canadian Industry By Department or Agency, 1972-74
($ millions)

DEPARTMENT OR AGENCY	1972			1973			1973		
	Grants	Contracts	Total[2]	Grants	Contracts	Total[2]	Grants	Contracts	Total[2]
ITC[1]	59.3	—	90.6	61.5	—	93.5	72.5	—	102.5
AECL	—	22.4	22.4	—	19.0	19.0	—	25.5	25.5
NRC	8.4	—	8.4	10.6	—	10.6	13.7	—	13.7
DND	4.5	6.1	10.6	4.5	4.6	9.1	4.5	6.5	11.0
DOC	—	4.7	4.7	—	1.6	1.6	—	2.7	2.7
EMR	2.8	.1	3.0	2.8	.4	3.2	1.8	.6	2.5
DOE	—	.8	.8	—	1.2	1.2	—	2.1	2.1
Others[3]	—	.8	.8	.1	1.2	1.3	.3	2.4	2.7
TOTAL	75.1	35.0	141.3	79.5	28.0	139.6	92.8	40.0	162.8

[1]*Total figures include IRDIA payments, which amounted to $31.3 million in 1972, $32.0 million in 1973, and will equal $30.0 million in 1974.*

[2]*Total figures do not include research fellowships which amounted to $.2 million in 1972, $.5 million in 1973, and will equal $.8 million in 1974.*

[3]*Includes primarily MOT, NHW, CMHC, AECB, and INA.*

TABLE 2-14

Total Expenditures on Research and Development in Canada, 1971[1]
($ millions)

SOURCE OF FUNDS	Sector of Performance			Source of Funds Total
	Industry	Government[2]	Education and Non Profit Institutions	
Industry	344	2	4	350
Government[2]	67	405	150	622
Non-profit Institutions	—	—	22	22
Education	—	—	138	138
Foreign	25	1	2	28
Performers Total	436	408	316	1,160

[1]*Fiscal years of institutions in the various sectors closest to calendar year 1971.*

[2]*Includes federal and provincial governments.*

TABLE 2-15

Federal Expenditures on Related Scientific Activities By Activity, 1965-74

	Data Collection[1]	Scientific Information[1]	Testing and Standard-ization[1]	Feasibility Studies[1]	Scholarship Programs[1]	Capital Expenditures	Total
			($ millions)				
1965	41.7	15.2	17.4	.7	4.2	4.6	83.8
1966	46.0	17.9	20.9	.9	6.2	6.8	98.7
1967	52.9	21.0	22.6	1.2	9.4	9.5	116.7
1968	58.7	23.4	23.6	2.2	12.1	10.7	130.7
1969	61.4	26.7	28.6	6.3	12.6	12.3	146.1
1970	76.6	31.9	28.5	4.2	13.2	13.2	167.6
1971	91.7	37.4	38.4	5.5	13.4	10.7	197.1
1972	87.3	63.4	36.6	14.3	15.6	16.8	234.0
1973	101.1	70.5	40.0	17.7	17.2	19.1	265.6
1974	110.7	78.8	43.1	20.4	18.0	20.2	291.3
			(% distribution)				
1965	(49.8)	(18.1)	(20.7)	(.8)	(5.1)	(5.5)	(100.0)
1966	(46.6)	(18.2)	(21.2)	(.9)	(6.2)	(6.9)	(100.0)
1967	(45.4)	(18.0)	(19.2)	(1.1)	(8.1)	(8.2)	(100.0)
1968	(44.9)	(17.9)	(18.0)	(1.7)	(9.3)	(8.2)	(100.0)
1969	(42.0)	(18.3)	(18.3)	(4.3)	(8.6)	(8.5)	(100.0)
1970	(45.7)	(19.0)	(17.0)	(2.5)	(7.9)	(7.9)	(100.0)
1971	(46.5)	(19.0)	(19.5)	(2.8)	(6.8)	(5.4)	(100.0)
1972	(37.3)	(27.1)	(15.6)	(6.1)	(6.7)	(7.2)	(100.0)
1973	(38.1)	(26.5)	(15.0)	(6.7)	(6.5)	(7.2)	(100.0)
1974	(38.0)	(27.0)	(14.8)	(7.0)	(6.3)	(6.9)	(100.0)

[1]*Current expenditures.*

TABLE 2-16

Federal Expenditures on Related Scientific Activities By Performer, 1965-74

	Intramural	Canadian Industry	ED & PNP	Others[1]	TOTAL
		($ millions)			
1965	76.0	3.3	3.7	.8	83.8
1966	89.1	2.7	6.1	.7	98.7
1967	102.9	3.5	9.1	1.2	116.7
1968	114.5	3.1	11.7	1.4	130.6
1969	130.2	2.7	12.3	.9	146.1
1970	142.9	5.4	13.4	5.9	167.6
1971	168.3	7.8	13.4	7.6	197.1
1972	189.4	18.9	15.9	9.8	234.0
1973	221.6	19.8	17.3	6.8	265.5
1974	241.4	21.4	18.2	10.3	291.3
		(% Distribution)			
1965	(90.7)	(3.9)	(4.4)	(1.0)	(100.0)
1966	(90.3)	(2.8)	(6.2)	(.7)	(100.0)
1967	(88.2)	(3.0)	(7.8)	(1.0)	(100.0)
1968	(87.6)	(2.4)	(9.0)	(1.0)	(100.0)
1969	(89.1)	(1.8)	(8.4)	(.7)	(100.0)
1970	(85.3)	(3.2)	(8.0)	(3.5)	(100.0)
1971	(85.4)	(4.0)	(6.8)	(3.8)	(100.0)
1972	(80.9)	(8.1)	(6.8)	(4.2)	(100.0)
1973	(83.5)	(7.4)	(6.5)	(2.6)	(100.0)
1974	(82.9)	(7.3)	(6.2)	(3.6)	(100.0)

[1]*Includes other Canadian and foreign performers.*

TABLE 2-17

Federal Expenditures on Related Scientific Activities By Department or Agency, 1972-74 ($ millions)

DEPARTMENT OR AGENCY	1972			1973			1974		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
DOE	93.0	3.7	96.7	111.2	4.3	115.5	121.4	4.7	126.1
EMR	30.0	2.9	32.9	33.2	2.2	35.3	36.0	2.0	38.0
DND	29.7	0.7	30.4	31.6	0.5	32.1	34.0	0.8	34.8
NRC	16.2	8.7	24.8	22.2	7.9	30.1	22.5	8.4	30.9
CIDA	0.3	18.7	19.0	0.3	21.1	21.4	0.3	22.4	22.7
CCA	7.7	—	7.7	8.8	—	8.8	10.5	—	10.5
REE	0.4	6.4	6.8	—	3.9	3.9	—	7.4	7.4
AECL	3.5	0.1	3.7	3.8	0.1	3.9	4.0	0.1	4.1
AGR	2.6	—	2.6	3.4	—	3.4	3.6	—	3.6
IDRC	0.3	0.1	0.4	1.0	0.3	1.3	1.8	0.5	2.3
Others[1]	5.7	3.2	9.0	6.2	3.6	9.9	7.3	3.6	10.9
TOTAL	189.4	44.6	234.0	221.7	43.9	265.6	241.4	49.9	291.3

