MOSST
DATA CATALOGUE
APRIL 83

RIS

DATA CATALOGUE

APRIL 1983

TABLE OF CONTENTS

The National R&D Target and implications: 1.5% of GNP by 1985

Introduction

This document is to serve as a comprehensive planning tool for science planners and policy makers in the federal government. The information also should be useful for other sectors. Although there is a degree of arbitrariness in the distributions adopted, the developing consensus in government, industry and the scientific community is that much more needs to be spent on science by the nation as a whole and that a larger share of both funding and performance of research and development should be done by the private sector. In part, this stance is based on comparisons with other western economies where R&D spending is markedly higher than in Canada and the role of the private sector is much more prominent. The targets presented here, then, are a path to a GERD (Gross Expenditure on R&D) for Canada comparable with other advanced countries.

Historical Context

The following table shows GERD as a share of the total economy since 1963.
NOTE: The data contained herein refer to R&D in the Natural Sciences in current dollars unless otherwise noted. Target data are based on the economic projections of the October, 1980 budget which projects the real growth of the economy to average less than three percent over the target period, the May, 1982 revision of GERD and the 1981/82 Main Estimates unless otherwise noted.

HISTORICAL CONTEXT

	GNP ($B)	GERD ($M)	RATIO (%)	REAL GROWTH GNP (%)	REAL GROWTH GERD (%)	INFLATION (%)	PRICE INDEX (1971=100)
1963	46.0	463	1.01	0.0	0.0	0.0	74.8
1964	50.3	554	1.10	6.8	16.8	2.4	76.6
1965	55.4	665	1.20	6.6	16.2	3.3	79.1
1966	61.8	754	1.22	6.9	8.6	4.4	82.6
1967	66.4	854	1.29	3.3	8.9	4.0	85.9
1968	72.6	910	1.25	5.9	3.2	3.3	88.7
1969	79.8	1002	1.26	5.3	5.5	4.4	92.6
1970	85.7	1061	1.24	2.6	1.2	4.6	96.9
1971	94.5	1158	1.23	6.8	5.8	3.2	100.0
1972	105.2	1189	1.13	6.1	-2.2	5.0	105.0
1973	123.6	1281	1.04	7.6	-1.3	9.1	114.6
1974	147.5	1500	1.02	3.6	1.6	15.3	132.1
1975	165.3	1682	1.02	1.2	1.2	10.7	146.3
1976	191.0	1928	0.96	5.5	-0.7	9.5	160.2
1977	208.9	2050	0.99	2.2	4.8	7.0	171.5
1978	230.5	2342	1.02	3.6	7.2	6.5	182.7
1979	261.6	2689	1.03	2.9	4.2	10.2	201.4
1980	291.9	3187	1.09	0.5	6.7	11.1	223.7
1981	331.3	3864	1.17	3.1	10.1	10.1	246.3
1982*	348.2e	4697	1.34	5.1	9.8	10.7	272.7e
1983*	376.1e	5224	1.39	1.6	9.8	6.3	289.9e

SOURCE: STATISTICS CANADA, FEBRUARY 1983.

* Preliminary estimate.
e Projected.

The next three tables show GERD by funder and performer for 1963 to 1983.

GERD BY FUNDER
($ M)

	FED	PROV	IND	UNIV	OTHER	TOTAL
1963	225	19	145	58	16	463
1964	262	25	176	70	22	554
1965	313	29	211	77	35	665
1966	346	35	246	96	32	754
1967	408	48	273	98	27	854
1968	452	55	281	94	27	910
1969	475	59	325	117	26	1,002
1970	497	58	333	141	32	1,062
1971	539	56	365	153	45	1,158
1972	566	70	359	146	48	1,189
1973	607	82	393	146	53	1,281
1974	663	94	499	183	61	1,500
1975	700	102	575	235	71	1,682
1976	750	122	616	261	79	1,828
1977	826	146	699	285	94	2,050
1978	928	166	843	301	103	2,342
1979	969	182	1,063	329	146	2,689
1980	1,121	217	1,314	347	188	3,187
1981	1,368	263	1,667	344	222	3,864
1982*	1,600	311	2,139	376	271	4,697
1983*	1,745	343	2,416	416	304	5,224

SOURCE : STATISTICS CANADA, FEBRUARY 1983.

* PRELIMINARY ESTIMATE

GERD BY FUNDER
ANNUAL GROWTH RATES

(%)

	FED	PROV	IND	UNIV	OTHER	TOTAL
1979	4.4	9.6	26.0	9.3	42.0	15.0
1980	16.0	19.0	24.0	5.0	29.0	19.0
1981	22.0	21.0	27.0	0.0	18.0	21.0
1982*	17.0	18.0	28.0	9.0	22.0	22.0
1983*	9.0	10.0	13.0	11.0	12.0	11.0
AVERAGE 79-82	18.0	20.0	26.0	5.0	23.0	20.0
TARGET	17.0	19.0	27.0	9.0	9.0	20.0

SOURCE: STATISTICS CANADA, FEBRUARY 1983.

