Federal Scientific Resources

1973 to 1975

Natural and Human Sciences

December 1974

Ministry of State
Science and Technology

Ministère d'État
Sciences et Technologie

Federal Scientific Resources

1973 to 1975

1974

Ministry of State
Science and Technology

Ministère d'État
Sciences et Technologie

Cette publication existe aussi en version française.

This report is also available in French.

Information Canada

Ottawa, 1974

Cat. No.: ST21-2/1975

FOREWORD

This is the fourth annual report prepared by the Ministry of State for Science and Technology on the allocation of manpower and financial resources to scientific activities by the federal government.

Information on the estimated expenditure and manpower levels is presented for the 1974-75 government fiscal year along with comparable data for previous years. Coverage extends to both the natural and human sciences and includes statistical information on the federal support of research and development and of such related scientific activities as data collection, scientific information and testing and standardization, among others. Examination of these data is provided by scientific activity, sector of performance, departmental source of support, field and application of science, geographical distribution, type of expenditure and manpower category.

We are indebted to the members of the Interdepartmental Committee on Scientific Expenditures and Statistics Canada whose efforts made possible the early release date of this report.

The Honourable C.M. Drury
Minister of State
for Science and Technology

CONTENTS

ABBREVIATIONS

AECB	Atomic Energy Control Board
AECL	Atomic Energy of Canada Limited
Agr	Department of Agriculture
BC	Bank of Canada
CAL	Canadian Arsenals Limited
CBC	Canadian Broadcasting Corporation
CC	Canada Council
CCA	Department of Consumer and Corporate Affairs
CIDA	Çanadian International Development Agency
CMHC	Central Mortgage and Housing Corporation
CPDL	Canadian Patents and Development Limited
CTC	Canadian Transport Commission
DND	Department of National Defence
DOC	Department of Communications
DOE	Department of the Environment
DPW	Department of Public Works
EC	Economic Council of Canada
EA	Department of External Affairs
EMR	Department of Energy, Mines and Resources
Fin	Department of Finance
IDRC	International Development Research Centre
INA	Department of Indian and Northern Affairs
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
NFB	National Film Board
NHW	Department of National Health and Welfare
NL	National Library
NM	National Museums
NRC	National Research Council
PA	Public Archives
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
SLSA	St. Lawrence Seaway Authority
SS	Secretary of State Department
TBS	Treasury Board Secretariat
U&NPI	Universities and Non-Profit Institutions
VA	Veterans Affairs

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 1975 began on April 1, 1974 and will end March 31, 1975.
3. The source of all data in this report is Statistics Canada unless otherwise indicated.

HIGHLIGHTS

Total federal expenditures on science are expected to reach $1,372.7 million in 1975 or 8.4% more than the $1,265.9 million total for 1974. The natural sciences will account for 78% of the total and the human sciences for 22%.

Research and development activities will represent 63% of the science budget; such **related scientific activities** as data collection, scientific information, testing and standardization, feasibility and operations studies, and scholarship programs will account for the remainder.

Scientific expenditures within federal establishments are expected to equal $913 million (67%); **support of universities and non-profit institutions** is estimated at $206 million (15%); industry $195 million (14%); **foreign performers** $39 million (3%); and **other Canadian performers** $19 million (1%).

One quarter of the intramural budget, or $230 million, will be spent by the Department of the Environment; Statistics Canada, National Defence, Agriculture, Energy, Mines and Resources, Atomic Energy of Canada Limited and the National Research Council will each spend between $75 and $99 million on in-house scientific activities and will collectively represent 56% of the total.

The growth of intramural spending on the natural sciences is expected to decrease in 1975; it is estimated at 7% as compared to 9% in 1974; expenditures on in-house human science activities will rise by 19% as compared to 24% in 1974.

The growth of extramural spending over 1974 is estimated at 22% in the human sciences and 3% in the natural sciences.

Expressed as a percentage of the total federal budget, federal scientific expenditures are expected to equal 6.2% in 1975, as compared to 6.3% in 1974 and 6.8% in 1973.

Manpower resources allocated to natural and human science activities in federal establishments in 1974 totalled 35,390 employees; 51% were assigned to R&D work, 47% to related scientific activities and 2% to the administration of extramural programs.

INTRODUCTION

This report is divided into three sections.

Part 1, printed on totally or partially ORANGE-coloured pages, provides an overview of the federal government's financial and manpower allocations to both the natural and human sciences for fiscal years 1972-73, 1973-74 and 1974-75. Data are presented by scientific activity, sector of performance, departmental source of support, budgetary function, and as a percentage of total federal resources.

Part 2, coded in GREEN, examines the allocation of federal resources to the natural sciences. Information is broken into six groupings:

1. Total scientific activity expenditures
2. Research and development expenditures
3. Related scientific activity expenditures
4. Manpower resources
5. Geographic distribution
6. International comparisons

Part 3, distinguished by its BLUE colour, relates to federal expenditures and manpower assigned to activities in the human sciences. Information is displayed in the same order as the second section, but does not include international comparisons, which are not available.

Additional statistical information complementing each of the three parts of the report will be found in the appendices at the back. Appendix 1 corresponds to Part 1 and so on. Appendix 4 presents technical notes on data limitations and the terminology used in the report.

Information on expenditures includes the non-program (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.

Unless otherwise indicated, the source of all statistical data in this report is Statistics Canada's annual surveys of federal scientific activities. Figures therefore correspond to the results of these surveys, which appear in *Federal Government Activities in the natural sciences, 1973-1975,* Catalogue No. 13-202 and, *Federal Government Activities in the human sciences, 1973-1975,* Catalogue No. 13-205.

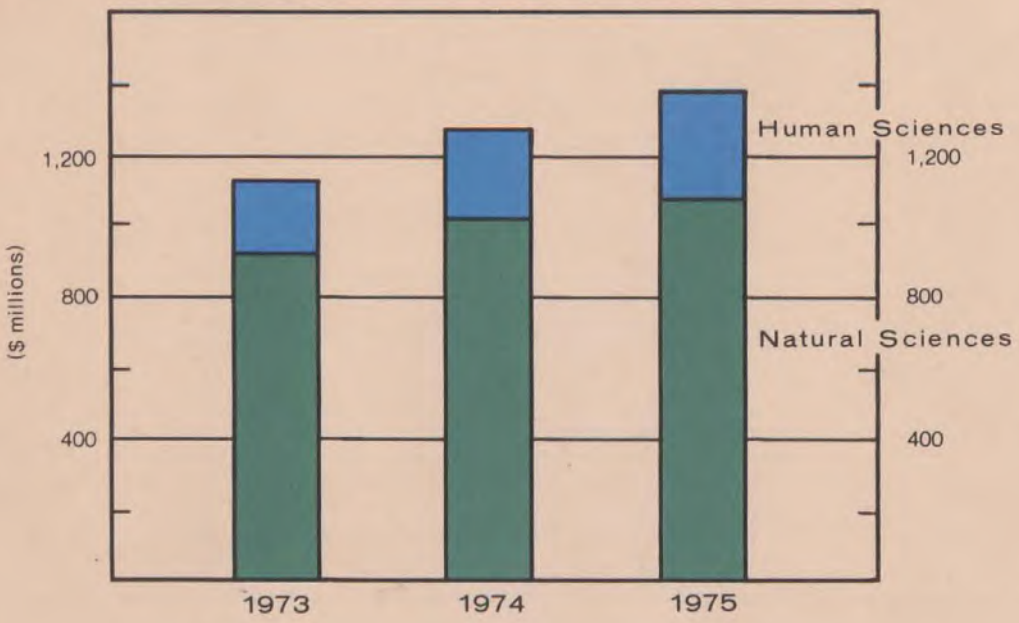
This report was prepared in the Scientific and Technological Resources Division, Cooperation Branch. The graphical displays were constructed by the Graphic Arts Section.

1

Natural and Human Sciences

1.1 Total Scientific Activity Expenditures

1. Federal Expenditures on Scientific Activities Natural and Human Sciences, 1973-75



($ millions)

	1973		1974		1975		Average Annual Percent Change
	$	%	$	%	$	%	
Natural Sciences	920.0	(81.6)	1010.2	(79.8)	1065.8	(77.6)	7.6
Human Sciences	207.2	(18.4)	255.7	(20.2)	306.9	(22.4)	21.7
TOTAL	1127.2	(100.0)	1265.9	(100.0)	1372.7	(100.0)	10.4

Total federal expenditures on the natural and human sciences are expected to reach $1372.7 million in 1975, an increase of $106.8 million or 8.4% over the previous year.

Natural science expenditures are estimated at $1065.8 million, a rise of $55.6 million over 1974.

Human science expenditures are estimated at $306.9 million, or $51.2 million more than in 1974.

The percentage of funds allocated to the natural sciences is expected to decline to 77.6% of the total in 1975, 4% less than in 1973; the share of the human sciences will increase by the same amount.

Average annual growth of expenditure between 1973 and 1975 is estimated at 7.6% for the natural sciences and 21.7% for the human sciences.

2. Federal Expenditures on Scientific Activities by Department or Agency, Natural and Human Sciences, 1973-75

($ millions)

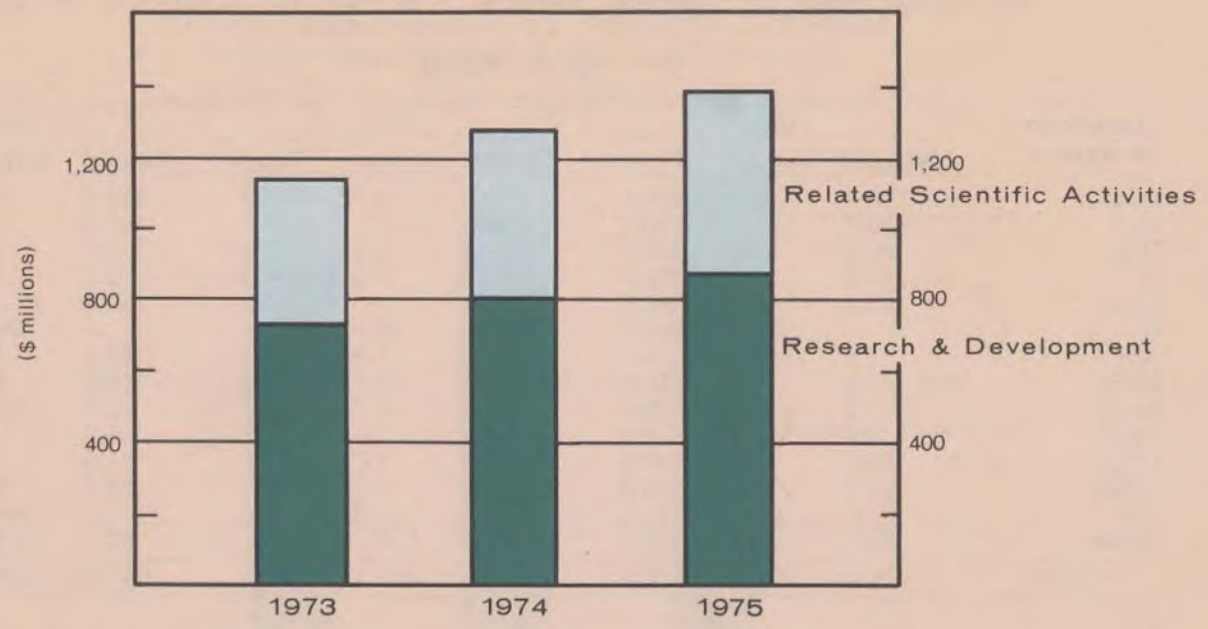
Department or Agency	1973			1974			1975		
	Natural	Human	Total	Natural	Human	Total	Natural	Human	Total
DOE	198.4	8.1	206.5	219.3	8.0	227.3	240.6	8.3	249.0
NRC	150.7	-	150.7	158.0	-	158.0	163.0	-	163.0
DND	92.8	2.9	95.7	93.8	3.4	97.2	103.7	3.8	107.6
ITC	91.8	0.8	92.5	103.3	2.0	105.3	103.2	2.1	105.3
AECL	85.9	-	85.9	97.9	-	97.9	99.1	-	99.1
SC	-	66.3	66.3	-	82.7	82.7	-	98.9	98.9
Agr	72.6	1.4	74.0	78.7	1.6	80.3	87.6	1.6	89.2
EMR	72.9	1.8	74.8	78.7	2.1	80.8	82.2	2.4	84.6
NHW	27.5	9.0	36.5	32.9	14.7	47.6	32.3	21.0	53.4
MRC	38.2	-	38.2	41.2	-	41.2	41.3	-	41.3
DOC	26.0	0.7	26.6	31.3	1.0	32.2	31.8	1.5	33.3
CIDA	18.2	5.4	23.6	20.9	7.7	28.6	22.3	8.5	30.8
CC	-	20.8	20.8	-	22.8	22.8	-	24.5	24.5
Other	45.0	90.0	135.1	54.2	109.7	164.1	58.7	134.3	192.7
TOTAL	920.0	207.2	1127.2	1010.2	255.7	1265.9	1065.8	306.9	1372.7

Seventy-three percent of the total science budget will be shared between eight departments and agencies in 1975: DOE will continue to be the largest spender with estimated expenditures of $249 million or 18.1% of the total; NRC ranks second with expenditures of $163 million (11.9%); six other departments and agencies — DND, ITC, AECL, Statistics Canada, Agriculture and EMR — each will account for about 7% of the total.

Expenditure increases of $5 million or more during the 1974-75 period are expected of eight departments and agencies; these are: DOE $21.7 million (a 9.6% increase), Statistics Canada $16.2 million (19.6%), DND $10.4 million (10.7%), Agriculture $8.9 million (11.1%), IDRC $6.6 million (41.5%), NHW $5.8 million (12.2%), MOSUA $5.4 million (87.1%) and NRC $5 million (3.2%).

The major performer in the natural sciences will be DOE with estimated expenditures of $240.6 million; in the **human sciences** it will be Statistics Canada with a $98.9 million budget.

3. Federal Expenditures on Scientific Activities by Activity, 1973-75



($ millions)

Activity	1973		1974		1975		Average Annual Percent Change
	$	%	$	%	$	%	
Research & Development	716.6	(63.6)	798.2	(63.0)	861.2	(62.7)	9.6
Related Scientific Activities	410.6	(36.4)	467.8	(37.0)	511.5	(37.3)	11.6
TOTAL	1127.2	(100.0)	1265.9	(100.0)	1372.7	(100.0)	10.4

Total federal expenditures on scientific activities are expected to reach $1372.7 million in 1975, an increase of $106.8 million or 8.4% over the previous year.

Research and development activities will account for $861.2 million, a 7.9% rise over 1974.

Related scientific activities will grow by 9.3% to $511.5 million.

The percentage of funds allocated to R&D is expected to represent 62.7% of the total in 1975; related scientific activities will account for the remainder.

Average annual growth of expenditure between 1973 and 1975 is estimated at 9.6% for R&D and 11.6% for related scientific activities.

4. Federal Expenditures on Scientific Activities by Performer, 1973-75

($ millions)

Performer	1973		1974		1975	
	$	%	$	%	$	%
Intramural	745.8	(66.2)	833.7	(65.9)	913.2	(66.5)
Universities and Non-Profit Institutions	176.8	(15.7)	195.0	(15.4)	205.8	(15.0)
Industry	170.3	(15.1)	192.5	(15.2)	195.1	(14.2)
Other Canadian	12.2	(1.1)	15.7	(1.2)	19.3	(1.4)
Foreign	22.1	(2.0)	29.0	(2.3)	39.3	(2.9)
TOTAL	1127.2	(100.0)	1265.9	(100.0)	1372.7	(100.0)

Intramural expenditures (within federal establishments) are estimated at $913.2 million in 1975, a $79.5 million increase over 1974; a rise of $87.9 million was recorded between 1973 and 1974.

Support of Canadian universities and non-profit institutions is expected to reach $205.8 million.

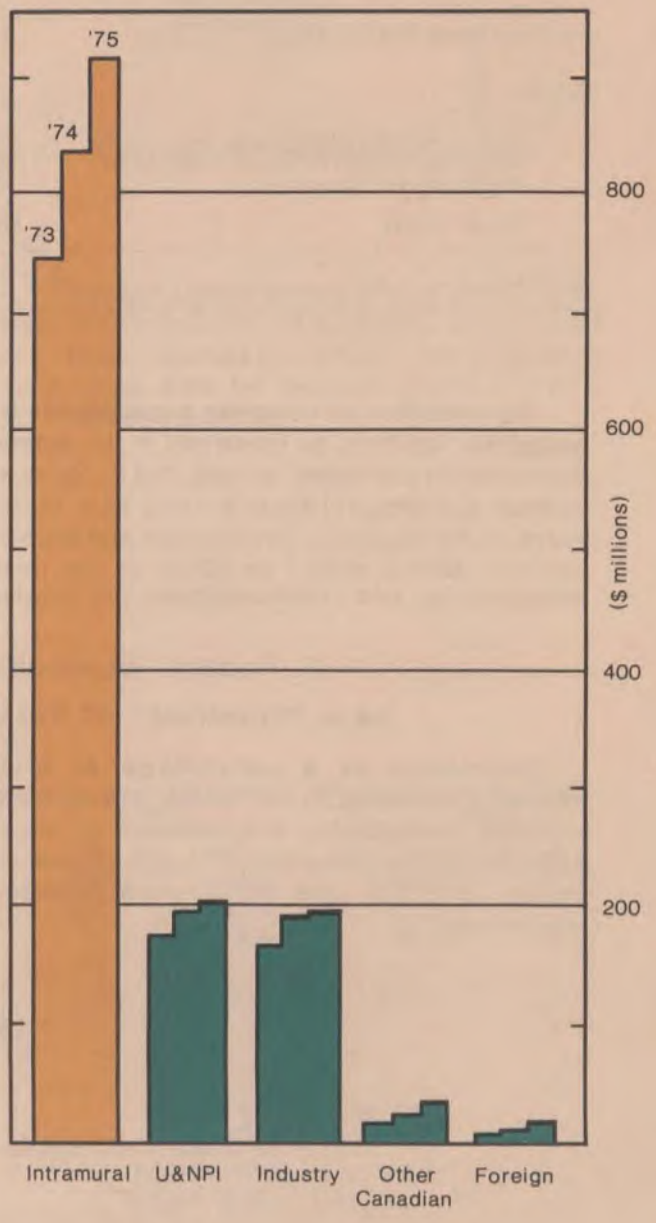
Industry will receive an estimated $195.1 million in support of its scientific activities.

Foreign performers of scientific activities will be allotted $39.3 million, a $10.3 million rise over 1974.

Other Canadian performers, such as provincial and municipal governments and provincial research councils, can expect to see the level of their funding increase to $19.3 million, from $15.7 million in 1974.

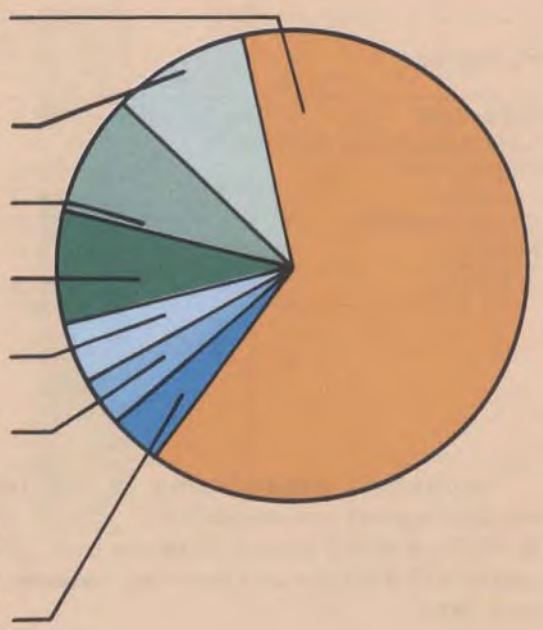
The percentage of funds allocated to activities within federal establishments is estimated at 66.5%, universities and non-profit institutions 15.0%, industry 14.2%, foreign performers 2.9% and other Canadian performers 1.4%.

Average annual growth of expenditure between 1973 and 1975 is estimated at 10.7% for intramural spending and at 9.7% for extramural performance.



5. Federal Expenditures on Scientific Activities by Budgetary Function, 1975

FUNCTION	($ millions)	(%)
Economic Development & Support	871.5	(63.5)
Transportation and Communications	129.4	(9.4)
Health and Welfare	112.7	(8.2)
Defence	107.7	(7.8)
Foreign Affairs	56.3	(4.1)
Culture and Recreation	44.7	(3.3)
Other		
-General Government Services	33.7	(2.5)
-Internal Overhead Expenses	12.9	(0.9)
-Education Support	3.9	(0.3)
-Sub Total	50.4	(3.7)
TOTAL	1,372.7	(100.0)



Classification of scientific expenditures by budgetary function, as presented in the federal government's Estimates, reveals that by far most science spending will apply in 1975, as in recent years, to the economic development and support function: $871.5 million or 63.5% of the total; transportation and communications will receive $129.4 million (9.4%); health and welfare $112.7 million (8.2%); defence $107.7 million (7.8%); foreign affairs $56.3 million (4.1%); culture and recreation $44.7 million (3.3%); and general government services, internal overhead expenses, and education assistance $50.4 million (3.7%).

6. Federal Expenditures on Scientific Activities as a Percentage of Total Federal Expenditures, 1973-75

Expressed as a percentage of total estimated spending by the federal government, scientific expenditures are expected to equal 6.23% in 1975, less than in 1974 and 1973 when figures of 6.30% and 6.81% were recorded respectively.

The average annual growth of science spending for the 1973-75 period is estimated at 10.4%, that of total federal spending at 15.3%.

($ millions)

	1973	1974	1975
Federal Science Budget	1,127.2	1,265.9	1,372.7
Total Federal Budget[1]	16,548.1	20,080.1	22,022.9
Science as a Percentage of Total Federal Budget	6.81%	6.30%	6.23%

[1]Source: ESTIMATES for the fiscal year ending March 31, 1975 ("Blue Book").

7. Federal Current Expenditures on Research and Development by Type of Funding, 1973-75

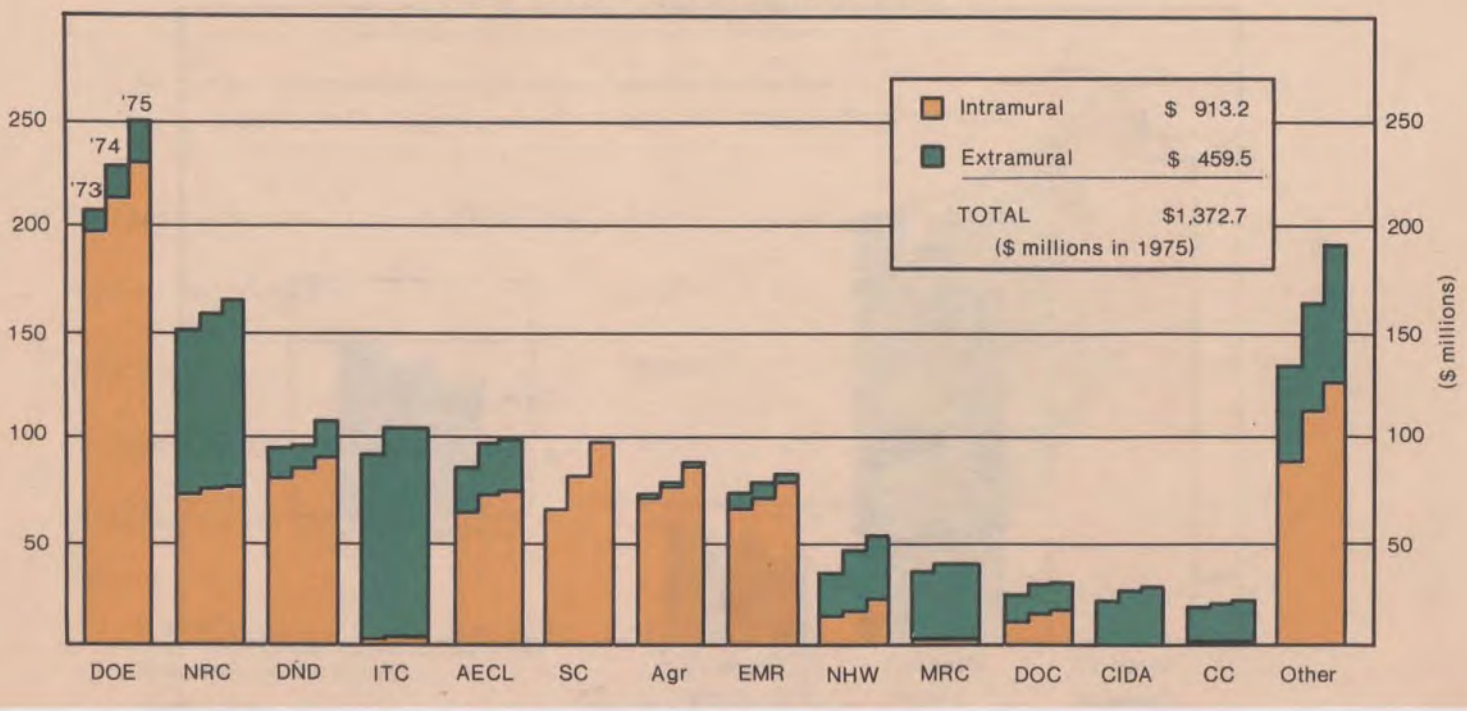
Current expenditures on research and development are expected to reach $811.6 million in 1975, a 7.7% rise over 1974. Approximately half of this total will be directed towards in-house research; the remainder will be distributed through research grants (37.6%), research contracts (9.9%) and research fellowships (1.8%).

Average annual growth of expenditure between 1973 and 1975 is estimated at 14.5% for research contracts, 12.4% for research fellowships, 9.9% for research grants and 9.1% for in-house research.

($ millions)

Type of Funding	1973		1974		1975	
	$	%	$	%	$	%
Intramural Research	346.3	(51.6)	379.9	(50.4)	411.7	(50.7)
Research Grants	252.8	(37.6)	285.7	(37.9)	305.2	(37.6)
Research Contracts	61.2	(9.1)	74.8	(9.9)	80.3	(9.9)
Research Fellowships	11.4	(1.7)	13.0	(1.7)	14.4	(1.8)
TOTAL	671.7	(100.0)	753.4	(100.0)	811.6	(100.0)

8. Federal Intramural and Extramural Expenditures on Scientific Activities by Department or Agency, 1973-75



Intramural expenditures on all scientific activities, as noted earlier, are expected to reach $913.2 million in 1975, a 9.5% increase over the previous year, and will represent 67% of the total science budget.

One quarter of the intramural budget, or $230 million, will be allocated to DOE; the intramural expenditures of this largest federal science spender will rise 8.5% over 1974.

Between $75 and $99 million will be spent on intramural scientific activities by each of Statistics Canada, DND, Agriculture, EMR, AECL and NRC. Together with DOE they will account for 81% of intramural expenditures.

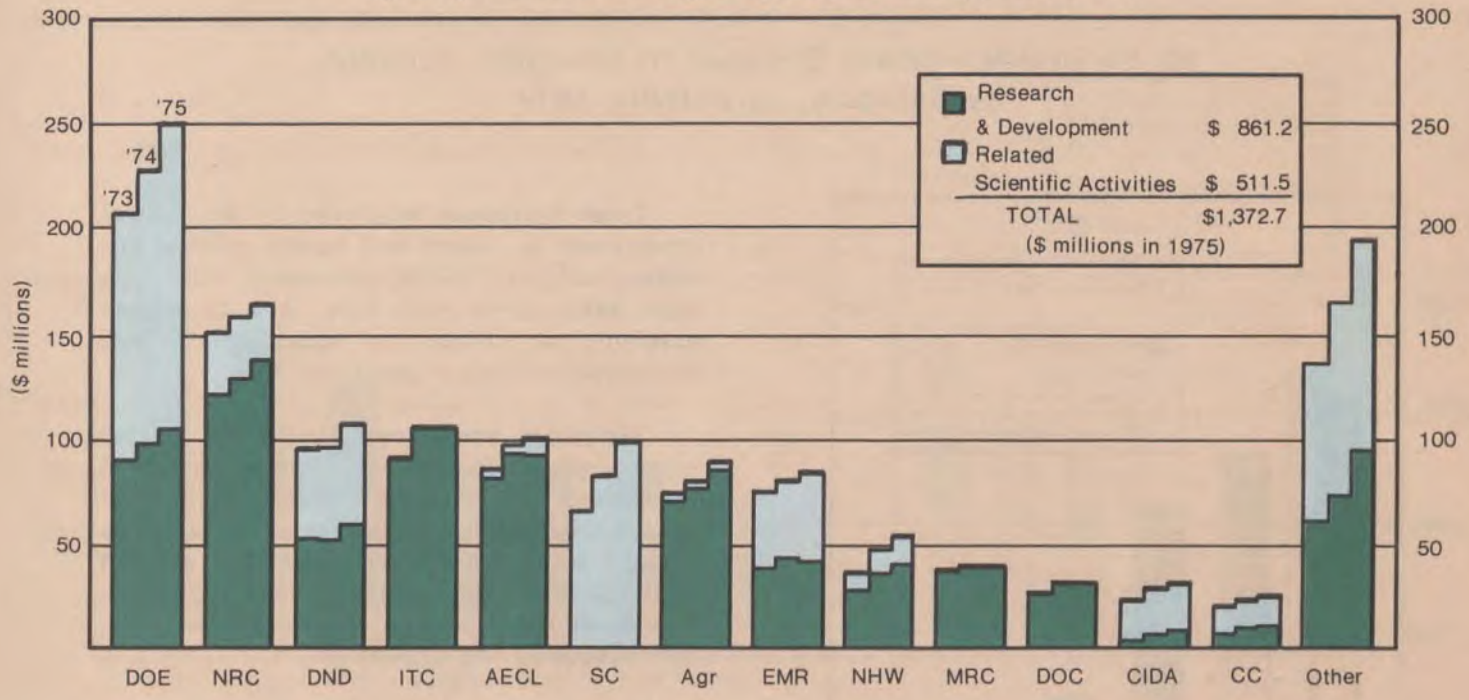
Extramural expenditures, that is payments to universities and non-profit institutions, industry and other performers, are estimated at $459.5 million or 6.3% more than in 1974.

Twenty-two percent of the extramural budget, or $101 million, will be allocated by ITC in 1975. NRC, MRC and NHW will account for 35%, and other departments and agencies for the remainder.

($ millions)

Department, or Agency	1973			1974			1975		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
DOE	196.5	10.0	206.5	212.1	15.3	227.3	230.2	18.8	249.0
NRC	72.6	78.1	150.7	75.8	82.2	158.0	74.8	88.2	163.0
DND	80.7	15.0	95.7	83.9	13.3	97.2	90.6	17.0	107.6
ITC	2.5	90.1	92.5	3.8	101.4	105.2	4.5	100.8	105.3
AECL	64.4	21.4	85.9	73.1	24.7	97.9	75.3	23.7	99.1
SC	66.3	-	66.3	82.7	-	82.7	98.9	-	98.9
Agr	73.0	1.0	74.0	79.3	1.0	80.3	88.3	1.0	89.2
EMR	67.2	7.6	74.8	72.5	8.4	80.8	79.9	4.7	84.6
NHW	15.3	21.3	36.5	17.8	29.7	47.6	22.6	30.8	53.4
MRC	0.7	37.5	38.2	0.9	40.4	41.2	1.0	40.4	41.3
DOC	13.9	12.7	26.6	16.5	15.7	32.2	18.1	15.2	33.3
CIDA	0.3	23.4	23.6	0.3	28.3	28.6	0.4	30.5	30.8
CC	1.1	19.8	20.8	1.2	21.6	22.8	1.3	23.2	24.5
Other	91.3	43.5	135.1	113.8	50.2	164.1	127.3	65.2	192.7
TOTAL	745.8	381.4	1127.2	833.7	432.2	1265.9	913.2	459.5	1372.7

9. Federal Expenditures on Scientific Activities by Department or Agency, by Activity, 1973-75



Research and development expenditures are largely shared by five departments and agencies, which will account for 61% of the total of $861 million: NRC $137 million or 16%, DOE $105 million or 12%, ITC $104 million or 12%, AECL $94 million or 11% and Agriculture $86 million or 10%.

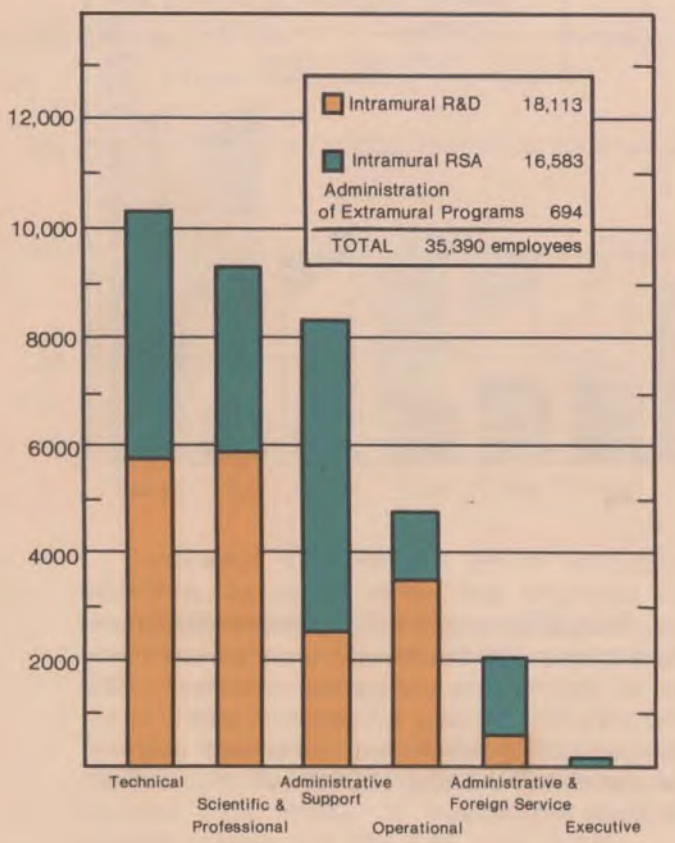
Related scientific activity expenditures are more evenly distributed between a greater number of departments and agencies; however DOE and Statistics Canada, with expenditures of $144 million and $93 million respectively, will account for almost half the total of $512 million allocated to these activities.

($ millions)

Department or Agency	1973			1974			1975		
	R&D	RSA	Total	R&D	RSA	Total	R&D	RSA	Total
DOE	90.8	115.8	206.5	98.2	129.1	227.3	105.0	144.0	249.0
NRC	120.9	29.7	150.7	128.1	29.9	158.0	137.0	26.0	163.0
DND	53.8	91.8	95.7	54.0	43.2	97.2	60.7	46.8	107.6
ITC	91.9	0.7	92.5	104.0	1.3	105.2	104.1	1.2	105.3
AECL	81.7	4.2	85.9	93.6	4.3	97.9	93.6	5.5	99.1
SC	2.6	63.6	66.3	3.5	79.3	82.7	5.5	93.4	98.9
Agr	71.1	2.9	74.0	76.9	3.4	80.3	85.5	3.7	89.2
EMR	39.6	35.2	74.8	43.3	37.5	80.8	42.5	42.0	84.6
NHW	27.3	9.2	36.5	36.3	11.2	47.6	41.2	12.2	53.4
MRC	36.5	1.7	38.2	39.6	1.7	41.2	39.7	1.7	41.3
DOC	25.6	1.1	26.6	30.8	1.5	32.2	31.1	2.2	33.3
CIDA	4.6	19.1	23.6	7.0	21.6	28.6	8.7	22.1	30.8
CC	8.1	12.7	20.8	9.5	13.3	22.8	10.7	13.8	24.5
Other	62.1	72.9	135.1	73.4	90.5	164.1	95.9	96.4	192.7
TOTAL	716.6	410.6	1127.2	798.2	467.8	1265.9	861.2	511.5	1372.7

1.2 Manpower Resources

10. Federal Manpower Engaged in Scientific Activities by Category, by Activity, 1974



Total manpower employed by the federal government in natural and human science activities numbered 35,390 persons in 1974: 51% were assigned to R&D work; 47% to related scientific activities; the remaining 2% administered extramural programs.

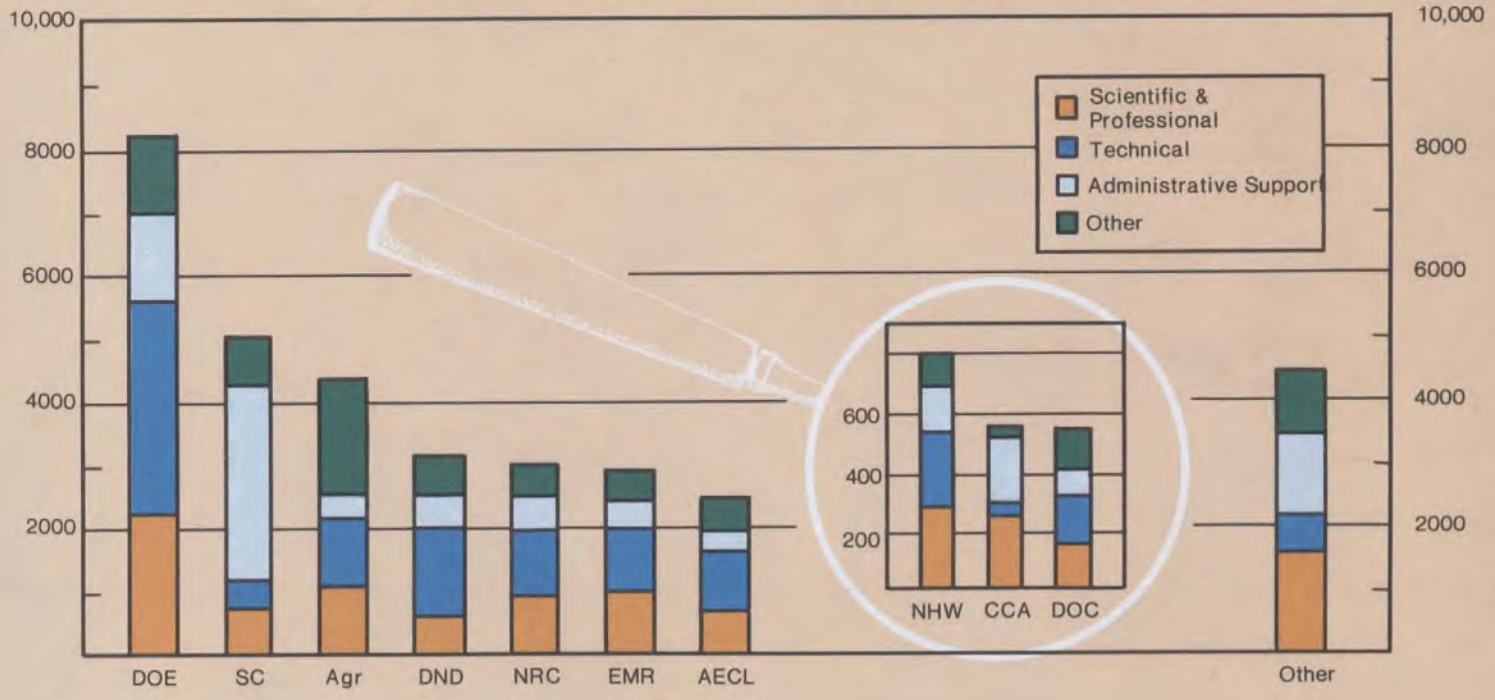
Technical employees accounted for the largest group among the various personnel categories: they numbered 10,285 or 29.1% of the total; **scientific and professional** employees totalled 9,433 (26.7%); **administrative support** 8,581 (24.2%); **operational** 4,719 (13.3%); **administrative and foreign service** 2,174 (6.1%); and **executive** 198 (0.6%).