[1]*Includes primarily National Museums, NHW, MRC, INA and External Affairs.*

TABLE 2-18

Federal Current Expenditures on Related Scientific Activities, 1974 ($ millions)

ACTIVITY \ DEPARTMENT OR AGENCY	DOE	EMR	DND	NRC	CIDA
Scientific Data Collection	70.0	24.6	—	0.5	3.0
Scientific Information	36.0	10.8	1.9	10.1	—
Testing and Standardization	1.6	1.2	30.9	5.8	—
Feasibility Studies	7.2	0.3	0.8	0.9	11.1
Scholarship Programs	—	—	—	7.8	8.5
TOTAL	114.7	36.8	33.6	25.2	22.7

TABLE 2-19

Federal Manpower Engaged in Scientific Activities[1] By Activity, 1973

CATEGORY / ACTIVITY		Intramural R&D	Intramural RSA	Administration of Extra-mural Programs	TOTAL
Technical	Continuing	4,934.2	3,648.6	14.0	8,596.8
	Others[2]	609.9	266.4	—	876.3
	Sub-Total	5,544.1	3,915.0	14.0	9,473.1
Scientific and Professional	Continuing	4,669.6	1,733.3	65.7	6,468.6
	Others[2]	253.4	36.8	1.0	291.2
	Sub-Total	4,923.0	1,770.1	66.7	6,759.8
Operational	Continuing	2,850.8	650.2	14.0	3,515.0
	Others[2]	594.4	229.4	3.2	827.0
	Sub-Total	3,445.2	879.6	17.2	4,342.0
Administrative Support	Continuing	1,856.9	1,741.5	138.0	3,736.4
	Others[2]	110.2	207.6	8.1	325.9
	Sub-Total	1,967.1	1,949.1	146.1	4,062.3
Administrative and Foreign Service	Continuing	365.7	320.5	130.0	816.2
	Others[2]	44.4	10.5	0.1	55.0
	Sub-Total	410.1	331.0	130.1	871.2
Executive	Continuing	34.8	15.1	9.5	59.4
	Others[2]	—	—	—	—
	Sub-Total	34.8	15.1	9.5	59.4
TOTAL	Continuing	14,712.0	8,109.2	371.2	23,192.4
	Others[2]	1,612.3	750.7	12.4	2,375.4
	TOTAL	16,324.3	8,859.9	383.6	26,189.8[3]

[1] *Expressed in full-time equivalent.*

[2] *Term, casual and seasonal employees as of September 30, 1972.*

[3] *Includes 622 DND military personnel unassignable by the above categories and activities.*

TABLE 2-20

Federal Manpower Engaged in Scientific Activities[1] By Department or Agency, 1973

DEPARTMENT OR AGENCY	Executive	Scientific and Professional	Administrative and Foreign Service	Technical	Administrative Support	Operational	TOTAL
			Intramural Research and Development				
AGR	1.9	905.6	40.0	947.0	355.0	1,641.8	3,891.3
DOE	5.5	1,108.5	142.0	1,368.0	482.7	416.0	3,522.7
AECL	12.0	619.0	—	842.0	254.0	555.0	2,282.0
NRC	4.0	712.3	106.4	906.5	293.5	228.9	2,251.6
DND	2.0	501.0	70.0	681.0	326.0	320.0	1,900.0
EMR	3.0	616.0	17.0	334.0	97.0	130.0	1,197.0
Others	6.4	460.6	34.7	465.6	158.9	153.5	1,279.7
TOTAL	34.8	4,923.0	410.1	5,544.1	1,967.1	3,445.2	16,324.3
			Intramural Related Scientific Activities				
DOE	4.5	935.0	168.0	2,115.5	834.5	443.0	4,500.5
EMR	5.0	225.0	51.0	664.0	315.0	200.0	1,460.0
DND	—	31.0	10.0	639.0	175.0	98.0	953.0
NRC	1.0	199.8	50.5	163.9	189.3	64.3	668.8
AECL	—	46.0	—	86.0	95.0	—	227.0
AGR	0.6	53.0	—	68.0	64.3	0.8	186.7
Others	4.0	280.3	51.5	178.6	276.0	73.5	863.9
TOTAL	15.1	1,770.1	331.0	3,915.0	1,949.1	879.6	8,859.9

[1] *Expressed in full-time equivalent; includes continuing, term, casual and seasonal employees as of September 30, 1972.*

NOTE: *There are an additional 383.6 employees who are engaged in administration of extramural programs and 622 DND military personnel unassignable by the above categories. This makes a total of 26,189.8 employees (expressed in full-time equivalent) engaged in scientific activities in 1973.*

TABLE 2-21

Ratio of R&D Scientists and Professionals to Supporting Personnel

DEPARTMENT OR AGENCY	1972	1973
EMR	1.15	1.06
NHW	.77	.80
DOE	.46	.46
NRC	.40	.46
DOC	.41	.43
AECL	.37	.37
DND	.34	.36
AGR	.31	.30
Others[1]	.35	.59
TOTAL	.42	.43

[1] *Equal to 3 and 2% of total R&D personnel in 1972 and 1973 respectively.*

APPENDIX III

PART THREE

HUMAN SCIENCES

TABLE 3-1

Federal Intramural and Extramural Expenditures on Scientific Activities By Department or Agency 1972-74 ($ millions)

DEPARTMENT OR AGENCY	1972			1973			1974		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
SC	80.9	—	80.9	69.9	—	69.9	84.3	—	84.3
Canada Council	0.9	19.2	20.0	1.1	20.6	21.7	1.1	21.4	22.5
NHW	1.9	5.2	7.2	3.8	7.0	10.8	4.3	12.4	16.7
INA	5.5	0.9	6.4	5.7	2.8	8.5	7.5	3.1	10.6
IDRC	1.2	0.9	2.1	1.8	3.4	5.2	3.2	6.0	9.2
MI	6.2	0.2	6.5	8.0	0.5	8.6	8.6	0.5	9.1
MOSUA	0.9	0.1	1.0	4.7	0.9	5.7	6.1	2.8	8.9
REE	1.6	4.4	6.0	2.3	5.2	7.5	2.5	6.4	8.9
CIDA	0.3	5.0	5.3	0.3	6.8	7.1	0.4	7.5	7.8
NL	4.6	0.1	4.6	6.2	0.2	6.4	7.3	0.3	7.6
MOT	0.7	0.5	1.3	0.8	2.3	3.0	1.4	6.1	7.4
Others[1]	35.1	10.6	45.6	46.7	14.3	60.9	53.2	17.9	71.3
TOTAL	139.8	47.1	186.9	151.3	64.0	215.3	179.9	84.4	264.3