* PRELIMINARY ESTIMATE

GERD BY PERFORMER

($ M)

	FED	PROV	IND	UNIV	OTHER	TOTAL
1963	175	17	180	86	4	463
1964	195	18	227	109	5	554
1965	221	21	287	130	5	665
1966	241	23	317	167	5	754
1967	282	26	336	206	6	854
1968	304	27	342	229	6	910
1969	305	31	394	266	7	1,002
1970	317	30	413	293	8	1,061
1971	341	33	464	312	8	1,158
1972	369	39	459	313	9	1,189
1973	395	48	503	325	10	1,281
1974	444	59	613	373	11	1,500
1975	472	61	700	437	12	1,682
1976	509	70	755	481	13	1,828
1977	556	81	857	540	16	2,050
1978	636	86	1,007	594	19	2,342
1979	646	100	1,269	653	21	2,689
1980	737	121	1,564	741	24	3,187
1981	865	137	2,004	828	30	3,864
1982*	1,016	166	2,572	908	35	4,697
1983*	1,095	182	2,907	1,000	40	5,224

SOURCE: STATISTICS CANADA, FEBRUARY 1983
(*) PRELIMINARY ESTIMATE

NATURAL SCIENCE R&D EXPENDITURES (GERD) IN SELECTED O.E.C.D. COUNTRIES EXPRESSED AS A PERCENTAGE OF G.D.P.(a)
(%)

	71	72	73	74	75	76	77	78	79	80P
US*	-	2.52	2.43	2.40	2.38	2.29	2.35	2.33	2.38	2.47
JAPAN	1.7	1.7	1.8	1.8	1.9	1.8	1.8	1.8	1.87	1.95
GERMANY	2.07	2.09	1.98	2.01	2.11	2.04	2.03	-	2.29	-
FRANCE*	1.91	1.86	1.78	1.80	1.80	1.77	1.76	1.75	1.81	1.83
UK	-	2.08	-	-	2.06	-	-	2.13	-	-
CANADA	1.21	1.12	1.02	1.00	1.00	0.93	0.95	0.99	0.98	1.02
NETHERLANDS	2.02	1.99	1.85	1.87	1.93	1.88	1.79	1.77	1.79	-
SWEDEN	1.47	-	1.59	-	1.71	-	1.85	-	1.88	-
SWITZERLAND	2.29	2.23	2.22	2.20	2.36	-	2.25	-	2.35	-
AUSTRALIA	-	-	-	-	-	-	-	0.93	-	-
BELGIUM	1.25	-	1.28	-	1.22	-	1.26	-	1.30	-
ITALY	0.83	0.84	0.80	0.76	0.86	0.80	0.82	-	0.81	-

SOURCE: OECD

(*) Includes some or all SSH

(-) Data not available

(P) Preliminary

(a) GDP is preferred by OECD.

INTERNATIONAL COMPARISON (OECD)
R&D FUNDING SHARES (%)
1979

	GOVERNMENT	UNIVERSITY	INDUSTRY	OTHER
AUSTRALIA*	-	-	-	-
DENMARK	29.6	22.3	44.7	3.4
FINLAND	26.8	12.2	59.3	1.7
FRANCE*	36.6	14.5	43.1	5.8
GERMANY	39.9		57.9	2.1
ICELAND	80.5	5.6	6.3	7.7
IRELAND	43.0	11.7	37.6	7.7
ITALY	-	-	-	-
JAPAN	16.5	17.2	65.8	0.5
NORWAY	32.7	22.3	43.0	2.1
SWEDEN	23.9	14.2	60.4	1.6
SWITZERLAND	21.9		76.6	1.5
USA*	49.3	3.1	46.1	1.5
CANADA(1) (FED/PROV)	42.8 (36.0/6.8)	12.2	39.5	5.4

IN ADDITION TO CANADA'S GERD/GNP RATIO BEING LOW IN COMPARISON TO OTHER OECD COUNTRIES, THE DISTRIBUTION OF FUNDING OF GERD IS CHARACTERISTICALLY DIFFERENT. FUNDING BY INDUSTRY IS GENERALLY LOW IN COMPARISON TO OTHER MORE INDUSTRIALIZED COUNTRIES.

(*) INCLUDES SOME OR ALL SSH. ALL OTHERS ARE NSE ONLY
(1) STATISTICS CANADA, FEB 1983

INTERNATIONAL COMPARISON (OECD)
R&D PERFORMING SHARES (%)
1979

	GOVERNMENT	UNIVERSITY	INDUSTRY	OTHER
AUSTRALIA*	44.7	31.0	23.4	0.9
DENMARK	20.9	20.9	57.2	0.9
FINLAND	24.7	15.8	59.0	0.5
FRANCE*	23.6	15.5	59.5	1.4
GERMANY	13.8	13.7	72.3	0.3
ICELAND	62.9	22.9	9.9	4.3
IRELAND	41.2	16.3	40.0	2.5
ITALY*	24.4	17.9	57.6	0.0
JAPAN	13.4	19.5	65.3	1.9
NORWAY	16.6	27.0	56.1	0.3
SWEDEN	8.5	21.7	69.7	0.1
SWITZERLAND	6.0	15.9	77.0	1.1
USA*	14.3	14.5	67.6	3.6
CANADA(1) (FED/PROV)	27.7 (24.0/3.7)	24.3	47.2	0.8

THE PERFORMANCE DISTRIBUTION OF GERD IN CANADA IS ALSO CHARACTERISTICALLY DIFFERENT IN COMPARISON TO OTHER OECD COUNTRIES. PERFORMANCE BY GOVERNMENT IS GENERALLY HIGHER AND PERFORMANCE BY INDUSTRY IS GENERALLY LOW IN COMPARISON TO OTHER MORE INDUSTRIALIZED COUNTRIES.