The percentage distribution of employees among certain manpower categories differed with the activity: for example, the number of scientific and professional employees was equal to 32% of the R&D total and 21% of the RSA total; in the administrative support group the percentages were 14 and 35, while those in the operational category were 19 and 8 respectively.

Category	Intramural R&D	Intramural RSA	Administration of Extramural Programs	Total	Percent of Total
Technical	5712.2	4549.7	22.8	10284.7	(29.1)
Scientific and Professional	5850.0	3413.3	170.0	9433.3	(26.7)
Administrative Support	2451.6	5841.2	288.3	8581.1	(24.2)
Operational	3454.3	1255.8	8.9	4719.0	(13.3)
Administrative and Foreign Service	587.1	1408.2	178.7	2174.0	(6.1)
Executive	57.7	114.8	25.5	198.0	(0.6)
TOTAL	18112.9	16583.0	694.2	35390.1	(100.0)

N.B. Manpower figures are expressed in full-time equivalent.

11. Federal Manpower Engaged in Scientific Activites by Department or Agency, by Category, 1974



The department employing the largest number of persons engaged in scientific activities in 1974 was DOE with a full-time equivalent of 8,162 employees or 23.1% of the federal total.

Other major employers of over four thousand personnel were Statistics Canada (5,037) and Agriculture (4,380). Four others each employed more than two thousand individuals: DND (3,105), NRC (2,993), EMR (2,887) and AECL (2,471). Together with DOE, these departments and agencies accounted for 82% of the total.

Scientific and professional employees were at least twice as numerous within DOE as in any other department; expressed as a percentage of total departmental scientific manpower however, their concentration was greater in CCA (45%), NHW (37%), EMR (33%), NRC (31%), DOC (30%) and AECL (28%).

Department or Agency	Scientific and Professional	Technical	Administrative Support	Others	Total
DOE	2219.5	3381.0	1370.0	1191.2	8161.7
SC	704.0	441.0	3122.0	770.0	5037.0
Agr	1050.8	1093.4	434.8	1801.0	4380.0
DND	614.5	1366.0	534.0	590.5	3105.0
NRC	922.0	1046.0	541.0	484.0	2993.0
EMR	963.0	1022.0	434.0	468.0	2887.0
AECL	680.0	912.0	344.0	535.0	2471.0
NHW	293.5	244.6	154.9	105.9	798.9
CCA	251.0	53.0	223.0	32.0	559.0
DOC	166.0	159.0	96.0	128.5	549.5
Other	1569.0	566.7	1327.4	984.9	4453.0
TOTAL	9433.3	10284.7	8581.1	7091.0	35390.1

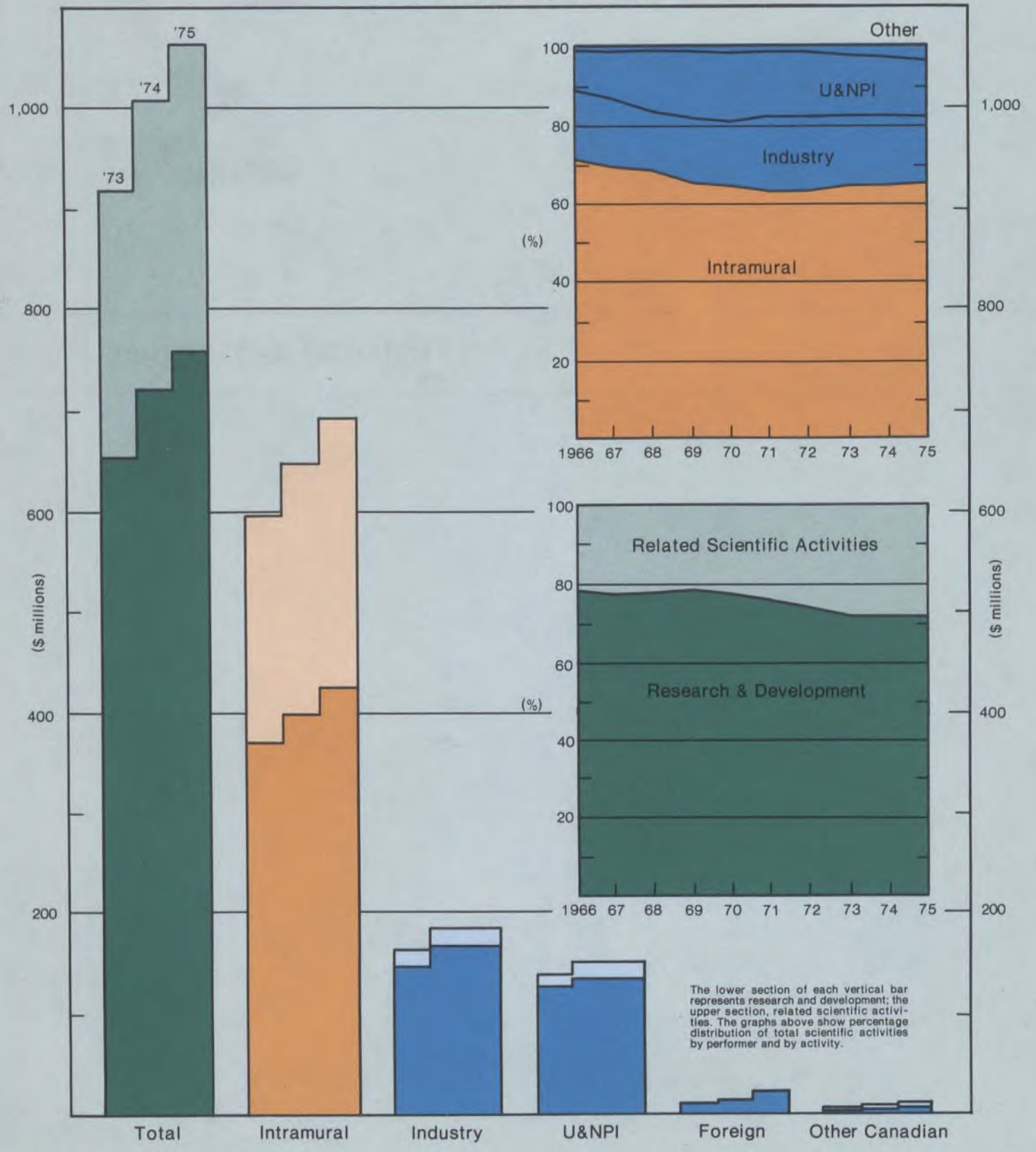
N.B. Manpower figures are expressed in full-time equivalent.

2

Natural Sciences

2.1 Total Scientific Activity Expenditures

12. Federal Expenditures on Scientific Activities by Performer, by Activity



The lower section of each vertical bar represents research and development; the upper section, related scientific activities. The graphs above show percentage distribution of total scientific activities by performer and by activity.

Total federal expenditures in the natural sciences are expected to reach $1,065.8 million in 1975, an increase of $55.6 million or 5.5% over 1974.

The average annual growth rate of expenditures in the natural sciences over the last 10 years is 10.4%. The highest growth rate was 19.5% in 1966 and the lowest 4.7% in 1970.

Research and development expenditures are expected to equal $760.2 million in 1975, a rise of $38.1 million or 5.3% over 1974.

Related scientific activities will account for $305.6 million or 28.7% of the federal natural science budget; their share of it has remained constant at about 29% since 1973, having risen from 22% in 1966.

Expenditures allocated to intramural performance of natural sciences are expected to equal $693.8 million in 1975, a rise of $44.0 million over 1974.

Expenditures allocated to Canadian industry are expected to reach $185.8 million, an increase of $1.3 million or 0.7% over 1974.

Expenditures allocated to universities and non-profit institutions are expected to equal $150.4 million in 1975, a drop of $0.2 million from 1974. Following a spectacular average growth rate of 28.9% per annum between 1966 and 1970, the average rate of increase in expenditures allocated to this sector has dropped to 3.2% between 1970 and 1975.

Foreign performers have witnessed the greatest growth in their share of the federal natural science budget, from 0.2% or $0.9 million in 1966 to 2.2% or $23.9 million in 1975.

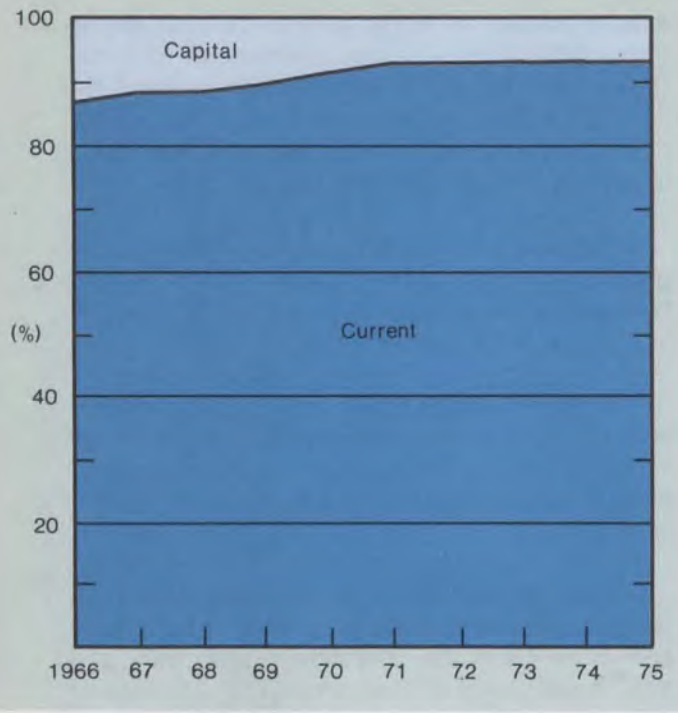
While industry's share of the federal natural science budget is expected to decrease to 17.4% in 1975 from 18.3% in 1974, the actual amount will increase by $1.3 million to $185.8 million.

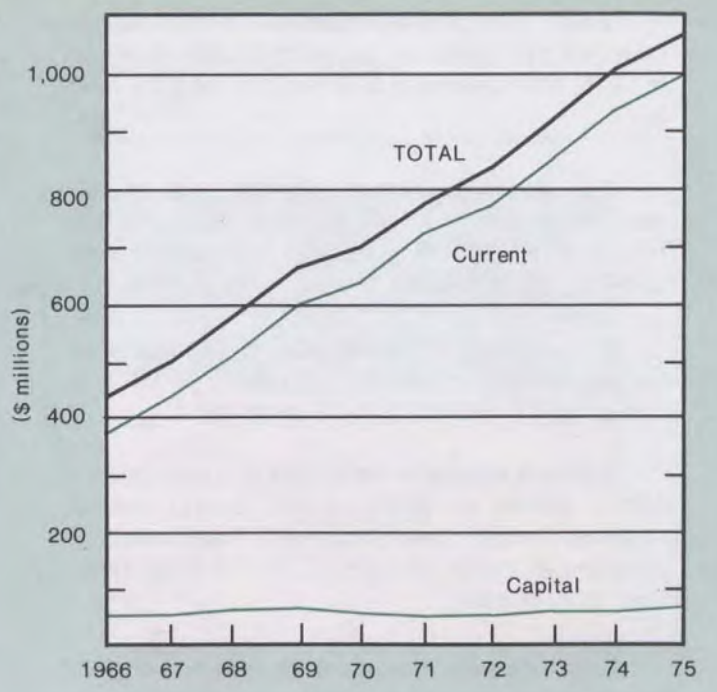
The highest relative concentrations of related scientific activities are by intramural and other Canadian performers, with 39% and 31% respectively of their shares of the federal natural science budget devoted to this activity.

The most rapid growth of expenditure in 1975 is expected in the foreign sector: a 57.2% increase is predicted; the slowest is in the university and non-profit institution sector where a 0.1% decline is anticipated.

Tables are in the Appendix

13. Federal Current and Capital Expenditures on Scientific Activities, 1966-75





Current expenditures in the natural sciences are expected to reach $998.7 million in 1975, a $52.2 million or 5.5% increase over 1974.

Capital expenditures in the natural sciences are estimated at $67.1 million, a $3.4 million or 5.3% increase over 1974.

The growth rate of current expenditures in the natural sciences in the last decade has averaged 11.4% per annum and has varied from a high of 16.9% in 1968 to a low of 5.5% in 1975.

The growth rate of capital expenditures in the natural sciences in the last decade has averaged 1.6% per annum and has varied substantially from a high of 17.7% in 1972 to a low of –17.8% in 1970.

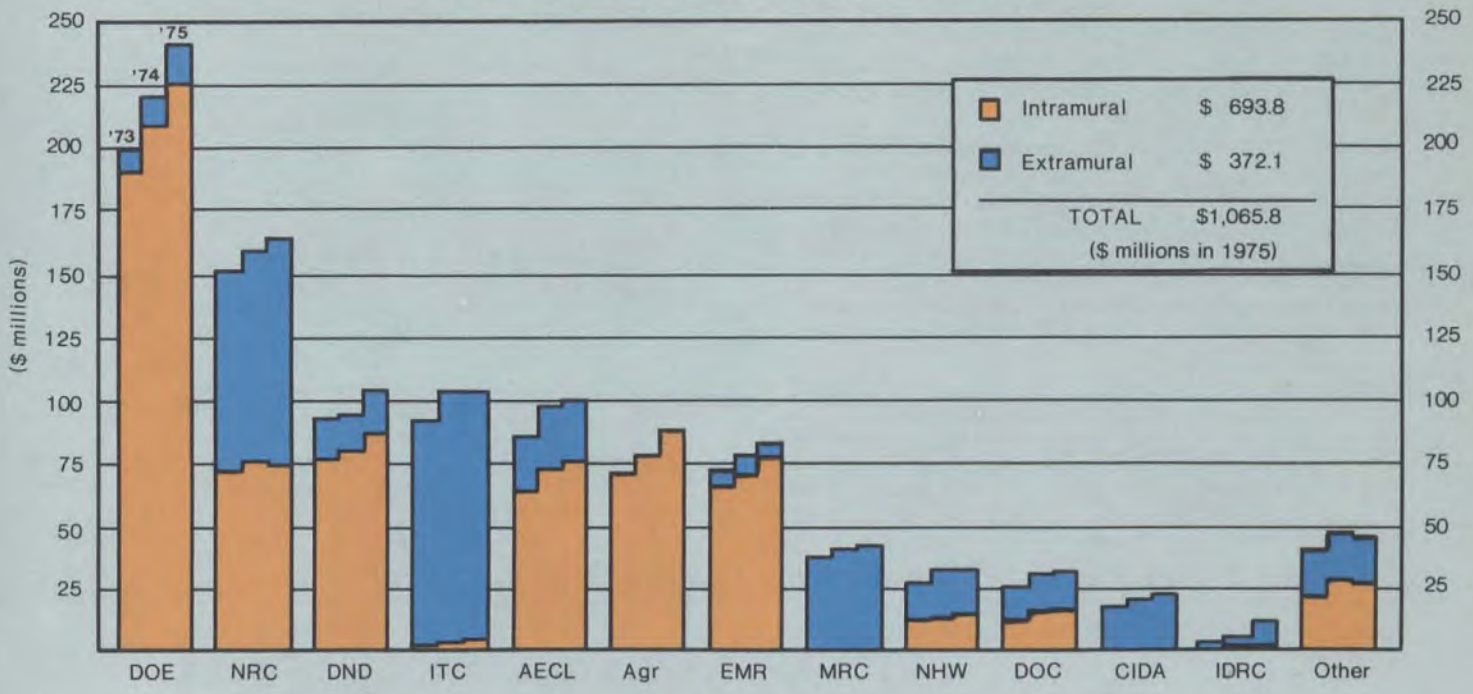
The department with the largest estimated capital expenditure in 1975 is Environment with $31.4 million; that with the largest portion of its funds allocated to capital expenditure is the Ministry of Transport (34.8%).

The capital expenditures mentioned above relate to federal intramural expenditures only; all payments to extramural performers are considered as current expenditures for survey purposes.

($ millions)

Year	Current		Capital		Total	
	$	%	$	%	$	%
1966	378.4	(86.6)	58.2	(13.3)	436.7	(100.0)
1967	438.5	(88.4)	57.3	(11.6)	495.9	(100.0)
1968	512.5	(88.6)	66.1	(11.4)	578.6	(100.0)
1969	598.7	(89.6)	69.7	(10.4)	668.4	(100.0)
1970	642.7	(91.8)	57.3	(8.2)	700.0	(100.0)
1971	725.3	(93.3)	52.1	(6.7)	777.4	(100.0)
1972	775.6	(92.7)	61.3	(7.3)	836.9	(100.0)
1973	856.2	(93.1)	63.7	(6.9)	920.0	(100.0)
1974	946.5	(93.7)	63.7	(6.3)	1010.2	(100.0)
1975	998.7	(93.7)	67.1	(6.3)	1065.8	(100.0)

14. Federal Intramural and Extramural Expenditures on Scientific Activities by Department or Agency, 1973-75



Intramural expenditures on the natural sciences are expected to reach $693.8 million in 1975, a 6.8% growth over the previous year.

Extramural expenditures on the natural sciences are expected to reach $372.1 million or 3.2% more than in 1974.

Over half of the total federal expenditures on the natural sciences is accounted for by four departments and agencies: DOE, NRC, DND and ITC.

Ninety-six percent of total federal expenditures on the natural sciences is accounted for by the 12 departments and agencies represented in the chart above.

The distribution between intramural and extramural expenditures is estimated at 65.1% and 34.9% respectively in 1975; this compares to 64.3% and 35.7% the previous year.

The Department of the Environment will be the largest spender of federal funds in the natural sciences in 1975 with an expenditure of $240.6 million or 22.6% of the total. This is up from $198.4 million or 21.6% of the total in 1973. DOE will also be the largest intramural spender at $224.6 million.

Industry, Trade and Commerce is expected to retain the lead in total extramural expenditures with $99.3 million, down $4.0 million from 1974.

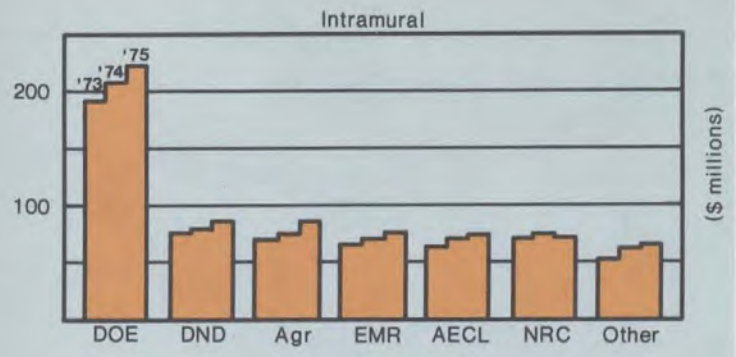
The National Research Council will rank second both in total expenditures ($163.0 million) and in extramural spending ($88.2 million).

The greatest dollar growth over 1974 expenditures on the natural sciences is expected of DOE with an increase of $21.3 million, bringing its total to $240.6 million; this represents 38% of the estimated growth of natural science expenditures by the federal government in 1975.

15. Federal Expenditures on Scientific Activities by Performer, by Department or Agency, 1973-75

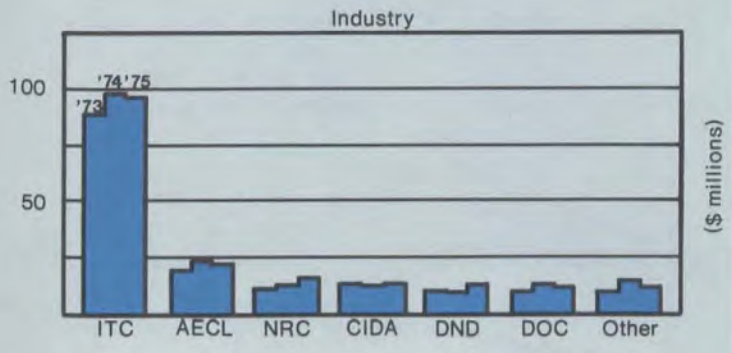
($ millions)

Performer	Department or Agency	1973		1974		1975	
		$	%	$	%	$	%
Intramural	DOE	191.7	(32.1)	207.2	(31.9)	224.6	(32.4)
	DND	78.0	(13.1)	80.8	(12.4)	87.0	(12.5)
	Agr	71.8	(12.0)	77.9	(12.0)	86.7	(12.5)
	EMR	65.5	(11.0)	70.6	(10.9)	77.7	(11.2)
	AECL	64.4	(10.8)	73.1	(11.3)	75.3	(10.9)
	NRC	72.6	(12.1)	75.8	(11.7)	74.8	(10.8)
	Other	53.5	(9.0)	64.6	(9.9)	67.5	(9.7)
	TOTAL	597.5	(100.0)	649.8	(100.0)	693.8	(100.0)
Extramural							
Industry	ITC	88.5	(53.7)	97.7	(53.0)	97.0	(52.2)
	AECL	20.3	(12.3)	23.5	(12.8)	22.8	(12.3)
	NRC	11.0	(6.7)	12.9	(7.0)	16.4	(8.8)
	CIDA	14.1	(8.6)	12.5	(6.8)	13.7	(7.4)
	DND	10.8	(6.5)	9.3	(5.0)	13.3	(7.2)
	DOC	10.7	(6.5)	13.9	(7.5)	11.8	(6.3)
	Other	9.3	(5.6)	14.8	(8.0)	10.9	(5.9)
	TOTAL	164.7	(100.0)	184.5	(100.0)	185.8	(100.0)
Universities and Non-Profit Institutions	NRC	65.4	(47.1)	66.8	(44.4)	67.2	(44.7)
	MRC	35.4	(22.5)	38.3	(25.4)	38.3	(25.5)
	NHW	14.4	(10.3)	19.6	(13.0)	17.1	(11.3)
	AECB	7.9	(5.7)	7.2	(4.8)	7.4	(4.9)
	Other	15.7	(11.3)	18.7	(12.4)	20.4	(13.6)
	TOTAL	138.8	(100.0)	150.6	(100.0)	150.4	(100.0)
Foreign	IDRC	2.6	(22.4)	3.9	(25.4)	8.7	(36.3)
	NRC	1.2	(10.4)	2.0	(13.5)	4.1	(17.2)
	CIDA	1.5	(12.7)	3.4	(22.4)	4.1	(17.1)
	DOC	1.1	(9.8)	0.9	(5.8)	2.3	(9.6)
	EA	1.9	(16.7)	2.1	(13.7)	2.3	(9.5)
	MRC	2.1	(18.0)	2.0	(13.3)	2.0	(8.4)
	Other	1.0	(10.0)	0.9	(6.1)	0.5	(1.9)
	TOTAL	11.4	(100.0)	15.2	(100.0)	23.9	(100.0)
Other Canadian	DOE	2.6	(34.8)	3.7	(36.6)	6.3	(52.5)
	REE	1.2	(15.6)	1.9	(19.4)	3.1	(25.6)
	DPW	2.0	(26.1)	1.8	(17.5)	0.8	(6.7)
	NRC	0.5	(7.0)	0.5	(4.8)	0.5	(4.3)
	ITC	0.1	(1.5)	1.0	(10.4)	0.5	(4.2)
	CMHC	0.5	(0.5)	0.1	(1.2)	0.4	(3.8)
	Other	0.7	(8.5)	1.0	(10.1)	0.4	(3.8)
	TOTAL	7.6	(100.0)	10.0	(100.0)	12.0	(100.0)



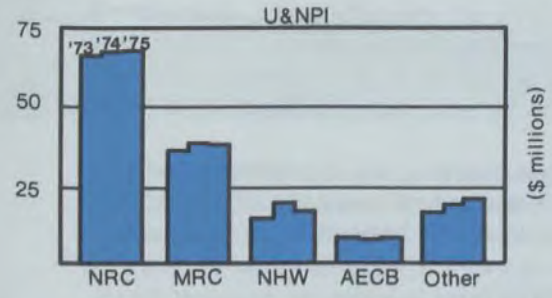
The Department of the Environment is by far the largest intramural natural science spender with over two and a half times the expenditure of the next largest department (DND) and almost a third of the total federal intramural natural science budget.

The greatest rate of growth among the six major spenders shown at left is expected of the Department of Agriculture with an annual average growth of 9.9% between 1973 and 1975. EMR at 8.9%, DOE at 8.2% and AECL at 8.1% follow closely. NRC is expected to grow much less rapidly at an estimated 1.5% per annum increase between 1973 and 1975,



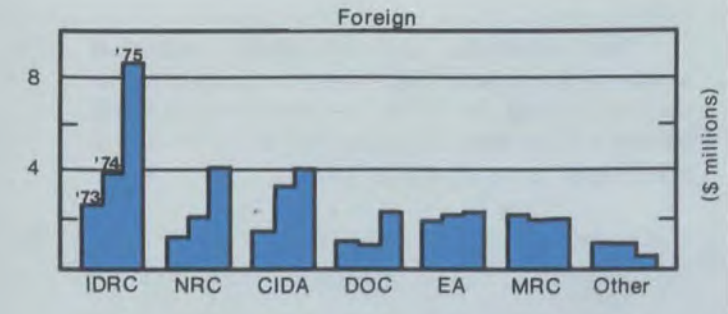
Support of the industrial sector has increased at an average annual rate of 6.2% since 1973, slightly less than the growth of intramural expenditures (7.8%) but greater than that of the university and non-profit sector (4.1%).

Industry, Trade and Commerce remains the largest supporter of activities in the natural sciences in industry accounting for just over half the total.

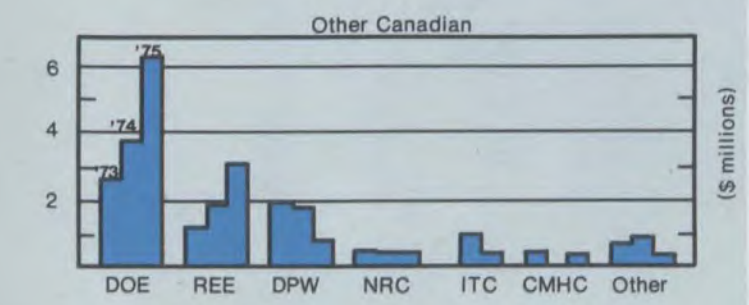


The National Research Council, as in recent years, will provide the lion's share of support to universities and non-profit institutions in 1975; however, this share is expected to drop to 44.7% of the total, down from 47.1% in 1973.

The small funders are gaining in importance, as support by "other" is expected to register annual increases of 14% between 1973 and 1975.



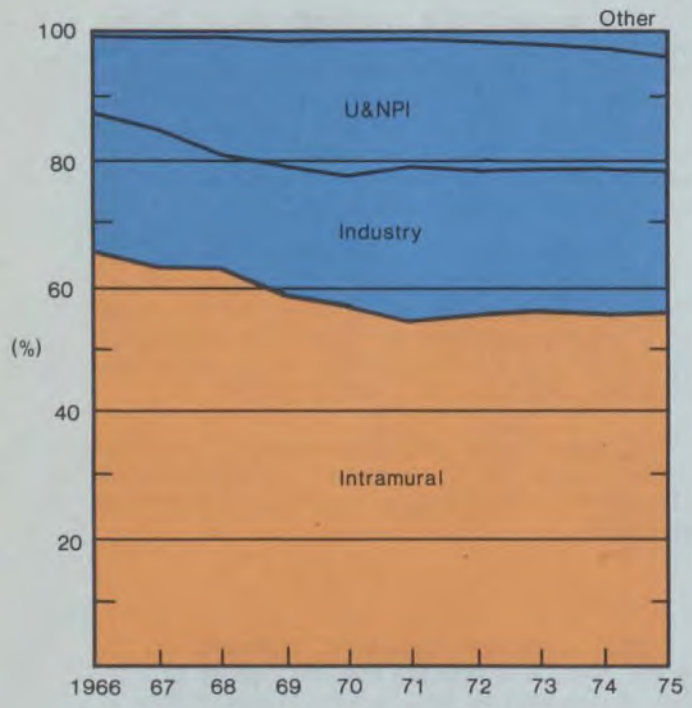
Growth in the support of foreign performers in 1975 is expected to be greater than in any other sector; average annual increases of 45% are estimated for the 1973-75 period. Funds for this sector will account for 2.2% of total federal expenditures in the natural sciences, up from 1.2% in 1973.

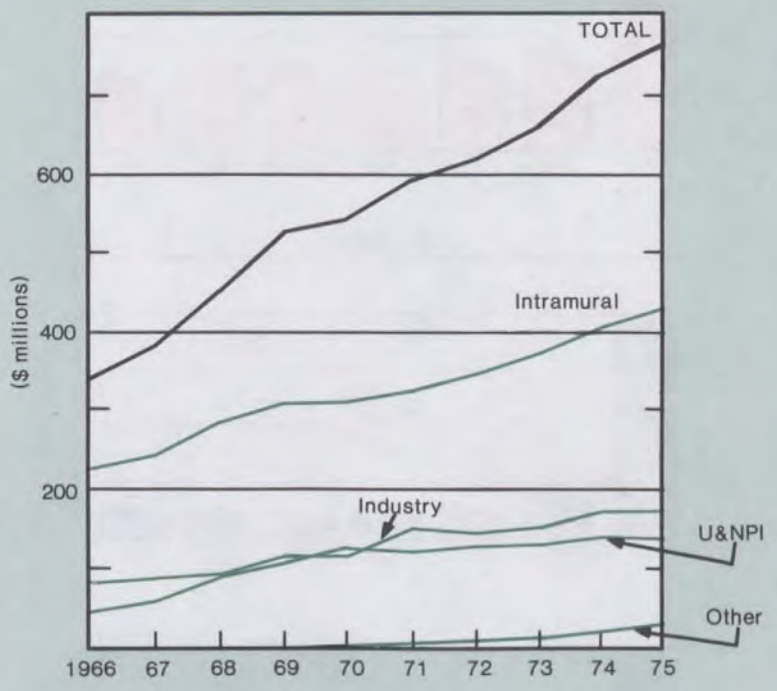


Other Canadian performers, which are made up of provincial research councils, provincial and municipal governments and private individuals, are expected to receive $12 million or 1.1% of the total federal natural science budget in 1975, 20% more than in 1974.

2.2 Research and Development Expenditures

16. Federal Expenditures on Research and Development by Performer, 1966-75





Total federal expenditures on research and development in the natural sciences are expected to reach $760.2 million in 1975, an increase of 5.3% over 1974. This is substantially lower than the average annual growth rate of 9.9% registered between 1966 and 1974.

Intramural research and development will account for $425.7 million or 56% of the total federal R&D budget; its share of the total is 9% lower than in 1966.

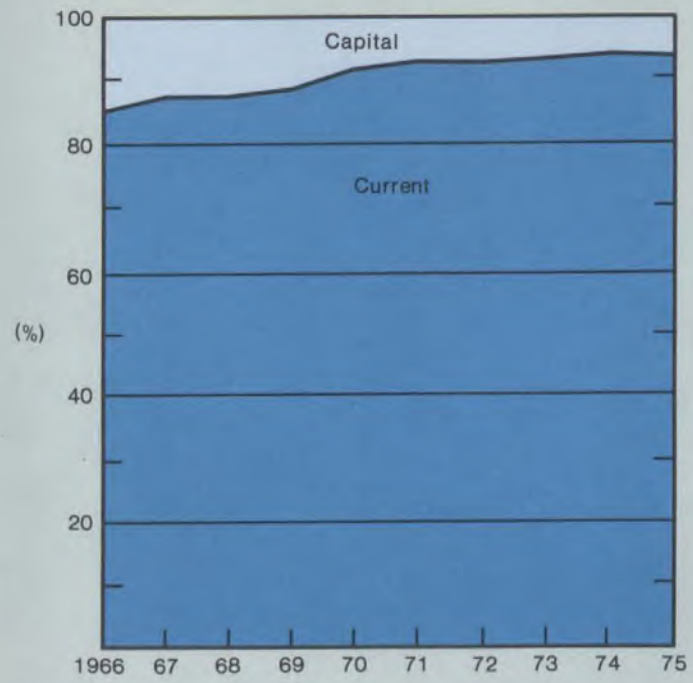
Industry's share of the federal research and development dollar has averaged about 22% of the total for the past decade, while fluctuating from a high of 24.5% in 1971 to a low of 18.8% in 1968. The 1975 level is expected to equal 22.1% or $167.9 million.

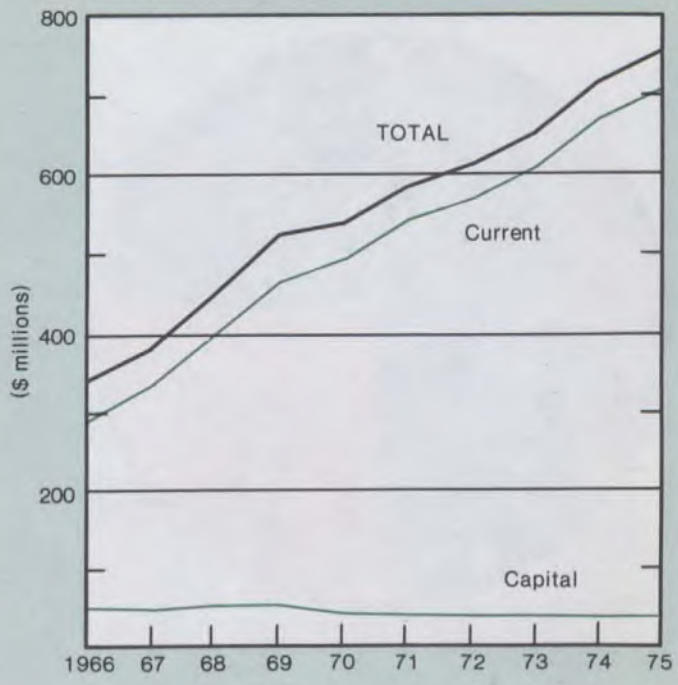
The university and non-profit institution share of the federal R&D budget is expected to decline further in 1975; an estimated $135.6 million will be spent in this sector or 17.8% of the total, down from 21.6% in 1970.

($ millions)

Year	Intramural		Industry		U & NPI		Others		Total	
	$	%	$	%	$	%	$	%	$	%
1966	221.0	(65.2)	75.5	(22.3)	41.4	(12.2)	1.3	(0.4)	339.1	(100.0)
1967	240.3	(63.0)	83.7	(22.0)	55.5	(14.6)	1.7	(0.4)	381.2	(100.0)
1968	281.2	(62.5)	84.4	(18.8)	81.7	(18.2)	2.9	(0.6)	450.1	(100.0)
1969	305.8	(58.4)	108.9	(20.8)	102.6	(19.6)	6.6	(1.3)	523.9	(100.0)
1970	307.5	(57.0)	109.8	(20.4)	116.4	(21.6)	5.4	(1.0)	539.1	(100.0)
1971	320.2	(54.5)	144.0	(24.5)	118.5	(20.2)	5.2	(0.9)	587.9	(100.0)
1972	342.3	(55.6)	138.5	(22.5)	125.5	(20.4)	9.0	(1.5)	615.3	(100.0)
1973	369.6	(56.4)	146.3	(22.3)	125.8	(19.2)	13.5	(2.1)	655.2	(100.0)
1974	400.3	(55.4)	167.2	(23.2)	135.0	(18.7)	19.6	(2.7)	722.1	(100.0)
1975	425.7	(56.0)	167.9	(22.1)	135.6	(17.8)	31.0	(4.1)	760.2	(100.0)

17. Federal Current and Capital Expenditures on Research and Development, 1966-75





Current expenditures on research and development in the natural sciences are expected to reach $712.9 million in 1975 or 93.8% of the $760.2 million total.

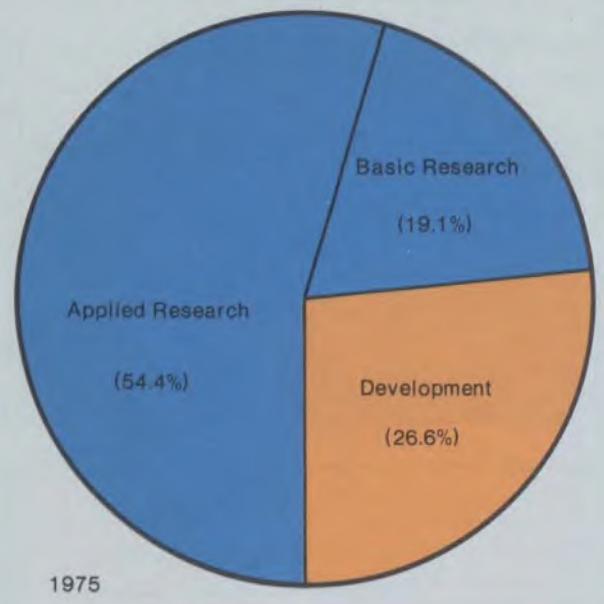
The growth of current expenditures on research and development averaged 11.3% per annum between 1966 and 1974; it is estimated at 5.0% in 1975.

Capital expenditures have remained fairly constant over the last decade, ranging from a high of $57.3 million in 1969 to a low of $41.3 million in 1971. In 1975, they are expected to equal $47.4 million; the annual average for the past ten years is $47.6 million.