[1] *Includes primarily Finance, Consumer and Corporate Affairs, Commissioner of Official Languages, Law Reform Commission, Science Council and National Revenue.*

TABLE 3-2

Application of Federal Current Expenditures on Scientific Activities, 1972

APPLICATION	Intramural		Extramural		TOTAL	
	$	%	$	%	$	%
Public Administration[1]	52.3	(38.2)	0.7	(1.4)	53.0	(28.6)
Manpower and Human Resources Development	19.6	(14.3)	5.6	(11.5)	25.2	(13.6)
Free (Unoriented) Research	0.9	(0.7)	19.2	(39.5)	20.1	(10.8)
National Economy	16.8	(12.3)	0.7	(1.3)	17.5	(9.4)
Public Health and Welfare	4.6	(3.4)	5.3	(10.8)	9.9	(5.3)
Culture, Sport and Recreation	7.9	(5.8)	0.3	(0.7)	8.2	(4.4)
Developing Countries	1.4	(1.0)	5.9	(12.2)	7.3	(3.9)
Agriculture, Mining, Fishing and Forestry	5.0	(3.7)	1.2	(2.5)	6.2	(3.4)
Transportation and Communication	4.3	(3.1)	1.6	(3.3)	5.9	(3.2)
Industrial Development	5.4	(4.0)	0.3	(0.6)	5.7	(3.1)
Housing Needs	0.7	(0.5)	4.3	(8.8)	5.0	(2.7)
International Relations	4.3	(3.1)	0.1	(0.2)	4.4	(2.4)
Education, Family and Child Development	2.0	(1.5)	1.9	(3.9)	3.9	(2.1)
Science Policy	2.5	(1.8)	0.1	(0.2)	2.6	(1.4)
Regional Economic Development	1.1	(0.8)	0.8	(1.7)	1.9	(1.0)
Urban Development	1.5	(1.1)	—	(—)	1.5	(0.8)
Northern Development	0.7	(0.5)	0.2	(0.5)	0.9	(0.5)
Energy Resources	0.9	(0.6)	—	(—)	0.9	(0.5)
Defence and Public Security	0.5	(0.4)	0.3	(0.6)	0.8	(0.4)
Others	4.5	(3.3)	0.1	(0.1)	4.6	(2.5)
TOTAL	137.1	(100.0)	48.5	(100.0)	185.6	(100.0)

[1] *Principally expenditures related to the census.*

TABLE 3-3

Federal Payments to Canadian Universities and Non-Profit Institutions For Scientific Activities, By Department or Agency, 1972-74 ($ millions)

DEPARTMENT OR AGENCY	1972		1973		1974	
	$	%	$	%	$	%
Canada Council	14.4	(39.8)	16.3	(35.5)	16.9	(32.2)
CIDA	4.1	(11.3)	5.9	(12.8)	6.1	(11.6)
NHW	4.8	(13.3)	5.4	(11.8)	5.8	(11.1)
CMHC	4.0	(11.0)	4.4	(9.6)	4.9	(9.3)
PCO	0.6	(1.6)	2.1	(4.6)	3.3	(6.3)
INA	0.8	(2.2)	2.8	(6.1)	3.0	(5.7)
MOT	1.0	(2.8)	0.7	(1.5)	1.8	(3.4)
DOE	1.6	(4.4)	1.7	(3.7)	1.8	(3.4)
MOSUA	—	(—)	0.7	(1.5)	1.7	(3.2)
IDRC	0.3	(0.8)	1.0	(2.2)	1.5	(2.9)
Secretary of State	0.8	(2.2)	1.0	(2.2)	1.3	(2.5)
REE	3.4	(9.4)	1.7	(3.7)	1.0	(1.9)
Law Reform Commission	—	(—)	0.5	(1.1)	0.9	(1.7)
Economic Council	0.2	(0.6)	0.3	(0.6)	0.6	(1.1)
Others[1]	0.2	(0.6)	1.4	(3.1)	1.9	(3.6)
TOTAL	36.2	(100.0)	45.9	(100.0)	52.5	(100.0)

[1] *Includes primarily Manpower and Immigration, Justice, Solicitor General, AGR, MOSST, CRTC, DOC, and the National Library.*

TABLE 3-4

Federal Intramural and Extramural Expenditures on Research & Development By Department or Agency, 1972-74 ($ millions)

DEPARTMENT OR AGENCY	1972			1973			1974		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
NHW	1.2	4.4	5.6	2.2	5.2	7.4	2.9	5.7	8.6
MOSUA	0.9	0.1	0.9	4.4	0.9	5.3	5.7	2.8	8.5
Canada Council	0.4	6.4	6.8	0.5	7.8	8.3	0.5	7.8	8.3
REE	1.6	4.2	5.8	2.3	4.4	6.8	2.5	4.9	7.4
INA	3.3	0.3	3.6	2.9	2.2	5.1	3.9	2.4	6.3
CMHC	0.6	3.5	4.0	0.6	3.8	4.4	0.7	4.2	4.9
PSC	2.6	– –	2.7	2.8	0.1	2.8	4.1	– –	4.1
IDRC	0.5	0.4	0.9	0.4	1.7	2.0	0.8	3.3	4.1
MI	2.2	0.1	2.3	2.4	0.3	2.7	3.6	0.4	4.0
EC	1.9	0.4	2.3	2.5	0.5	3.0	2.8	0.9	3.7
Others[1]	11.8	5.1	17.0	16.8	7.8	24.6	19.8	11.2	30.9
TOTAL	27.0	24.9	51.9	37.8	34.7	72.4	47.3	43.6	90.8

[1] *Includes primarily DOE, PCO, MOT, Statistics Canada, Labour, CCA, AGR, CIDA, Bank of Canada, EMR, and Secretary of State.*

TABLE 3-5

Federal Payments in Support of Extramural Research and Development By Department or Agency, 1972-74 ($ millions)

DEPARTMENT OR AGENCY	1972		1973		1974	
	$	%	$	%	$	%
Canada Council	6.4	(25.7)	7.8	(22.5)	7.8	(17.9)
NHW	4.4	(17.8)	5.2	(15.0)	5.7	(13.0)
REE	4.2	(17.0)	4.5	(12.8)	4.9	(11.3)
CMHC	3.5	(14.0)	3.8	(11.0)	4.2	(9.6)
IDRC	0.4	(1.8)	1.7	(4.8)	3.3	(7.6)
PCO	0.6	(2.5)	2.1	(6.0)	3.3	(7.6)
MOSUA	0.1	(0.2)	0.9	(2.7)	2.8	(6.4)
INA	0.3	(1.1)	2.2	(6.4)	2.4	(5.5)
MOT	0.3	(1.3)	1.0	(2.8)	2.3	(5.3)
DOE	1.8	(7.0)	1.9	(5.4)	2.0	(4.6)
Others	2.9	(11.6)	3.6	(10.4)	4.9	(11.2)
TOTAL	24.9	(100.0)	34.7	(100.0)	43.6	(100.0)