(*) INCLUDES SOME OR ALL SSH. ALL OTHERS ARE NSE ONLY
(1) Statistics Canada, FEB 1983

Implications of targets for Federal R&D

Due to definitional and methodological differences, federal R&D spending in the natural sciences as recorded in Main Estimates is not the same as reported by Statistics Canada in GERD tables. Nevertheless, it is possible to convert a GERD-based target for federal R&D into one that is compatible with the budgeting process.

The following table presents the target track for federal R&D (natural science), broken down by intended performer. At this level of detail, targets appear to be exact but should be considered only as general indicators derived from more aggregated projections. It is not possible to be as specific as the figures seem to imply.

FEDERAL R&D BY PERFORMER
(NATURAL SCIENCE)
(TARGET TRACK, MARCH 1981)

		GROWTH (%)	79/80	80/81	81/82	82/83	83/84	84/85	85/86
$M BUDGET YEAR PRICES	INTRAMURAL	(11.5)	587.7	666.0	750.8	841.1	935.9	1,032.5	1,129.0
	INDUSTRY	(26.3)	213.4	269.6	340.6	430.4	543.8	687.0	868.0
	UNIVERSITY	(20.5)	200.6	241.6	291.0	350.6	422.2	508.6	612.6
	OTHER	(5.7)	98.7	104.3	110.2	116.4	123.0	130.0	137.3
	TOTAL	(18.6)	1,100.3	1,281.5	1,492.6	1,738.5	2,024.9	2,358.1	2,746.9
EXPENDITURES(1)			1,100.3	1,240.0	1,506.6	1,766.0	1,955.9(2)		
OVER(UNDER) TRACK			-	(41.5)	14.0	27.5	(69.0)		

(*)MAY NOT ADD TO TOTALS DUE TO ROUNDING
(1) Actual expenditures are based on the 1983/84 Main Estimates.
(2) Does not include recent Cabinet Decisions amounting to $30 million or initiatives to be undertaken as announced in the April 19, 1983 budget.

DIFFERENCES BETWEEN REQUIREMENTS FOR RESEARCHERS AND AVAILABILITY OF PH.D.S AND MASTERS, UNDER THE VARIOUS GERD SENARIOS AND ASSUMPTIONS

GERD SCENARIOS

		1978-85		1978-1990		
		0.95/85	1.5/85	0.95/90	1.5/90	2.5/90
1.5% ATTRITION FULL LIFE-TIME R&D CAREER	3.0% GROWTH IN R&D/RESEARCHER	9,815	-4,050	17,345	3,015	-22,515
	1.5% GROWTH IN R&D/RESEARCHER	7,225	-8,090	12,636	-4,380	-34,730
	NO GROWTH IN R&D/RESEARCHER	4,380	-12,630	6,945	-13,315	-49,490
1.5% ATTRITION, 15 YEAR R&D WORK LIFE	3.0% GROWTH IN R&D/RESEARCHER	-915	-14,785	-1,055	-15,380	-40,915
	1.5% GROWTH IN R&D/RESEARCHER	-3,475	-18,820	-5,765	-22,780	-53,130
	NO GROWTH IN R&D/RESEARCHER	-6,355	-23,360	-11,450	-31,710	-67,890

SOURCE: MOSST ESTIMATES

(a) NOTE: (-) INDICATES A SHORTFALL IN THE NUMBER OF AVAILABLE PH.D.S AND M.SC.S.

(b) GERD SCENARIOS: 1.5/85 MEANS THAT GERD IS ASSUMED TO BE 1.5% OF GNP IN 1985, ETC.

DIFFERENCES BETWEEN REQUIREMENTS FOR RESEARCHERS AND AVAILABILITY OF PH.D.S AND MASTERS IN APPLIED AND OTHER THAN APPLIED NATURAL SCIENCES

GERD SCENARIOS

		1978-85		1978-90		
		0.95/85	1.5/85	0.95/90	1.5/90	2.5/90
3% GROWTH IN R&D/RESEARCHER, AND 1.5% ATTRITION	APPLIED NATURAL SCIENCES	4,920	-2,960	9,035	900	-13,610
	OTHER NATURAL SCIENCES	4,895	-1,090	8,310	2,120	-8,905
	TOTAL	9,815	-4,050	17,345	3,020	-22,515
NO GROWTH IN R&D/RESEARCHER, PRODUCTIVITY GROWTH/1.5% ATTRITION & 15 YEAR WORK LIFE	APPLIED NATURAL SCIENCES	-4,035	-13,700	-6,925	-18,435	-38,995
	OTHER NATURAL SCIENCES	-2,320	-9,660	-4,525	-13,275	-28,895
	TOTAL	-6,355	-23,360	-11,450	-31,710	-67,890

SOURCE: MOSST ESTIMATES.

(a) (-) INDICATES A SHORTFALL IN THE NUMBER OF AVAILABLE PH.D.S AND M.SC.S.