($ millions)

Year	Current		Capital		Total	
	$	%	$	%	$	%
1966	287.7	(84.8)	51.5	(15.2)	339.1	(100.0)
1967	333.4	(87.5)	47.8	(12.5)	381.2	(100.0)
1968	394.8	(87.7)	55.4	(12.3)	450.1	(100.0)
1969	466.6	(89.1)	57.3	(10.9)	523.9	(100.0)
1970	495.0	(91.8)	44.1	(8.2)	539.1	(100.0)
1971	546.6	(93.0)	41.3	(7.0)	587.9	(100.0)
1972	570.8	(92.8)	44.5	(7.2)	615.3	(100.0)
1973	611.8	(93.4)	43.4	(6.6)	655.2	(100.0)
1974	678.9	(94.0)	43.2	(6.0)	722.1	(100.0)
1975	712.9	(93.8)	47.4	(6.2)	760.2	(100.0)

18. Federal Current Intramural Expenditures on Research and Development by Category of Research and Development, 1973-75



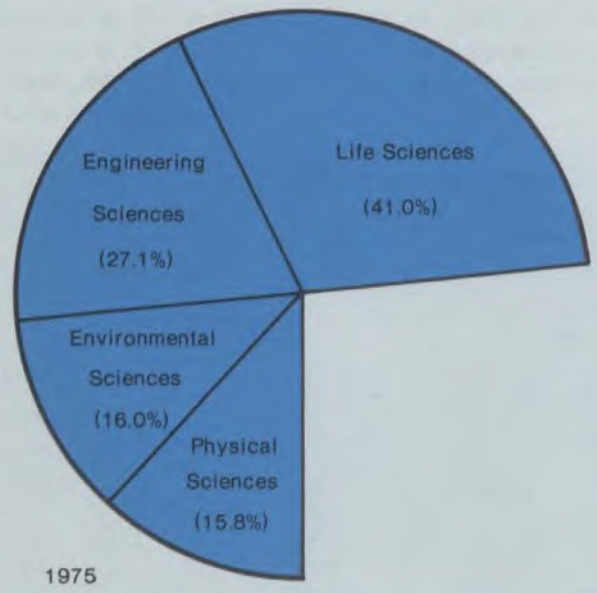
($ millions)

Category	1973		1974		1975	
	$	%	$	%	$	%
Research	236.7	(74.7)	253.2	(73.2)	268.3	(73.4)
Basic	*64.3*	*(20.3)*	*69.5*	*(20.1)*	*69.7*	*(19.1)*
Applied	*172.4*	*(54.4)*	*183.7*	*(53.1)*	*198.7*	*(54.4)*
Development	80.4	(25.3)	92.6	(26.8)	97.2	(26.6)
TOTAL	317.0	(100.0)	345.9	(100.0)	365.6	(100.0)

Current intramural research expenditures are expected to increase 6.0% in 1975; applied research will grow 8.2% and basic research 0.3%.

Current intramural development expenditures are expected to increase 5.0% in 1975; in 1974 they rose 15.2%.

19. Federal Current Intramural Expenditures on Research by Field of Science, 1973-75



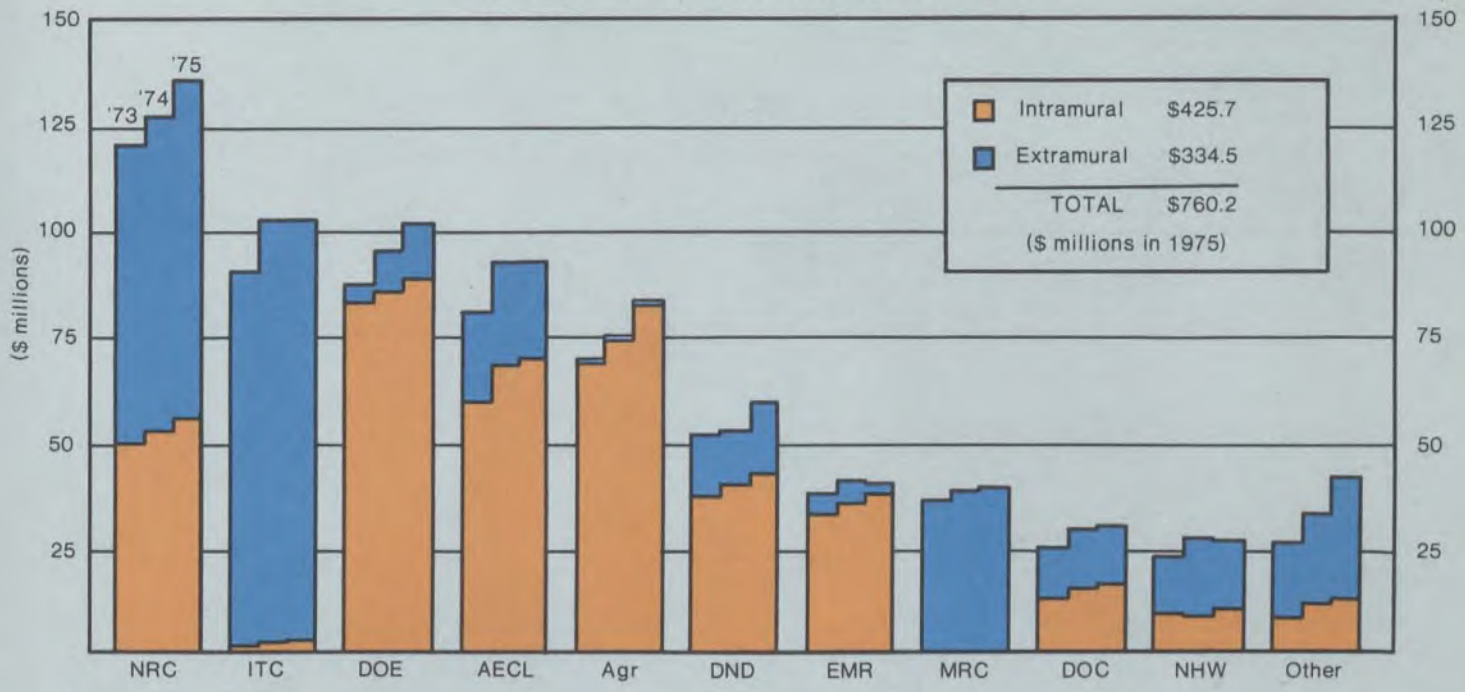
($ millions)

Field of Science	1973		1974		1975	
	$	%	$	%	$	%
Life Sciences	98.6	(41.7)	101.2	(40.0)	110.1	(41.0)
Engineering Sciences	64.0	(27.0)	70.4	(27.8)	72.6	(27.1)
Environmental Sciences	37.9	(16.0)	40.9	(16.2)	42.9	(16.0)
Physical Sciences	38.1	(16.1)	40.5	(16.0)	42.5	(15.8)
Mathematical Sciences	0.2	(--)	0.2	(--)	0.3	(--)
TOTAL	236.7	(100.0)	253.2	(100.0)	268.3	(100.0)

The growth of current intramural expenditures on research during the 1973-75 period is expected to be about the same for all fields of science, approximately 6% per annum.

Absolute growth in dollars over 1974 is estimated at $8.9 million for the life sciences, $2.2 for the engineering sciences, and $2.0 million for both the environmental and physical sciences.

20. Federal Intramural and Extramural Expenditures on Research and Development by Department or Agency, 1973-75



Intramural expenditures on research and development in the natural sciences are expected to reach $425.7 million in 1975, a 6.3% growth over the previous year.

Extramural expenditures on research and development in the natural sciences are expected to reach $334.5 million or $3.9% more than in 1974.

Ninety-four percent of total federal expenditures on the natural sciences is accounted for by the 10 departments and agencies represented in the chart above.

The distribution between intramural and extramural expenditures is estimated at 56.0% and 44.0% respectively; this compares to 55.4% and 44.6% in 1974.

The National Research Council will be the largest spender of federal research and development funds for the natural sciences in 1975 with an expenditure of $137.0 million or 18.0% of the total. This is up from $128.1 or 17.7% in 1974 but represents a smaller share than the 1973 figures of $120.9 million or 18.5%.

Industry, Trade and Commerce is expected to retain the lead in total extramural R&D expenditures with $98.8 million, down $0.7 million from 1974.

The greatest dollar growth over 1974 R&D expenditures on the natural sciences is expected of NRC with an increase of $8.9 million, bringing its total to $137.0 million; this represents 23% of the estimated growth of natural science expenditures by the federal government in 1975.

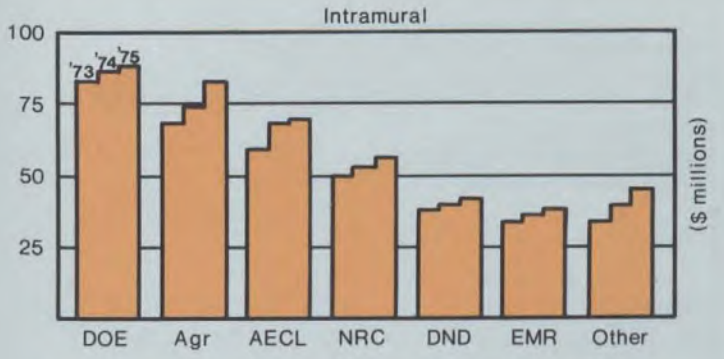
There is expected to be a decline in the share of the federal intramural natural science budget allocated to most of the top ten spenders since 1973; Agr, DOC and NHW will be the only departments or agencies to increase their share of the R&D dollar.

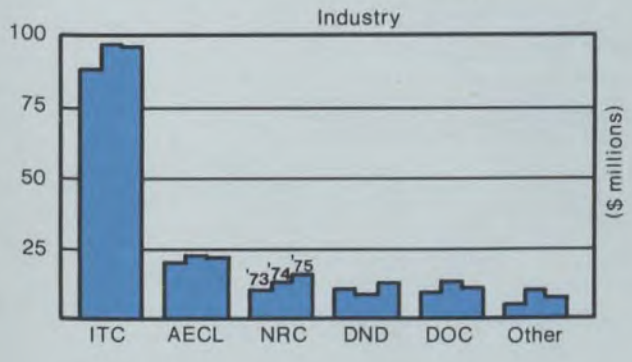
The ranking of the top ten departments and agencies is expected to remain the same as it was in 1973 and 1974.

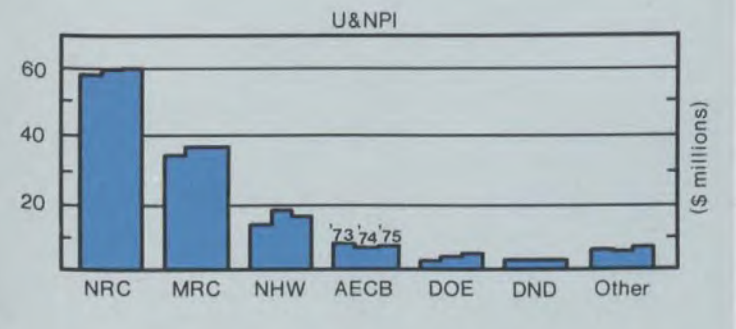
21. Federal Expenditures on Research and Development by Performer, by Department or Agency, 1973-75

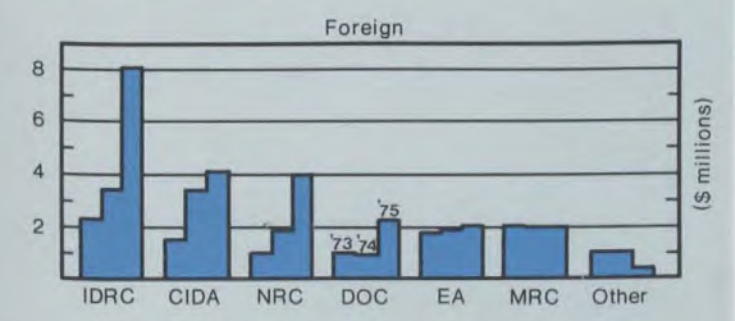
($ millions)

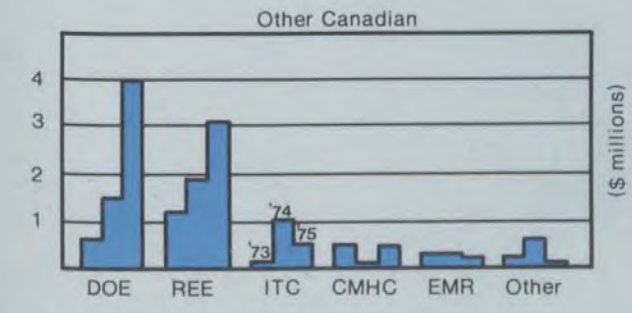
Performer	Department or Agency	1973		1974		1975	
		$	%	$	%	$	%
Intramural	DOE	83.9	(22.7)	86.2	(21.5)	89.0	(20.9)
	Agr	68.9	(18.6)	74.4	(18.6)	83.0	(19.5)
	AECL	60.6	(16.4)	69.3	(17.3)	70.4	(16.5)
	NRC	50.7	(13.7)	53.9	(13.5)	56.7	(13.3)
	DND	38.1	(10.3)	40.2	(10.0)	43.3	(10.2)
	EMR	33.6	(9.1)	36.2	(9.0)	38.5	(9.0)
	Other	33.8	(9.1)	40.1	(10.0)	44.8	(10.5)
	TOTAL	369.6	(100.0)	400.3	(100.0)	425.7	(100.0)
Extramural Industry	ITC	88.5	(60.5)	97.7	(58.4)	97.0	(57.8)
	AECL	20.0	(13.7)	23.1	(13.8)	22.2	(13.2)
	NRC	11.0	(7.5)	12.8	(7.7)	16.4	(9.8)
	DND	10.8	(7.4)	9.3	(5.6)	13.2	(7.9)
	DOC	10.6	(7.2)	13.7	(8.2)	11.4	(6.8)
	Other	5.4	(3.7)	10.6	(6.3)	7.7	(4.6)
	TOTAL	146.3	(100.0)	167.2	(100.0)	167.9	(100.0)
Universities and Non-Profit Institutions	NRC	58.2	(46.3)	59.6	(44.1)	60.0	(44.2)
	MRC	33.8	(26.9)	36.8	(27.3)	36.8	(27.1)
	NHW	13.8	(11.0)	19.0	(14.1)	16.5	(12.2)
	AECB	7.9	(6.3)	7.2	(5.3)	7.4	(5.5)
	DOE	2.8	(2.2)	3.4	(2.5)	4.7	(3.5)
	DND	3.1	(2.5)	3.2	(2.4)	3.1	(2.3)
	Other	6.2	(4.9)	5.8	(4.3)	7.1	(5.2)
	TOTAL	125.8	(100.0)	135.0	(100.0)	135.6	(100.0)
Foreign	IDRC	2.3	(21.5)	3.4	(24.2)	8.0	(35.1)
	CIDA	1.5	(13.7)	3.4	(24.0)	4.1	(18.1)
	NRC	1.0	(9.2)	1.8	(12.9)	4.0	(17.5)
	DOC	1.0	(10.6)	0.9	(6.2)	2.3	(10.1)
	EA	1.7	(15.6)	1.8	(12.7)	2.0	(8.7)
	MRC	2.0	(18.6)	1.9	(13.7)	1.9	(8.5)
	Other	1.0	(10.8)	1.0	(6.3)	0.4	(2.0)
	TOTAL	10.6	(100.0)	14.2	(100.0)	22.7	(100.0)
Other Canadian	DOE	0.6	(20.6)	1.5	(27.9)	4.0	(48.6)
	REE	1.2	(40.3)	1.9	(36.0)	3.1	(36.8)
	ITC	0.1	(3.8)	1.0	(19.3)	0.5	(6.0)
	CMHC	0.5	(16.7)	0.1	(2.2)	0.4	(4.2)
	EMR	0.3	(9.2)	0.3	(5.8)	0.2	(2.3)
	Other	0.2	(9.4)	0.6	(8.8)	0.1	(2.1)
	TOTAL	2.9	(100.0)	5.4	(100.0)	8.3	(100.0)











The largest intramural spender on research and development in the natural sciences will be the **Department of the Environment** with an expected budget of $89.0 million in 1975 or 20.9% of the total. Agriculture will spend $83.0 million or 19.5%.

The fastest rate of growth in the six departments shown is by the Department of Agriculture with 9.8% per annum growth over the 1973 to 1975 period; however, the smaller departments are collectively growing faster than any of the largest six, registering an increase of 15.1% per annum, and now account for 10.5% of the total.

Support of R&D in the industrial sector is expected to increase 7.1% per annum for the 1973-75 period; this growth is similar to that of intramural expenditures (7.3%) but greater than that of the university and non-profit sector (3.8%).

Industry, Trade and Commerce remains the largest federal supporter of R&D in industry accounting for over half the total (57.8%) or $97.0 million.

The growth of support of R&D in Canadian universities and non-profit institutions is the slowest of any sector during the 1973-75 period; it averages 3.8%

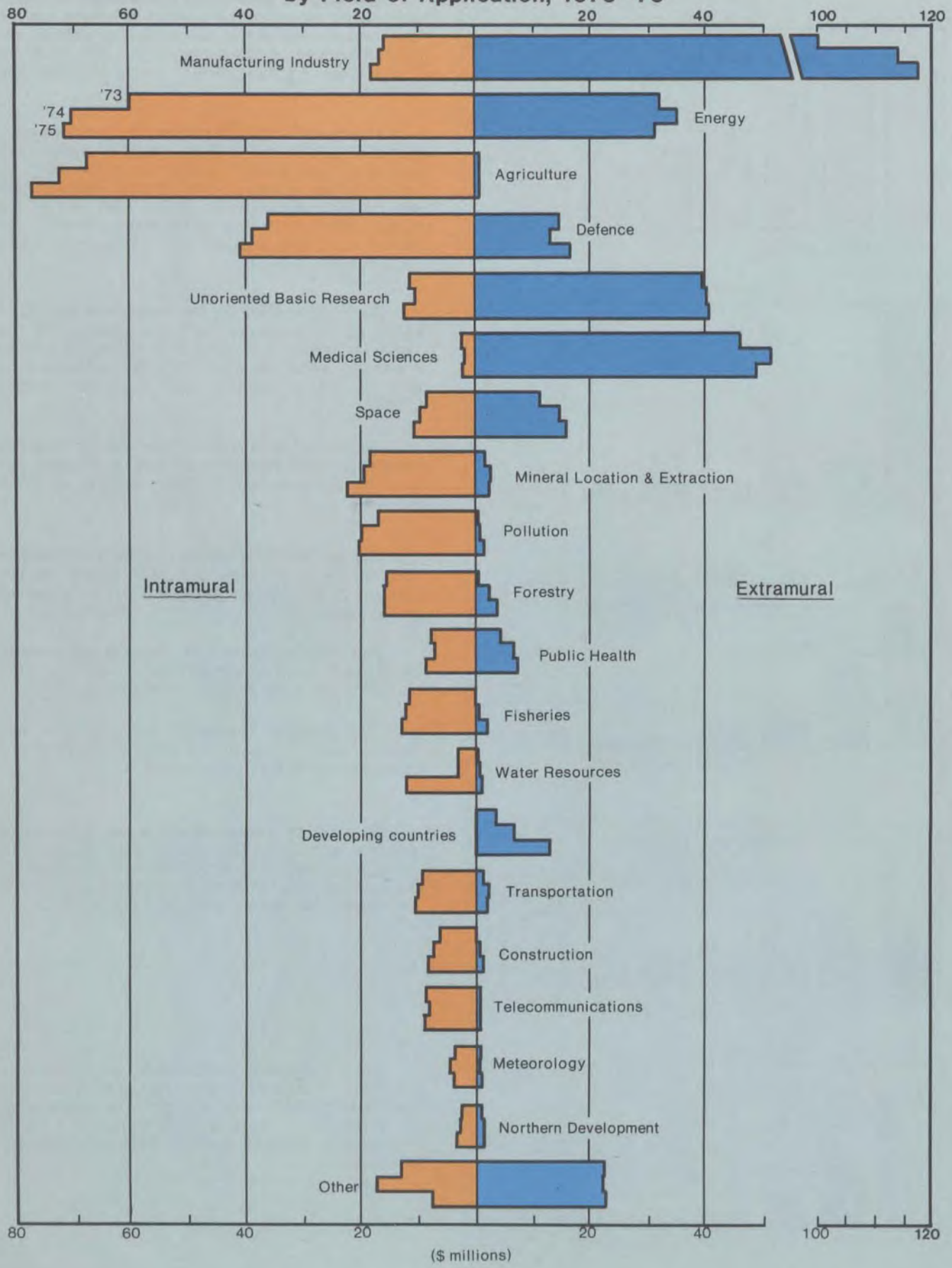
The National Research Council will provide the largest share of support but it will drop from 46.3% of the total in 1973 to 44.2% in 1975.

The Medical Research Council will rank second with 27.1% of the total — almost unchanged in the last three years.

Support of foreign performers is expected to grow at an average annual rate of 46% between 1973 and 1975; this sector will account for 3.0% of the total federal expenditure on R&D in the natural sciences, up from 1.6% in 1973

Other Canadian performers, which include provincial research councils, provincial and municipal governments and private individuals, are expected to receive $8.3 million or 1.1% of total federal expenditures on R&D in the natural sciences.

22. Federal Current Expenditures on Research and Development by Field of Application, 1973 -75



Federal current expenditures on R&D in the natural sciences will total $702.5 million in 1975.

The manufacturing industry is the largest single application, accounting for about 20% of these funds; approximately 15% will be applied to energy R&D, 11% to agriculture, and about 8% each to defence, unoriented basic research and medical sciences.

Fifty-two percent of these current expenditures are intramural, the remaining 48 percent extramural. The individual applications do not reflect this roughly 50:50 distribution.

The main applications of intramural funds are agriculture, 20.8% of the intramural total, energy 19.3%, and defence 11.1%.

The main applications of extramural funds are the manufacturing industry, 35.1% of the extramural total, the medical sciences 14.6%, and unoriented basic research 12.2%.

The most rapid growth of expenditures on R&D are expected to be those related to developing countries and water resources; spending on both these applications is expected to grow an average of about 85% per annum between 1973 and 1975.

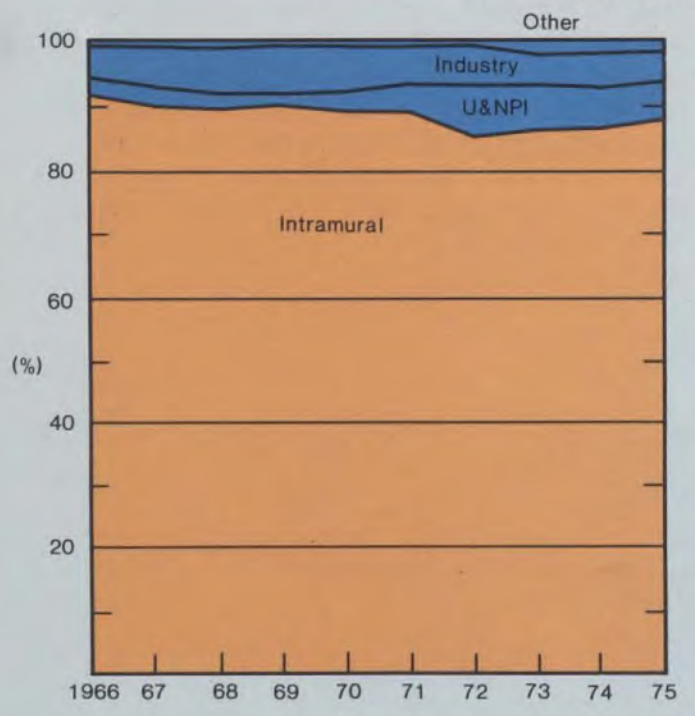
Federal Current Expenditures on Research & Development by Field of Application, 1973-75

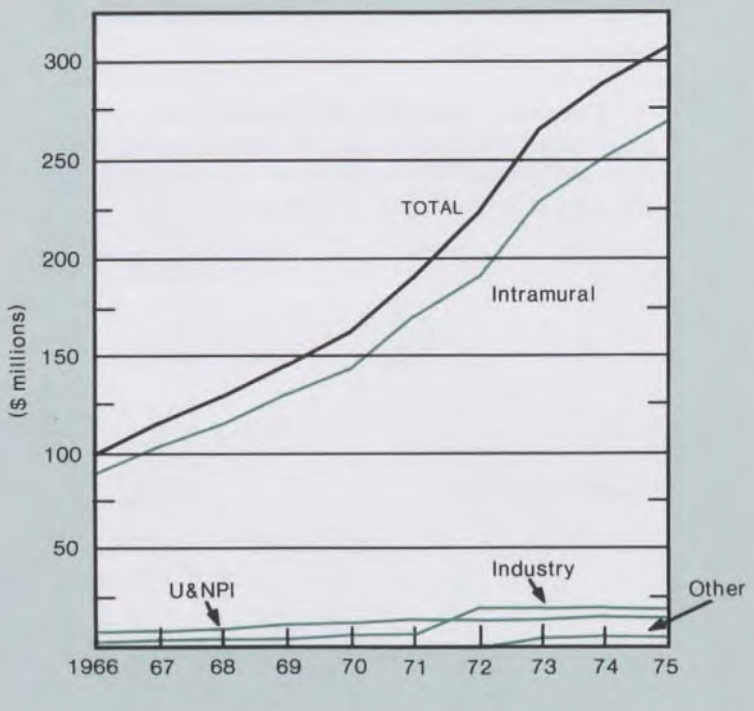
($ millions)

Field of Application	1973			1974			1975		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
Manufacturing Industry	15.9	100.1	116.1	16.7	113.9	130.5	18.1	117.4	135.4
Energy	59.9	32.1	92.0	70.1	35.3	105.3	71.0	31.3	102.3
Agriculture	67.3	1.2	68.4	72.2	1.2	73.3	76.6	1.3	77.8
Defence	36.1	14.8	50.9	38.7	13.2	52.0	40.8	16.7	57.6
Unoriented Basic Research	11.3	39.4	50.7	10.5	40.5	51.0	12.5	40.7	53.1
Medical Sciences	2.2	46.0	48.2	2.1	51.4	53.5	2.3	48.8	51.0
Space	8.6	11.4	20.0	9.8	14.7	24.6	10.7	16.1	26.8
Mineral Location and Extraction	18.4	1.9	20.3	19.3	2.9	22.2	22.3	2.6	25.0
Pollution	17.0	0.9	17.8	20.1	1.1	21.2	20.5	1.5	22.0
Forestry	15.5	0.9	16.4	16.1	2.6	18.7	16.0	4.2	20.2
Public Health	7.7	4.5	12.2	7.2	6.9	14.2	8.9	7.5	16.5
Fisheries	11.7	0.4	12.0	12.0	1.0	13.0	12.7	2.4	15.1
Water Resources	3.2	0.7	4.0	3.2	0.9	4.1	12.4	1.2	13.6
Developing Countries	-	3.8	3.8	-	7.0	7.0	-	13.0	13.0
Transportation	9.3	1.8	11.0	10.2	2.6	12.8	10.4	2.3	12.7
Construction	6.4	0.2	6.7	7.2	1.1	8.3	8.4	1.5	9.9
Telecommunications	8.7	0.9	9.7	8.2	0.9	9.1	9.1	0.8	9.9
Meteorology	3.9	0.7	4.6	4.6	0.7	5.3	4.2	1.1	5.3
Northern Development	2.4	1.4	3.8	2.6	1.5	4.0	3.3	1.6	4.9
Other	13.4	22.6	36.0	17.4	22.3	39.8	7.9	22.6	30.9
TOTAL	318.9	285.6	604.5	348.2	321.8	670.0	368.0	334.5	702.5

2.3 Related Scientific Activity Expenditures

23. Federal Expenditures on Related Scientific Activities by Performer, 1966-75





Federal expenditures on related scientific activities in the natural sciences are expected to reach $305.6 million in 1975, an increase of 6.1% over 1974. This is far less than the yearly average growth rate of 14.5% registered between 1966 and 1974.

Intramural related scientific activities will continue to account for the largest share of the federal natural science RSA budget, representing expenditures of $268.0 million or 88% of the total.

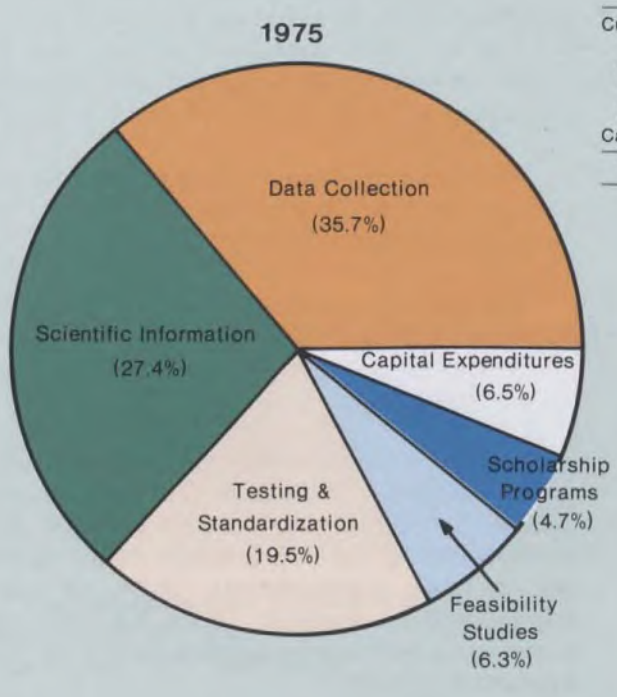
Industry's share of the federal government's natural science RSA budget is expected to equal 5.9%. This is down from 8.5% in 1972 but greater than the low of 1.9% recorded in 1969.

Universities and non-profit institutions are expected to receive 4.8% of total RSA expenditures in 1975, continuing a drop from a high of 7.5% in 1968.

($ millions)

Year	Intramural		Industry		U & NPI		Others		Total	
	$	%	$	%	$	%	$	%	$	%
1966	89.1	(91.3)	2.7	(2.8)	5.0	(5.1)	0.7	(0.7)	97.6	(100.0)
1967	102.8	(89.6)	3.5	(3.1)	7.1	(6.2)	1.2	(1.0)	114.7	(100.0)
1968	114.4	(89.1)	3.1	(2.4)	9.6	(7.5)	1.4	(1.1)	128.4	(100.0)
1969	130.2	(90.1)	2.7	(1.9)	10.8	(7.5)	0.9	(0.6)	144.5	(100.0)
1970	142.8	(88.8)	5.4	(3.4)	11.8	(7.3)	0.9	(0.6)	160.9	(100.0)
1971	169.2	(89.3)	7.8	(4.1)	11.7	(6.2)	0.9	(0.5)	189.5	(100.0)
1972	188.4	(85.0)	18.9	(8.5)	13.0	(5.9)	1.3	(0.6)	221.6	(100.0)
1973	227.9	(86.1)	18.4	(6.9)	13.0	(4.9)	5.5	(2.1)	264.8	(100.0)
1974	249.6	(86.6)	17.3	(6.0)	15.6	(5.4)	5.6	(1.9)	288.1	(100.0)
1975	268.0	(87.7)	17.9	(5.9)	14.8	(4.8)	4.9	(1.6)	305.6	(100.0)

24. Federal Expenditures on Related Scientific Activities by Activity, 1973-75

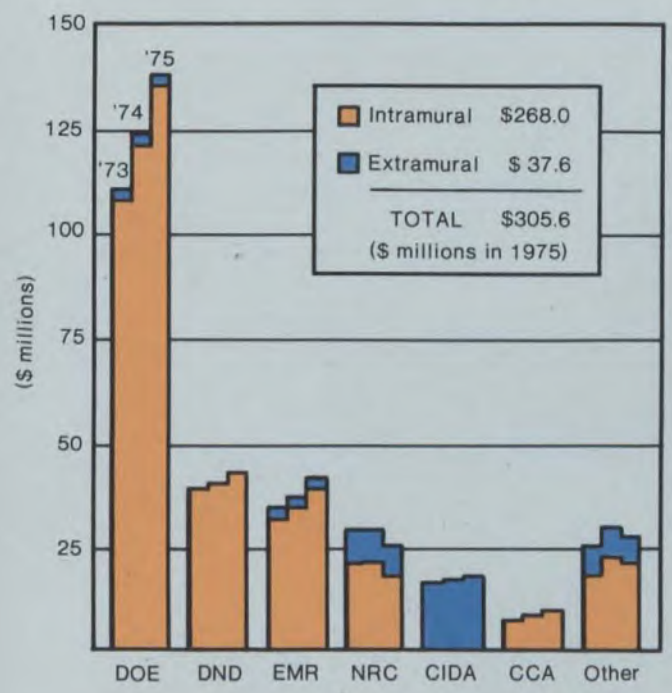


($ millions)

Activity	1973		1974		1975	
	$	%	$	%	$	%
Current Expenditures	244.4	(92.3)	267.6	(92.9)	285.8	(93.5)
Data Collection	93.7	(35.4)	102.2	(35.5)	109.0	(35.7)
Scientific Information	67.1	(25.3)	75.3	(26.1)	83.6	(27.4)
Testing & Standardization	50.1	(18.9)	54.1	(18.8)	59.6	(19.5)
Feasibility Studies	21.1	(8.0)	21.2	(7.4)	19.4	(6.3)
Scholarship Programs	12.5	(4.7)	14.8	(5.1)	14.3	(4.7)
Capital Expenditures	20.3	(7.7)	20.5	(7.1)	19.8	(6.5)
TOTAL	264.8	(100.0)	288.1	(100.0)	305.6	(100.0)

The largest spenders on individual related scientific activities in 1975 will be: for data collection, DOE spending $76.0 million or 70% of the total; scientific information, DOE $37.8 million or 45%; testing and standardization, DND $41.5 million or 70%; scholarship programs, NRC $7.2 million or 50%. Capital expenditures of $16.4 million by DOE will represent 83% of the total capital budget.

25. Federal Expenditures on Related Scientific Activities by Department or Agency, 1973-75



($ millions)

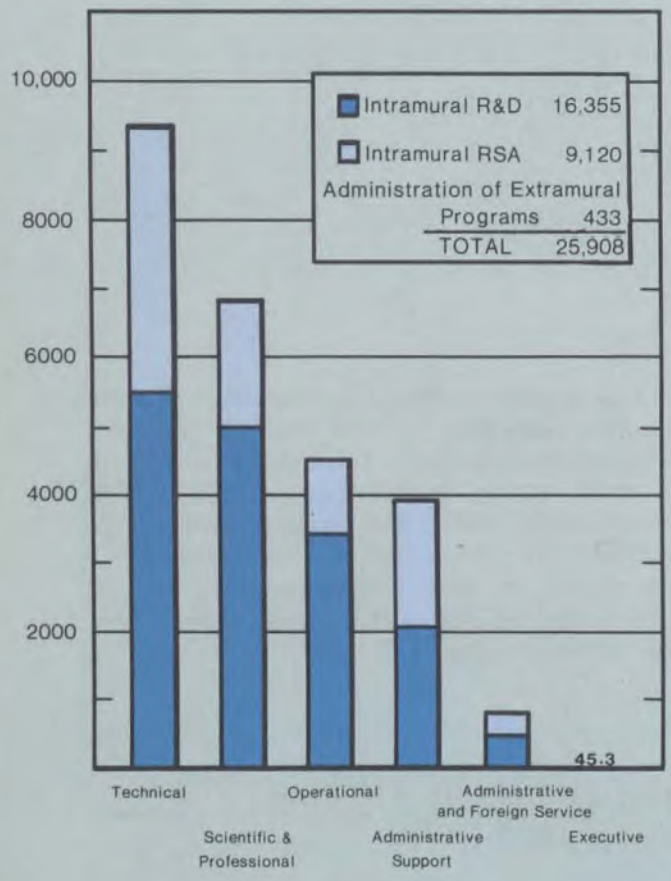
Department or Agency	1973			1974			1975		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
DOE	107.8	2.3	110.1	120.9	2.8	123.7	135.6	3.0	138.6
DND	40.0	–	40.0	40.6	–	40.6	43.8	0.1	43.9
EMR	31.9	2.9	34.8	34.3	2.7	37.0	39.2	2.3	41.5
NRC	21.9	7.9	29.7	21.9	8.0	29.9	18.1	7.9	26.0
CIDA	–	16.8	16.8	–	17.5	17.5	–	18.2	18.2
CCA	7.6	–	7.6	8.8	–	8.8	9.6	–	9.6
Other	18.7	7.0	25.8	23.1	7.6	30.6	21.7	6.1	27.8
TOTAL	227.9	36.9	264.8	249.6	38.6	288.1	268.0	37.6	305.6

The Department of the Environment will be the largest performer of related scientific activities in the natural sciences in 1975 with expected expenditures of $138.6 million or 45% of the total; 98% will be performed intramurally.

The Canadian International Development Agency will be the largest funder of extramural related scientific activities in the natural sciences; its allotment of $18.2 million will equal 48% of the extramural total.

2.4 Manpower Resources

26. Federal Manpower Engaged in Scientific Activities by Category, by Activity, 1974



The federal government employed 25,908 personnel engaged in natural science activities in 1974. This total, expressed in man-years, included continuing, term, casual and seasonal employees as of September 30, 1973.

Federal employees engaged in research and development accounted for 63.1% of the total; their number equalled 16,355.

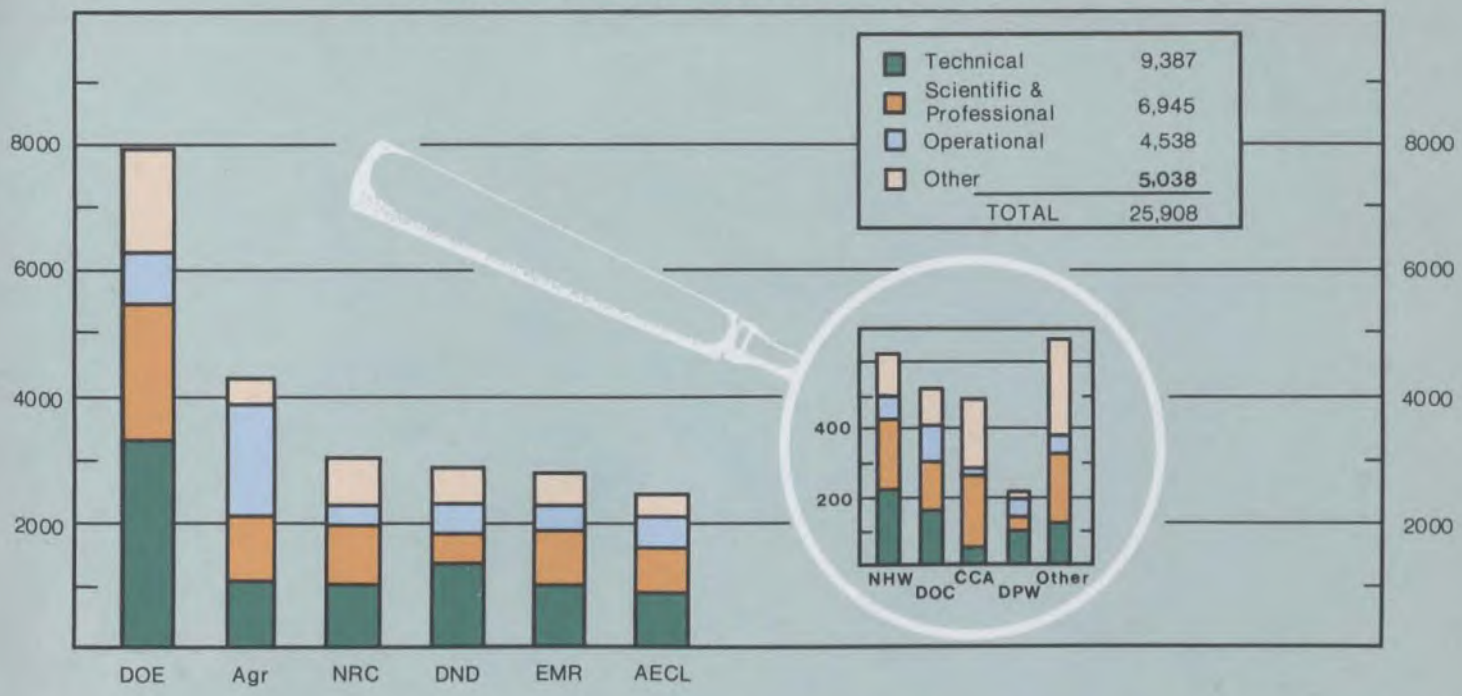
Employees engaged in related scientific activities numbered 9,120 or 35.2% of the total; the remaining 433 employees administered extramural programs.