TABLE 3-6

Federal Current Extramural Expenditures on Research By Field of Research, 1972

($ millions)

Field of Research	$	%
Sociology, Criminology, Demography	5.5	(22.0)
Urban and regional Studies	4.4	(17.8)
Economics	4.0	(16.2)
Social Work	3.8	(15.3)
Literature and Linguistics	1.5	(6.1)
History	0.8	(3.4)
Psychology	0.8	(3.3)
Anthropology	0.6	(2.5)
Political Science	0.5	(2.0)
Human Geography	0.4	(1.6)
Business Administration, Commerce	0.4	(1.4)
Philosophy	0.3	(1.2)
Communications	0.3	(1.2)
Law	0.3	(1.0)
Religious Studies	0.1	(0.3)
Others	1.2	(4.7)
TOTAL	24.9	(100.0)

TABLE 3-7

Federal Expenditures on Related Scientific Activities By Department or Agency, 1972-74

($ millions)

DEPARTMENT OR AGENCY	1972	1973	1974
Statistics Canada	79.4	67.9	81.6
Canada Council	13.2	13.4	14.2
NHW	1.5	3.4	8.1
National Library	4.4	5.8	6.7
CIDA	4.4	6.2	6.5
Manpower & Immigration	4.2	5.9	5.2
IDRC	1.2	3.1	5.1
MOT	0.5	1.7	4.5
Public Archives	2.8	3.7	4.5
INA	2.8	3.4	4.2
DOE	2.9	3.1	3.2
Treasury Board	1.6	2.3	3.1
MOSST	1.4	3.6	2.9
Finance	2.0	2.6	2.9
Secretary of State	1.3	1.6	2.2
CMHC	1.5	1.6	1.8
Comm. of Official Languages	1.0	1.2	1.8
REE	0.2	0.8	1.5
National Museums	0.9	1.2	1.5
National Revenue	1.0	1.5	1.4
Science Council	0.9	1.0	1.1
Others	6.0	7.9	9.5
TOTAL	135.1	142.9	173.5

TABLE 3-8

Federal Manpower Engaged in Scientific Activities[1] By Activity, 1973

ACTIVITY / CATEGORY		Intramural R&D	Intramural RSA	Administration of Extra-mural Programs	TOTAL
Executive	Continuing	44.8	44.1	10.1	99.0
	Others[2]	—	—	—	—
	Sub-Total	44.8	44.1	10.1	99.0
Scientific and Professional	Continuing	758.8	1,144.8	43.8	1,947.4
	Others[2]	36.3	38.0	1.0	75.3
	Sub-Total	795.1	1,182.8	44.8	2,022.7
Administrative and Foreign Service	Continuing	127.3	871.4	66.6	1,065.3
	Others[2]	5.0	32.5	4.3	41.8
	Sub-Total	132.3	903.9	70.9	1,107.1
Technical	Continuing	164.6	651.8	—	816.4
	Others[2]	22.9	60.2	—	83.1
	Sub-Total	187.5	712.0	—	899.5
Administrative Support	Continuing	353.3	2,527.7	99.9	2,980.9
	Others[2]	141.5	1,099.0	11.8	1,252.3
	Sub-Total	494.8	3,626.7	111.7	4,233.2
Operational	Continuing	27.5	92.0	4.0	123.5
	Others[2]	23.0	41.0	—	64.0
	Sub-Total	50.5	133.0	4.0	187.5
TOTAL	Continuing	1,476.3	5,331.8	224.4	7,032.5
	Others[2]	228.7	1,270.7	17.1	1,516.5
	TOTAL	1,705.0	6,602.5	241.5	8,549.0

[1] *Expressed in full-time equivalent.*

[2] *Term, casual and seasonal employees as of September 30, 1972.*

APPENDIX IV

UNIVERSITY RESEARCH

TABLE 4-1

Sources of Total Operating Income[1] In Canadian Universities, 1965-72 ($ millions)

	Federal Government		Provincial Governments		Student Fees		Other[2]		TOTAL	
	$	%	$	%	$	%	$	%	$	%
1965	63.1	(18.4)	136.7	(39.9)	89.7	(26.2)	53.2	(15.5)	342.8	(100.0)
1966	73.1	(17.1)	183.2	(43.0)	110.6	(26.0)	59.4	(13.9)	426.3	(100.0)
1967	133.7	(23.0)	249.1	(42.8)	130.0	(22.3)	68.9	(11.8)	581.6	(100.0)
1968	83.8	(11.3)	435.5	(58.8)	144.5	(19.5)	76.8	(10.4)	740.6	(100.0)
1969	101.1	(11.2)	551.6	(60.9)	162.3	(17.9)	90.6	(10.0)	905.6	(100.0)
1970	114.6	(10.6)	698.1	(64.3)	178.8	(16.5)	93.5	(8.6)	1,084.9	(100.0)
1971	120.7	(9.8)	811.3	(66.0)	190.5	(15.5)	106.4	(8.7)	1,228.9	(100.0)
1972	130.4	(9.5)	928.1	(67.6)	214.8	(15.6)	99.9	(7.3)	1,373.2	(100.0)

[1] *Includes funds for assisted research.*

[2] *Includes municipal governments, corporations, foundations, religious organizations, alumni, other gifts, endowments, and other income.*

SOURCE: *Statistics Canada, Canadian Universities, Income and Expenditure, Catalogue no. 81-212; data for 1972 are preliminary.*

TABLE 4-2

Sources of Assisted Research Funds In Canadian Universities, 1965-72 ($ millions)

	Federal Government		Provincial Governments		Others[1]		TOTAL	
	$	%	$	%	$	%	$	%
1965	27.3	(57.3)	7.1	(14.9)	13.2	(27.8)	47.6	(100.0)
1966	36.6	(59.6)	9.5	(15.3)	15.4	(25.1)	61.5	(100.0)
1967	52.1	(64.6)	11.8	(14.6)	16.8	(20.9)	80.7	(100.0)
1968	71.2	(68.3)	15.3	(14.7)	17.7	(17.0)	104.2	(100.0)
1969	86.2	(67.7)	19.8	(15.6)	21.3	(16.7)	127.4	(100.0)
1970	99.4	(69.0)	23.9	(16.6)	20.8	(14.5)	144.1	(100.0)
1971	105.0	(69.1)	23.0	(15.1)	23.9	(15.8)	151.9	(100.0)
1972	103.5	(68.0)	23.0	(15.1)	25.7	(16.9)	152.2	(100.0)