(b) GERD SCENARIOS: 1.5/85 MEANS THAT GERD IS ASSUMED TO BE 1.5% OF GNP IN 1985, ETC.

PART B FEDERAL SCIENCE EXPENDITURES

Introduction

1. Part B contains statistics on the federal government's science expenditures over the past five fiscal years (1979/80 to 1983/84).

2. These differ from the data used in calculating federally funded GERD figures (see Part A) in a number of ways:

(a) GERD only takes account of the amounts spent on R & D in the natural sciences and engineering. FSE totals also include amounts spent on human sciences.

(b) FSE totals also include amounts spent on related scientific activities (RSA) such as data collection, museum services, scientific librairies etc.

(c) GERD takes account only of R&D performed inside Canada. FSE includes federal expenditures by such agencies as CIDA, IDRC and DND for R&D performed outside the country.

(d) In calculating GERD, internal administrative overhead costs are included, whereas FSE totals exclude overhead.

(e) GERD is based on a survey of performers of R&D. The costs of some extramural non-R&D inputs to federal R&D projects are not included in GERD. FSE totals include such extramural expenditures.

(f) The GERD report is produced by the Science Statistics Center (Statistics Canada) early each year and covers the previous calendar year.The FSE figures are obtained in conjunction with the preparation of the Main Estimates, normally tabled in the House in February, and therefore they forecast expenditures for the coming fiscal year. Each February the FSE figures for the current fiscal year are adjusted (usually downward) in accordance with departmental expenditure figures provided in conjunction with Main Estimates submissions. The figures for the previous fiscal year's expenditures are also re-adjusted on the basis of actual departmental expenditures reported to the Public Accounts Committee. Although the FSE figures for the previous fiscal year are reasonably firm, the figures for the current year and for the coming fiscal year (based on the Main Estimates) may change because of changes initiated by departmental managers or by Treasury Board. Expenditure additions and deletions are monitored by Program Review and Assessement Division (Government Branch, MOSST) but resource allocation data are treated as confidential until supplementary estimates are tabled in the House, which may take up to ten months or more.

Section 1.

Total S & T expenditures for 1983/84 are $ 3,242.0 million. This is $ 308.6 million greater than 1982/83 expenditures of $ 2,933.4 million and $ 653.1 million greater than the $ 2,588.9 million spent in 1981/82. Cumulative growth since 1981/82 has been 25.2%.

FEDERAL EXPENDITURES ON SCIENTIFIC ACTIVITY BY PERFORMER

PERFORMER	1979-80		1980-81		1981-82		1982-83		1983-84	
	$M	%	$M	%	$M	%	$M	%	$M	%
TOTAL	1,891.8	100	2,121.3	100	2,588.9	100	2,933.4	100	3,242.0	100
INTRAMURAL	1,202.2	64	1,351.0	64	1,662.0	64	1,838.4	63	2,000.4	62
EXTRAMURAL	689.6	36	770.3	36	926.9	36	1,095.0	37	1,241.6	38
-IND.	273.4	14	306.1	14	363.4	14	447.9	15	550.1	17
-UNIV.	256.1	14	320.0	15	388.8	15	444.9	15	472.5	15
-PNP	25.7	1	22.5	1	20.1	1	28.4	1	29.8	1
-PROV. & MUN. GOVT.	68.8	4	46.6	2	48.8	2	52.1	2	59.4	2
-OTHER CAN.	16.1	1	17.6	1	28.8	1	29.3	1	29.9	1
-FOREIGN	49.5	3	57.5	3	76.9	3	92.5	3	99.9	3

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM , MARCH 1983

NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

R&D & RSA EXPENDITURES IN THE NATURAL SCIENCES BY PERFORMING SECTOR

	1979-80		1980-81		1981-82		1982-83		1983-84	
	$M	%	$M	%	$M	%	$M	%	$M	%
TOTAL NATURAL SCIENCES	1,494.5	-	1,677.6	-	2,016.3	-	2,350.1	-	2,610.8	-
R&D EXPEND. (TOTAL)	1,100.3	100	1,240.0	100	1,506.6	100	1,766.0	100	1,955.9	100
INTRAMURAL	587.8	53	665.3	54	803.5	53	945.6	54	1,016.3	52
EXTRAMURAL	512.5	47	574.7	46	703.1	47	820.4	46	939.6	48
-IND	213.4	19	237.2	19	282.2	19	364.6	21	461.5	24
-UNIV	200.6	18	254.1	20	312.7	21	352.2	20	374.2	19
-PNP	8.9	1	8.6	1	5.9	-	11.5	1	10.5	1
-PROV. & MUN. GOVT.	53.8	5	31.7	3	33.0	2	12.0	1	8.2	-
-OTHER CAN.	4.3	-	4.3	-	13.8	1	12.3	1	13.9	1
-FOREIGN	31.7	3	38.8	3	55.5	4	67.8	4	71.3	4
RSA EXPEND. (TOTAL)	394.2	100	437.6	100	509.7	100	584.0	100	654.8	100
INTRAMURAL	313.4	79	342.1	78	396.7	78	442.5	76	497.3	76
EXTRAMURAL	80.8	20	95.5	22	113.0	22	141.6	24	157.6	24
-IND.	45.8	12	55.4	13	68.0	13	65.6	11	69.6	11
-UNIV.	15.0	4	19.9	5	26.0	5	31.5	5	33.0	5
-PNP	2.6	1	3.2	1	2.9	1	4.0	1	3.9	1
-PROV. & MUN. GOVT.	7.4	2	7.4	2	6.0	1	28.2	5	38.9	6
-OTHER CAN.	7.2	2	6.3	1	6.2	1	7.3	1	6.3	1
-FOREIGN	2.8	1	3.2	1	3.8	1	5.1	1	5.9	1