Technical personnel, the largest manpower category with 9,387 employees accounted for 36.2% of the total; the **scientific and professional** group represented 26.8% (6,945 employees); **operational** 17.5% (4,538); **administrative support** 15.8% (4,082); **administrative and foreign service** 3.5% (894); and **executive** 0.2% (61).

Category	Intramural R&D	Intramural RSA	Administration of Extramural Programs	Total
Technical	5491.7	3873.2	22.0	9386.9
Scientific and Professional	4956.9	1880.9	107.0	6944.8
Operational	3399.5	1133.3	5.4	4538.2
Administrative Support	2010.6	1895.3	176.2	4082.1
Administrative and Foreign Service	464.7	323.3	106.4	894.4
Executive	31.5	13.8	16.1	61.4
TOTAL	16354.9	9119.8	433.1	25907.8

N.B. Manpower figures are expressed in full-time equivalent.

27. Federal Manpower Engaged in Scientific Activities by Department or Agency, by Category, 1974



The largest federal employer in the natural sciences was the Department of the Environment in 1974 with 7,911 employees.

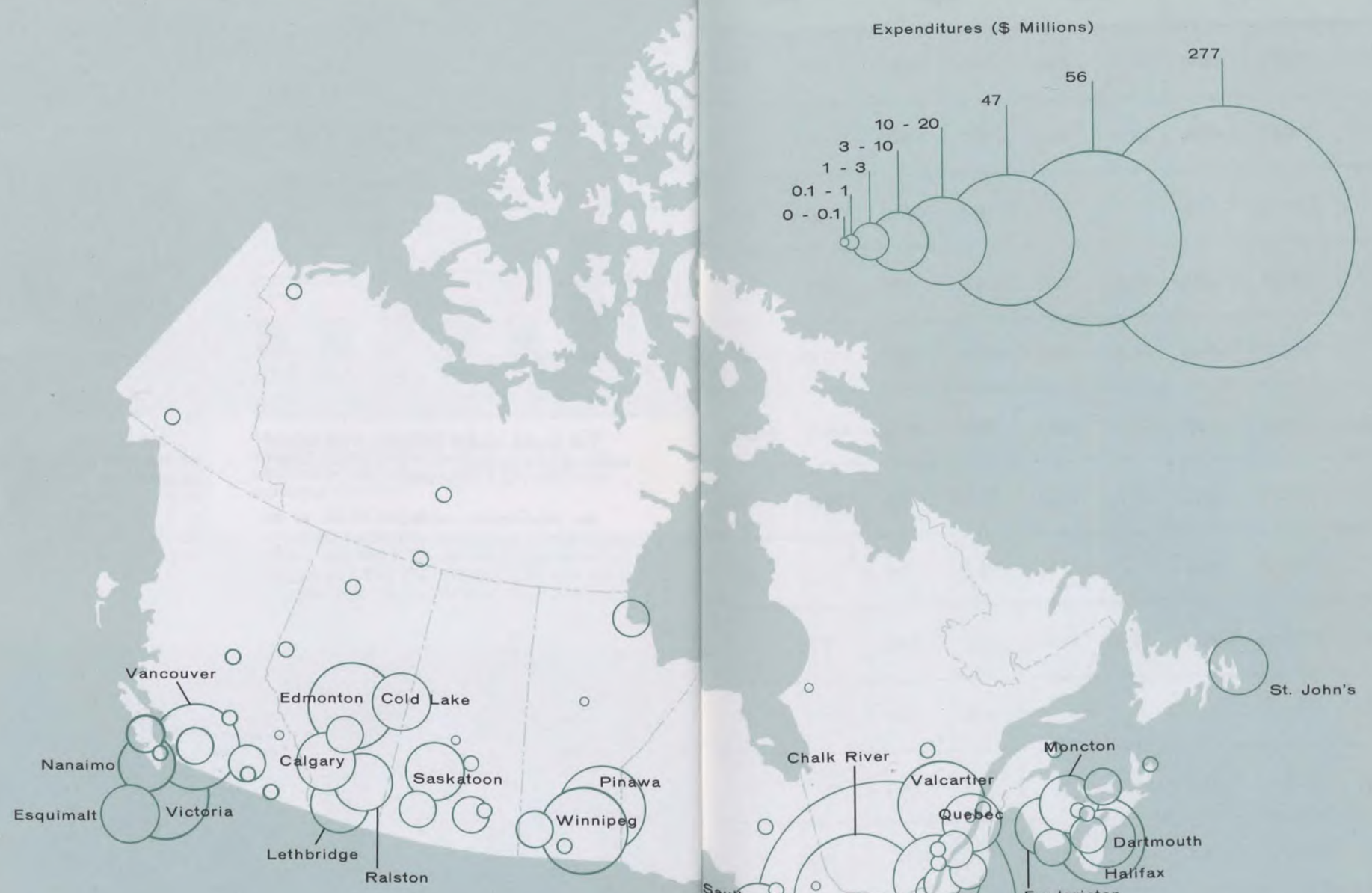
Six departments employed 90.3% of all manpower in the natural sciences: DOE 7,911 personnel and 30.5%; Agr 4,311 and 16.6%; NRC 2,993 and 11.6%; DND 2,894 and 11.2%; EMR 2,808 and 10.8%; and AECL 2,471 and 9.5%.

Almost half of all the scientific and professional personnel were employed by two departments: DOE with 2,123 employees or 30.6% of the total and Agr with 1,008 employees or 14.5%. A similar distribution applied to technical personnel: 35.4% were employed by DOE and 11.6% by Agr.

Department or Agency	Executive	Scientific and Professional	Administrative and Foreign Service	Technical	Administrative Support	Operational	Total
DOE	10.1	2122.5	344.0	3324.0	1292.0	818.1	7910.7
Agr	1.5	1007.8	46.5	1085.4	416.8	1753.0	4311.0
NRC	7.0	922.0	178.0	1046.0	541.0	299.0	2993.0
DND	3.0	485.9	82.0	1353.0	491.9	478.0	2893.8
EMR	6.0	896.0	72.0	1010.0	434.0	390.0	2808.0
AECL	13.0	680.0	-	912.0	344.0	522.0	2471.0
NHW	0.1	207.9	32.7	224.6	95.1	63.0	623.4
DOC	-	149.0	24.0	159.0	88.5	101.0	521.5
CCA	2.0	219.0	8.0	50.0	199.0	11.0	489.0
DPW	0.1	37.5	2.0	105.0	15.0	56.0	215.6
Other	18.6	217.2	105.2	117.9	164.8	47.1	670.8
TOTAL	61.4	6944.8	894.4	9386.9	4082.1	4538.2	25907.8

N.B. Manpower figures are expressed in full-time equivalent.

2.5 Geographic Distribution



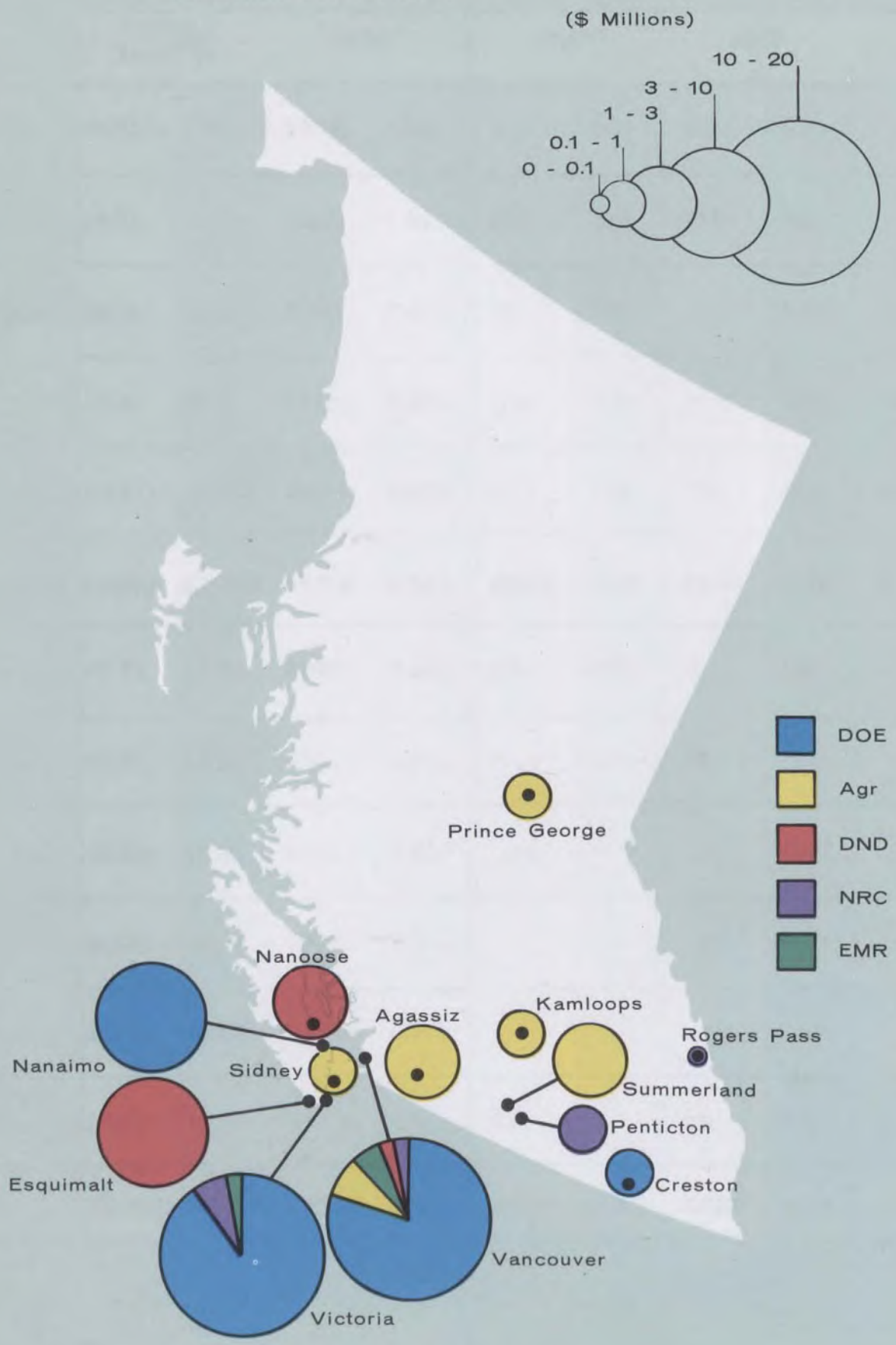
This map illustrates the relative expenditures of federal scientific establishments by location.

Geographic Distribution
Expenditures and Manpower, 1974

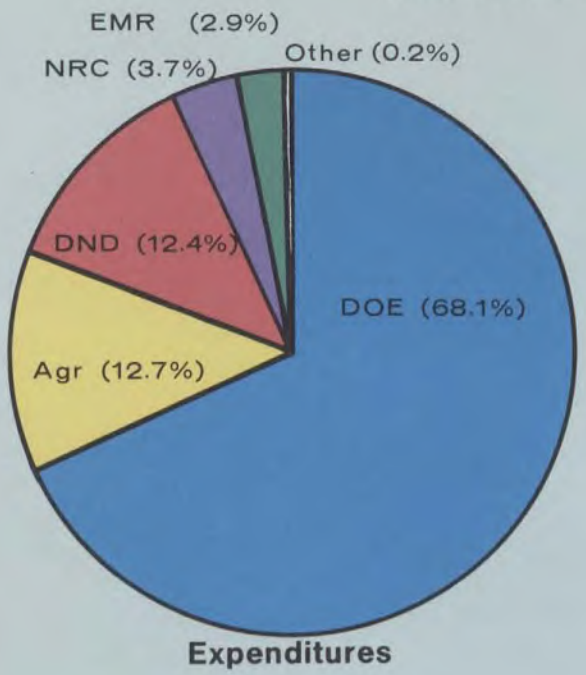
Province or Region	DOE		DND		Agr		NRC		AECL		EMR		Other		TOTAL		Percent of Total	
British Columbia	28.6	1174	5.2	232	5.3	329	1.6	74	—	—	1.2	50	0.1	7	42.1	1866	(6.5)	(7.0)
Alberta	14.2	635	13.8	581	7.7	502	–	–	–	–	6.0	171	3.5	120	45.1	2009	(6.9)	(7.5)
Saskatchewan	1.0	58	—	—	6.1	422	1.9	102	—	–	0.1	2	0.1	8	9.3	592	(1.4)	(2.2)
Manitoba	12.8	536	0.8	37	6.0	374	1.4	10	18.6	593	– –	1	0.2	10	39.9	1561	(6.1)	(5.8)
Ontario	69.7	2280	13.4	590	6.3	397	0.6	30	48.8	1765	0.6	25	0.1	3	139.4	5090	(21.5)	(19.0)
National Capital Region	35.2	1190	18.5	906	34.7	1513	68.3	2687	5.7	113	57.9	2443	57.1	2286	277.4	11138	(42.7)	(41.6)
Quebec	10.4	413	22.7	1128	5.0	326	0.2	10	–	–	0.1	6	2.0	69	40.5	1952	(6.2)	(7.3)
Nova Scotia	11.9	824	–	271	2.3	156	–	80	–	–	–	88	–	4	14.2	1423	(2.2)	(5.3)
New Brunswick	19.1	600	6.3	–	2.3	149	1.7	-	–	–	2.5	–	– –	–	31.8	749	(4.9)	(2.8)
Prince Edward Island	–	–	–	–	1.6	101	–	—	–	–	-	–	–	–	1.6	101	(0.3)	(0.4)
Newfoundland	3.4	177	–	–	0.6	43	–	–	–	–	–	–	–	–	4.0	220	(0.6)	(0.8)
Yukon and NWT	1.0	24	–	–	–	–	–	–	–	–	2.1	22	1.2	23	4.3	69	(0.7)	(0.3)
TOTAL	207.2	7911	80.8	3745	77.9	4312	75.8	2993	73.1	2471	70.6	2808	64.4	2530	649.8	26770	(100.0)	(100.0)

Expenditures ($ millions) | Manpower

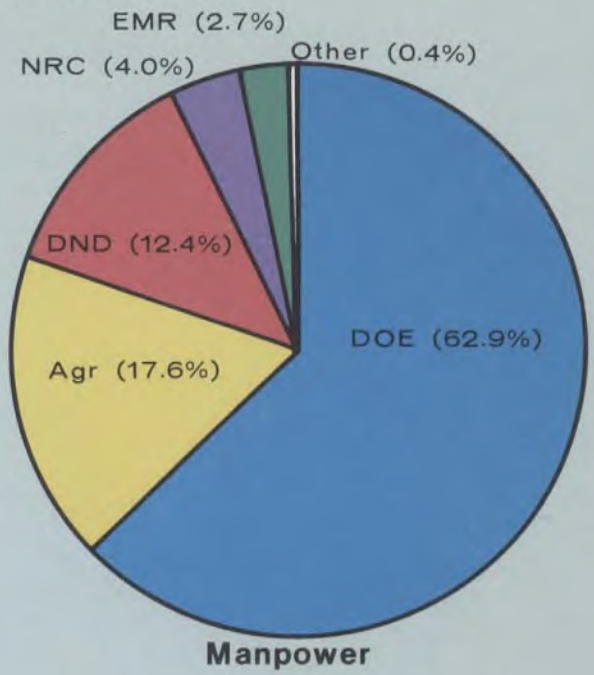
30.1 Federal Intramural Expenditures on Scientific Activities in British Columbia, 1974



30.1 British Columbia, 1974



Expenditures



Manpower

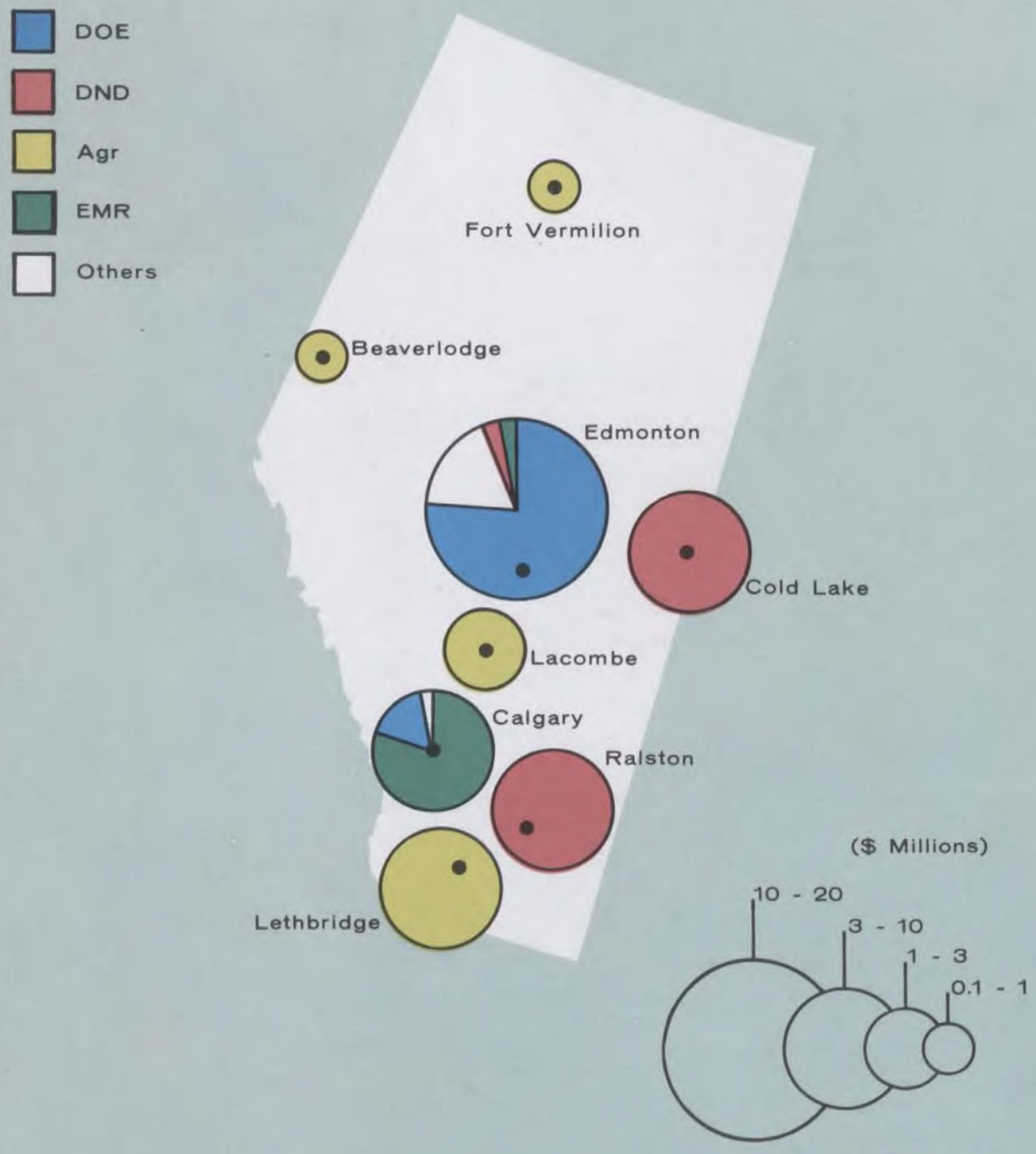
Department or Agency	Expenditures ($ millions)			Manpower		
	Current	Capital	Total	Scientific & Professional	Others	Total
DOE	25.6	3.0	28.6	285.0	879.0	1,174.0
Agr	5.2	0.2	5.3	74.0	255.0	329.0
DND	5.0	0.2	5.2	48.0	184.0	232.0*
NRC	1.3	0.2	1.6	35.0	39.0	74.0
EMR	1.2	--	1.2	32.0	18.0	50.0
VA	0.1	—	0.1	0.5	4.0	4.5
NM	--	—	--	—	2.0	2.0
TOTAL	38.4	3.7	42.1	474.5	1,381.0	1,865.5

** Includes 9 military personnel.*

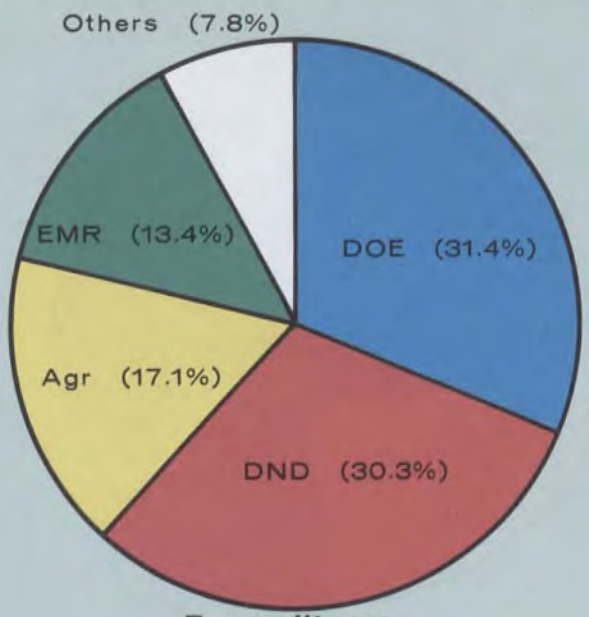
BRITISH COLUMBIA: **Major Scientific Establishments**

Department or Agency	Branch or Program	Establishment	Location	Expenditures ($ millions)	Manpower
DOE	Marine Sciences	Pacific Regional Office	Victoria	7.7	272
DOE	Fisheries R&D	Pacific Biological Station	Nanaimo	4.5	206
DOE	Atmospheric Environment	Pacific Regional Office	Vancouver	4.3	192
DOE	Canadian Forestry Service	Pacific Forest Research Centre	Victoria	4.0	201
DND	Defence Research	Defence Research Establishment Pacific	Esquimalt	3.6	129
DOE	Inland Waters	Water Resources, Water Quality, Water Planning and Management Branches	Vancouver	2.8	93
DOE	Canadian Forestry Service	Western Forest Products Laboratory	Vancouver	2.8	123
Agr	Research	Research Station	Summerland	1.9	117
DOE	Fisheries R&D	Research Laboratory	Vancouver	1.2	53
DND	Defence Services	Maritime Experimental and Test Range	Nanoose	1.2	83
Agr	Research	Research Station	Vancouver	1.1	57
Agr	Research	Research Station	Agassiz	1.1	67
Other				5.9	273

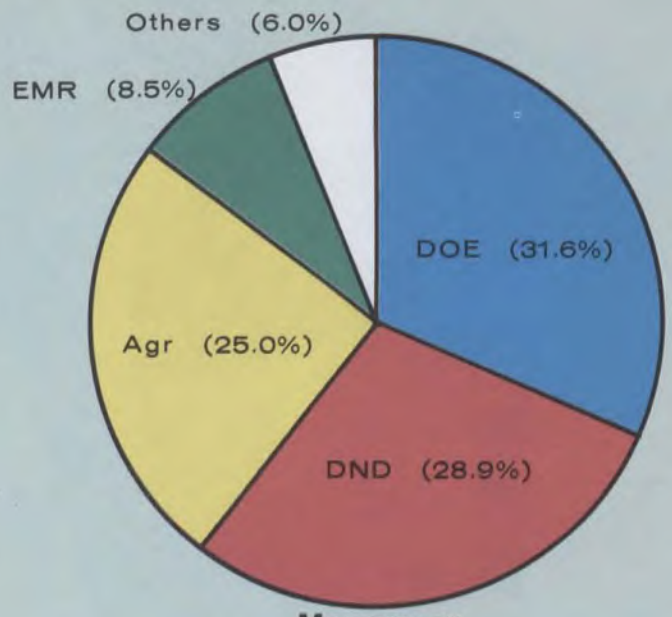
30.2 Federal Intramural Expenditures on Scientific Activities in Alberta, 1974



30.2 Alberta, 1974



Expenditures



Manpower

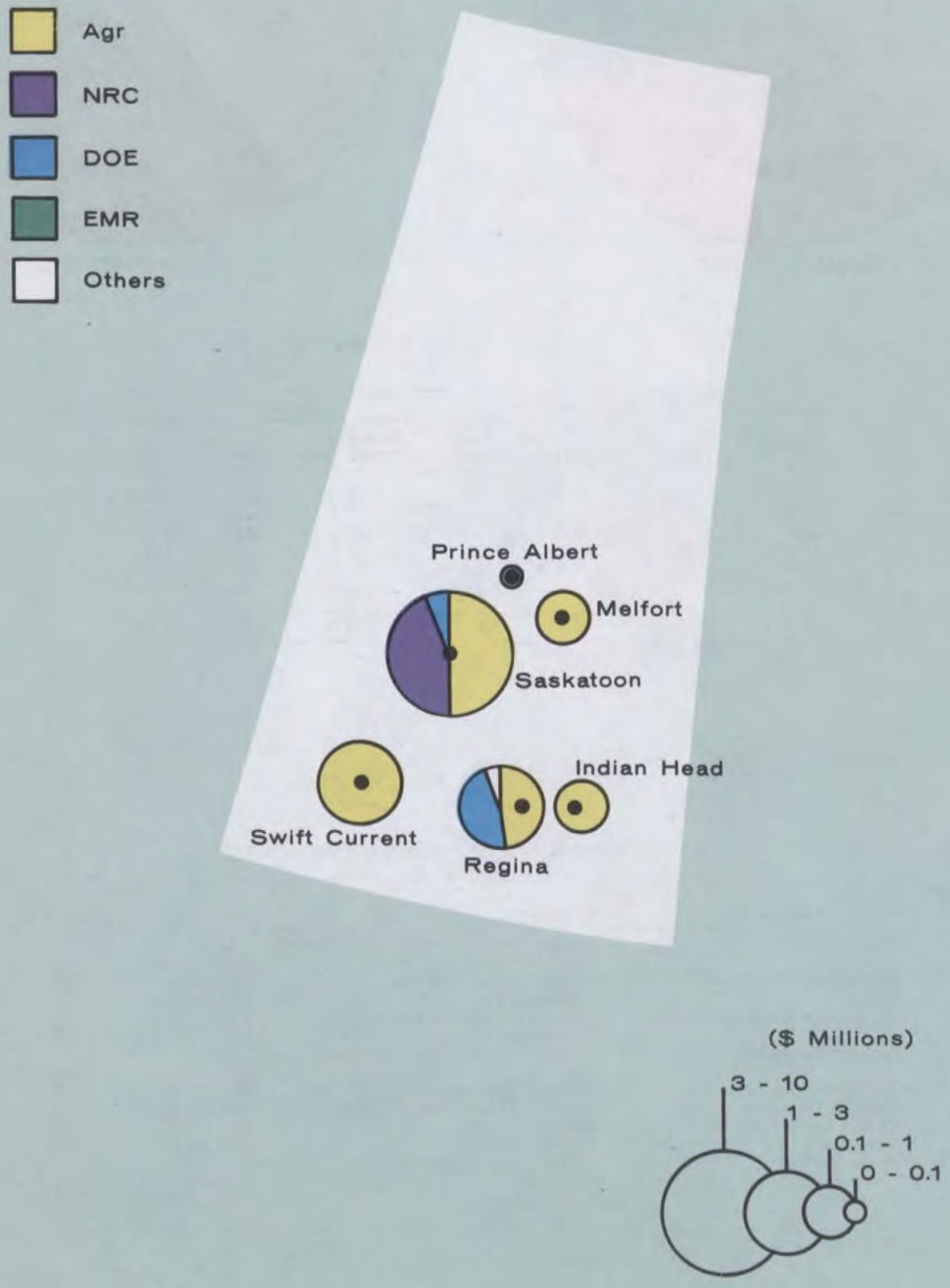
Department or Agency	Expenditures ($ millions)			Manpower		
	Current	Capital	Total	Scientific & Professional	Others	Total
DOE	13.4	0.8	14.2	145.0	490.0	635.0
DND	13.5	0.2	13.8	37.0	544.0	581.0*
Agr	7.5	0.3	7.7	97.0	404.5	501.5
EMR	4.8	1.2	6.0	81.0	90.0	171.0
DPW	3.0	0.4	3.4	14.0	102.1	116.1
NHW	0.1	—	0.1	2.0	2.0	4.0
TOTAL	42.3	2.8	45.1	376.0	1,632.6	2,008.6

** Includes 350 military personnel.*

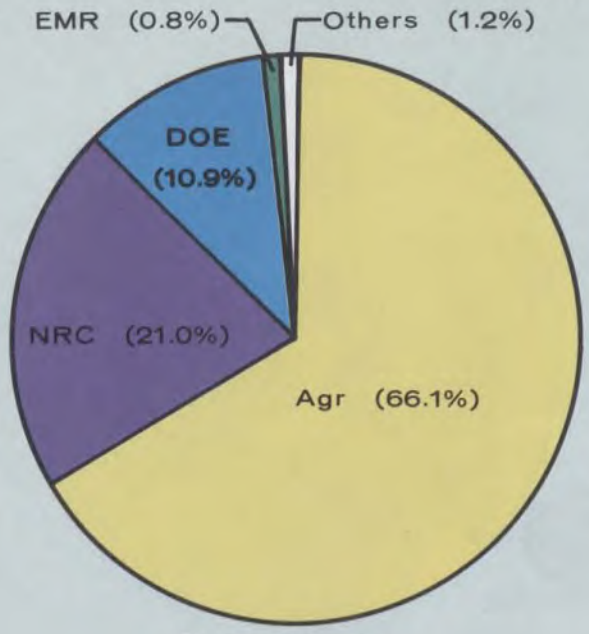
ALBERTA: **Major Scientific Establishments**

Department or Agency	Branch or Program	Establishment	Location	Expenditures ($ millions)	Manpower
DND	Defence Services	Headquarters Aerospace Engineering Test Establishment	Cold Lake	9.3	354
DOE	Atmospheric Environment	Western Regional Office	Edmonton	5.9	286
Agr	Research	Research Station	Lethbridge	4.6	296
EMR	Geological Survey of Canada	Institute of Sedimentary and Petroleum Geology	Calgary	4.5	142
DND	Defence Research	Defence Research Establishment Suffield	Ralston	3.8	198
DOE	Canadian Wildlife Service	Western Regional Office	Edmonton	3.7	110
DOE	Canadian Forestry Service	Northern Forest Research Centre	Edmonton	3.4	168
DPW	Design and Construction	Western Regional Office	Edmonton	3.2	112
Agr	Research	Research Station	Lacombe	1.5	97
DOE	Inland Waters	Water Resources and Quality Branches	Calgary	1.2	68
Agr	Research	Research Station	Beaverlodge	0.9	74
Other				3.1	104

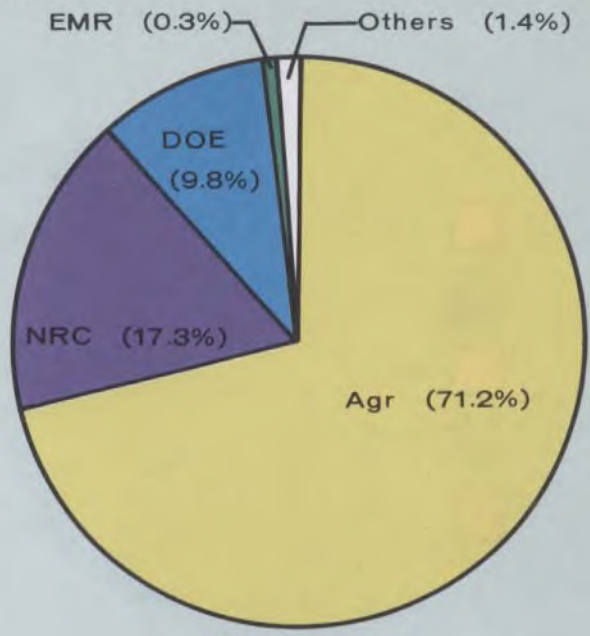
30.3 Federal Intramural Expenditures on Scientific Activities in Saskatchewan, 1974



30.3 Saskatchewan, 1974



Expenditures



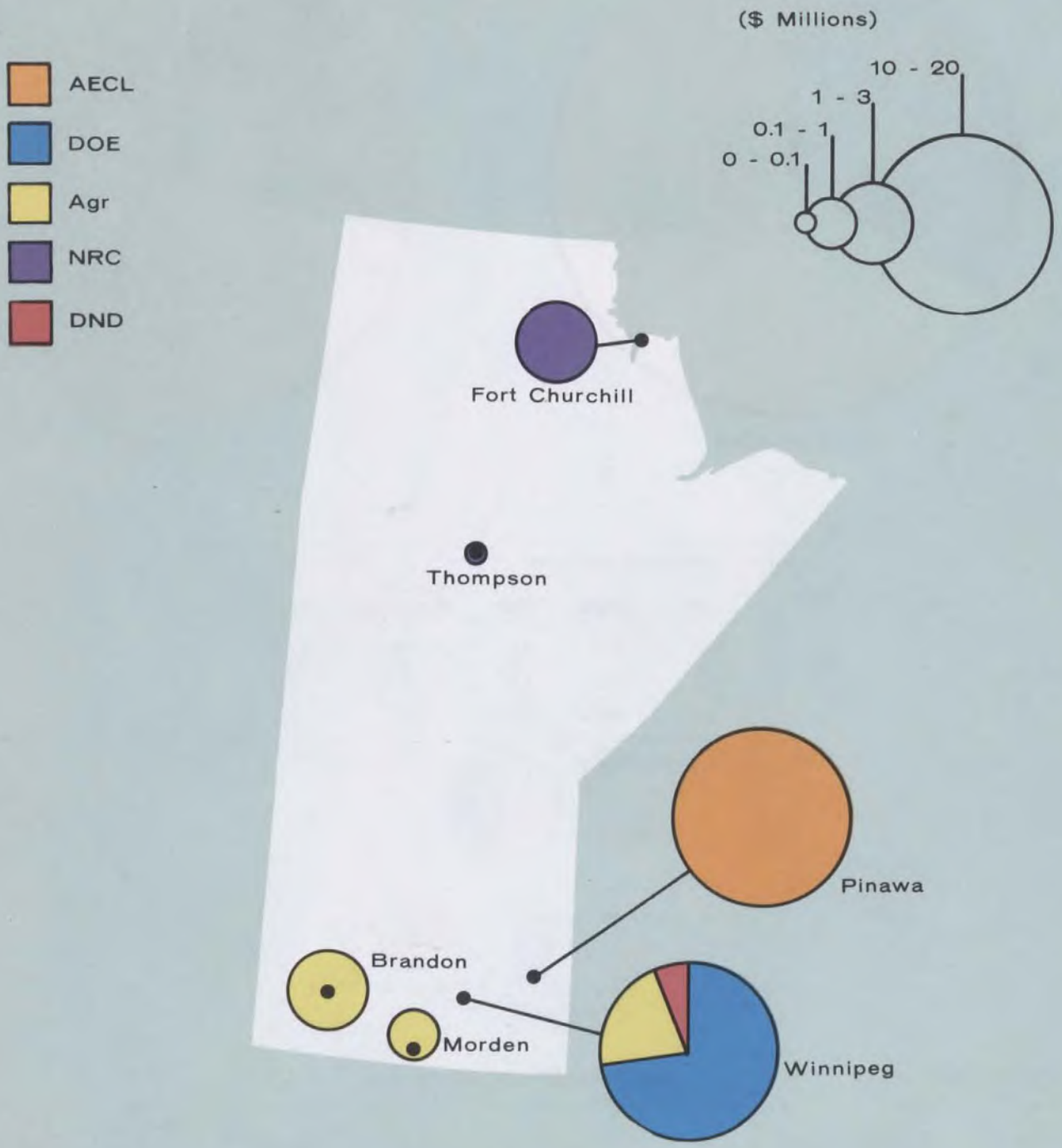
Manpower

Department or Agency	Expenditures ($ millions)			Manpower		
	Current	Capital	Total	Scientific & Professional	Others	Total
Agr	5.8	0.2	6.1	104.0	317.5	421.5
NRC	1.9	--	1.9	38.5	64.0	102.5
DOE	0.9	0.2	1.0	15.0	43.0	58.0
REE	0.1	—	0.1	1.0	7.0	8.0
EMR	—	0.1	0.1	—	2.0	2.0
TOTAL	8.7	0.5	9.3	158.5	433.5	592.0

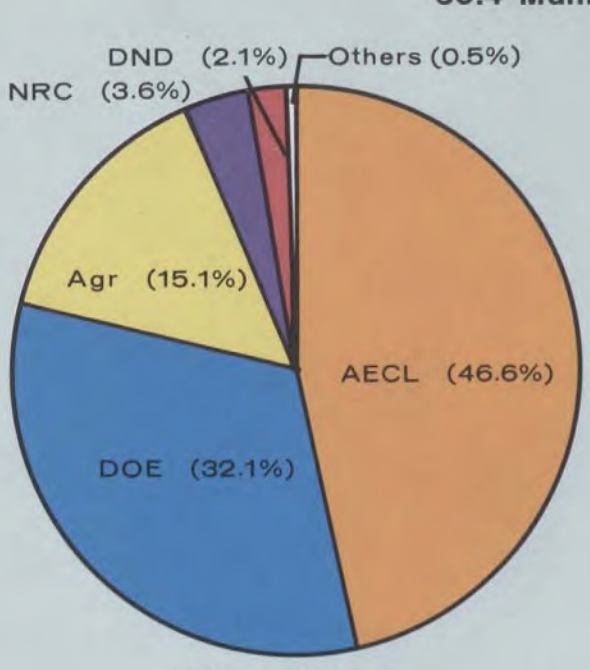
SASKATCHEWAN: **Major Scientific Establishments**