[1] *Includes municipal governments, corporations, foundations, religious organizations, alumni, other gifts, endowments, and other income.*

SOURCE: *Statistics Canada, Canadian Universities, Income and Expenditure, catalogue no. 81-212; data for 1972 are preliminary.*

TABLE 4-3

Full-Time Enrolment in Canadian Universities, by Province 1967-73

PROVINCE	1967	1968	1969	1970	1971	1972	1973[1]
Newfoundland	3,893	4,473	4,782	5,157	6,378	7,007	7,306
Prince Edward Island	1,139	1,369	1,555	1,766	1,755	1,771	1,585
Nova Scotia	9,711	10,403	11,747	13,956	15,626	16,291	16,693
New Brunswick	6,862	7,927	8,961	9,608	10,580	10,952	10,262
Quebec	75,070	78,382	64,401	66,830	62,113	62,819	65,493
Ontario	68,930	79 433	92,932	108,825	131,115	134,419	135,200
Manitoba	12,389	13,426	15,099	16,597	16,941	17,351	17,019
Saskatchewan	11,531	12,665	13,833	14,919	14,814	14,801	13,360
Alberta	16,084	18,696	23,213	26,624	29,524	28,769	27,756
British Columbia	24,728	26,712	29,320	30,064	30,623	28,776	27,600
TOTAL	230,337	253,486	265,843	294,146	309,469	323,026	322,274

[1] *Preliminary data.*

SOURCE: *Statistics Canada, Education, Science and Culture Division.*

TABLE 4-4

Graduate Enrolment in Canadian Universities Natural and Human Sciences, by Region, 1971-72

REGION		HUMAN SCIENCES				NATURAL SCIENCES				TOTAL			
		Masters		Doctorates		Masters		Doctorates		Masters		Doctorates	
		1971	1972	1971	1972	1971	1972	1971	1972	1971	1972	1971	1972
Maritime Region	Full-time	738	821	90	78	495	437	277	266	1,233	1,258	367	344
	Part-time	674	724	32	42	134	170	37	40	808	894	69	82
	Total	1,412	1,545	122	120	629	607	314	306	2,041	2,152	436	426
Quebec	Full-time	2,884	2,858	906	862	1,492	1,331	942	868	4,376	4,189	1,848	1,730
	Part-time	2,716	3,402	835	965	703	822	252	315	3,419	4,224	1,087	1,280
	Total	5,600	6,260	1,741	1,827	2,195	2,153	1,194	1,183	7,795	8,413	2,935	3,010
Ontario	Full-time	5,221	5,244	2,470	2,676	2,861	2,588	2,623	2,461	8,082	7,832	5,093	5,137
	Part-time	4,132	4,678	839	1,062	644	801	301	341	4,776	5,479	1,140	1,403
	Total	9,353	9,922	3,309	3,738	3,505	3,389	2,924	2,802	12,858	13,311	6,233	6,540
Western Region	Full-time	3,159	3,000	974	1,059	2,097	1,826	1,773	1,692	5,256	4,826	2,747	2,751
	Part-time	1,614	1,809	287	359	468	490	176	182	2,082	2,299	463	541
	Total	4,773	4,809	1,261	1,418	2,565	2,316	1,949	1,874	7,338	7,125	3,210	3,292
TOTAL	Full-time	12,002	11,923	4,440	4,675	6,945	6,182	5,615	5,287	18,947	18,105	10,055	9,962
	Part-time	9,136	10,613	1,993	2,428	1,949	2,283	766	878	11,085	12,896	2,759	3,306
	Total	21,138	22,536	6,433	7,103	8,894	8,465	6,381	6,165	30,032	31,001	12,814	13,268

SOURCE: *Canadian Association of Graduate Schools, 1972 Statistical Report.*

NRC Assistance to University Research[1] By Province and University, 1972-73 ($ 000)

University	1972	1973
British Columbia	4,971.9	4,846.0
Notre Dame	15.7	2.5
Simon Fraser	808.3	844.6
Victoria	466.2	516.8
BRITISH COLUMBIA	6,262.1	6,209.9
Alberta	3,927.5	3,854.8
Calgary	1,861.5	1,847.3
Lethbridge	73.4	66.0
Camrose	5.0	5.0
ALBERTA	5,867.4	5,773.1
Sask-Sask	1,560.1	1,719.6
Sask-Regina	461.5	275.4
SASKATCHEWAN	2,021.6	1,995.0
Manitoba	2,129.0	2,074.8
Brandon	21.7	29.0
Winnipeg	57.5	32.5
MANITOBA	2,208.2	2,136.3
Brock	212.1	213.6
Carleton	1,324.3	1,186.3
Guelph	1,639.9	1,733.6
Lakehead	192.3	222.1
Laurentian	199.7	167.1
McMaster	3,298.7	3,644.0
Ottawa	1,186.7	982.6
Queen's	1,713.1	1,552.3
Toronto	7,166.0	7,098.1
Trent	132.5	97.2
Waterloo	2,813.3	3,041.3
Waterloo-Lutheran	—	0.5
Western Ontario	1,992.9	2,368.4
Windsor	877.4	1,102.1
York	851.7	939.1
ONTARIO	23,600.6	24,348.2
Bishops	26.0	12.0
Qué-Montréal	117.4	72.5[2]
Qué-Chicoutimi	182.6	191.5
Qué-Trois-Rivières	61.5	142.2
Qué-Rimouski	71.7	70.1
Qué-Québec	155.1	388.9
Laval	2,451.7	2,424.4
Loyola	42.5	25.6
McGill	3,697.8	3,553.3
Montréal	2,522.7	2,198.1
Ecole Polytechnique	639.4	815.2
Sherbrooke	732.6	754.5
Sir George Williams	416.8	335.6
QUEBEC	11,117.7	10,984.0
Moncton	245.6	217.6
Mt. Allison	100.7	101.3
New Brunswick	970.6	821.3
NEW BRUNSWICK	1,316.9	1,140.3
Acadia	71.2	145.8
Dalhousie	1,192.1	954.5
Mt. St. Vincent	—	14.0
Nova Scotia Tech.	441.7	347.3
St. Fr. Xavier	145.4	145.5
St. Mary's	37.0	57.7
NOVA SCOTIA	1,887.3	1,664.9
Prince Edward Island	81.9	57.7
PRINCE EDWARD ISLAND	81.9	57.7
Memorial	850.9	972.6
NEWFOUNDLAND	850.9	972.6
UNDISTRIBUTED	525.0	565.0
TOTAL	55,739.6	55,845.0