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

R&D & RSA EXPENDITURES IN THE HUMAN SCIENCES BY PERFORMING SECTOR

	1979-80		1980-81		1981-82		1982-83		1983-84	
	$M	%	$M	%	$M	%	$M	%	$M	%
TOTAL HUMAN SCIENCES	397.3	-	443.7	-	572.6	-	583.3	-	631.3	-
R&D EXPEND. (TOTAL)	90.7	100	95.1	100	106.7	100	128.6	100	134.0	100
INTRAMURAL	36.4	40	39.8	42	43.3	41	50.1	39	53.2	40
EXTRAMURAL (TOTAL)	54.3	60	55.3	58	63.4	59	78.5	61	80.8	60
-IND.	4.7	5	3.3	3	4.6	4	6.6	5	7.5	6
-UNIV.	26.9	30	30.5	32	34.2	32	42.7	33	45.2	33
-OTHERS	22.7	25	21.5	23	24.6	23	29.1	23	28.1	21
RSA EXPEND. (TOTAL)	306.6	100	348.6	100	465.9	100	454.8	100	497.3	100
INTRAMURAL	264.7	86	303.7	87	418.5	90	400.2	88	433.6	87
EXTRAMURAL (TOTAL)	41.9	14	44.9	13	47.4	10	54.5	12	63.7	13
-IND.	9.6	3	10.2	3	8.6	2	11.1	2	11.6	2
-UNIV.	13.6	4	15.5	4	16.0	3	18.3	4	20.1	4
-OTHERS	18.7	7	19.2	6	22.8	5	25.1	6	32.0	6

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

Section 2

Section 2 provides details of federal spending in universities, in industry, in the foreign sector and in the provincial sector for 1981/82, 1982/83 and 1983/84.
Expenditures for R & D in industry (grants and contracts) are estimated for 1983/84 at $469.0 million a 26% increase over 1982/83 which is forecast to be 29% higher than 1981/82. Expenditures on university research for the three granting councils are estimated to be $ 421.3 million for 1983/84, a 6% increase over 1982/83 which was 14% higher than 1981/82.
Payments to provinces are estimated to increase to $59.4 million, a 14% increase from 1982/83.

FEDERAL SCIENCE EXPENDITURES IN INDUSTRY
(MILLIONS OF DOLLARS)

	1981-82	1982-83	1983-84
TOTAL PAYMENTS TO INDUSTRY	363.4	447.9	550.1
R&D GRANTS AND CONTRACTS (TOTAL)	286.8	371.2	469.0
NATURAL SCIENCES R&D (TOTAL)	282.2	364.6	461.5
R&D CONTRACTS (TOTAL)	126.8	165.1	190.2
-COMM.	10.3	20.3	20.2
-EMR	6.8	12.4	14.4
-AECL	6.4	10.5	9.6
-ENV	13.5	14.1	11.5
-F&O	5.4	5.7	6.0
-DND	30.1	35.5	47.7
-NRC	28.2	34.8	40.3
-DSS(UNSOLICITED PROPOSALS)	11.9	10.0	11.0
-TRANSPORT	8.7	13.9	20.6
-OTHERS	5.5	7.9	8.9
R&D GRANTS AND CONTRIBUTIONS (TOTAL)	155.4	199.5	271.3
-COMM	2.5	0.6	-
-EMR	2.6	13.9	36.6
-ITC	116.3	133.2	164.0
-NRC	27.8	46.5	63.2
-NSERC (IRF)	1.9	2.2	3.1
-OTHERS	4.3	3.1	4.4
HUMAN SCIENCES R&D (TOTAL)	4.6	6.6	7.5
RSA GRANTS & CONTRACTS (TOTAL)	76.6	76.7	81.2
NATURAL SCIENCES RSA (TOTAL)	68.0	65.6	69.6
-EMR	20.0	9.9	7.0
-AECL	0.9	1.9	1.5
-ENV	1.4	1.6	1.8
-F&O	5.8	6.1	6.5
-CIDA	25.9	28.0	36.4
-TRANSPORT	1.8	2.6	3.0
-OTHERS	12.2	15.5	13.4
HUMAN SCIENCES RSA (TOTAL)	8.6	11.1	11.6

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

FEDERAL SCIENCE EXPENDITURES IN UNIVERSITIES
(MILLIONS OF DOLLARS)