Department or Agency	Branch or Program	Establishment	Location	Expenditures ($ millions)	Manpower
Agr	Research	Research Station	Saskatoon	2.1	140
Agr	Research	Research Station	Swift Current	2.0	144
NRC	Prairie Regional Laboratory		Saskatoon	1.9	101
Agr	Research	Research Station	Melfort	0.8	58
Agr	Research	Research Station	Regina	0.7	48
DOE	Inland Waters	Water Resources, Water Planning and Management Branches	Regina	0.7	40
Agr	Research	Experimental Farm	Indian Head	0.3	30
DOE	Canadian Wildlife Service	Western Regional Office	Saskatoon	0.3	18
REE	Prairie Farm Rehabilitation	Engineering Services	Regina	0.1	8
Other				1.4	5

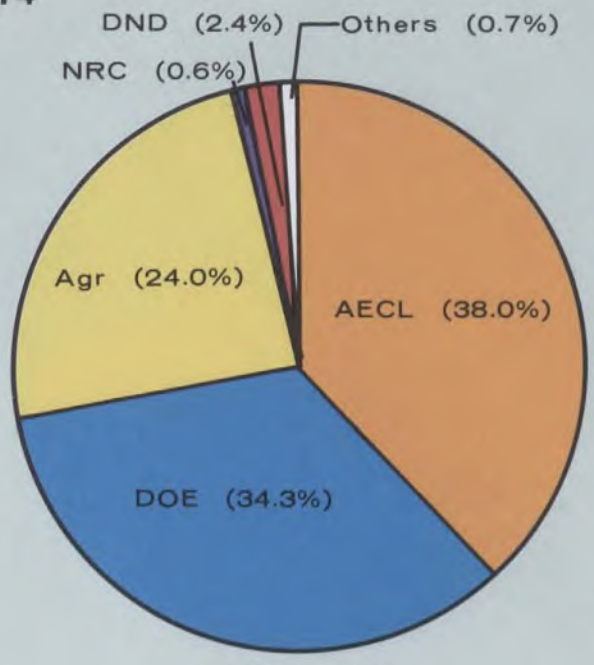
30.4 Federal Intramural Expenditures on Scientific Activities in Manitoba, 1974



30.4 Manitoba, 1974



Expenditures



Manpower

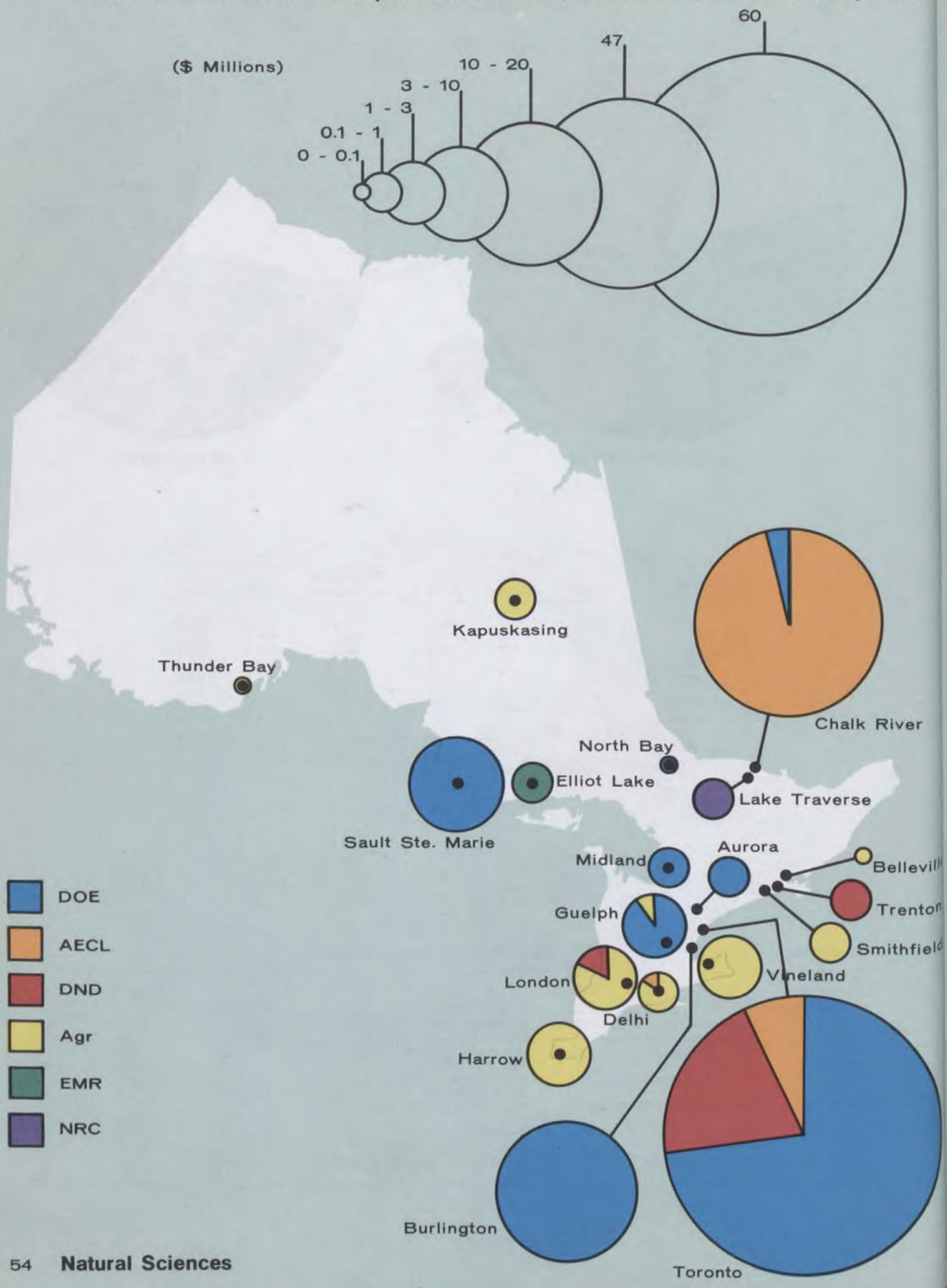
Department or Agency	Expenditures ($ millions)			Manpower		
	Current	Capital	Total	Scientific & Professional	Others	Total
AECL	17.5	1.1	18.6	157.0	436.0	593.0
DOE	11.4	1.4	12.8	135.0	401.0	536.0
Agr	5.7	0.3	6.0	91.5	283.0	374.5
NRC	1.4	--	1.4	5.5	4.0	9.5
DND	0.8	—	0.8	—	37.0	37.0*
VA	0.1	—	0.1	2.5	5.3	7.8
DPW	0.1	—	0.1	—	2.0	2.0
EMR	--	—	--	—	1.0	1.0
TOTAL	37.1	2.8	39.9	391.5	1,169.3	1,560.8

** Includes 22 military personnel.*

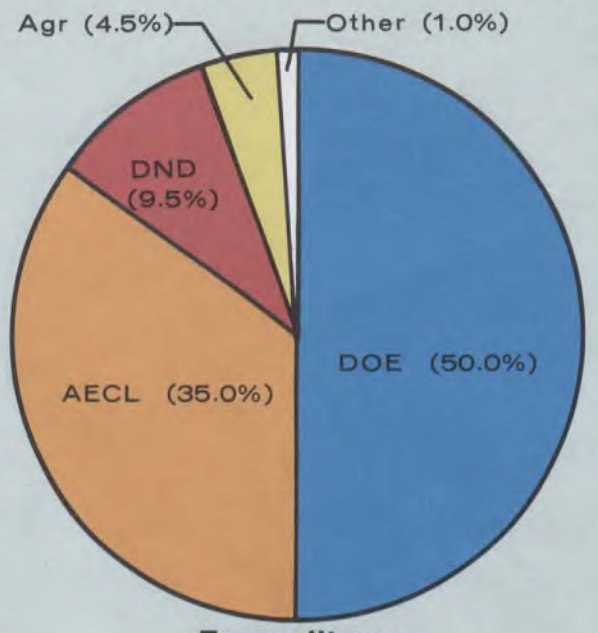
MANITOBA: **Major Scientific Establishments**

Department or Agency	Branch or Program	Establishment	Location	Expenditures ($ millions)	Manpower
AECL	Nuclear Research and Utilization	Whiteshell Nuclear Research	Pinawa	18.6	593
DOE	Atmospheric Environment	Central Regional Office	Winnipeg	7.8	310
DOE	Fisheries R & D	Freshwater Institute	Winnipeg	4.0	172
Agr	Research	Research Station	Winnipeg	2.0	134
Agr	Canadian Grain Commission	Grain Research Laboratory	Winnipeg	1.7	77
Agr	Research	Research Station	Brandon	1.4	91
NRC	Space Research Facilities	Churchill Research Range	Fort Churchill	1.3	4
Agr	Research	Research Station	Morden	0.9	71
DOE	Inland Waters	Water Resources Branch	Winnipeg	0.9	50
DND	Defence Services	Technical Services Detachment	Winnipeg	0.8	37
Other				0.5	22

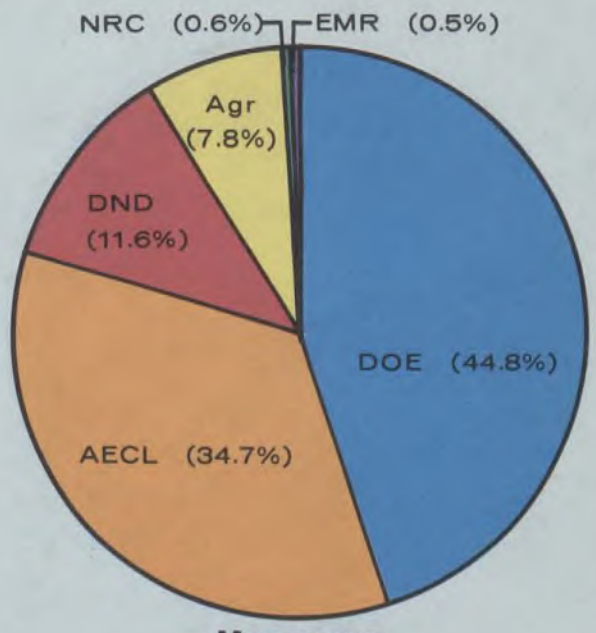
30.5 Federal Intramural Expenditures on Scientific Activities in Ontario, 1974



30.5 Ontario (excluding Ottawa), 1974



Expenditures



Manpower

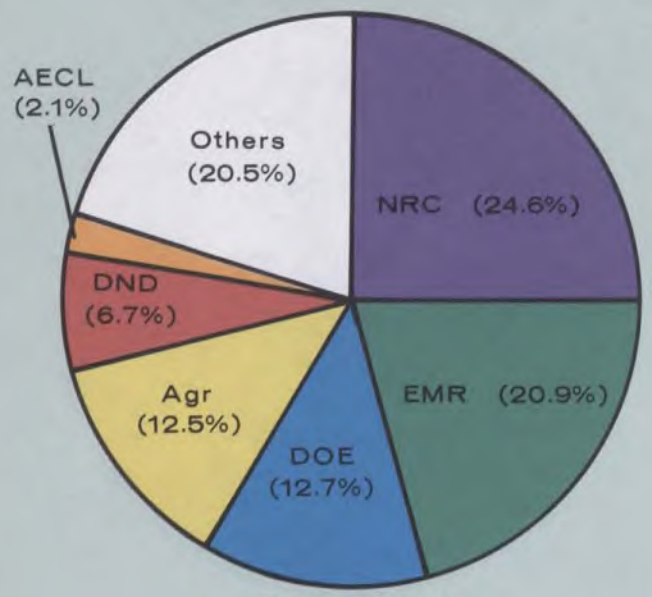
Department or Agency	Expenditures ($ millions)			Manpower		
	Current	Capital	Total	Scientific & Professional	Others	Total
DOE	61.4	8.2	69.7	711.0	1,569.1	2,280.1
AECL	45.6	3.2	48.8	478.0	1,287.0	1,765.1
DND	13.0	0.3	13.4	35.0	555.0	590.0*
Agr	6.0	0.3	6.3	95.0	301.5	396.5
EMR	0.6	--	0.6	13.0	12.0	25.0
NRC	0.6	—	0.6	6.5	24.0	30.5
NHW	--	0.1	0.1	—	1.5	1.5
SLSA	--	—	--	1.0	—	1.0
VA	--	—	--	0.3	0.5	0.8
TOTAL	127.2	12.1	139.4	1,339.8	3,750.6	5,090.4

** Includes 185 military personnel.*

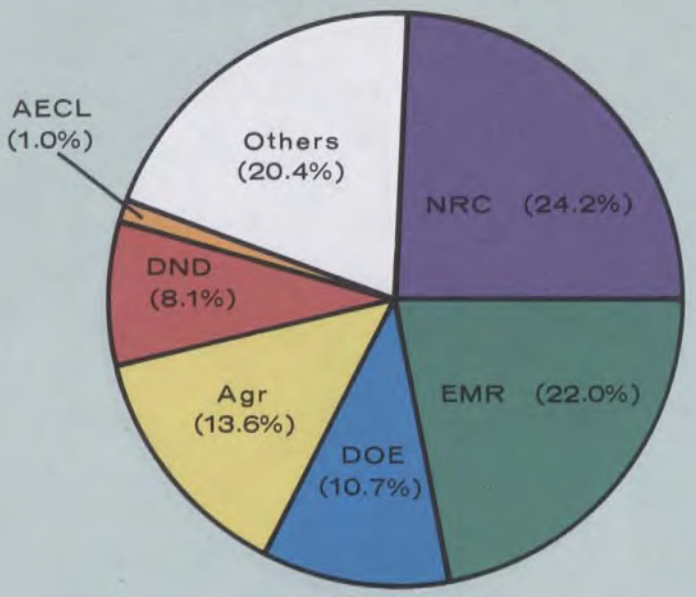
ONTARIO: **Major Scientific Establishments**

Department or Agency	Branch or Program	Establishment	Location	Expenditures ($ millions)	Manpower
AECL	Nuclear Research and Utilization	Chalk River Nuclear Laboratory	Chalk River	44.8	1665
DOE	Atmospheric Environment	Service Headquarters	Toronto	42.0	1144
DOE	Inland Waters	Canada Centre for Inland Waters	Burlington	8.5	374
DOE	Canadian Forestry Service	Great Lakes Forest Research Centre	Sault Ste. Marie	6.2	170
DND	Defence Services	Technical Services Detachment	Toronto	5.4	227
DOE	Marine Sciences	Central Regional Office	Burlington	4.4	165
AECL	Nuclear Research and Utilization	Power Projects	Sheridan Park	4.0	100
DOE	Atmospheric Environment	Ontario Regional Office	Toronto	3.1	174
DND	Defence Research	Defence and Civil Institute of Environmental Medicine	Toronto	3.0	152
DND	Defence Services	Environmental Medicine Establishment	Toronto	2.5	89
Agr	Research	Research Station	Harrow	2.0	123
DOE	Canadian Forestry Service	Petawawa Forest Experimental Station	Chalk River	1.7	89
DOE	Canadian Forestry Service	Insect Pathology Research Institute	Sault Ste. Marie	1.5	67
Agr	Research	Research Station	London	1.5	90
Other				8.8	461

30.6 National Capital Region, 1974



Expenditures



Manpower

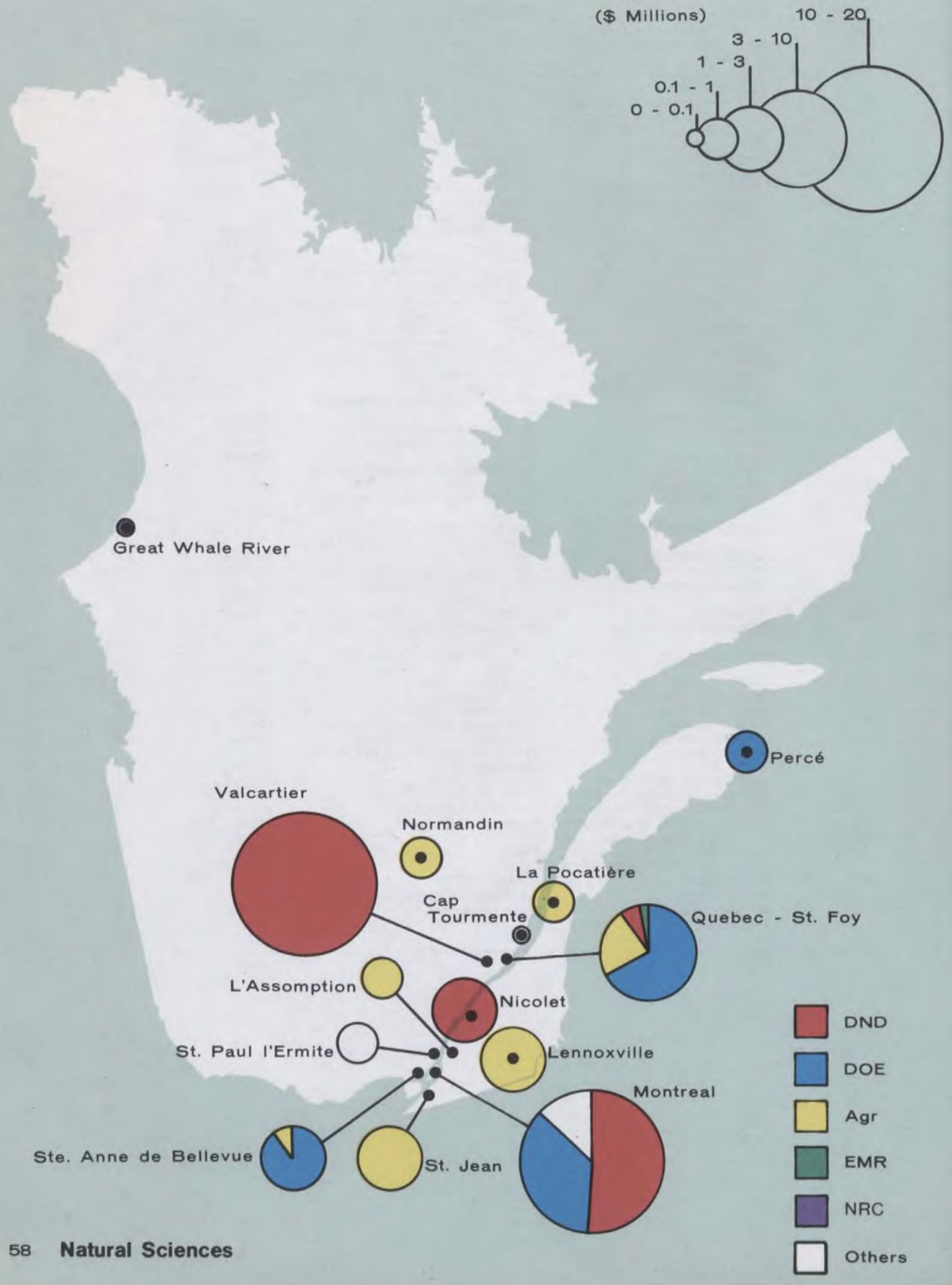
Department or Agency	Expenditures ($ millions)			Manpower		
	Current	Capital	Total	Scientific & Professional	Others	Total
NRC	60.2	8.2	68.3	795.0	1,892.0	2,687.0
EMR	53.5	4.3	57.9	715.0	1,728.0	2,443.0
DOE	26.1	9.1	35.2	388.5	801.1	1,189.6
Agr	32.0	2.7	34.7	380.5	1,133.0	1,513.5
DND	17.7	0.8	18.5	175.9	740.9	916.8*
DOC	8.0	7.9	15.9	149.0	372.5	521.5
NHW	12.3	0.6	12.9	206.3	411.6	617.9
CCA	8.7	0.1	8.8	219.0	270.0	489.0
AECL	5.7	—	5.7	45.0	68.0	113.0
NM	4.2	0.4	4.6	50.7	110.1	160.8
MOT	2.0	2.5	4.5	35.5	56.1	91.6
ITC	3.3	—	3.3	32.0	97.3	129.3
IDRC	2.6	—	2.6	17.5	61.4	78.9
DPW	1.7	0.4	2.2	23.5	74.0	97.5
MRC	0.9	—	0.9	5.0	24.0	29.0
CPDL	0.7	—	0.7	11.0	12.0	23.0
INA	0.3	—	0.3	6.0	5.2	11.2
EA	0.2	—	0.2	—	21.0	21.0
SLSA	0.1	—	0.1	2.0	2.1	4.1
CMHC	--	—	--	0.2	0.5	0.7
TOTAL	240.5	37.0	277.4	3,257.6	7,880.8	11,138.4

** Includes 144 military personnel.*

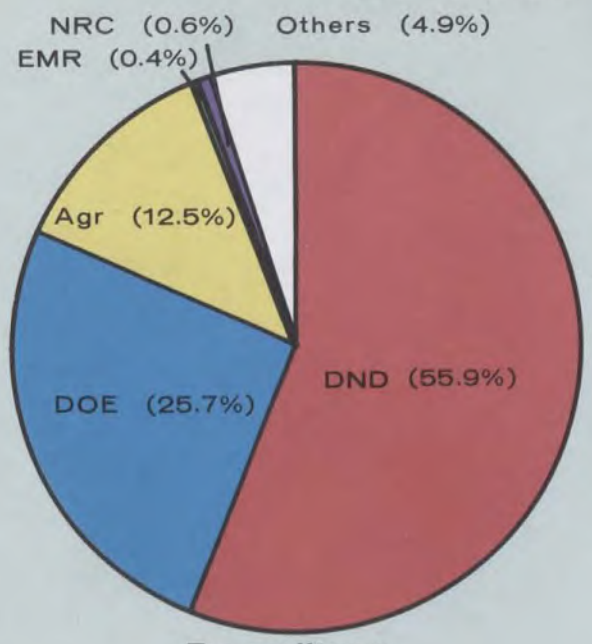
NATIONAL CAPITAL REGION **Major Scientific Establishments**

Department or Agency	Branch or Program	Establishment	Location	Expenditures ($ millions)	Manpower
NRC	National Research Council Operations		Ottawa	68.3	2687
EMR	Surveys and Mapping Branch (earth sciences program)		Ottawa	17.4	1026
	Mines Branch (mineral and energy resources program)		Ottawa	14.8	674
	Geological Survey of Canada (mineral and energy resources program)		Ottawa	10.3	419
	Canada Centre for Remote Sensing (earth sciences program)		Ottawa	6.5	82
	Earth Physics Branch (earth sciences program)		Ottawa	4.8	146
	Geological Survey of Canada (earth sciences program)		Ottawa	2.0	74
	Polar Continental Shelf Project (earth sciences program)		Ottawa	1.7	15
	Energy Development (mineral and energy resources program)		Ottawa	0.4	7
DOE	Marine Sciences	Headquarters	Ottawa, Hull	12.1	293
	Inland Waters	Headquarters	Hull	6.9	243
	Canadian Wildlife Service	Headquarters Region	Ottawa, Hull	2.2	113
	Canadian Forestry Service	Eastern Forest Products Laboratory	Ottawa	2.7	144
	Lands Directorate	Geographic Information System	Hull	1.9	38
	Canadian Forestry Service	Forest Management Institute	Ottawa	1.9	58
	Environmental Protection	Headquarters	Ottawa	1.4	38
	Canadian Wildlife Service	Eastern Regional Office	Ottawa	1.3	59
	Canadian Forestry Service	Chemical Control Research Institute	Ottawa	1.3	34
	Canadian Forestry Service	Forest Fire Research Institute	Ottawa	1.0	32
	Canadian Forestry Service	Forest Economics Research Institute	Ottawa	0.5	26
		Other establishments	Ottawa	2.0	112
Agr	Research	Various administrative services	Ottawa	8.2	356
	Research	Animal Research Institute	Ottawa	7.0	283
	Research	Biosystematics Research Institute	Ottawa	3.4	98
	Research	Ottawa Research Station	Ottawa	3.3	152
	Research	Soil Research Institute	Ottawa	3.0	106
	Research	Chemical and Biological Research Institute	Ottawa	2.9	103
	Research	Ornamentals Research Service	Ottawa	2.1	140
	Research	Food Research Institute	Ottawa	1.7	69
	Administration	Main Library	Ottawa	1.6	104
	Health of Animals	Animal Diseases Research Institute	Hull	1.5	103
DND	Defence Research	Headquarters	Ottawa	6.1	265
	Defence Research	Defence Research Establishment Ottawa	Ottawa	4.4	197
	Defence Services	Quality Engineering Test Establishment	Hull	2.7	179
	Defence Services	Headquarters	Ottawa	2.7	89
	Defence Services	Land Engineering Test Establishment	Ottawa	2.5	178
	Defence Research	Defence Research Analysis Establishment	Ottawa	0.1	9
DOC	Research	Communications Research Centre	Ottawa	15.4	509
	Operations and Planning	Headquarters and Systems Planning Groups	Ottawa	0.5	13
NHW	Health Protection	Laboratory Centre for Disease Control	Ottawa	3.7	32
	Health Protection	Food Directorate	Ottawa	3.3	160
	Health Protection	Drug Directorate	Ottawa	1.8	99
	Health Protection	Administration Directorate	Ottawa	1.7	176
	Health Protection	Environmental Health Directorate	Ottawa	1.3	77
	Health Protection	Radiation Protection Bureau	Ottawa	0.6	47
	Health Programs	Health Facilities Design and Health Research	Ottawa	0.5	20
	Non-Medical Use of Drugs		Ottawa	0.1	6
CCA	Bureau of Intellectual Property	Patent Office	Hull	7.4	405
	Bureau of Consumer Affairs	Standards Laboratory	Ottawa	1.3	84
AECL	Nuclear Research and Utilization	Commercial Products	Ottawa	5.7	113
NM	Museum of Natural Sciences		Ottawa	2.0	74
	Museum of Science & Technology		Ottawa	1.5	59
	Canadian Conservation Institute		Ottawa	1.1	28
MOT	Air Transport	Applied R&D	Ottawa	2.3	31
	Air Transport	Air Traffic Simulation Centre	Hull	1.3	21
	Air, Surface and Marine Transport	Other establishments	Ottawa	0.9	40
Other			Ottawa	10.3	392

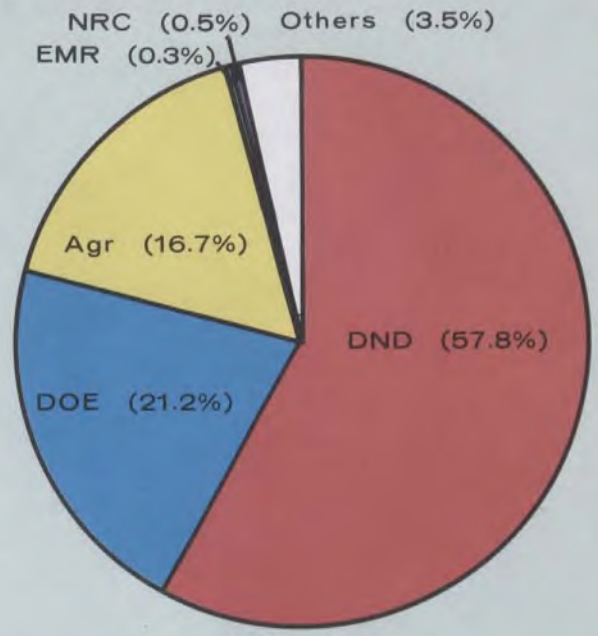
30.7 Federal Intramural Expenditures on Scientific Activities in Quebec, 1974



30.7 Quebec (excluding Hull), 1974



Expenditures



Manpower

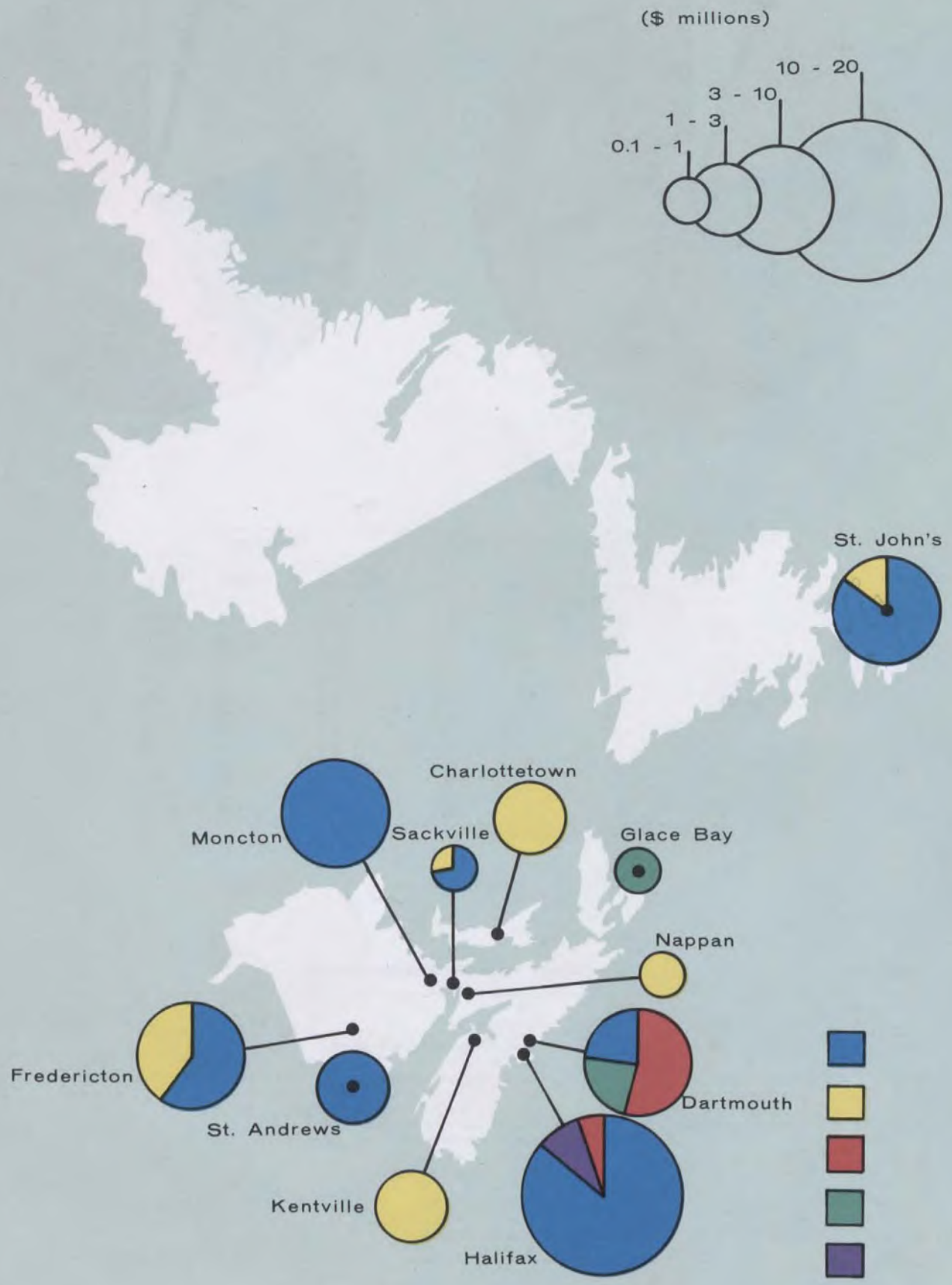
Department or Agency	Expenditures ($ millions)			Manpower		
	Current	Capital	Total	Scientific & Professional	Others	Total
DND	21.7	0.9	22.7	127.0	1,001.0	1,128.0*
DOE	9.4	1.0	10.4	83.0	330.0	413.0
Agr	4.8	0.2	5.0	66.0	260.0	326.0
MOT	0.8	--	0.8	13.5	13.3	26.8
NFB	0.6	--	0.6	3.0	7.0	10.0
NRC	0.2	—	0.2	8.0	2.0	10.0
CBC	0.2	--	0.2	7.0	2.0	9.0
CAL	0.2	--	0.2	4.5	3.4	7.9
EMR	0.1	--	0.1	2.0	4.0	6.0
SLSA	0.1	—	0.1	10.3	1.2	11.5
VA	0.1	—	0.1	1.5	2.7	4.2
TOTAL	38.2	2.2	40.5	325.8	1,626.6	1,952.4

** Includes 109 military personnel.*

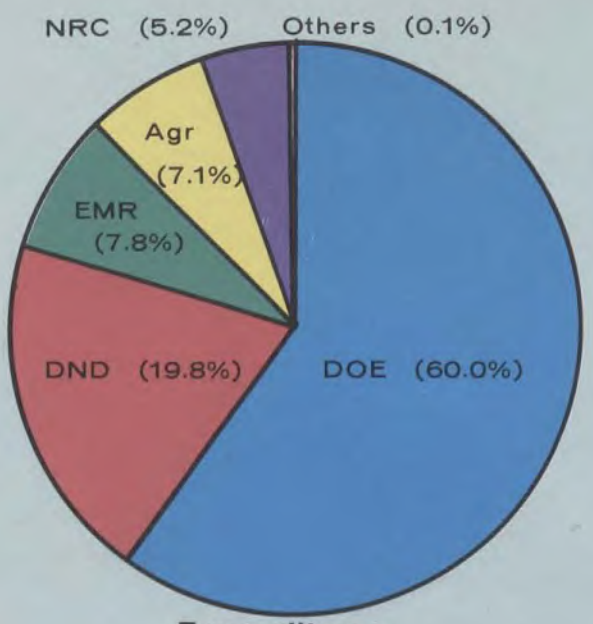
QUEBEC: **Major Scientific Establishments**

Department or Agency	Branch or Program	Establishment	Location	Expenditures ($ millions)	Manpower
DND	Defence Research	Defence Research Establishment Valcartier	Valcartier	13.1	723
DND	Defence Services	Test Services Detachment	Montreal	6.0	250
DOE	Atmospheric Environment	Quebec Regional Office	Montreal	4.7	209
DOE	Canadian Forestry Service	Laurentian Forest Research Centre	Ste. Foy	3.1	137
DND	Defence Services	Proof & Experimental Test Establishment	Nicolet	1.8	74
DND	Defence Services	Test Services Agency	Montreal	1.4	53
DOE	Fisheries R&D	Arctic Biological Station	Ste. Anne de Bellevue	1.4	41
Agr	Research	Research Station	Lennoxville	1.3	85
Agr	Research	Research Station	Ste. Foy	1.2	65
Agr	Research	Research Station	St. Jean	1.0	65
Other				5.5	250

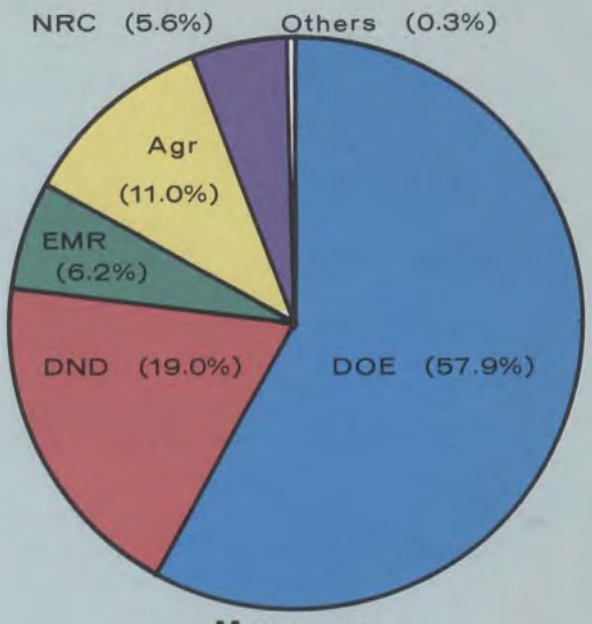
30.8 Federal Intramural Expenditures on Scientific Activities in the Atlantic Provinces, 1974



30.8 Nova Scotia, 1974



Expenditures



Manpower

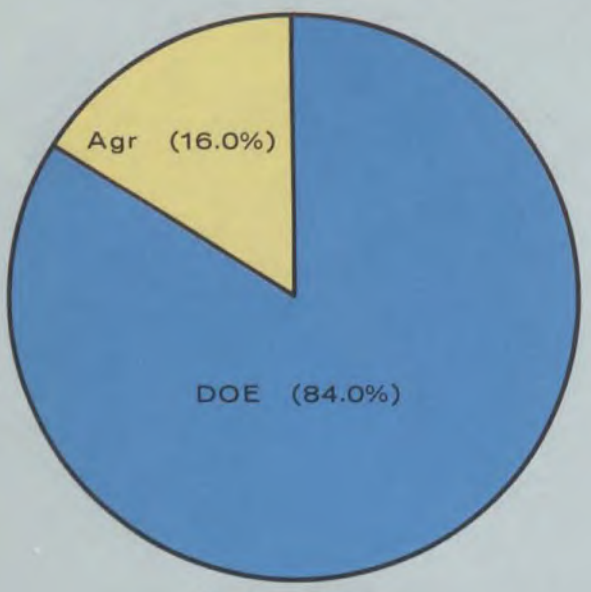
Department or Agency	Expenditures ($ millions)			Manpower		
	Current	Capital	Total	Scientific & Professional	Others	Total
DOE	17.4	1.6	19.1	158.0	666.0	824.0
DND	6.0	0.4	6.3	63.0	208.0	271.0*
EMR	2.2	0.3	2.5	51.0	37.0	88.0
Agr	2.2	0.1	2.3	38.0	118.0	156.0
NRC	1.6	0.1	1.7	33.5	46.0	79.5
VA	--	—	--	0.2	4.5	4.7
TOTAL	29.4	2.4	31.8	343.7	1,079.5	1,423.2

** Includes 43 military personnel.*

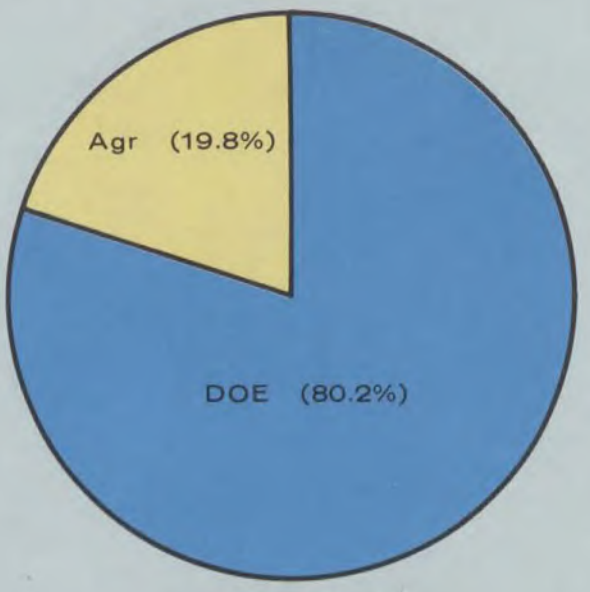
NOVA SCOTIA: **Major Scientific Establishments**

Department or Agency	Branch or Program	Establishment	Location	Expenditures ($ millions)	Manpower
DOE	Marine Sciences	Atlantic Regional Office	Halifax	12.2	553
DND	Defence Research	Defence Research Establishment Atlantic	Dartmouth	5.3	216
EMR	Geological Survey of Canada	Atlantic Geoscience Centre	Dartmouth	2.3	86
DOE	Fisheries R&D	Marine Ecology Laboratory	Dartmouth	2.2	83
DOE	Fisheries R&D	Halifax Laboratory	Halifax	1.9	74
DOE	Fisheries R&D	Atlantic Regional Director Research	Halifax	1.8	79
Agr	Research	Research Station	Kentville	1.7	114
NRC	Atlantic Regional Laboratory		Halifax	1.7	80
DOE	Inland Waters	Water Resources Branch	Halifax	0.9	32
DND	Defence Services	Technical Services Detachment	Halifax	0.6	35
Agr	Research	Experimental Farm	Nappan	0.5	42
Other				0.7	29

30.8 New Brunswick, 1974



Expenditures



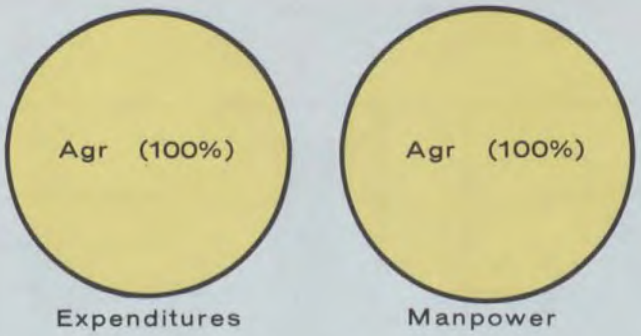
Manpower

Department or Agency	Expenditures ($ millions)			Manpower		
	Current	Capital	Total	Scientific & Professional	Others	Total
DOE	11.3	0.5	11.9	142.0	458.0	600.0
Agr	2.2	0.1	2.3	36.0	112.5	148.5
TOTAL	13.5	0.7	14.2	178.0	570.5	748.5

NEW BRUNSWICK: **Major Scientific Establishments**

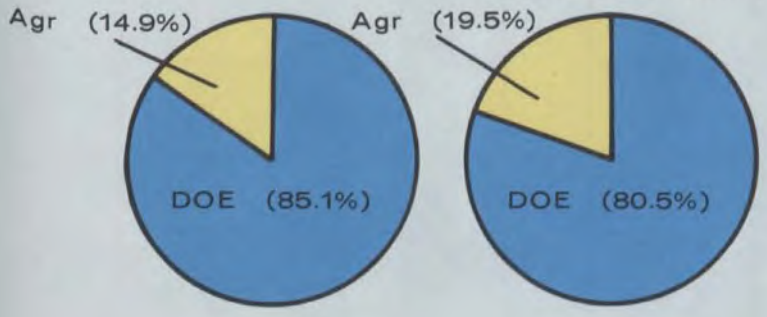
Department or Agency	Branch or Program	Establishment	Location	Expenditures ($ millions)	Manpower
DOE	Atmospheric Environment	Atlantic Regional Office	Moncton	5.2	282
DOE	Canadian Forestry Service	Maritimes Forest Research Centre	Fredericton	3.1	174
DOE	Fisheries R&D	Biological Station	St. Andrews	2.6	106
Agr	Research	Research Station	Fredericton	2.1	142
DOE	Inland Waters	Water Quality Branch	Moncton	0.6	24
DOE	Canadian Wildlife Service	Eastern Regional Office	Sackville	0.3	8
DOE	Canadian Wildlife Service	Eastern Regional Office	Fredericton	0.1	6
Agr	Health of Animals	Laboratory	Sackville	0.1	7

30.8 Prince Edward Island, 1974



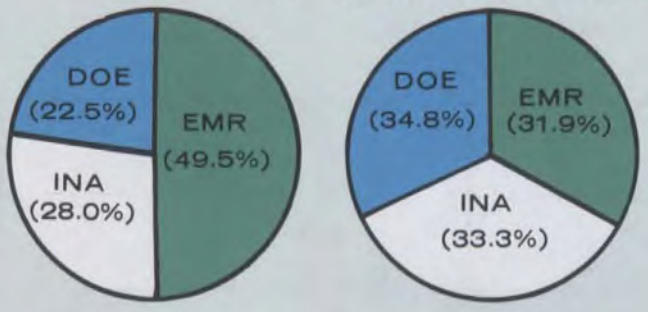
The Department of Agriculture operates a Research Station at Charlottetown.