[1] *Includes the following grants: operating, computing, equipment, major equipment, general research, nuclear physics, institutes, development, major installation, special study and special projects; also includes E. W. R. Steacie fellowship, travel fellowships and special regional support.*

[2] *Includes $8,000 granted to l'Institut de Microbiologie et d'Hygiène in 1973.*

SOURCE: *NRC*

TABLE 4-6

MRC Assistance to University Research[1] By Province and University, 1972-73 ($000)

University	1972	1973
British Columbia	1,947.5	1,947.6
Simon Fraser	22.3	15.6
Victoria	41.1	51.4
BRITISH COLUMBIA	2,010.9	2,014.6
Alberta	1,635.0	1,702.0
Calgary	413.1	467.1
ALBERTA	2,048.1	2,169.1
Saskatchewan	820.6	747.9
SASKATCHEWAN	820.6	747.9
Manitoba	1,809.0	1,910.1
MANITOBA	1,809.0	1,910.1
Carleton	—	9.0
Guelph	158.8	90.8
Laurentian	13.0	—
McMaster	1,380.0	1,648.9
Ottawa	911.8	1,063.6
Queen's	1,011.9	1,061.8
Toronto	4,814.2	5,205.2
Waterloo	30.1	62.4
Western Ontario	1,227.9	1,208.8
York	27.1	31.9
ONTARIO	9,573.8	10,382.4
Laval	857.1	809.3
McGill	4,828.1	5,054.0
Montreal	2,547.6	3,058.3
Sherbrooke	914.6	868.5
Sir George Williams	11.2	7.3
QUEBEC	9,158.5	9,797.3
Moncton	4.5	—
NEW BRUNSWICK	4.5	—
Dalhousie	780.4	717.1
NOVA SCOTIA	780.4	717.1
Memorial	357.2	297.3
NEWFOUNDLAND	357.2	297.3
TOTAL	26,563.0	28,035.8

[1] *Includes operating, general research, travel, special projects, major equipment and development grants as well as grants to groups.*

SOURCE: MRC.

Canada Council Assistance to University Research[1] By Province and University, 1972-73 ($ 000)

University	1972	1973
British Columbia	195.8	238.6
Notre Dame	0.4	1.8
Simon Fraser	71.9	76.3
Victoria	58.5	53.4
Others	17.9	2.2
BRITISH COLUMBIA	344.5	372.2
Alberta	229.5	119.8
Calgary	106.8	105.7
Lethbridge	2.8	12.5
ALBERTA	339.1	238.0
Sask-Regina	20.7	17.9
Sask-Saskatoon	52.9	52.5
SASKATCHEWAN	73.7	70.4
Manitoba	97.6	74.6
Brandon	1.5	9.5
Winnipeg	6.0	6.7
MANITOBA	105.1	90.8
Brock	7.4	23.3
Carleton	74.6	81.5
Guelph	41.7	59.6
Lakehead	11.9	2.0
Laurentian	13.2	15.8
McMáster	85.4	298.6
Ottawa	67.4	159.0
Queen's	130.7	52.7
RMC	1.8	—
Toronto	500.6	530.3
Trent	70.0	43.3
Waterloo	211.5	155.7
Waterloo-Lutheran	2.3	3.6
Western Ontario	122.6	104.8
Windsor	30.9	44.1
York	157.6	126.8
Others	3.9	4.1
ONTARIO	1,533.5	1,705.0
Bishop's	1.0	0.8
Laval	252.6	517.3
McGill	153.4	149.2
Montreal	287.4	327.6
Loyola	7.4	10.8
Quebec-Chicoutimi	—	123.9
Quebec-Montreal	56.2	40.7
Quebec-Trois Rivières	16.0	—
Québec-Québec	32.0	—
Sherbrooke	22.1	36.6
Sir George Williams	49.8	57.4
QUEBEC	877.9	1,264.4
Moncton	6.7	0.1
Mount Allison	7.8	—
New Brunswick	30.9	50.2
NEW BRUNSWICK	45.4	50.3
Acadia	2.0	12.1
Dalhousie	61.2	63.7
Mount St. Vincent	0.5	2.2
St. Fr. Xavier	8.6	21.4
St. Mary's	10.7	0.8
NOVA SCOTIA	83.0	100.2
Prince Edward Island	1.5	3.2
PRINCE EDWARD ISLAND	1.5	3.2
Memorial	96.6	87.8
NEWFOUNDLAND	96.6	87.8
PRIVATE SCHOLARS	162.0	188.3
TOTAL	3,661.4	4,170.7

[1] *Includes all research grants to university and private scholars.*

SOURCE: *Canada Council.*

APPENDIX V
TECHNICAL NOTES

I SCOPE AND LIMITATIONS OF DATA

Data included in this publication were reported by 54 federal departments and agencies:

Department of Agriculture
Atomic Energy of Canada Limited
Atomic Energy Control Board
Bank of Canada
Canada Council
Canadian Arsenals Limited
Canadian Broadcasting Corporation
Canadian Dairy Commission
Canadian International Development Agency
Canadian Livestock Feed Board
Canadian Patents and Development Limited
Canadian Radio-Television Commission
Central Mortgage and Housing Corporation
Commissioner of Official Languages
Department of Communications
Department of Consumer and Corporate Affairs
Economic Council of Canada
Department of Energy, Mines and Resources
Department of the Environment,
Department of External Affairs
Department of Finance
Department of Indian and Northern Affairs
Information Canada
Department of Industry, Trade and Commerce
International Development Research Centre
Department of Justice
Department of Labour
Law Reform Commission
Department of Manpower and Immigration
Medical Research Council
Department of National Defence
National Film Board
National Harbours Board
Department of National Health and Welfare
National Library
National Museums
National Research Council
Department of National Revenue
Post Office Department
Privy Council Office
Public Archives
Public Service Commission
Public Works Department
Department of Regional Economic Expansion
Saint Lawrence Seaway Authority
Science Council of Canada
Ministry of State for Science and Technology
Secretary of State Department
Ministry of the Solicitor General
Statistics Canada
Ministry of Transport
Treasury Board Secretariat
Ministry of State for Urban Affairs
Department of Veterans Affairs

Some of the above cannot be properly defined as federal departments or agencies, for example, the International Development Research Centre or the Law Reform Commission; however, since they are federal bodies entirely funded by the federal government, it was felt that their inclusion led to a more accurate reflection of total scientific activities conducted by the federal government.

The reader is advised that the creation of the Department of the Environment in December, 1970, altered the level of resources allocated to several other departments and agencies during this and subsequent fiscal years: added to the responsibilities of the former Department of Fisheries and Forestry were INA's Canadian Wildlife Service, MOT's Meteorological Service, the Water Resources Program of EMR, the Air Pollution Control and Public Health Engineering Divisions of NHW, and REE's Canada Land Inventory.