	1981-82	1982-83	1983-84
TOTAL PAYMENT TO UNIVERSITIES	388.8	444.8	472.5
R&D GRANTS & CONT. (TOTAL)	346.8	394.9	419.4
NATURAL SCIENCES R&D (TOTAL)	312.7	352.2	374.2
R&D GRANTS (TOTAL)	285.9	315.0	335.2
-MRC	88.4	98.2	104.0
-NSERC	167.0	182.0	191.8
-NRC	16.8	20.9	23.2
-OTHERS	13.7	13.9	16.2
R&D CONTRACTS	17.7	24.9	25.5
RESEARCH FELLOWSHIPS	9.0	12.3	13.5
HUMAN SCIENCES R&D (TOTAL)	34.2	42.7	45.2
R & D GRANTS (TOTAL)	26.1	33.7	35.9
-SSHRC	21.2	28.2	29.9
-NHW	3.4	3.6	4.2
-OTHERS	1.5	1.9	1.8
R & D CONTRACTS (TOTAL)	1.6	2.3	2.2
RESEARCH FELLOWSHIPS	6.4	6.7	7.1
RSA GRANTS AND CONT. (TOTAL)	42.1	49.8	53.1
NATURAL SCIENCES RSA (TOTAL)	26.0	31.5	33.0
EDUCATION SUPP. (TOTAL)	20.3	25.9	27.3
-MRC	2.6	3.4	3.6
-NSERC	16.9	21.6	22.5
-OTHERS	.8	0.9	1.2
OTHER RSA (TOTAL)	5.8	5.6	5.7
HUMAN SCIENCES RSA (TOTAL)	16.0	18.3	20.1
EDUCATION SUPPORT (TOTAL)	11.0	12.1	13.3
-SSHRC	7.2	8.0	8.5
-OTHERS	3.8	4.1	4.8
OTHER RSA (TOTAL)	5.0	6.2	6.8

NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING
SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983

BUDGETS OF THE GRANTING COUNCILS
(MILLIONS OF DOLLARS)

	1983-84			
	NSERC	MRC	SSHRC	TOTAL
GRANTS TO UNIVERSITIES	191.8	104.0	29.9	325.7
FELLOWSHIPS TO INDIV. IN UNIVERSITIES	8.2	5.3	6.2	19.7
GRANTS AND FELLOWSHIP TO NON UNIVERSITIES	7.2	4.0	-	11.2
EDUCATION SUPP. TO UN.	22.5	3.6	8.5	34.6
OTHER EDUCATION SUPP.	3.5	-	3.3	6.8
INTERNAL ADMIN.	7.3	3.9	12.1	23.3
TOTAL COUNCIL BUDGET	240.5	120.8	60.0	421.3

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

FEDERAL FUNDS FOR UNIVERSITIES
(MILLIONS OF DOLLARS)

	79-80	80-81	81-82	82-83	83-84
R&D (NS)	200.6	254.1	312.7	352.2	374.2
R&D (HS)	26.9	30.5	34.2	42.7	45.2
RSA (NS)	15.0	19.9	26.0	31.5	33.0
RSA (HS)	13.6	15.5	16.0	18.3	20.1
TOTAL	256.1	320.0	388.8	444.8	472.5

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983
NOTE : TOTALS MAY NOT ADD UP DUE TO ROUNDING

FEDERAL SCIENCE EXPENDITURES IN THE FOREIGN SECTOR
(MILLIONS OF DOLLARS)

	1981-82	1982-83	1983-84
TOTAL	76.9	92.5	99.9
COMMUNICATIONS	9.7	16.7	19.5
SOCIAL SCIENCES & HUMANITIES RESEARCH COUNCIL	2.8	3.1	3.3
ENERGY MINES AND RESOURCES	1.9	3.4	1.8
CANADIAN INTERNATIONAL DEVELOPMENT AGENCY	10.5	12.0	13.4
INTERNATIONAL DEVELOPMENT RESEARCH CENTRE	31.1	37.9	42.5
NATIONAL DEFENCE	3.9	2.3	1.5
MEDICAL RESEARCH COUNCIL	3.1	3.7	4.0
SCIENCE AND TECHNOLOGY	2.1	2.4	2.4
NATIONAL RESEARCH COUNCIL	2.5	1.9	2.4
NATURAL SCIENCES & ENGINEERING RESEARCH COUNC.	3.5	4.1	4.2
OTHERS	5.8	5.0	4.9

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

FEDERAL SCIENCE EXPENDITURES IN THE PROVINCIAL SECTOR
(MILLIONS OF DOLLARS)

	1981-82	1982-83	1983-84
TOTAL	48.8	52.1	59.4
ENERGY MINES AND RESOURCES	32.6	29.5	30.4
ENVIRONMENT	2.9	4.4	5.0
NATIONAL HEALTH AND WELFARE	2.4	2.3	3.0
REGIONAL ECONOMIC EXPANSION	0.8	4.5	7.3
NATIONAL MUSEUMS	6.3	6.9	7.1
OTHERS	3.8	4.5	6.6

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

Section 3

Section 3 provides for science spending and person-years by department and by selected application area. The largest concentration of federal S & T expenditures is for energy ($ 385.5 million, 11%), food ($ 288.2 million, 9%) health ($228.0 million , 7%), natural resources ($214.2 million, 7%), information services ($202.3 million, 6%), and national security ($162.0 million, 5%).