30.8 Newfoundland, 1974



The Department of Agriculture operates a Research Station in St. John's West. The Department of the Environment operates four facilities from St. John's: for the Fisheries and Marine Program, a Biological Station; for the Environmental Services Program, an Environmental Protection District Office and Laboratory, the Newfoundland Forest Research Centre and a Canadian Wildlife Service Office.

30.9 Yukon and Northwest Territories, 1974

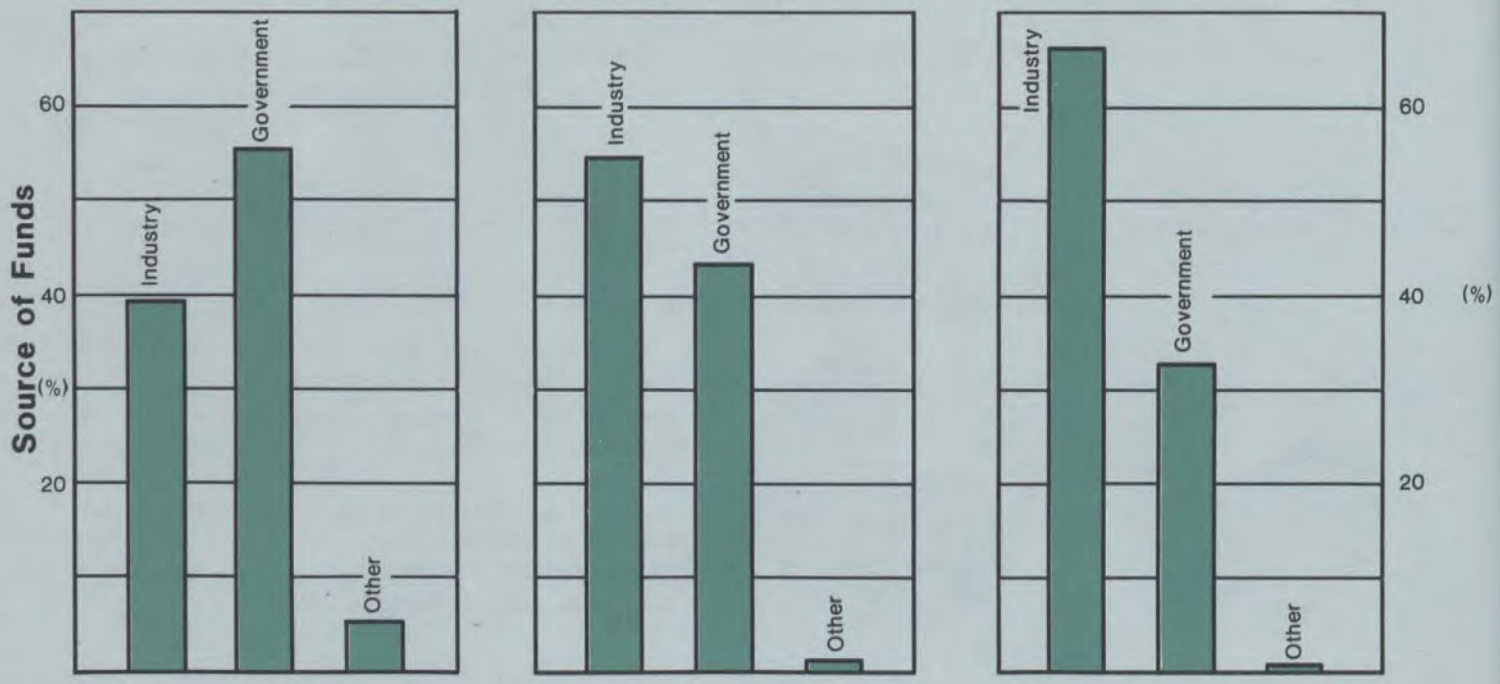


The Department of Energy, Mines and Resources operates a Polar Continental Shelf Project as well as Geophysical Laboratories in the Northwest Territories. Indian and Northern Affairs operates a Research Laboratory in Inuvik. The Department of Environment operates Canadian Wildlife Service offices from Fort Smith and the western Arctic and Water Resources Branch offices at Whitehorse and Fort Smith.

Department or Agency	Expenditures ($ millions)			Manpower			
	Current	Capital	Total	Scientific & Professional	Other	Total	
Agr	1.5	--	1.6	19.0	82.0	101.0	**Prince Edward Island**
TOTAL	1.5	--	1.6	19.0	82.0	101.0	
DOE	3.2	0.2	3.4	56.0	121.0	177.0	**Newfoundland**
Agr	0.6	--	0.6	7.0	36.0	43.0	
TOTAL	3.8	0.2	4.0	63.0	157.0	220.0	
EMR	1.9	0.2	2.1	1.0	21.0	22.0	**Yukon & NWT**
INA	0.6	0.6	1.2	12.0	11.0	23.0	
DOE	0.9	0.1	1.0	4.0	20.0	24.0	
TOTAL	3.4	0.9	4.3	17.0	52.0	69.0	

2.6 International Comparisons

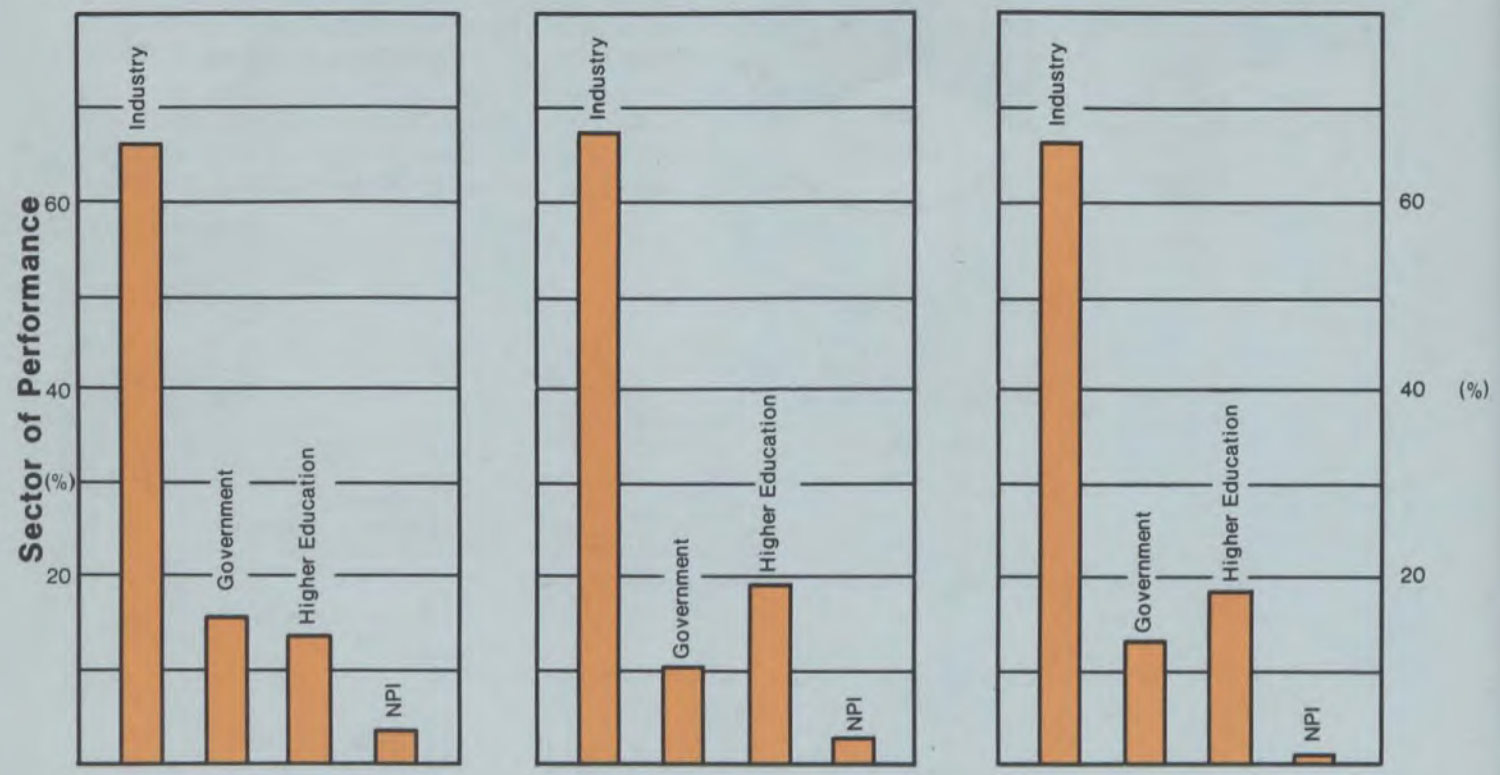
The bars in each graph total 100%.



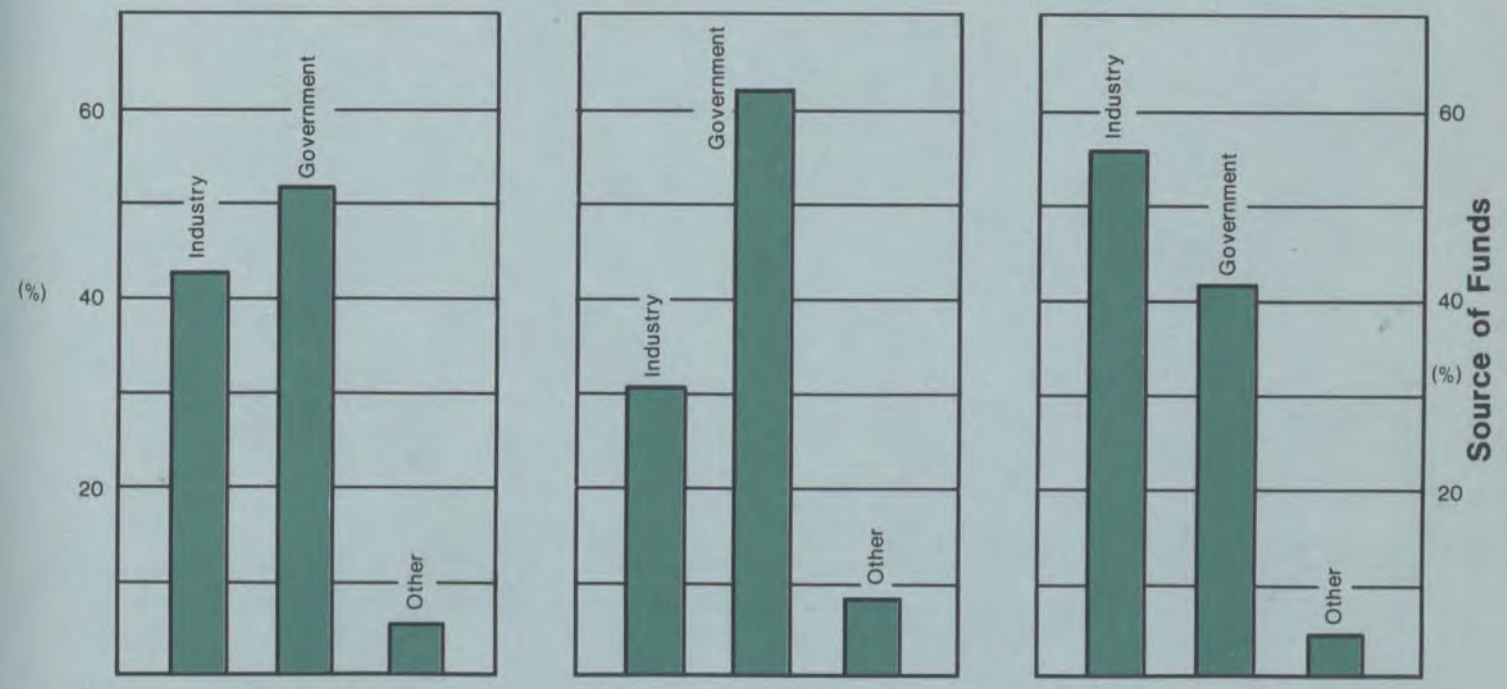
United States
$27,527 million US

Germany
$4,499 million US

Japan
$4,040 million US



Gross Expenditures on Research and Development by Source of Funds and Sector of Performance, 1971 (% distribution)



United Kingdom

$2,596 million US

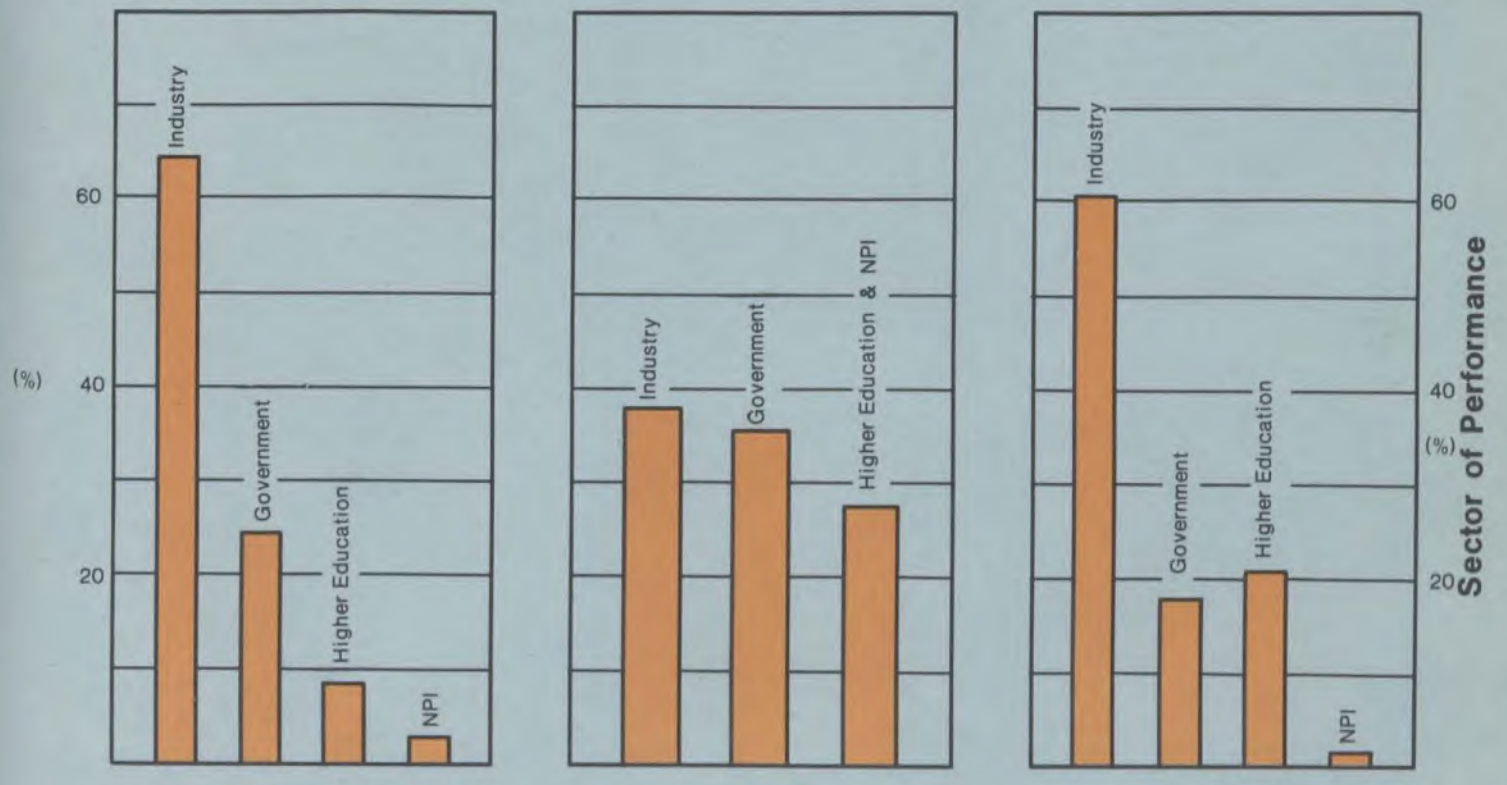
(Figures are for 1970.)

Canada

$1,145 million US

Netherlands

$783 million US

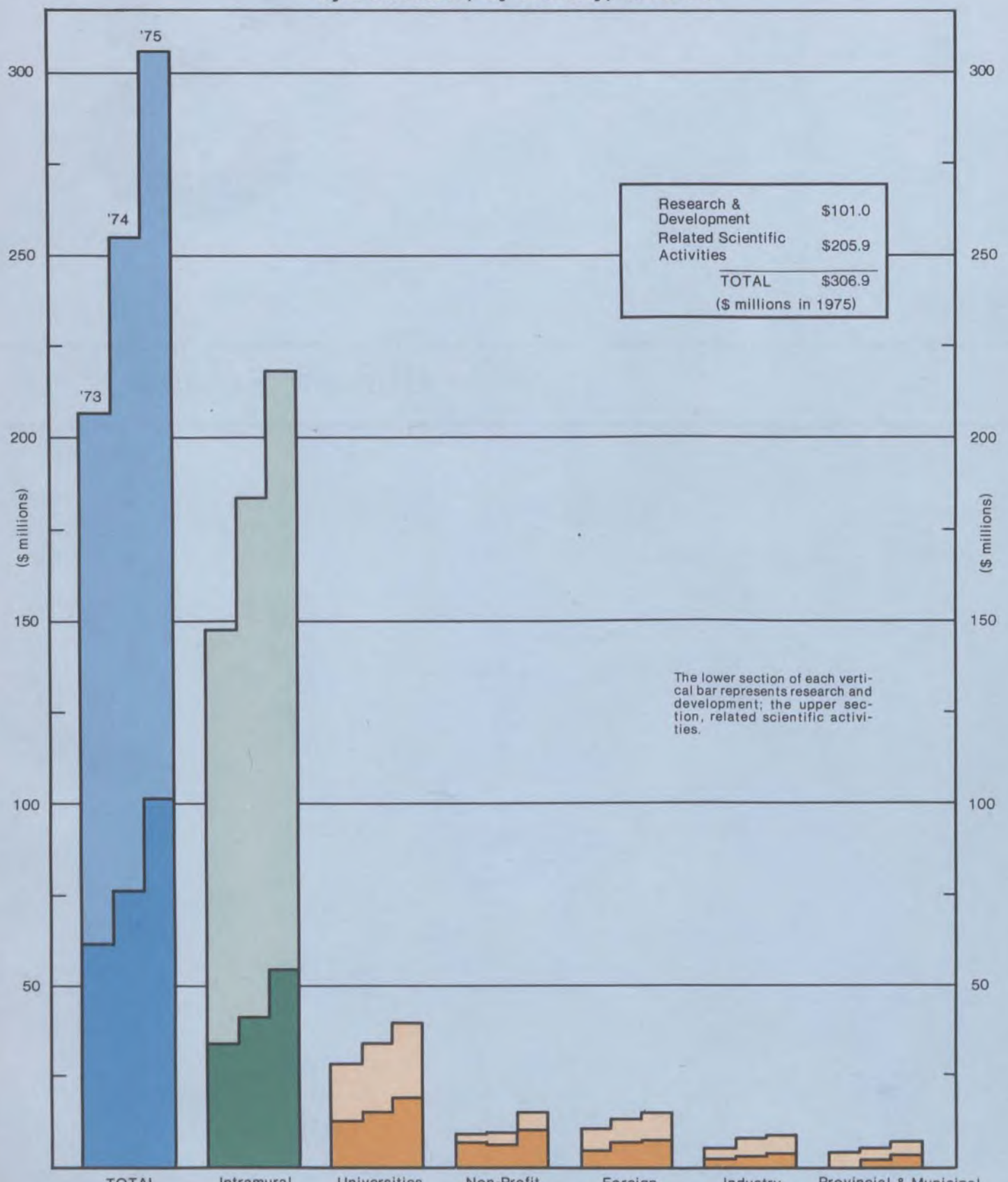


3

Human Sciences

3.1 Total Scientific Activity Expenditures

31. Federal Expenditures on Scientific Activities by Performer, by Activity, 1973-75



Total expenditures on activities in the human sciences will reach $306.9 million dollars in 1975, an increase of $51.2 million or 20.0% over 1974.

Two thirds of the expenditures or $206 million will apply to related scientific activities, which include data collection, scientific information, education support and operations studies. This is an increase of $26.3 million or 14.6% over 1974.

Research and development will receive the remaining third, or $101 million, an increase of $24.9 million representing a 32.7% rise over 1974.

The federal government is the major performer of all human science activities maintaining a steady 72% of the total over the period 1973-75. Its total of $219.4 million in 1975 is $35.5 million or 19.3% higher than the previous year.

The next largest performer, the university sector, is expected to spend $39.6 million in 1975, accounting for 12.9% of the total. This is $5.4 million or 15.8% higher than in 1974. From 1973 to 1975 universities are expected to drop from 13.7% to 12.9% of the total.

Spending approximately 5% of the total each are non-profit institutions and foreign performers with budgets of $15.8 and $15.4 million respectively for 1975. Non-profit institutions should show a large increase over 1974 jumping $5.7 million or 56.4%, while foreign performers will receive an additional 11.6%.

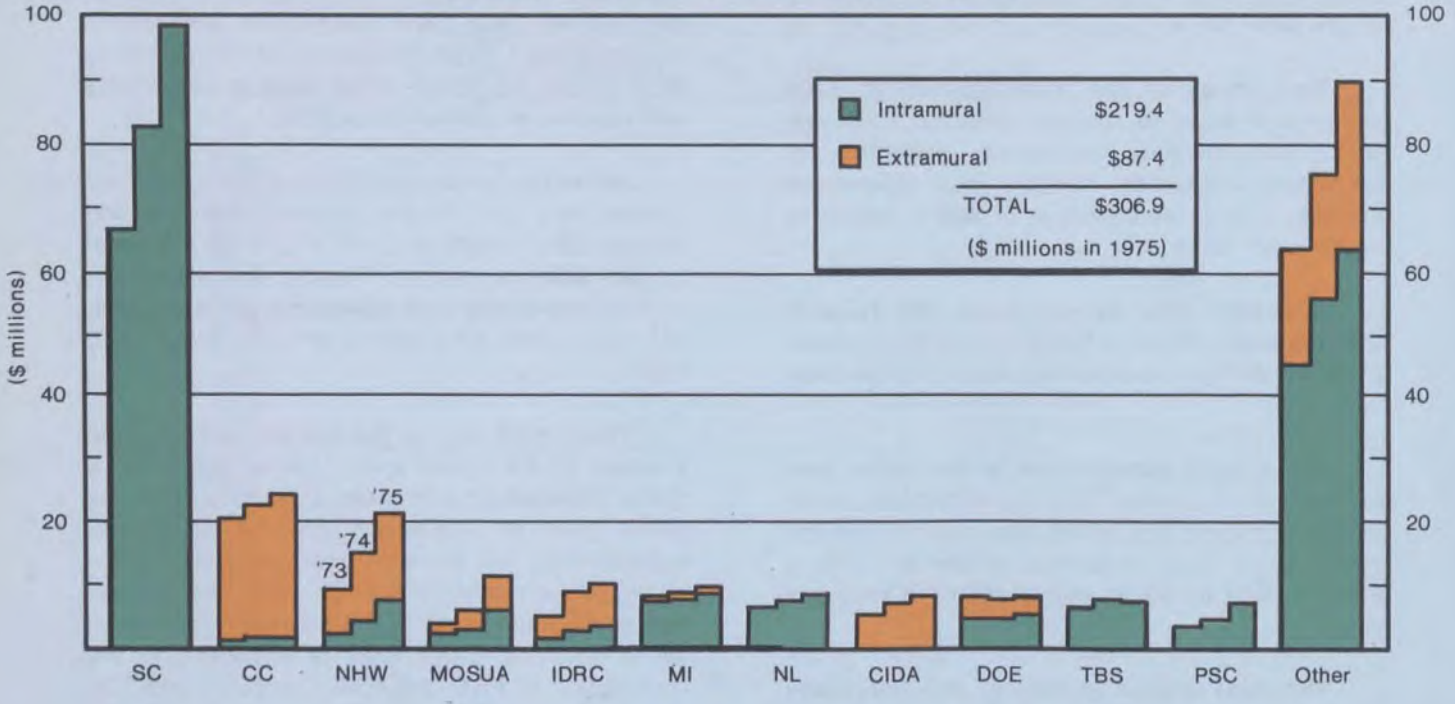
Industry, understandably a smaller performer here than in the natural sciences, will receive $9.3 million or 3.0% of the 1975 federal human science budget. Finally, the sixth performer, **provincial and municipal governments,** will be allotted $7.4 million or 2.4% of the 1975 total.

The growth rate of the human sciences will average 21.7% a year from 1973 to 1975 with a dollar increase of just under $100 million for the same period. Research and development expenditures will grow an average of 28.3% annually while related scientific activities are expected to register an 18.8% increase each year. As a result a slight shift is expected in the distribution of R&D and RSA: from 30% and 70% in 1973 to 33% R&D and 67% RSA in 1975.

($ millions)

Performer	1973			1974			1975		
	R&D	RSA	Total	R&D	RSA	Total	R&D	RSA	Total
Intramural	34.1	114.2	148.3	41.6	142.3	183.9	54.7	164.7	219.4
Universities	12.7	15.7	28.4	15.5	18.7	34.2	19.4	20.2	39.6
Non-Profit Institutions	7.1	2.6	9.7	6.4	3.7	10.1	10.8	5.0	15.8
Foreign	4.9	5.7	10.7	7.0	6.8	13.8	8.2	7.2	15.4
Industry	2.3	3.3	5.5	3.4	4.6	8.0	4.0	5.4	9.3
Provincial and Municipal Governments	0.4	4.2	4.6	2.2	3.5	5.7	3.9	3.4	7.4
TOTAL	61.4	145.8	207.2	76.1	179.6	255.7	101.0	205.9	306.9

32. Federal Intramural and Extramural Expenditures on Scientific Activities by Department or Agency, 1973-75



The leading spender in the human sciences in 1975 will again be **Statistics Canada** with exclusively intramural expenditures of $98.9 million. This represents 32.2% of the total spent by all departments and agencies.

One half of the human science budget in 1975 is accounted for by four departments or agencies. They are: Statistics Canada, $98.9 million (32.2%); Canada Council, $24.5 million (8.0%); National Health and Welfare, $21.0 million (6.8%) and Urban Affairs, $11.6 million (3.8%).

Five departments or agencies will spend about $8 million each on intramural activities. They are: National Library ($8.6), Manpower and Immigration ($8.4), Treasury Board Secretariat ($7.9), National Health and Welfare ($7.7), and the Public Service Commission ($7.6 million).

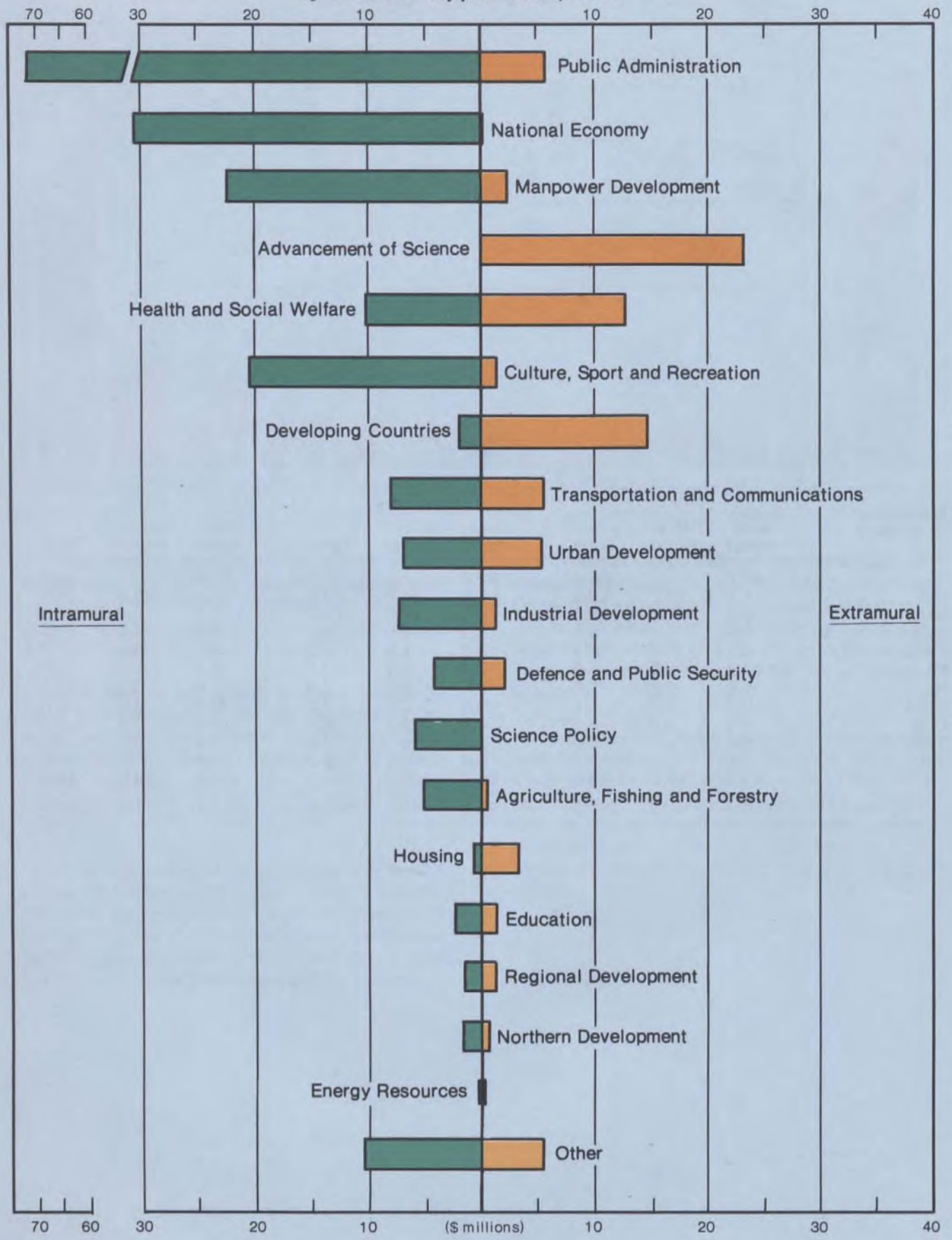
Canada Council will register the largest extramural expenditure in 1975, $23.2 million, or 26.5% of the extramural total. Next are National Health and Welfare at $13.4 million or 15.3% and CIDA at $8.2 million or 9.4%. These three departments will account for 51.2% of extramural spending in 1975.

Statistics Canada's average annual growth rate is estimated at 22.1% between 1973 and 1975; the figure for Canada Council is 8.5%. The next three largest departments have at least doubled their expenditures over the same period, NHW from $9.0 to $21.0 million, MOSUA from $3.8 to $11.6 million and IDRC from $5.1 to $10.2 million.

($ millions)

Department or Agency	1973			1974			1975		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
SC	66.3	-	66.3	82.7	-	82.7	98.9	-	98.9
CC	1.1	19.7	20.8	1.2	21.6	22.8	1.4	23.2	24.5
NHW	2.3	6.8	9.0	4.7	10.0	14.7	7.7	13.4	21.0
MOSUA	2.4	1.4	3.8	3.2	3.0	6.2	6.0	5.5	11.6
IDRC	1.8	3.4	5.1	3.2	6.0	9.2	3.6	6.6	10.2
MI	7.7	0.5	8.2	7.7	1.1	8.7	8.4	1.2	9.5
NL	6.3	0.2	6.6	7.5	0.3	7.8	8.6	0.3	8.8
CIDA	0.3	5.2	5.4	0.3	7.4	7.7	0.4	8.2	8.5
DOE	4.8	3.3	8.1	4.9	3.1	8.0	5.6	2.7	8.3
TBS	6.6	0.1	6.6	7.7	0.1	7.8	7.9	0.1	8.0
PSC	3.4	0.1	3.5	5.0	- -	5.0	7.6	- -	7.7
Other	45.3	18.2	63.8	55.8	19.2	75.1	63.3	26.2	89.9
TOTAL	148.3	58.9	207.2	183.9	71.8	255.7	219.4	87.4	306.9

33. Federal Current Expenditures on Scientific Activities by Field of Application, 1975



Federal current expenditures on activities in the human sciences will total $302.2 million in 1975.

Public administration is the largest single application accounting for approximately one quarter of these funds; one tenth will be allotted to the national economy and about 8% each to manpower development, the advancement of science, health and social welfare, and culture, sport and recreation.

Seventy percent of these current expenditures are intramural, the remaining 30 percent extramural. The individual applications generally do not reflect this 70:30 distribution.

The main applications of intramural funds are public administration, 34.1% of the intramural total, the national economy, 14.3%, manpower development, 10.5%, and culture, sport and recreation, 9.6%.

The main applications of extramural funds are the advancement of science, 25.9% of the extramural total, developing countries, 16.4%, health and social welfare, 14.3% and public administration, 6.5%.

The only major application common to both sectors of performance is public administration, ranking first intramurally and fourth extramurally.