Expenditures on scientific activities in the natural and human sciences are reported to Statistics Canada on a three-year cycle based on the estimates submitted annually to Treasury Board by each department and agency. Data for 1972 and previous years are considered as actual expenditures since they reflect transactions of completed government fiscal years. Amounts reported for 1973 and 1974 are estimates and are subject to further government decisions the effects of which will be reflected in future reports. For this reason, estimates for the last two years of the previous report have been updated here to reflect the budgetary decisions and departmental revisions in the classification of scientific activities made since its publication.

Since most departments and agencies do not maintain records of their activities corresponding to the classification adhered to in this report, it is necessary for them to estimate their expenditures and manpower allocated to each item within these classifications. The precision of these estimates is expected to vary from department to department and even within the programs of one department: for example, an agency such as the National Research Council which is wholly engaged in scientific activities, should experience less difficulty in categorizing its scientific activities than, perhaps, the Department of Indian and Northern Affairs whose scientific resources are part of larger and broader programs. Concern on this score, however, should be minimized by the fact that departments and agencies have participated in Statistics Canada surveys on federal activities in the natural sciences since 1959, and in human science surveys since 1970; further, Statistics Canada staff assisted all respondents in the interpretation of concepts and definitions, and evaluated responses for consistency and accuracy.

II DEFINITIONS

The following definitions reflect the existence of two separate Statistics Canada surveys on federal scientific activities: one on the natural sciences and a second on the human sciences. These definitions are as presented in the guidelines accompanying the Statistics Canada survey questionnaires.

A. SCIENTIFIC ACTIVITIES

(a) Natural Sciences:

Natural Sciences encompass all of the disciplines grouped under the life, physical, environmental, mathematical and engineering sciences.

RESEARCH AND EXPERIMENTAL DEVELOPMENT: is considered as creative work undertaken on a systematic basis to increase the stock of scientific and technical knowledge and to use it in new applications. The central characteristic of R&D is an appreciable element of novelty—new knowledge (new information integrated into existing hypotheses; new hypotheses derived from new facts; the re-evaluation of known data) or new products or processes are sought. The routine gathering of information to fulfil administrative or operational requirements is not included.

The concept of research and experimental development covers a wide range of activities—from that of the independent researcher trying to satisfy his personal curiosity, to that of the multi-disciplinary team constructing a prototype. Most often it is classified under three categories: basic reasearch, applied research, and experimental development. While it is difficult to consistently apply these concepts to the real work situation, it is felt that they serve as useful general indications of the type, or mix of types, of R&D being carried out.

Basic Research: is original investigation undertaken in order to gain new scientific knowledge with the primary purpose of contributing to the conceptual development of science. Its motivation adds to the accumulated, objective and systematic knowledge of the inherent properties and interactions of matter, space, energy, natural phenomena and biosystems.

In free basic research, the original impulse comes mainly from scientific curiosity. In oriented basic research, the investigation is directed towards the definition and solution of fundamental technical or scientific problems in a general area of interest.

Basic research yields new hypotheses, theories, and general laws. The resulting information is usually non-negotiable and freely published in scientific journals or circulated among interested colleagues. Results often affect a broad field of science and may have several ultimate applications.

Applied Research: is original investigation undertaken in order to gain new scientific knowledge with the primary purpose of applying such knowledge to the solutions of practical or technical problems. It is required either to determine possible uses for the findings of basic research or to select the appropriate method of achieving some specific and pre-determined objective.

The results of applied research are intended mainly to be valid for a single or limited number of products, operations, methods, and systems. It develops ideas into operational forms, and the knowledge or information derived from it is often patented.

Experimental Development: is the application of scientific knowledge in order to produce specific new materials, devices, products and processes (or classes thereof), or to make technically significant improvement to existing ones. It consists of systematic work whose objective, drawing on existing knowledge, is to gather all the information necessary to provide the technical elements of a decision to produce new materials, devices, and products, or to implement new processes and systems for commercial sale or operational utilisation. It includes pilot plant and prototype design and testing.

RELATED SCIENTIFIC ACTIVITIES: which are closely related to R&D, include scientific data collection, scientific information, testing and standardization, feasibility studies and scholarship programs.

Scientific Data Collection: is the gathering, processing, collating and analyzing of data on natural phenomena. Data may be in the form of measurements such as observations and readings, or in the form of statistics of such measurements. These data normally result from surveys, from routine laboratory analyses, or from compilations of operating records. The collection of specimens for museums, zoological or botanical displays is also included. Data collected primarily for internal administrative purposes are excluded.

Data collected as part of an existing or proposed research project are not included in this activity—they are part of the research process. Similarly, the quantifiable development of new techniques of data collection are to be considered as R&D. The costs of analyzing existing data as part of a research project are R&D, even when the data were originally collected for some other purpose. For the present, space 'surveys' are considered as R&D.

Examples of scientific data collection could be routine geological, hydrographic, oceanographic and topographical surveys; maintenance of meteorological records; wildlife and fishery surveys.

Scientific Information: is that information and knowledge acquired as a result of scientific activities. The costs attributable to this activity are those for the operation of scientific and technical libraries, the dissemination of information or knowledge by means of scientific and technical journals, books, newsletters, computer tapes, exhibits, films or through scientific conferences and symposia.

Testing and Standardization: is work directed towards the establishment of national standards for materials, devices, products and processes, the calibration of secondary standards and non-routine quality testing, separately identifiable from R&D which may be required to identify the characteristics of materials, devices, products and processes. An example of testing might occur when an organization which requires equipment with certain capabilities purchases a few models and tests them exhaustively in order to determine if the equipment is satisfactory and, if not, what modifications are required. The quantifiable development of new measures for standards, or of new methods of measuring or testing, is included in R&D.

Feasibility Studies: are technical investigations of proposed engineering projects, which provide necessary additional information before deciding on implementation.

Scholarship Programs: are grants to individuals or institutions intended to support the education of students in the engineering, physical and life sciences. Grants intended primarily to support the research activities of individuals are considered as R&D (either R&D grants or research fellowships).

(b) Human Sciences:

Human Sciences encompass the disciplines generally referred to as the "social sciences and humanities"; no distinction is made between these two groups of disciplines since it is not clear that such a breakdown is possible or desirable for statistical purposes. Thus, the human sciences include all disciplines involving the study of human actions and conditions and the social, economic and institutional mechanisms affecting them. This would include the sciences of anthropology, economics, human geography, law and sociology, political science and the social aspects of architecture, design, psychology and linguistics. In addition, applied social science fields such as public and business administration, commerce, communications, criminology, demography, agricultural economics, industrial relations, social work, and urban and regional studies, are included.

Two groups of activities are surveyed in the human sciences: research (or "R&D" as it is called in the body of this report to maintain consistency with the natural sciences) and related scientific activities.