FEDERAL S&T EXPENDITURES BY MAJOR FUNDING DEPARTMENT
(MILLIONS OF DOLLARS)

DEPARTMENT	1979-80	1980-81	1981-82	1982-83	1983-84
TOTAL SCIENCE	1,891.8	2,121.3	2,588.9	2,933.4	3,242.0
TOTAL MAJOR FUNDERS	1,759.4	1,973.3	2.408.7	2,724.8	3,010.3
AGRICULTURE	143.9	152.4	174.2	197.4	224.0
COMMUNICATIONS	59.2	66.0	88.3	110.1	97.4
NLIB	14.7	17.2	21.6	27.2	29.8
NMUS	50.1	54.0	59.6	64.6	67.3
SSHRC	36.6	42.4	46.6	56.7	60.0
ENERGY, MINES & RESOURCES	162.7	179.1	209.4	248.9	284.8
AECL	88.9	96.8	97.5	118.3	126.9
ENVIRONMENT	220.1	247.2	277.4	329.4	358.6
EXTERNAL AFFAIRS	5.0	5.9	6.3	7.6	8.1
CIDA	37.4	36.5	41.7	45.7	56.3
IDRC	36.5	39.8	45.9	56.5	64.9
FISHERIES & OCEANS	112.7	116.4	151.2	164.0	173.7
INDUSTRY, TRADE & COMMERCE	83.5	97.5	133.4	151.9	185.3
NATIONAL DEFENCE	87.1	102.6	117.7	133.4	160.8
NATIONAL HEALTH & WELFARE	58.0	63.8	75.7	80.8	86.2
MRC	70.1	82.0	100.2	113.3	120.8
SCIENCE & TECHNOLOGY	5.7	8.4	9.6	10.3	12.1
NRC	201.4	226.1	281.0	354.0	402.8
NSERC	121.0	162.9	201.6	226.9	240.5
SUPPLY AND SERVICES	14.9	15.0	15.2	15.0	15.1
SC	122.2	144.1	231.6	187.8	199.5
TRANSPORT CANADA	27.7	17.2	23.0	25.0	35.4
MINOR FUNDERS	132.4	148.0	180.2	208.6	231.7

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

PERCENTAGE DISTRIBUTION OF FEDERAL S&T EXPENDITURES BY DEPARTMENT

DEPARTMENT	1970-71		1983-84	
	S&T %	R&D (NS) %	S&T %	R&D (NS) %
AGRICULTURE	8.8	11.0	6.9	10.9
AECL	13.5	14.5	3.9	6.0
COMMUNICATIONS	1.5	1.9	3.0	4.7
EM&R	7.7	6.1	8.8	9.7
ENVIRONMENT	20.2	12.4	11.1	5.6
IT&C	9.7	12.6	5.7	9.1
NRC	8.5	8.0	12.4	17.6
DND	7.8	9.7	5.0	8.0
NH&W	2.8	3.4	2.7	1.1
TRANSPORT	1.6	0.3	1.1	1.4
NSERC	9.3	11.5	7.4	10.9
MRC	4.6	5.7	3.7	5.9
OTHERS	4.1	3.0	28.3	9.1
TOTAL	100.0	100.0	100.0	100.0

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983.
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

PERSON-YEARS DEVOTED TO ACTIVITIES IN S&T
(PERSON-YEARS)

DEPARTMENT	1979-80	1980-81	1981-82	1982-83	1983-84
TOTAL SCIENCE	33,124	33,088	34,814	35,598	34,563
TOTAL MAJOR FUNDERS	29,423	29,855	31,503	31,273	31,323
AGRICULTURE	4,057	4,018	4,124	4,116	3,993
COMMUNICATIONS	649	670	683	743	694
NLIB	500	500	517	526	540
NMUS	1,013	1,006	981	1,000	1,006
SSHRC	105	105	85	96	99
ENERGY, MINES & RESOURCES	2,403	2,484	2,401	2,534	2,579
AECL	2,322	2,394	2,486	2,606	2,647
ENVIRONMENT	4,921	4,915	4,894	4,924	5,000
EXTERNAL AFFAIRS	-	-	104	103	103
CIDA	56	57	57	57	57
IDRC	217	218	225	262	286
FISHERIES & OCEANS	2,122	2,143	2,516	2,519	2,518
INDUSTRY, TRADE & COMMERCE	275	167	169	171	177
NATIONAL DEFENCE	1,895	1,870	1,932	1,922	1,947
NATIONAL HEALTH & WELFARE	1,186	1,334	1,260	1,369	1,368
MRC	40	39	39	45	51
SCIENCE & TECHNOLOGY	-	-	161	161	173
NRC	3,160	3,158	3,197	3,341	3,360
NSERC	61	75	81	98	97
SUPPLY AND SERVICES	-	-	4	4	4
SC	4,534	4,619	5,489	4,588	4,506
TRANSPORT CANADA	207	83	98	88	118
MINOR FUNDERS	3,401	3,233	3,311	3,325	3,240

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

SUMMARY OF FEDERAL SCIENTIFIC EXPENDITURES IN APPLICATION AREA
(MILLIONS OF DOLLARS)