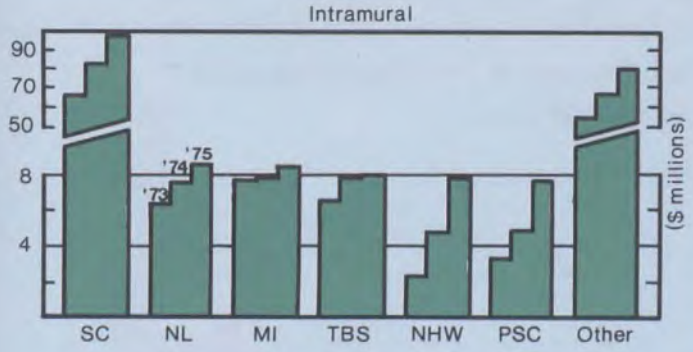
($ millions)

Field of Application	Intramural	Extramural	Total
Public Administration	72.4	5.8	78.2
National Economy	30.5	0.4	30.9
Manpower Development	22.4	2.5	24.9
Advancement of Science	0.1	23.2	23.3
Health and Social Welfare	10.2	12.8	23.0
Culture, Sport and Recreation	20.4	1.6	22.0
Developing Countries	2.0	14.7	16.7
Transportation and Communications	8.0	5.7	13.7
Urban Development	6.9	5.5	12.4
Industrial Development	7.3	1.5	8.8
Defence and Public Security	4.2	2.2	6.4
Science Policy	5.9	0.3	6.2
Agriculture, Fishing and Forestry	5.2	0.6	5.8
Housing	0.8	3.3	4.1
Education	2.4	1.5	3.9
Regional Development	1.7	1.3	3.0
Northern Development	1.7	0.7	2.3
Energy Resources	0.2	0.2	0.4
Other	10.6	5.5	16.1
TOTAL	212.6	89.6	302.2

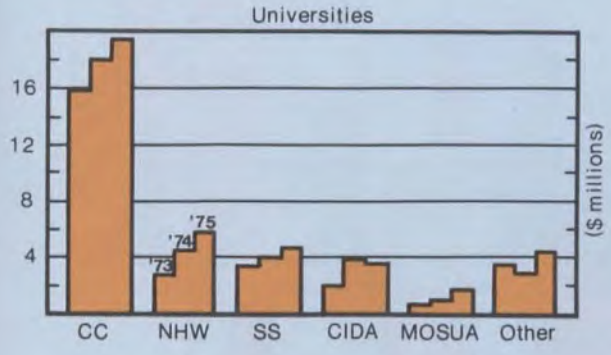
34. Federal Expenditures on Scientific Activities by Performer, by Department or Agency, 1973-75

($ millions)

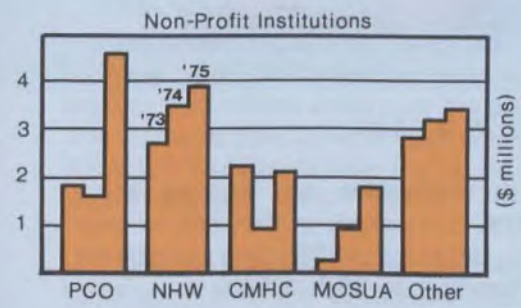
Performer	Department or Agency	1973		1974		1975	
		$	%	$	%	$	%
Intramural	SC	66.3	(44.7)	82.7	(45.0)	98.9	(45.1)
	NL	6.4	(4.3)	7.5	(4.1)	8.6	(3.9)
	MI	7.6	(5.1)	7.7	(4.2)	8.4	(3.8)
	TBS	6.6	(4.5)	7.7	(4.2)	7.9	(3.6)
	NHW	2.3	(1.6)	4.7	(2.6)	7.7	(3.5)
	PSC	3.4	(2.3)	5.0	(2.7)	7.6	(3.5)
	OTHER	55.7	(37.5)	68.6	(37.3)	80.3	(36.6)
	TOTAL	148.3	(100.0)	183.9	(100.0)	219.4	(100.0)
Extramural							
Universities	CC	15.9	(56.1)	17.9	(52.2)	19.4	(49.1)
	NHW	2.8	(10.0)	4.5	(13.1)	5.8	(14.6)
	SS	3.4	(12.0)	4.1	(12.0)	4.7	(11.9)
	CIDA	2.1	(7.2)	3.8	(11.1)	3.6	(9.0)
	MOSUA	0.7	(2.6)	1.0	(3.0)	1.7	(4.2)
	OTHER	3.5	(12.1)	2.9	(8.9)	4.4	(11.2)
	TOTAL	28.4	(100.0)	34.2	(100.0)	39.6	(100.0)
Non-Profit Institutions	PCO	1.8	(19.0)	1.6	(15.3)	4.6	(29.2)
	NHW	2.7	(27.7)	3.5	(35.2)	3.9	(24.5)
	CMHC	2.2	(22.3)	0.9	(10.1)	2.1	(13.0)
	MOSUA	0.2	(2.2)	0.9	(9.0)	1.8	(11.3)
	OTHER	2.8	(28.8)	3.2	(30.4)	3.4	(22.0)
	TOTAL	9.7	(100.0)	10.1	(100.0)	15.8	(100.0)
Foreign	IDRC	3.4	(31.8)	6.0	(43.5)	6.6	(42.9)
	CIDA	3.1	(29.0)	3.6	(26.1)	4.6	(29.9)
	CC	3.8	(35.5)	3.7	(26.8)	3.7	(24.0)
	OTHER	0.4	(3.7)	0.5	(3.6)	0.5	(3.2)
	TOTAL	10.7	(100.0)	13.8	(100.0)	15.4	(100.0)
Other	NHW	1.1	(11.0)	1.9	(13.8)	3.6	(21.5)
	DOE	2.9	(29.1)	2.7	(19.7)	2.1	(12.5)
	MOSUA	0.4	(4.3)	1.0	(7.2)	2.1	(12.4)
	MOT	1.7	(16.4)	2.1	(15.1)	1.4	(8.5)
	ITC	0.5	(4.4)	1.0	(7.4)	1.1	(6.4)
	CTC	1.0	(9.7)	1.0	(7.1)	1.1	(6.3)
	OTHER	2.5	(25.1)	4.0	(29.7)	5.3	(32.4)
	TOTAL	10.1	(100.0)	13.7	(100.0)	16.7	(100.0)



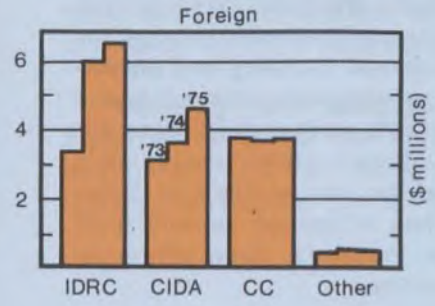
The largest intramural spender in 1975 will be Statistics Canada with expenditures of $98.9 million for human science activities, an increase of $16.2 million over the previous year. Five departments will spend from 8 to 9 million dollars in 1975. Of these, National Health and Welfare will register the largest increase, from a total of $2.3 million in 1973 to an expected $7.7 million in 1975. The National Library, Manpower and Immigration and Treasury Board Secretariat can expect their share of the human science budget to decrease.



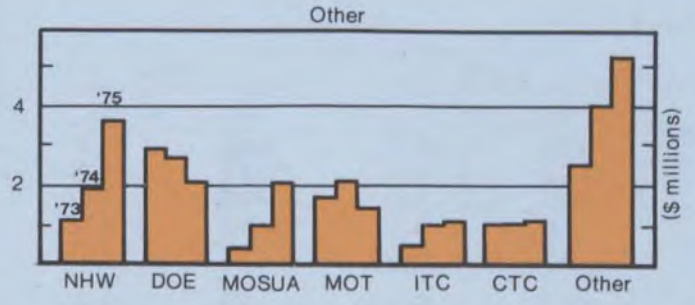
Universities will be the largest extramural performers of activities in the human sciences with an expected total of $39.6 million in 1975. One half of this total (49.1%) will come from the Canada Council; its funding represented 56.1% of the total in 1973.



Non-Profit Institutions will receive $15.8 million in 1975, an increase of $5.7 million over 1974; this compares to a $0.4 million increase from 1973 to 1974. The largest increase is attributable to the leading funder, the Privy Council Office, which almost tripled its budget of the preceding year.



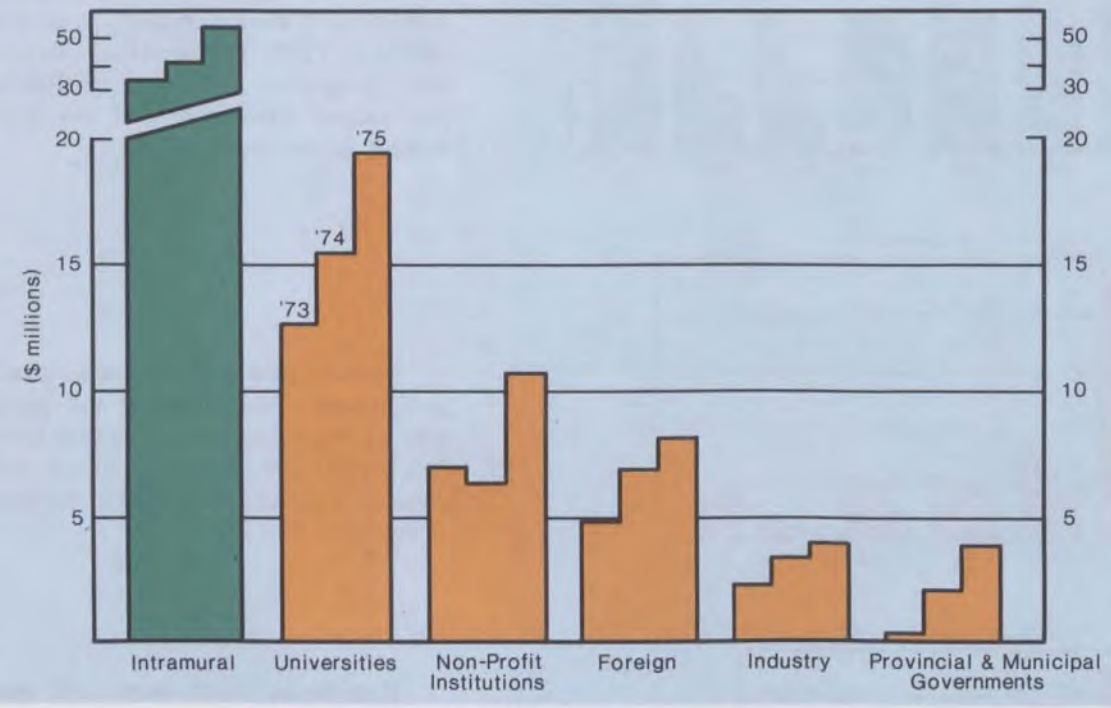
Support of foreign performers of activities in the human sciences will reach $15.4 million in 1975, an 11.4% rise over the previous year. Three major departments account for 97% of the support directed to foreign performers: IDRC $6.6 million or 42.9%, CIDA, $4.6 million or 29.9% and Canada Council, $3.7 million or 24.0%.



This $16.7 million expenditure in 1975 includes payments to Canadian industry ($9.3 million) and provincial and municipal governments ($7.4 million).

3.2 Research and Development Expenditures

35. Federal Expenditures on Research and Development by Performer, 1973-75



Federal expenditures on research and development in the human sciences will reach $101.0 million in 1975, an increase of $24.9 million over 1973; this compares to a $14.7 million increment between 1973 and 1974.

Intramural expenditures account for over half of the research and development budget (54.2%) and will show an increase of $13.1 million in 1975, or 31.5%. Funds for intramural performance and for non-profit institutions will grow at a much greater rate than in 1974.

The university sector is the next largest performer, after intramural, claiming about 20% of the total in the past three years (19.2% or $19.4 million in 1975). Its average annual growth rate for 1973-75 is 23.6%.

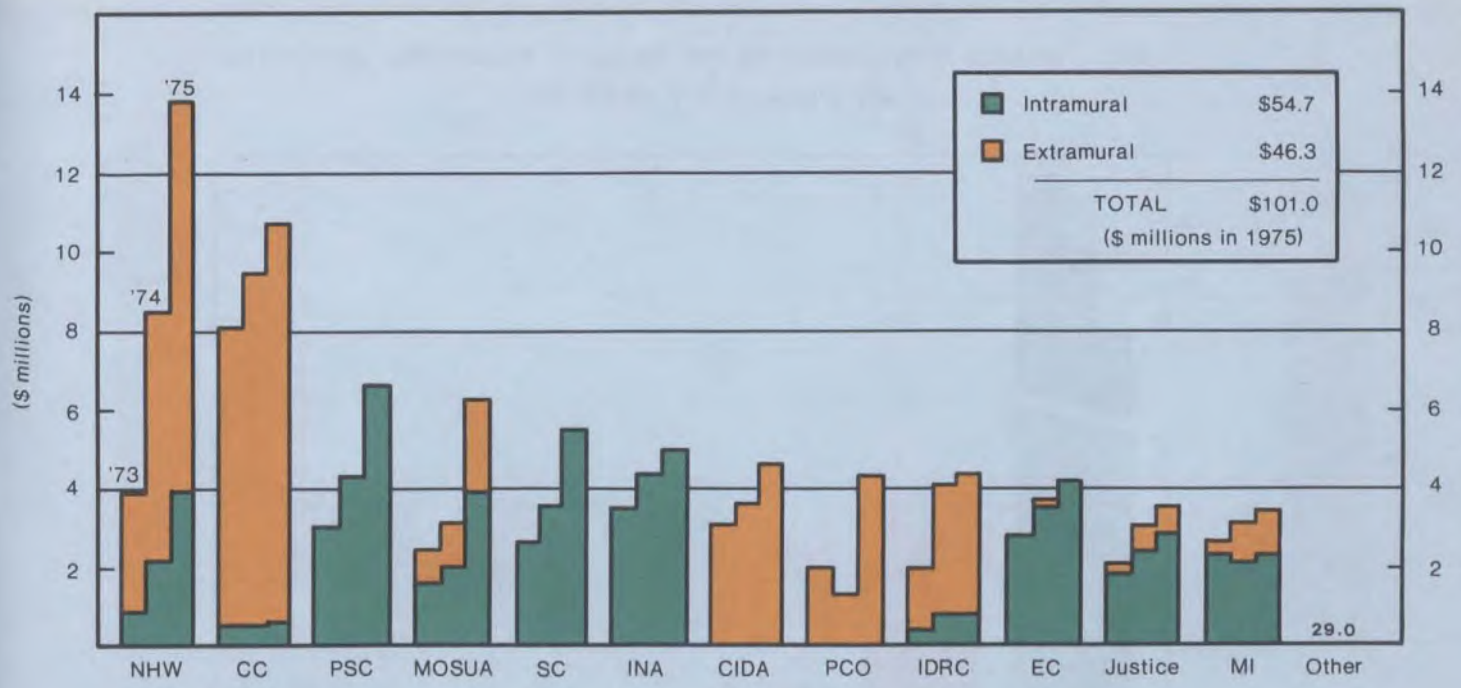
Non-profit institutions will receive $10.8 million in 1975, an increase of $4.4 million over 1974. From 1973 to 1974 their allotment decreased from $7.1 to $6.4 million.

Foreign performers are expected to receive about 8% or $8.2 million of the federal budget for research and development. **Industry and provincial and municipal governments** each will spend about 4%; this represents a sizeable increase, for provincial and municipal governments were allotted only 0.1% of the total in 1973. In dollar terms, their share has increased ten-fold from $0.4 to $3.9 million. Industry's share will grow from $2.3 to $4.0 million.

($ millions)

Performer	1973		1974		1975	
	$	%	$	%	$	%
Intramural	34.1	(55.5)	41.6	(54.7)	54.7	(54.2)
Universities	12.7	(20.7)	15.5	(20.4)	19.4	(19.2)
Non-Profit Institutions	7.1	(11.5)	6.4	(8.4)	10.8	(10.7)
Foreign	4.9	(8.0)	7.0	(9.2)	8.2	(8.1)
Industry	2.3	(3.7)	3.4	(4.5)	4.0	(4.0)
Provincial and Municipal Governments	0.4	(0.1)	2.2	(2.9)	3.9	(3.9)
TOTAL	61.4	(100.0)	76.1	(100.0)	101.0	(100.0)

36. Federal Intramural and Extramural Expenditures on Research and Development by Department or Agency, 1973-75



The leading spender in 1975 for R&D in the human sciences will be **National Health and Welfare** with an expected budget of $13.8 million, $5.3 million more than the previous year. The increase from 1973 to 1974 was $4.6 million. NHW will have more than tripled its budget between 1973 and 1975.

Canada Council, the largest R&D spender in 1973 and 1974, will be alloted $10.7 million in 1975, $1.2 million more than the preceding year. NHW and Canada Council will account for one quarter of the 1975 R&D budget.

Claiming 1975 budgets at least double those of 1973 are: the Public Service Commission, climbing from 3.0 to 6.6 million dollars, Urban Affairs, from 2.4 to 6.2, and Statistics Canada, from 2.6 to 5.5.

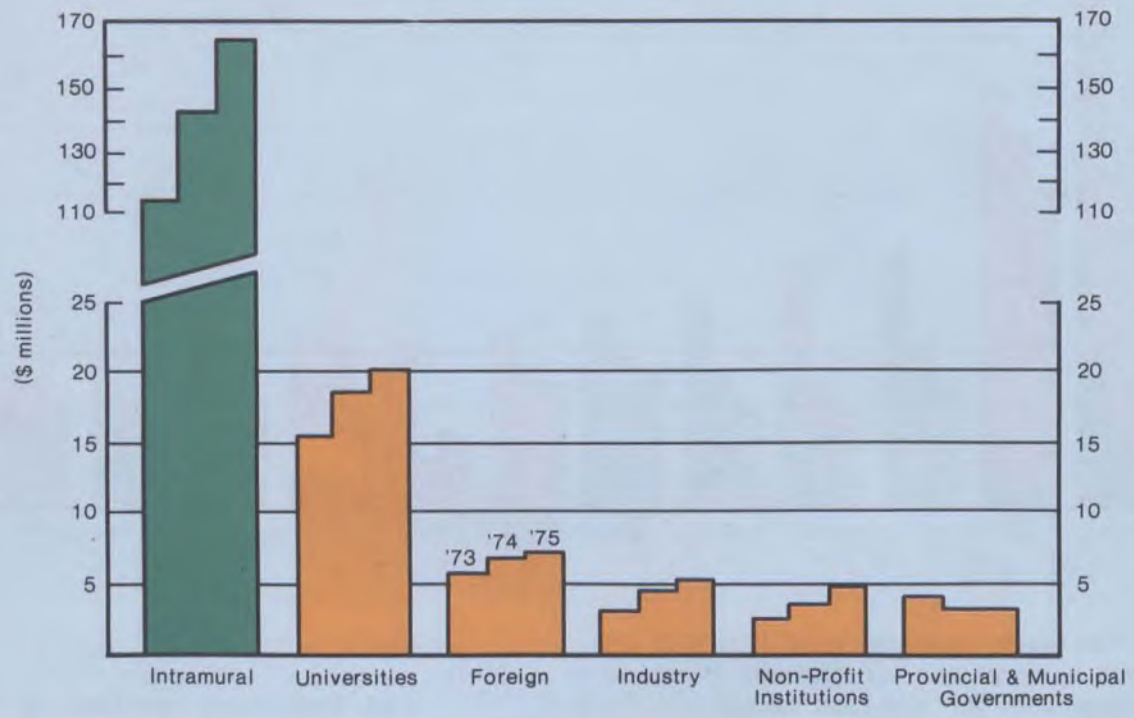
The intramural portion of R&D expenditures is slightly greater than half (54.2% or $54.7 million in 1975) of the total. No one department has intramural expenditures totalling more than 12% of the total. The largest intramural spender is the Public Service Commission, $6.6 million; following it are Statistics Canada, $5.5 million, and the Economic Council, $4.2 million.

Extramural expenditures of $46.3 million for research and development, or 45.8% of the total in 1975, are not so widely distributed. National Health and Welfare and the Canada Council will receive $9.9 and $10.1 million respectively or 43.2% of the extra-mural total.

The table is in the Appendix

3.3 Related Scientific Activity Expenditures

37. Federal Expenditures on Related Scientific Activities by Performer, 1973-1975



Federal expenditures on related scientific activities are expected to equal $205.9 million in 1975, a $26.3 million increase over 1974. This is less than the $33.8 million rise between 1973 and 1974. The average annual growth for the 1973-75 period is estimated at 18.8%.

The largest performance sector, intramural, is slowly increasing its share of the total, from 78.3% in 1973 to 80.0% in 1975. Intramural performers of related scientific activities are expected to receive $164.7 million in 1975.

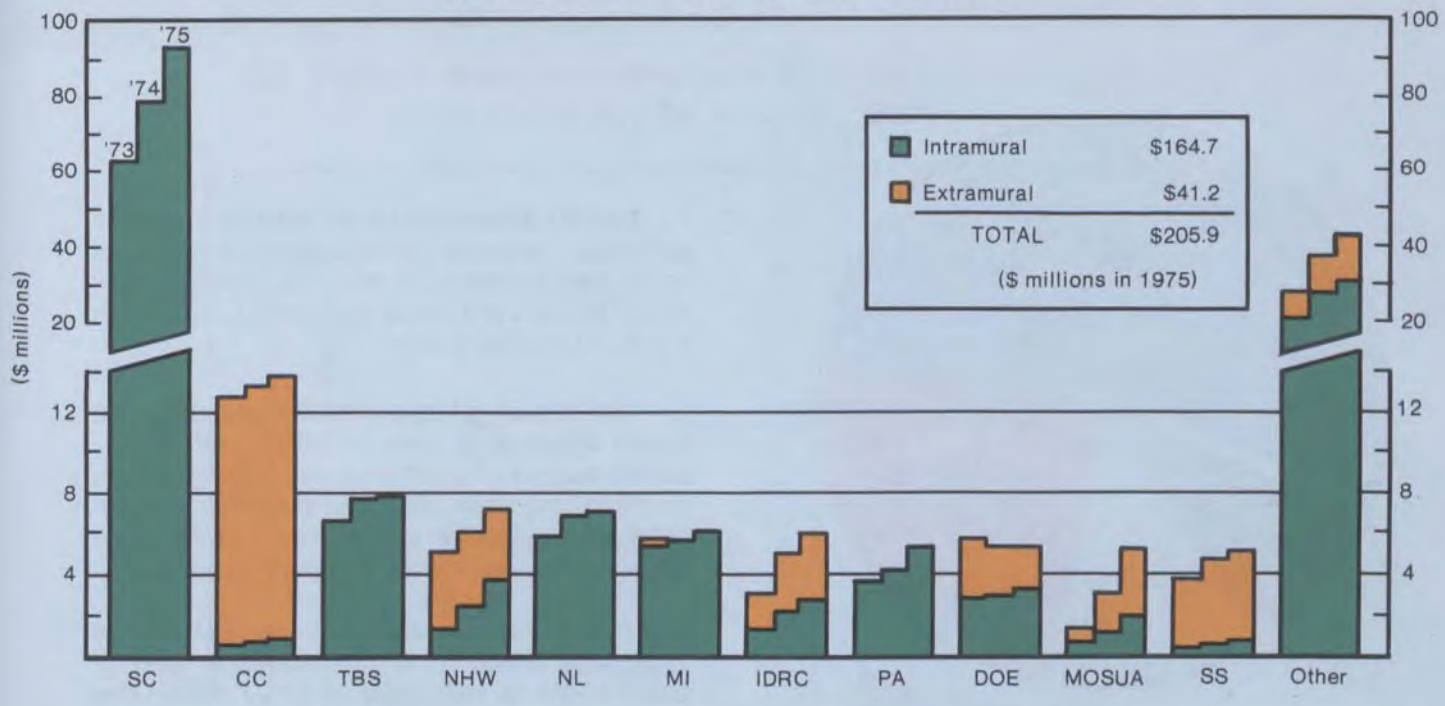
Canadian universities have seen their share of the total shrink over the last three years (from 10.8% in 1973 to 9.8% in 1975) and are expected to receive $20.2 million in 1975. They, the second largest performer, receive as much as the four remaining sectors combined.

The remaining 10.2% or $21.0 million of the 1975 funds for related scientific activities will go to foreign performers, industry, non-profit institutions and provincial and municipal governments. The annual growth rate for the group is 15.8% between 1973 and 1975, compared to 18.8% for all sectors. Funds for provincial and municipal governments will drop from $4.2 million in 1973 to $3.4 million in 1975; those directed to non-profit institutions will almost double to $5.0 million.

($ millions)

Performer	1973		1974		1975	
	$	%	$	%	$	%
Intramural	114.2	(78.3)	142.3	(79.2)	164.7	(80.0)
Universities	15.7	(10.8)	18.7	(10.4)	20.2	(9.8)
Foreign	5.7	(3.9)	6.8	(3.8)	7.2	(3.5)
Industry	3.3	(2.3)	4.6	(2.6)	5.4	(2.6)
Non-Profit Institutions	2.6	(1.8)	3.7	(2.1)	5.0	(2.4)
Provincial and Municipal Governments	4.2	(2.9)	3.5	(1.9)	3.4	(1.7)
TOTAL	145.8	(100.0)	179.6	(100.0)	205.9	(100.0)

38. Federal Intramural and Extramural Expenditures on Related Scientific Activities by Department or Agency, 1973-75



Statistics Canada will be the largest spender on related scientific activities in 1975; it will receive 45.4% of the total with an expected budget of $93.4 million. This is a $14.1 million increase over 1974, down from the $15.7 million increment received the year before.

Canada Council ranks a distant second with 6.7% of the total on the basis of $13.8 million in 1975. This represents $1.1 million more than in 1973.

Another $55.4 million is accounted for by nine departments with budgets between 5 and 8 million dollars. Of this group, Urban Affairs has grown most rapidly from 1973 to 1975, from $1.4 million to $5.3 million. IDRC's budget has almost doubled from $3.1 million to $5.9 million.

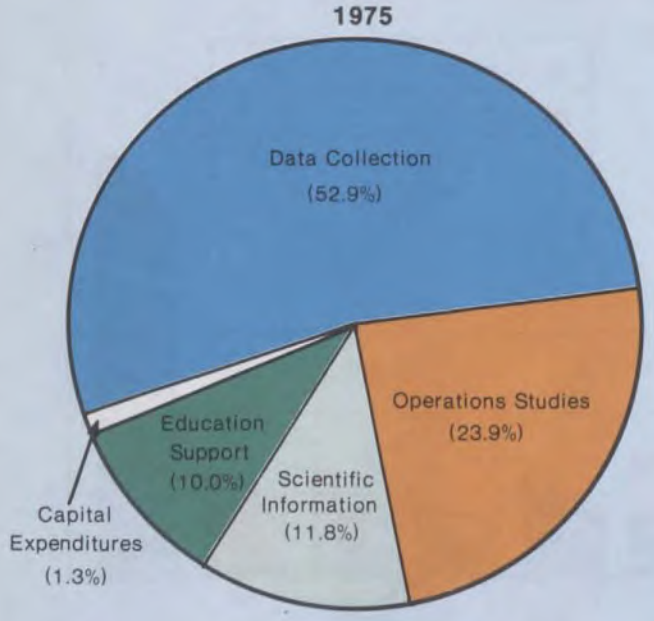
Departments with expenditures of less than $5 million will account for $43.3 million in 1975 or 21.0% of the total.

($ millions)

Department or Agency	1973			1974			1975		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
SC	63.6	-	63.6	79.3	-	79.3	93.4	-	93.4
CC	0.6	12.1	12.7	0.7	12.6	13.3	0.8	13.1	13.8
TBS	6.6	-	6.6	7.7	-	7.7	7.9	-	7.9
NHW	1.4	3.7	5.1	2.5	3.7	6.1	3.8	3.5	7.2
NL	5.8	0.1	5.9	6.7	0.2	6.9	7.1	-	7.1
MI	5.4	0.3	5.6	5.6	-	5.6	6.1	-	6.1
IDRC	1.4	1.7	3.1	2.4	2.7	5.1	2.8	3.1	5.9
PA	3.7	-	3.7	4.2	-	4.2	5.4	-	5.4
DOE	2.8	2.9	5.7	3.0	2.4	5.4	3.4	2.0	5.4
MOSUA	0.8	0.5	1.4	1.3	1.8	3.1	2.1	3.2	5.3
SS	0.5	3.4	3.9	0.6	4.1	4.7	0.7	4.4	5.1
Other[1]	21.6	6.9	28.5	28.3	9.8	38.1	31.2	11.9	43.3
TOTAL	114.2	31.6	145.8	142.3	37.3	179.6	164.7	41.2	205.9

[1] *In 1975 includes, among others, Finance ($4.5), MOSST ($4.4), CIDA ($3.9), DND ($3.0) and Solicitor General ($2.5).*

39. Federal Expenditures on Related Scientific Activities by Activity,1973-75



All capital expenditures for related scientific activities are assigned to a separate category and are not distributed among the individual activities. Consequently the figures for each activity represent current expenditures only.

Current expenditures on related scientific activities in the human sciences will reach $203.2 million in 1975, a $26.0 million or 14.7% increase over 1974; they will represent 98.7% of the 1975 total.

Capital expenditures on related scientific activities are expected to equal $2.6 million in 1975, $0.2 million more than the previous year. From 1973 to 1974, these expenditures rose from 1.0 to 2.4 million dollars.

The largest related scientific activity in the human sciences is data collection with an expected budget of $109.0 million, a $17.1 million or 18.6% increase over the previous year. In 1975, data collection will represent 52.9% of the related scientific activity expenditure total.

The most rapidly growing activity is operations studies with an expected total of $49.3 million in 1975. This is a $5.7 million rise (13.1%) over 1974; a $14.0 million increase (47.3%) was registered between 1973 and 1974. Operations studies will claim 23.9% of the RSA budget in 1975 compared to 20.3% in 1973.

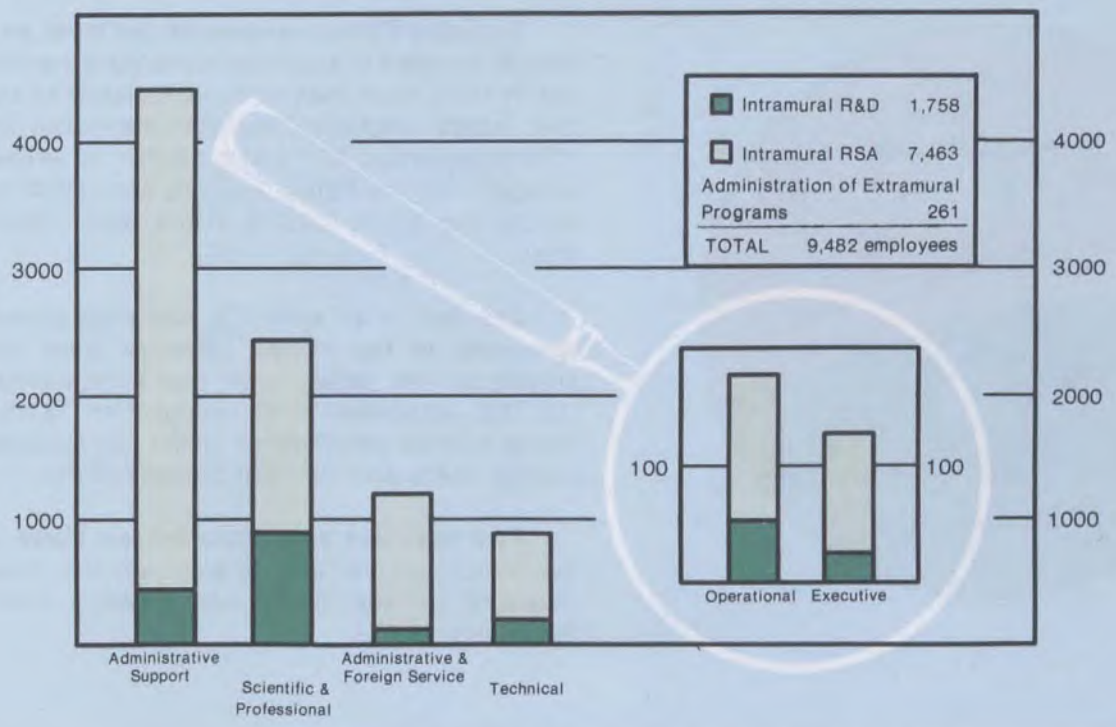
Expenditures on scientific Information and education support will reach $24.4 million and $20.6 million respectively. Both show declining growth rates: scientific Information from 14.1% to 11.9% for 1974 and 1975 respectively; and education support from 16.4% to 3.5% for the same years.

($ millions)

Activity	1973		1974		1975	
	$	%	$	%	$	%
Current Expenditures	144.8	(99.3)	177.2	(98.7)	203.2	(98.7)
Data Collection	79.1	(54.2)	91.9	(51.1)	109.0	(52.9)
Operations Studies	29.6	(20.3)	43.6	(24.3)	49.3	(23.9)
Scientific Information	19.1	(13.1)	21.8	(12.1)	24.4	(11.8)
Education Support	17.1	(11.7)	19.9	(11.1)	20.6	(10.0)
Capital Expenditures	1.0	(0.7)	2.4	(1.3)	2.6	(1.3)
TOTAL	145.8	(100.0)	179.6	(100.0)	205.9	(100.0)

3.4 Manpower Resources

40. Federal Manpower Engaged in Scientific Activities by Category, by Activity, 1974



The number of federal employees engaged in human science activities in 1974 equalled 9,482 man-years. This total included continuing, term, casual and seasonal employees engaged in intramural research and development, intramural related scientific activities or the administration of extramural programs.

The largest category of employees, representing almost half of the total, was the administrative support group, with 4,499 man-years. Of these, 3,946 were engaged in intramural RSA — over three quarters of them with Statistics Canada.

Scientific and professional personnel represented slightly over one quarter of the total, with 2,489 man-years. In intramural R&D activities their 983 man-years equalled 50.8% of the total.

The third largest category, with 13.5% of the total, is the administrative and foreign service group numbering 1,280 in 1974. They are primarily engaged in intramural related scientific activities.

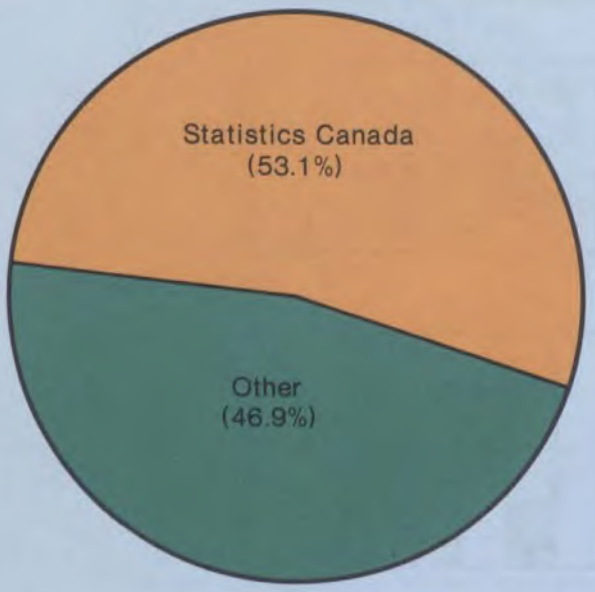
Technical personnel accounted for 9.5% of total employees and were three times more numerous in RSA than in R&D.

The two smallest categories, operational and executive, together accounted for 3.3% of the total on the basis of 181 and 137 man-years.

Category	Intramural R&D	Intramural RSA	Administration of Extramural Programs	Total
Administrative Support	441.0	3945.9	112.1	4499.0
Scientific and Professional	893.1	1532.4	63.0	2488.5
Administrative and Foreign Service	122.4	1084.9	72.3	1279.6
Technical	220.5	676.5	0.8	897.8
Operational	54.8	122.5	3.5	180.8
Executive	26.2	101.0	9.4	136.6
TOTAL	1758.0	7463.2	261.1	9482.3

N.B. Manpower figures are expressed in full-time equivalent.

41. Federal Manpower Engaged in Scientific Activities by Department or Agency, by Category, 1974



Statistics Canada employed the most personnel engaged in activities in the human sciences in 1974, more than 12 times as many as the next largest employer. Its 5,037 man-years for 1974 represented 53.1% of the total. Its largest category, administrative support, accounted for almost two thirds (62.0%) of the departmental total.

One half of all scientific and professional personnel in the human sciences were employed by five departments: Statistics Canada (28.3%), Manpower and Immigration (6.8%), Public Service Commission (6.5%), the National Library (5.4%) and National Defence (5.2%).

Two agencies accounted for two thirds of the administrative and foreign service total: Statistics Canada (55.9%) and Treasury Board Secretariat (9.7%).

Department or Agency	Executive	Scientific Professional	Administrative and Foreign Service	Technical	Administrative Support	Operational	Total
SC	23.0	704.0	715.0	441.0	3122.0	32.0	5037.0
MI	3.0	168.0	87.0	13.0	123.0	–	394.0
NL	2.0	135.0	11.0	14.0	209.0	22.0	393.0
PSC	1.0	161.0	25.0	21.0	77.0	3.0	288.0
DOE	1.0	97.0	17.0	57.0	78.0	1.0	251.0
TBS	24.0	29.0	124.0	7.0	59.0	–	243.0
DND	1.5	128.6	8.0	13.0	42.1	18.0	211.2
PA	–	70.0	6.0	37.0	62.0	23.0	198.0
Fin	14.0	99.0	5.0	17.0	47.0	–	182.0
NHW	4.3	85.6	5.8	20.0	59.8	–	175.5
NL	1.0	44.0	9.7	39.3	27.1	25.8	146.9
BC	6.0	67.8	4.0	42.0	13.0	–	132.8
Other	55.8	699.5	262.1	176.5	580.0	56.0	1829.9
TOTAL	136.6	2488.5	1279.6	897.8	4499.0	180.8	9482.3

N.B. Manpower figures are expressed in full-time equivalent.

3.5 Geographic Distribution

Geographic Distribution of Current Intramural Expenditures, 1974

Province or region	$ millions	%
National Capital Region[1]	148.5	93.2
Ontario[2]	2.8	1.7
Quebec[3]	2.2	1.4
Nova Scotia	1.5	0.9
British Columbia	1.4	0.9
Alberta	1.1	0.7
Manitoba	0.9	0.6
Newfoundland	0.5	0.3
Saskatchewan	0.3	0.2
New Brunswick	0.1	0.1
Sub total	159.3	100.0
Unallocated	20.7	
TOTAL	179.9	

[1]Ottawa-Hull.
[2]Excludes Ottawa.
[3]Excludes Hull.

The National Capital Region received 93.2% of the current intramural expenditures on activities in the human sciences in 1974. The total expenditures for the region were $148.5 million.

The balance was distributed among the Western provinces 34%, Ontario (excluding Ottawa) 26%, Quebec (excluding Hull) 20% and the Atlantic provinces 20%. This amounted to a total of $10.7 million.

A further $20.7 million was not allocated to any particular location in Canada.