RESEARCH: in the context of the human sciences, is explanatory and innovative work undertaken on a systematic basis towards the acquisition of new knowledge about man, his actions and institutions, and the application of this knowledge in new ways. It is characterized by objectivity, controlled observation and measurement, and logical analysis. To be classified as research, projects must generally involve a substantial element of novelty, uncertainty and innovation, have a well-defined project design, and result in a written report of results and procedures.

Research covers a wide range of activities which differ greatly in the level of theoretical reflection, methodological approach, functions and objectives. Using this criterion of objective, three categories of research have been defined: the objective of a research project may be to *explain* phenomena, to observe and *describe* facts and situations, or to *develop* proposals for action.

Explanatory (or Theoretical) Research: is primarily oriented towards the discovery and understanding of the principles and laws underlying human situations and behavior; it includes the formulation of concepts, models and methodologies. Examples include: research on non-economic factors affecting economic decisions; an experimental study on the role of personal values as selective values in perception; and, a research project on the influence of the family in the choice of profession of Canadian university students.

Descriptive Research: is primarily oriented towards reflective and organized observation and description of phenomena to reveal their structural components. For example, a study of inter-provincial migration patterns; a comparative study of urban structure in Quebec and Ontario with reference to the tertiary sector, and, an historical perspective of the Canadian economy since World War II.

Development Research: is primarily oriented towards the rational utilization of human science knowledge as a basis for the definition of programs, policies and operations. The principal function of this type of research is to examine issues, identify possible solutions, and provide information for decision-makers. Examples of this category include: a study on rail transportation in the North considering the costs and benefits, employment patterns and regional impact of possible systems; a study of the choices for metropolitan growth in Canada; and, development of a social accounting system for welfare planning.

RELATED SCIENTIFIC ACTIVITIES: precede, complement and extend research work; they include general data collection, scientific information, education support, and operations studies.

General Data Collection: is the routine gathering, processing, collating and analysis of information on social and human phenomena. The information may be collected through routine surveys, regular and special investigations, or special compilations of existing records. The costs of routine publication of such data are included. The collection of data primarily for internal administrative purposes is excluded. Data collection which is part of a research project is considered to be research. Projects to develop new collection methods are also defined as research. Similarly, studies of data collection procedures and programs, carried out to assess efficiency, costs or benefits, are considered operations studies. Examples of general data collection would include the quinquennial censuses, surveys of employment and production, and the routine analysis of foreign economic statistics.

Scientific Information: involves the storage, classification and dissemination of information and knowledge resulting from scientific activities in the human sciences. Costs attributable to this activity include contributions to scientific journals (whether subsidies or subscriptions), grants to assist in the publication of doctoral theses and other research papers, support of learned and professional societies, scientific exhibits, films, conferences and symposia and scientific libraries.

Education Support: consists of grants to individuals or institutions specifically intended to support the education of students in the human sciences. Grants intended primarily to support the research activities of individuals are considered as research, for example, post-doctoral fellowships.

Operations Studies: include all studies of programs, policies and operations of departments and agencies aimed at the optimal utilization of committed resources. This would include the analysis and assessment of present programs, projects and policies, and the development of standards, procedures and classification systems for present or future programs, projects or policies. Such activities often take the form of program analysis studies, or, organizational, operational, management, and market studies. Much of the work carried out by federal government departments in units with names implying research activity, for example, Research and Development Section, or Development and Integration Unit, actually falls into this category.

B. PERFORMERS

The performer is defined by the type of institution where the scientific activity is conducted. The basic distinction is between intramural and extramural performance.

a) **Intramural performers** are the federal departments and agencies that conduct scientific work in their own establishments using their own personnel. Included in intramural performance are expenditures on equipment and supplies which are used within these establishments. The costs of administering intramural and extramural scientific programs are also included.

b) **Extramural performers** are identified as:

Canadian industry: business and government enterprises. Included are public utilities, government-owned firms (e.g. Polymer), and non-profit institutions and associations mainly serving industry and not controlled by another institution (e.g. Pulp and Paper Research Institute). Industrial research institutes affiliated with a university belong in the Canadian educational institutions sector.

Canadian educational institutions: any public or privately owned institution subject to government educational regulations and designed primarily to provide education. Included are affiliated institutes owned, administered or staffed by such institutions.

Canadian non-profit institutions: charitable foundations, voluntary health associations, scientific and professional societies, and other organizations not established to earn profits. Non-profit institutions mainly serving or controlled by industry, the federal government and educational institutions are included in these respective sectors.

Other Canadian performers: provincial research councils and foundations, provincial and municipal governments and individuals not working in any other sector.

Foreign: all foreign governments, companies (including foreign subsidiaries of Canadian firms), non-resident foreign nationals and Canadians studying or working abroad.

C. EXPENDITURE COVERAGE

Expenditures reported for scientific activities reflect total costs, that is, they include the direct costs of scientific programs and non-program ("indirect") costs; the latter include the value of services supplied by other departments, accommodation provided by the reporting agency and administration program costs attributable to scientific activities; they apply only to the intramural activities of departments and agencies.

Expenditures are reported as either current or capital. Current expenditures are, in terms of the standard object, and in government accounts, expenditures on: personnel; transportation and communication; information; professional and special services; rentals; purchased repair and upkeep; utilities, materials and supplies; transfer payments; and "all other expenditures". Capital expenditures are expenditures on: construction and acquisition of land, buildings and equipment; and construction and acquisition of machinery and equipment.

Expenditure data cover the federal government fiscal year beginning April 1 of one year and ending March 31 of the following year; thus, fiscal year 1974 began April 1, 1973 and will end March 31, 1974.

D. MANPOWER CATEGORIES

Information on manpower appearing in this report is presented under the six occupational categories identified in the general classification system which applies to most public service positions:

Executive: refers only to the senior executive group. It is composed of positions, the incumbents of which are responsible for managing an agency or major component of a department or agency and for providing advice on the development and conduct of government programs.

Scientific and Professional: groups engaged in the application of a comprehensive body of knowledge acquired through university graduation or groups in which membership in Canada is generally controlled by legally licensing bodies.

Administrative and Foreign Service: groups engaged in the planning, execution, conduct and control of programs serving the public interest, relations between Canada and other countries and the requirements of internal management in the Public Service of Canada.

Technical: groups engaged in the conduct of analytical, experimental and investigative duties in all the sciences and the performance of similar technical duties in which the requisite knowledge and skills are normally acquired through completion of secondary school education and specialized training.

Administrative Support: groups such as: clerical and regulatory; communications; data processing; office equipment, operation; secretarial, stenographic, typing, and telephone operation.

Operational: groups engaged in the performance of a craft or of unskilled work. It refers to groups such as Correctional, General Services, Postal Operations, and Printing Operations.

The above categories are measured in full-time equivalent, that is, the number of man-years actually devoted to scientific activities by all the employees engaged in these activities.