Appendices

APPENDIX 1 Natural and Human Sciences

A 1.1 Federal Expenditures on Activities in the Natural and Human Sciences by Department or Agency, 1973-75

($ millions)

Department or Agency	1973			1974			1975		
	Natural	Human	Total	Natural	Human	Total	Natural	Human	Total
Agriculture	72.6	1.4	74.0	78.7	1.6	80.3	87.6	1.6	89.2
AECB	7.9	–	7.9	7.3	–	7.3	7.4	–	7.4
AECL	85.9	–	85.9	97.9	–	97.9	99.1	–	99.1
Bank of Canada	–	2.3	2.3	–	2.9	2.9	–	3.5	3.5
Canada Council	–	20.8	20.8	–	22.8	22.8	–	24.5	24.5
CAL	0.1	–	0.1	0.2	–	0.2	0.2	–	0.2
CBC	0.1	1.4	1.5	0.2	1.5	1.7	0.3	1.6	1.9
CIDA	18.2	5.4	23.6	20.9	7.7	28.6	22.3	8.5	30.8
Canadian Dairy Commission	–	--	--	–	0.1	0.1	–	0.1	0.1
Canadian Livestock Feed Board	–	0.1	0.1	–	0.1	0.1	–	0.1	0.1
CPDL	0.9	–	0.9	0.9	–	0.9	0.9	–	0.9
CRTC	–	0.4	0.4	–	0.6	0.6	–	0.9	0.9
CTC	–	2.1	2.1	–	2.2	2.2	–	2.9	2.9
CMHC	0.7	3.7	4.4	0.3	2.0	2.3	0.9	3.8	4.7
Commissioner of Official Languages	–	1.1	1.1	–	1.7	1.7	–	2.0	2.0
DOC	26.0	0.7	26.7	31.3	1.0	32.3	31.8	1.5	33.3
CCA	7.6	1.5	9.1	8.8	1.9	10.7	9.6	2.1	11.7
EC	–	2.8	2.8	–	3.7	3.7	–	4.3	4.3
EMR	72.9	1.8	74.7	78.7	2.1	80.8	82.2	2.4	84.6
DOE	198.4	8.1	206.5	219.3	8.0	227.3	240.6	8.3	248.9
EA	2.3	0.2	2.5	2.5	0.2	2.7	2.7	0.2	2.9
Finance	–	3.8	3.8	–	5.0	5.0	–	4.5	4.5
Food Prices Review Board	–	–	–	–	1.0	1.0	–	2.0	2.0
INA	2.0	4.7	6.7	2.8	5.8	8.6	2.5	6.8	9.3
Information Canada	–	0.2	0.2	–	0.3	0.3	–	0.3	0.3
ITC	91.8	0.8	92.6	103.3	2.0	105.3	103.2	2.1	105.3
IDRC	4.2	5.1	9.3	6.7	9.2	15.9	12.4	10.2	22.6
Justice	–	2.4	2.4	–	3.5	3.5	–	3.8	3.8
Labour	–	3.2	3.2	–	2.9	2.9	–	3.0	3.0
MI	–	8.2	8.2	–	8.7	8.7	–	9.5	9.5
MRC	38.2	–	38.2	41.2	–	41.2	41.3	–	41.3
National Capital Commission	–	0.7	0.7	–	0.7	0.7	–	0.8	0.8
DND	92.8	2.9	95.7	93.8	3.4	97.2	103.7	3.8	107.5
NFB	0.5	0.1	0.6	0.6	0.1	0.7	0.5	0.2	0.7
National Harbours Board	–	0.2	0.2	–	0.2	0.2	–	0.2	0.2
NHW	27.5	9.0	36.5	32.9	14.7	47.6	32.3	21.0	53.3
NL	–	6.6	6.6	–	7.8	7.8	–	8.8	8.8
NM	3.2	3.2	6.4	4.7	3.7	8.4	5.2	4.5	9.7
NRC	150.7	–	150.7	158.0	–	158.0	163.0	–	163.0
National Revenue	–	1.2	1.2	–	1.2	1.2	–	1.5	1.5
Post Office	–	0.1	0.1	–	0.2	0.2	–	0.5	0.5
PCO	–	2.0	2.0	–	1.6	1.6	–	4.7	4.7
PA	–	3.7	3.7	–	4.2	4.2	–	5.4	5.4
PSC	–	3.5	3.5	–	5.0	5.0	–	7.7	7.7
DPW	8.0	--	8.0	8.1	--	8.1	4.1	--	4.2
REE	2.0	1.4	3.4	2.0	0.9	2.9	3.1	0.5	3.6
SLSA	0.2	–	0.2	0.3	–	0.3	0.4	–	0.4
Science Council	–	1.5	1.5	–	1.7	1.7	–	1.8	1.8
MOSST	–	3.6	3.6	–	5.2	5.2	–	4.4	4.4
SS	–	4.4	4.4	–	5.4	5.4	–	6.0	6.0
Solicitor General	–	0.7	0.7	–	0.9	0.9	–	2.9	2.9
SC	–	66.3	66.3	–	82.7	82.7	–	98.9	98.9
MOT	5.2	3.4	8.6	8.7	3.4	12.1	8.1	3.2	11.3
TBS	–	6.6	6.6	–	7.8	7.8	–	8.0	8.0
MOSUA	–	3.8	3.8	–	6.2	6.2	–	11.6	11.6
VA	0.3	0.1	0.4	0.3	0.1	0.4	0.3	0.1	0.4
TOTAL	920.0	207.2	1127.2	1010.2	255.7	1265.9	1065.8	306.9	1372.7

APPENDIX 2 Natural Sciences

A 2.1 Federal Expenditures on Scientific Activities by Performer, by Activity, 1973-75 ($ millions)

Performer	1973			1974			1975		
	R&D	RSA	Total	R&D	RSA	Total	R&D	RSA	Total
Intramural	369.6	227.9	597.5	400.3	249.6	649.8	425.7	268.0	693.8
Industry	146.3	18.4	164.7	167.2	17.3	184.5	167.9	17.9	185.8
Universities and Non-Profit Institutions	125.8	13.0	138.8	135.0	15.6	150.6	135.6	14.8	150.4
Foreign	10.6	0.8	11.4	14.2	1.0	15.2	22.7	1.3	23.9
Other Canadian	2.9	4.6	7.6	5.4	4.6	10.0	8.3	3.7	12.0
TOTAL	655.2	264.8	920.0	722.1	288.1	1010.2	760.2	305.6	1065.8

A 2.2 Federal Expenditures on Scientific Activities by Performer, 1966-75 ($ millions)

Year	Intramural		Industry		U & NPI		Other[1]		Total	
	$	%	$	%	$	%	$	%	$	%
1966	310.1	(71.0)	78.2	(17.9)	46.4	(10.6)	2.0	(0.5)	436.7	(100.0)
1967	343.2	(69.2)	87.2	(17.6)	62.6	(12.6)	2.9	(0.6)	495.9	(100.0)
1968	395.6	(68.4)	87.5	(15.1)	91.3	(15.8)	4.3	(0.7)	578.6	(100.0)
1969	435.9	(65.2)	111.6	(16.7)	113.4	(17.0)	7.5	(1.1)	668.4	(100.0)
1970	450.3	(64.3)	115.2	(16.5)	128.2	(18.3)	6.3	(0.9)	700.0	(100.0)
1971	489.3	(62.9)	151.8	(19.5)	130.2	(16.7)	6.1	(0.8)	777.4	(100.0)
1972	530.7	(63.4)	157.4	(18.8)	138.5	(16.5)	10.2	(1.2)	836.9	(100.0)
1973	597.5	(64.9)	164.7	(17.9)	138.8	(15.1)	19.0	(2.1)	920.0	(100.0)
1974	649.8	(64.3)	184.5	(18.3)	150.6	(14.9)	25.2	(2.5)	1010.2	(100.0)
1975	693.8	(65.1)	185.8	(17.4)	150.4	(14.1)	35.9	(3.4)	1065.8	(100.0)

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

A 2.3 Federal Expenditures on Scientific Activities by Activity, 1966-75 ($ millions)

Year	Research & Development		Related Scientific Activities		Total	
	$	%	$	%	$	%
1966	339.1	(77.7)	97.6	(22.3)	436.7	(100.0)
1967	381.2	(76.9)	114.7	(23.1)	495.9	(100.0)
1968	450.1	(77.8)	128.4	(22.2)	578.6	(100.0)
1969	523.9	(78.4)	144.5	(21.6)	668.4	(100.0)
1970	539.1	(77.0)	160.9	(23.0)	700.0	(100.0)
1971	587.9	(75.6)	189.5	(24.4)	777.4	(100.0)
1972	615.3	(73.5)	221.6	(26.5)	836.9	(100.0)
1973	655.2	(71.2)	264.8	(28.8)	920.0	(100.0)
1974	722.1	(71.5)	288.1	(28.5)	1010.2	(100.0)
1975	760.2	(71.3)	305.6	(28.7)	1065.8	(100.0)

A 2.4 Federal Intramural and Extramural Expenditures on Scientific Activities by Department or Agency, 1973-75 ($ millions)

Department or Agency	1973			1974			1975		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
DOE	191.7	6.7	198.4	207.2	12.2	219.3	224.6	16.0	240.6
NRC	72.6	78.1	150.7	75.8	82.2	158.0	74.8	88.2	163.0
DND	78.0	14.8	92.8	80.8	13.0	93.8	87.0	16.7	103.7
ITC	2.4	89.4	91.8	3.3	100.0	103.3	3.9	99.3	103.2
AECL	64.4	21.4	85.9	73.1	24.7	97.9	75.3	23.7	99.1
Agr	71.8	0.8	72.6	77.9	0.8	78.7	86.7	0.9	87.6
EMR	65.5	7.4	72.9	70.6	8.2	78.7	77.7	4.5	82.2
MRC	0.7	37.5	38.2	0.9	40.4	41.2	1.0	40.4	41.4
NHW	13.0	14.5	27.5	13.1	19.7	32.9	14.9	17.4	32.3
DOC	13.5	12.5	26.0	15.9	15.3	31.3	17.2	14.6	31.8
CIDA	–	18.2	18.2	–	20.9	20.9	–	22.3	22.3
IDRC	1.5	2.7	4.2	2.6	4.0	6.7	2.7	9.6	12.4
Other	22.4	18.5	40.8	28.6	19.0	47.5	28.0	18.2	46.2
TOTAL	597.5	322.5	920.0	649.8	360.4	1010.2	693.8	372.1	1065.8

A 2.5 Federal Intramural and Extramural Expenditures on Research and Development by Department or Agency, 1973-75 ($ millions)

Department or Agency	1973			1974			1975		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
NRC	50.7	70.2	120.9	53.9	74.3	128.1	56.7	80.3	137.0
ITC	2.4	88.9	91.3	3.3	99.5	102.7	3.9	98.8	102.7
DOE	83.9	4.4	88.3	86.2	9.4	95.6	89.0	13.1	102.0
AECL	60.6	21.1	81.7	69.3	24.3	93.6	70.4	23.1	93.6
Agr	68.9	0.8	69.7	74.4	0.8	75.2	83.0	0.9	83.9
DND	38.1	14.8	52.8	40.2	13.0	53.2	43.3	16.6	59.9
EMR	33.6	4.6	38.3	36.2	5.5	41.7	38.5	2.2	40.7
MRC	0.7	35.8	36.5	0.8	38.8	39.6	0.9	38.8	39.7
DOC	13.1	12.3	25.4	15.5	15.1	30.6	16.7	14.2	30.9
NHW	9.4	13.9	23.4	8.6	19.2	27.8	10.6	16.8	27.4
Other[1]	8.2	18.8	26.9	11.9	21.9	34.0	12.7	29.7	42.4
TOTAL	369.6	285.6	655.2	400.3	321.8	722.1	425.7	334.5	760.2

[1]In 1975, includes primarily IDRC ($9.9), MOT ($7.4), AECB ($7.4), CIDA ($4.1), REE ($3.1) and National Museums ($2.9).

A 2.6 Federal Current Intramural Expenditures on Research[1] by Field of Research, 1973-75

($ millions)

	1973	1974	1975
Life Sciences	96.6	103.5	110.1
Biology	91.8	98.1	104.0
Clinical Medical	1.2	1.4	1.5
Other	3.6	4.0	4.6
Engineering Sciences	64.0	70.4	72.6
Aero and Astro	3.6	4.0	4.2
Agriculture & Forestry	2.5	2.9	3.1
Architecture	0.3	0.4	0.4
Bio-Engineering	0.4	0.4	0.5
Chemical	5.5	6.1	5.9
Civil & Surveying	2.7	3.2	2.9
Electrical	12.3	11.6	11.0
Engineering Physics	5.5	6.0	6.6
Industrial	1.3	1.4	0.6
Materials	2.7	2.2	2.1
Mechanical	3.4	4.1	1.6
Mining	0.8	0.8	4.4
Ocean Engineering	1.0	1.2	1.3
Other	22.0	26.0	28.0
Environmental Sciences	37.9	40.9	42.9
Atmospheric	4.9	5.5	4.8
Geology	16.2	17.6	19.6
Biological Oceanography	5.0	6.4	6.4
Physical Oceanography	8.0	8.5	9.1
Other	3.7	2.9	3.0
Physical Sciences	38.1	38.2	42.5
Astronomy & Astrophysics	4.4	4.8	5.2
Chemistry	11.8	11.4	13.3
Physics	11.8	11.7	12.9
Other	10.1	10.4	11.0
Mathematical Sciences	0.2	0.2	0.3
TOTAL	236.7	253.2	268.4

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

A 2.7 Federal Support of Research and Development in Canadian Universities and Non-Profit Institutions[1] by Department or Agency, 1973-75

($ millions)

Department or Agency	1973		1974		1975	
	Grants	Contracts	Grants	Contracts	Grants	Contracts
NRC	57.1	0.4	58.7	0.2	58.9	0.3
MRC	32.0	–	35.0	–	35.0	–
NHW	13.6	--	18.7	--	16.1	0.1
AECB	7.9	–	7.2	–	7.4	–
DOE	1.7	1.0	1.8	1.5	3.0	1.7
DND	2.9	0.2	2.9	0.3	2.9	0.2
ITC	0.3	–	0.7	–	1.3	–
EMR	0.4	0.5	0.8	0.4	0.8	0.4
INA	0.3	0.7	0.3	0.7	0.3	0.7
MOT	–	0.6	0.1	0.5	0.2	0.5
Agr	0.8	--	0.8	–	0.8	–
DOC	–	0.6	–	0.6	–	0.5
AECL	–	0.8	–	0.7	–	0.8
Other	0.8	--	0.2	--	0.9	--
TOTAL	118.0	4.9	127.2	4.9	127.6	5.1

[1]This table excludes research fellowships which amounted to $2.9 million during each of the three years.

A 2.8 Federal Support of Research and Development in Canadian Industry[1] by Department or Agency, 1973-75

($ millions)

Department or Agency	1973		1974		1975	
	Grants	Contracts	Grants	Contracts	Grants	Contracts
ITC	88.5	–	97.7	–	97.0	–
AECL	–	20.0	–	23.1	–	22.2
NRC	10.5	–	12.0	–	15.2	–
DND	4.2	6.6	4.5	4.7	4.5	8.7
DOC	–	10.6	–	13.7	–	11.4
EMR	2.8	0.4	3.3	0.5	0.3	0.4
DOE	–	0.9	0.6	3.8	–	4.3
Other	--	1.2	--	2.4	--	2.7
TOTAL	106.1	39.8	118.2	48.2	117.0	49.7

[1]This table excludes research fellowships which amounted to $0.5 million in 1973, $0.8 million in 1974, and will equal $1.2 million in 1975.

A 2.9 Federal Support of Research and Development in Canadian Universities and Non-Profit Institutions[1] by Department or Agency, 1966-75

($ millions)

Department or Agency	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
NRC	18.1	29.1	37.9	49.8	55.5	55.5	58.5	58.2	59.6	60.0
MRC	11.5	11.2	18.5	25.1	28.0	30.7	32.0	33.8	36.8	36.8
NHW	4.2	6.6	14.5	16.8	14.4	12.4	12.6	13.8	19.0	16.5
AECB	1.6	2.0	2.5	3.6	5.4	7.1	11.7	7.9	7.2	7.4
DOE	–	–	–	–	3.4	2.8	2.8	2.8	3.4	4.7
DND	2.5	2.9	3.7	3.2	3.3	3.3	3.4	3.1	3.2	3.1
ITC	2.4	1.4	0.1	0.2	0.4	0.4	0.6	0.3	0.7	1.3
EMR	0.2	0.3	0.6	0.8	0.5	0.6	0.7	1.0	1.1	1.2
INA	0.2	0.2	0.3	0.3	0.2	0.5	0.8	1.0	1.0	1.0
IDRC	–	–	–	–	–	--	--	0.1	0.2	0.9
Agr	0.1	0.4	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8
AECL	0.1	0.4	0.6	0.7	0.6	0.6	0.5	0.8	0.7	0.8
MOT	0.2	0.2	0.3	0.3	0.2	0.1	0.1	0.8	0.7	0.7
DOC	–	–	–	–	0.1	0.1	0.4	0.6	0.6	0.5
Other	0.3	0.8	2.1	1.0	3.6	3.6	0.6	0.8	--	--
TOTAL	41.4	55.5	81.7	102.6	116.4	118.5	125.5	125.8	135.0	135.6

[1]Includes R&D grants, contracts and fellowships.

A 2.10 Federal Support of Research and Development in Canadian Industry[1] by Department or Agency, 1966-75

($ millions)

Department or Agency	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
ITC	21.9	25.8	31.3	45.7	52.1	68.8	87.6	88.5	97.7	97.0
AECL	13.7	28.5	27.3	35.8	33.3	42.9	22.4	20.0	23.1	22.2
NRC	3.3	4.2	5.1	5.8	6.2	6.9	8.6	11.0	12.8	16.4
DND	35.1	24.0	19.5	17.0	13.7	10.0	10.6	10.8	9.3	13.2
DOC	–	–	–	3.3	2.7	3.1	4.7	10.6	13.7	11.4
DOE	–	–	–	–	0.7	0.4	0.8	0.9	4.4	4.3
MOT	--	0.4	0.9	0.6	0.7	0.2	0.4	0.8	1.7	1.4
EMR	–	--	--	0.4	0.1	11.2	3.0	3.3	3.9	0.7
Other	1.5	0.8	0.3	0.3	0.3	0.5	0.4	0.4	0.6	1.3
TOTAL	75.5	83.7	84.4	108.9	109.8	144.0	138.5	146.3	167.2	167.9

[1]Includes R&D grants, contracts and fellowships.

A 2.11 Federal Programs in Support of Research and Development in Canadian Industry, by Program, 1973-75

($ millions)

Program	1973		1974		1975	
	$	%	$	%	$	%
PAIT[1]	26.5	(25.8)	27.5	(24.2)	35.1	(30.3)
IRDIA[2]	32.0	(31.0)	30.0	(26.4)	31.0	(26.8)
DIP[3]	29.7	(28.9)	39.5	(34.8)	30.0	(25.9)
IRAP[4]	10.5	(10.2)	12.0	(10.6)	15.2	(13.1)
DIR[5]	4.2	(4.1)	4.5	(4.0)	4.5	(3.9)
TOTAL	103.0	(100.0)	113.5	(100.0)	115.8	(100.0)

[1]PAIT: Program for the Advancement of Industrial Technology.

[2]IRDIA: Industrial Research and Development Incentives Act.

[3]DIP: Defence Industry Productivity Program.

[4]IRAP: Industrial Research Assistance Program.

[5]DIR: Defence Industrial Research Program.

A 2.12 Expenditures on Research and Development in Canada, 1972 by Source of Funds and Sector of Performance

($ millions)

Source of Funds	Sector of Performance			Source of Funds Total
	Industry	Government[2]	U&NPI	
Industry	331	2	4	337
Government[2]	63	393	150	606
Universities	–	–	212	212
Non-Profit Institutions	–	–	16	16
Foreign	36	1	2	39
Sector of Performance Total	430	396	384	1,210

[1]Fiscal years of institutions in the various sectors closest to calendar year 1972.

[2]Includes federal and provincial governments.

A 2.13 Federal Expenditures on Related Scientific Activities by Activity, 1966-75

($ millions)

	Data Collection[1]	Scientific Information[1]	Testing and Standardization[1]	Feasibility Studies[1]	Scholarship Programs[1]	Capital Expenditures	Total
1966	46.0	17.9	20.9	0.9	5.1	6.8	97.6
1967	52.9	21.0	22.5	1.2	7.5	9.5	114.7
1968	58.7	23.4	23.5	2.3	10.0	10.7	128.4
1969	61.4	26.7	26.7	6.3	11.1	12.3	144.5
1970	71.5	31.8	28.4	4.2	11.6	13.2	160.9
1971	85.0	37.4	39.3	5.5	11.7	10.7	189.5
1972	77.2	62.9	38.0	14.0	12.7	16.8	221.6
1973	93.7	67.1	50.1	21.1	12.5	20.3	264.8
1974	102.2	75.3	54.1	21.2	14.8	20.5	288.1
1975	109.0	83.6	59.6	19.4	14.3	19.8	305.6

[1]Current expenditures.

A 2.14 Federal Current Expenditures on Related Scientific Activities by Activity, by Department or Agency, 1973-75

($ millions)

ACTIVITY / Department or Agency		DOE	DND	EMR	NRC	CIDA	CCA	AECL	NHW	Other	TOTAL
Scientific Data Collection	1973	61.6	–	22.2	0.5	3.7	–	1.1	1.3	3.3	93.7
	1974	69.3	–	22.9	0.5	3.6	–	1.1	1.0	3.7	102.2
	1975	76.0	–	24.0	0.5	3.7	–	1.1	0.4	3.2	109.0
Scientific Information	1973	31.9	1.5	9.4	9.1	–	6.8	2.1	0.2	6.0	67.1
	1974	34.8	1.9	10.6	10.3	–	7.4	2.4	0.3	7.7	75.3
	1975	37.8	2.1	13.7	11.2	–	8.0	2.5	0.3	8.2	83.6
Testing and Standardization	1973	1.4	38.3	0.9	5.2	–	0.8	0.8	2.0	0.6	50.1
	1974	3.3	38.3	0.9	5.5	–	1.2	0.8	3.1	0.9	54.1
	1975	3.4	41.5	1.1	5.8	–	1.6	1.8	3.5	1.0	59.6
Feasibility Studies	1973	4.4	–	0.6	0.8	10.4	–	0.1	--	4.8	21.1
	1974	4.7	–	0.7	0.9	8.9	–	0.1	--	5.9	21.2
	1975	4.9	–	0.7	0.9	10.0	–	0.1	--	2.8	19.4
Scholarship Program	1973	--	–	–	7.3	2.7	–	–	0.6	1.9	12.5
	1974	--	–	–	7.3	5.0	–	–	0.6	1.9	14.8
	1975	0.1	–	–	7.2	4.5	–	–	0.6	1.9	14.3
TOTAL	1973	99.4	39.8	33.1	23.0	16.7	7.6	4.2	4.1	16.6	244.4
	1974	112.4	40.2	35.1	24.6	17.5	8.6	4.3	5.0	20.2	267.6
	1975	122.2	43.6	39.5	25.6	18.2	9.5	5.4	4.7	17.0	285.8

A 2.15 NRC Assistance to University Research[1] by Province and University, 1972-74 ($ 000)

University	1972	1973	1974
British Columbia	4,971.9	4,846.0	5,386.0
Notre Dame	15.7	2.5	1.0
Simon Fraser	808.3	844.6	833.8
Victoria	466.2	516.8	524.5
BRITISH COLUMBIA	6,262.1	6,209.9	6,745.4
Alberta	3,927.5	3,854.8	3,785.7
Calgary	1,861.5	1,847.3	1,863.9
Lethbridge	73.4	66.0	79.0
Camrose	5.0	5.0	–
ALBERTA	5,867.4	5,773.1	5,728.6
Saskatchewan	1,560.1	1,719.6	1,575.2
Regina	461.5	275.4	287.4
SASKATCHEWAN	2,021.6	1,995.0	1,862.7
Manitoba	2,129.0	2,074.8	2,192.4
Brandon	21.7	29.0	30.8
Winnipeg	57.5	32.5	71.0
MANITOBA	2,208.2	2,136.3	2,294.2
Brock	212.1	213.6	244.3
Carleton	1,324.3	1,186.3	1,211.4
Guelph	1,639.9	1,733.6	1,841.7
Lakehead	192.3	222.1	238.8
Laurentian	199.7	167.1	178.2
McMaster	3,298.7	3,644.0	3,619.4
Ottawa	1,186.7	982.6	1,077.5
Queen's	1,713.1	1,552.3	1,731.2
Toronto	7,166.0	7,098.1	6,889.2
Trent	132.5	97.2	98.3
Waterloo	2,813.3	3,041.3	3,297.1
Western Ontario	1,992.9	2,368.4	2,461.5
Wilfred Laurier	–	0.5	5.8
Windsor	877.4	1,102.1	1,018.2
York	851.7	939.1	1,092.6
ONTARIO	23,600.6	24,348.2	25,005.2
Bishop's	26.0	12.0	16.2
Québec	583.3	865.2[2]	965.1[2]
Laval	2,451.7	2,424.4	2,442.7
Loyola	42.5	25.6	41.6
McGill	3,697.8	3,553.3	3,331.0
Montréal	2,522.7	2,198.1	2,599.5
Ecole Polytechnique	639.4	815.2	1,057.4
Sherbrooke	732.6	754.5	839.8
Sir George Williams	416.8	335.6	500.9
QUEBEC	11,117.7	10,984.0	11,179.4
Moncton	245.6	217.6	214.4
Mt. Allison	100.7	101.3	122.7
New Brunswick	970.6	821.3	923.4
NEW BRUNSWICK	1,316.9	1,140.3	1,260.4
Acadia	71.2	145.8	103.9
Dalhousie	1,192.1	954.5	1,305.5
Mt. St. Vincent	–	14.0	19.0
Nova Scotia Tech.	441.7	347.3	208.1
St. Fr. Xavier	145.4	145.5	159.2
St. Mary's	37.0	57.7	58.3
NOVA SCOTIA	1,887.3	1,664.9	1,853.9
Prince Edward Island	81.9	57.7	73.2
PRINCE EDWARD ISLAND	81.9	57.7	73.2
Memorial	850.9	972.6	1,137.6
NEWFOUNDLAND	850.9	972.6	1,137.6
OTHER CANADIAN	525.0	565.0	515.0
TOTAL	55,739.6	55,845.0	58,270.3

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

[2] *Includes $8,000 granted to l'Institut de Microbiologie et d'Hygiène in 1973 and 1974.*

SOURCE: *NRC*

A 2.16 MRC Assistance to University Research[1] by Province and University, 1972-74 ($ 000)

University	1972	1973	1974
British Columbia	1,947.5	1,947.6	1,906.4
Simon Fraser	22.3	15.6	21.0
Victoria	41.1	51.4	51.4
BRITISH COLUMBIA	2,010.9	2,014.6	1,978.8
Alberta	1,635.0	1,702.0	1,842.3
Calgary	413.1	467.1	463.1
ALBERTA	2,048.1	2,169.1	2,305.4
Saskatchewan	820.6	747.9	952.1
SASKATCHEWAN	820.6	747.9	952.1
Manitoba	1,809.0	1,910.1	2,395.4
MANITOBA	1,809.0	1,910.1	2,395.4
Carleton	–	9.0	4.5
Guelph	158.8	90.8	122.1
Laurentian	13.0	–	–
McMaster	1,380.0	1,648.9	1,609.8
Ottawa	911.8	1,063.6	1,117.8
Queen's	1,010.9	1,061.8	1,223.9
Toronto	4,814.2	5,205.2	5,563.6
Waterloo	30.1	62.4	48.3
Western Ontario	1,227.9	1,208.8	1,482.6
York	27.1	31.9	33.1
ONTARIO	9,573.8	10,382.4	11,205.7
Laval	857.1	809.3	1,111.6
McGill	4,828.1	5,054.0	4,970.0
Montreal	2,547.6	3,058.3	3,636.9
Sherbrooke	914.6	868.5	992.0
Sir George Williams	11.2	7.3	11.0
QUEBEC	9,158.5	9,797.3	10,721.6
Moncton	4.5	–	–
New Brunswick	–	–	4.1
NEW BRUNSWICK	4.5	–	4.1
Dalhousie	780.4	717.1	815.8
St. Francis Xavier	–	–	0.9
NOVA SCOTIA	780.4	717.1	816.7
Memorial	357.2	297.3	386.0
NEWFOUNDLAND	357.2	297.3	386.0
TOTAL	26,563.0	28,035.8	30,765.9

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

SOURCE: *MRC.*

A 3.1 Federal Intramural and Extramural Expenditures on Research and Development, by Department or Agency, 1973-75

($ millions)

Department or Agency	1973			1974			1975		
	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total	Intra-mural	Extra-mural	Total
NHW	0.9	3.1	3.9	2.2	6.3	8.5	3.9	9.9	13.8
CC	0.5	7.6	8.1	0.5	9.0	9.5	0.6	10.1	10.7
PSC	2.9	0.1	3.0	4.3	--	4.3	6.6	--	6.6
MOSUA	1.6	0.8	2.4	2.0	1.1	3.1	3.9	2.3	6.2
SC	2.6	–	2.6	3.5	–	3.5	5.5	–	5.5
INA	2.9	0.6	3.5	3.3	1.0	4.3	4.1	0.8	4.9
CIDA	–	3.1	3.1	–	3.6	3.6	–	4.6	4.6
PCO	0.1	1.8	2.0	0.1	1.2	1.3	0.1	4.2	4.3
IDRC	0.4	1.7	2.0	0.8	3.3	4.1	0.8	3.5	4.3
EC	2.8	--	2.8	3.5	0.2	3.7	4.2	--	4.2
Justice	1.8	0.2	2.1	2.4	0.6	3.0	2.8	0.7	3.5
MI	2.3	0.3	2.6	2.1	1.1	3.1	2.3	1.2	3.4
Other[1]	15.3	8.0	23.3	16.9	7.1	24.1	19.9	9.0	29.0
TOTAL	34.1	27.3	61.4	41.6	34.5	76.1	54.7	46.3	101.0

[1]In 1975 includes primarily DOE ($2.9), National Museums ($2.7), Bank of Canada ($2.6), Law Reform Commission ($1.9), CCA ($1.9), and EMR ($1.8).

A 3.2 Canada Council Assistance to University Research[1] by Province and University, 1972-74

($ 000)

University	1972	1973	1974
British Columbia	195.8	238.6	257.0
Notre Dame	0.4	1.8	–
Simon Fraser	71.9	76.3	112.9
Victoria	58.5	53.4	54.3
Other	17.9	2.2	20.5
BRITISH COLUMBIA	344.5	372.2	444.7
Alberta	229.5	119.8	181.9
Calgary	106.8	105.7	82.4
Lethbridge	2.8	12.5	12.7
ALBERTA	339.1	238.0	277.0
Regina	20.7	17.9	22.1
Saskatchewan	52.9	52.5	47.6
SASKATCHEWAN	73.7	70.4	74.7
Manitoba	97.6	74.6	73.1
Brandon	1.5	9.5	0.4
Winnipeg	6.0	6.7	15.2
MANITOBA	105.1	90.8	88.7
Brock	7.4	23.3	29.0
Carleton	74.6	81.5	149.1
Guelph	41.7	59.6	90.7
Lakehead	11.9	2.0	2.2
Laurentian	13.2	15.8	3.9
McMaster	85.4	298.6	139.2
OISE	–	–	40.1
Ottawa	67.4	159.0	51.6
Queen's	130.7	52.7	72.8
RMC	1.8	–	–
Toronto	500.6	530.3	516.4
Trent	70.0	43.3	33.3
Waterloo	211.5	155.7	159.9
Western Ontario	122.6	104.8	132.4
Wilfred Laurier	2.3	3.6	4.0
Windsor	30.9	44.1	197.7
York	157.6	126.8	181.8
Other	3.9	4.1	0.8
ONTARIO	1,533.5	1,705.0	1,831.5
Bishop's	1.0	0.8	2.1
Laval	252.6	517.3	710.2
McGill	153.4	149.2	215.2
Montreal	287.4	327.6	363.3
Loyola	7.4	10.8	6.3
Quebec-Chicoutimi	–	123.9	89.7
Quebec-Montreal	56.2	40.7	157.9
Quebec-Quebec	32.0	–	11.5
Quebec-Trois Rivières	16.0	–	28.1
Sherbrooke	22.1	36.6	82.6
Sir George Williams	49.8	57.4	53.2
QUEBEC	877.9	1,264.4	1,720.1
Moncton	6.7	0.1	–
Mount Allison	7.8	–	16.7
New Brunswick	30.9	50.2	80.3
NEW BRUNSWICK	45.4	50.3	97.0
Acadia	2.0	12.1	1.2
Dalhousie	61.2	63.7	90.9
Mount St. Vincent	0.5	2.2	3.6
St. Fr. Xavier	8.6	21.4	8.5
St. Mary's	10.7	0.8	9.6
NOVA SCOTIA	83.0	100.2	113.9
Prince Edward Island	1.5	3.2	1.5
PRINCE EDWARD ISLAND	1.5	3.2	1.5
Memorial	96.6	87.8	77.5
NEWFOUNDLAND	96.6	87.8	77.5
PRIVATE SCHOLARS	162.0	188.3	148.0
TOTAL	3,661.4	4,170.7	4,847.6

[1] *Includes all research grants to university and private scholars but does not include fellowships.*

SOURCE: *Canada Council.*

A 3.3 Federal Current Extramural Expenditures on Research by Field of Research, 1973-75 ($ millions)

Field of Research	1973	1974	1975
Sociology, Criminology and Demography	4.3	5.8	7.8
Political Science	2.0	1.9	5.5
Economics	3.5	5.1	5.1
Urban and Regional Studies	3.6	2.9	4.9
Literature and Linguistics	1.9	2.3	3.3
Human Geography	2.4	2.4	2.1
Commerce	0.9	1.7	1.8
History	1.0	1.4	1.5
Psychology	1.2	0.9	1.4
Law	0.6	1.0	1.2
Anthropology	0.7	0.9	1.0
Philosophy	0.3	0.3	0.4
Communications	0.2	0.1	0.2
Industrial Relations	0.1	0.1	0.1
Religious Studies	0.1	0.2	0.1
Other[1]	4.5	7.5	9.9
TOTAL	27.3	34.5	46.3

[1]NHW is expected to account for 82% of this figure in 1975.

A 3.4 Federal Support of Research and Development[1] in Canadian Universities and Non-Profit Institutions by Department or Agency, 1973-75 ($ millions)

Department or Agency	1973		1974		1975	
	Grants	Contracts	Grants	Contracts	Grants	Contracts
CC	4.7	--	5.5	--	6.1	0.1
NHW	2.7	--	4.7	--	6.1	--
PCO	1.5	0.4	1.0	0.2	4.0	0.2
MOSUA	–	0.8	–	0.9	0.6	1.4
CMHC	2.0	–	0.6	–	1.7	–
SS	0.4	–	0.6	–	0.8	–
Justice	--	0.2	–	0.6	0.3	0.7
INA	0.1	0.4	0.1	0.7	0.1	0.6
DOE	0.3	0.1	0.3	0.1	0.5	0.1
REE	1.4	–	0.9	–	0.5	–
MOT	--	0.4	0.1	0.1	0.1	0.2
ITC	0.2	–	0.3	--	0.3	–
Solicitor General	–	0.1	--	0.1	0.1	0.2
MI	0.1	0.1	0.1	0.1	--	0.2
CTC	–	0.2	–	0.2	–	0.2
Other	0.3	0.4	0.4	0.5	0.1	0.8
TOTAL	13.9	2.9	14.7	3.5	21.2	4.6

[1]This table excludes research fellowships which amount to $3.8 million in 1975, $3.5 million of which is from the Canada Council.

I SCOPE AND LIMITATIONS OF DATA

Data included in this publication were reported by 55 federal departments and agencies who fund and/or perform scientific activities:

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
Canadian Transport 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 organizations entirely funded by the federal government, their inclusion more accurately reflects the total of scientific activities conducted by the federal government.

The reader is advised that the official establishment of the Department of the Environment in June, 1971, 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 1973 and previous years are considered as actual expenditures since they reflect transactions of completed government fiscal years. Amounts reported for 1974 and 1975 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:

The natural sciences encompass all the disciplines grouped under the life, physical, environmental, mathematical and engineering sciences.

The **life sciences** include the biological sciences, which deal with the origin, development, structure, function and interaction of living things, and the clinical medical sciences, which are concerned with the use of scientific knowledge for the identification, treatment and cure of disease.

The **physical sciences** are concerned with the understanding of the material universe and its phenomena. They include the subfields of astronomy, chemistry, physics and other physical sciences.

The **environmental sciences** are concerned with the properties of the solar system that affect man's survival and welfare. They include the fields of atmospheric sciences, geological sciences, oceanography, and other environmental sciences.

The **mathematical sciences** employ logical reasoning with the aid of symbols and are concerned with the development of methods of operation employing such symbols.

The **engineering sciences** are concerned with studies directed towards developing engineering principles or towards making specific scientific principles usable in engineering practice.

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 multidisciplinary team constructing a prototype. Most often it is classified under three categories: basic research, 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 is to increase the ac-

cumulated, 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 is scientific curiosity. Oriented basic research 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 and circulated. Results often affect a broad field of science and may have several ultimate applications.

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

The results of applied research are usually valid for a limited number of products, operations, methods, and systems. Ideas are developed into operational forms, and the knowledge or information derived is often patented.

Experimental development is the application of scientific knowledge to produce specific new materials, devices, products and processes 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 utilization. It includes pilot plant and prototype design and testing.

RELATED SCIENTIFIC ACTIVITIES are closely related to R&D and 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. These data 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 a research project are included in the research activity. Similarly, the development of significantly new techniques for data collection are considered as R&D.

Examples of scientific data collection include 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 and for the dissemination of information or knowledge by means of scientific and technical journals, books, newsletters, computer tapes, exhibits, films, 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, which is separately identifiable from R&D. The development of new measures for standards, or of new methods of measuring or testing, is R&D.

Feasibility studies are technical investigations of proposed engineering projects to provide necessary additional information for decisions on implementation.

Scholarship programs are grants to individuals or institutions intended to support the education of students in technology and the natural 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:

The human sciences encompass the disciplines generally referred to as the "social sciences and humanities"; no distinction is made between the 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 includes 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 exploratory 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, 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 that 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 oriented towards the discovery and understanding of principles and laws underlying human situations and behaviour; 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 factors in perception; and, a research project on the influence of family conditions of Canadian university students in the choice of their profession.

Descriptive research emphasizes the observation, measurements, description and analysis of human phenomena. 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 oriented towards the 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 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 as part of a research project is included in the research activity. 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 and benefits, are defined as operations studies. Examples of general data collection 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 (subsidies and subscriptions), grants for 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 aimed at the optimal utilization of committed resources. This includes the analysis and assessment of existing programs, projects and policies, and the development of standards, procedures and classification systems for such analysis and assessment. Such activities are often referred to as program analysis, organizational, management, or 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 (in-house) using their own personnel. Included in intramural performance are expenditures on equipment and supplies that 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 universities sector.
Canadian universities: include affiliated institutes owned, administered or staffed by universities.
Canadian non-profit institutions: charitable foundations, voluntary health organizations, scientific and professional societies, and other organizations not established to earn profits. Non-profit institutions mainly serving or controlled by another sector are included in that sector.
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 teaching 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; they are recorded for intramural performance only.

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 1975 began April 1, 1974 and will end March 31, 1975.

D. Manpower Categories

Information on manpower appearing in this report is presented under the six occupational categories identified in the general classification system that 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.