	1981-82		1982-83		1983-84	
	S&T*	R&D*	S&T	R&D	S&T	R&D
COMMUNICATIONS	54.6	40.6	59.6	45.0	48.3	36.9
DOMESTIC SECURITY	18.5	2.3	21.6	2.3	19.7	2.5
ENERGY	256.7	216.1	317.5	269.2	385.5	330.0
ENVIRONMENTAL ISSUES	76.5	44.4	86.4	48.4	90.9	50.6
FOOD	249.3	207.7	271.4	226.0	288.2	240.9
HEALTH	192.4	138.6	212.8	154.1	228.0	165.4
NATIONAL SECURITY	119.4	115.1	134.4	129.9	162.0	156.8
NATURAL RESOURCES	151.3	102.0	180.3	122.4	214.2	136.3
OCEANS	72.1	53.7	82.8	58.6	94.9	63.0
INFORMATION SERVICES**	163.0	91.5	181.4	102.0	202.3	115.2
SOCIAL DEVELOPMENT	36.3	_	40.7	_	43.6	_
SPACE	67.7	63.3	91.4	88.0	97.5	95.4
TRANSPORTATION	87.2	37.6	98.2	49.0	118.3	64.3

SOURCE: MAIN ESTIMATES SCIENCE ADDENDUM, MARCH 1983.
NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING.

* IN THIS AND SUBSEQUENT TABLES IN THIS SECTION ,S&T REFERS TO THE SUM OF R&D AND RSA (RELATED SCIENTIFIC ACTIVITIES) IN BOTH THE NATURAL AND HUMAN SCIENCES, R&D REFERS TO R&D IN THE NATURAL SCIENCES ONLY.

** BY DEFINITION, INFORMATION SERVICES IS A RELATED SCIENTIFIC ACTIVITY BUT IS INCLUDED IN THE DISCUSSION OF APPLICATION AREAS BECAUSE OF ITS IMPORTANCE AND OCCURRENCE IN MANY DEPARTMENTS AND AGENCIES

Section 4.

The Regional Distribution of Federal Government Expenditures on Science.

. The R&D and RSA activities performed in the National Capital Region (NCR) accounted for 32% of the federal natural science expenditures in all sectors in 1981/82, those performed in Ontario (excluding Ottawa) 23%, in the Prairies 15%, in Quebec (excluding Hull) 13%, in the Atlantic 9%, and in British Colombia 8%.

. Approximately 45% of all federal intramural activities were performed in the NCR and intramural expenditures accounted for 91% of the total funds for this region. Seventeen per cent of the intramural activities were in other parts of Ontario, 14% in the Prairies, 10% in the Atlantic region, 7% in Quebec (excluding Hull) and 6% in British Columbia.

. Thirty-four per cent of the expenditures in the industrial sector went to firms in Ontario while those in Quebec received 31%, and 14% went to companies in the NCR.

. In the university sector, 35% of the expenditures were in Ontario, 24% in Quebec, 16% in the prairies, and 15% in British Columbia.

Note : For a number of technical reasons there are differences between the data in this section, gathered in the Statistics Canada Regional Survey of Federal Scientific Activity, and that taken from the MOSST/ Statistics Canada Main Estimate Survey. The Regional Survey does not include research performed in the international sector nor does it include amounts which departments cannot allocate on a regional basis. For these and other reasons amounts of expenditures may differ between this section of the book and others. The distribution, however, is considered to be a good representation of the allocation of federal government expenditures on scientific activity across regions.

TOTAL FEDERAL EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES
BY REGION AND SECTOR OF PERFORMANCE. 1981/82
(MILLIONS OF DOLLARS AND %)

REGION

	FEDERAL GOV'T		CND. INDUSTRY		CND. UNIVERSITIES		OTHER CND. PERFORMERS		TOTAL	
	$	%	$	%	$	%	$	%	$	%
ATLANTIC	119.7	(10)	19.8	(7)	22.9	(7)	6.7	(12)	169.1	(9)
QUEBEC EX. HULL	75.6	(7)	85.0	(31)	78.7	(23)	3.7	(7)	243.0	(13)
ONTARIO EX. OTTA.	195.6	(17)	92.5	(34)	118.7	(35)	8.7	(16)	415.5	(23)
NCR	520.5	(45)	38.5	(14)	13.0	(4)	2.0	(4)	574.0	(32)
PRAIRIES	167.0	(14)	17.7	(6)	52.9	(16)	29.0	(53)	266.6	(15)
B.C., YUK. & N.W. T.	74.3	(6)	20.3	(9)	49.1	(15)	4.4	(8)	148.1	(8)
TOTAL	1152.7	(100)	273.8	(100)	335.3	(100)	54.5	(100)	1,816.3	(100)

NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING

INTRAMURAL EXPENDITURES ON ACTIVITIES IN THE NATURAL SCIENCES
BY REGION AND SELECTED DEPARTMENTS, 1981-82
(MILLIONS OF DOLLARS AND %)

REGION	AGRIC.		AECL		EMR		ENV.		F&O		NHW		DND		NRC		OTHERS		TOTAL	
	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%
ATLANTIC	18	(11)	_	_	6	(5)	17	(8)	61	(54)	_	_	9	(12)	7	(4)	.5	-	119	(10)
QUEBEC	14	(9)	_	_	_	_	16	(8)	3	(3)	2	(4)	26	(34)	12	(6)	4	(2)	75	(7)
ONTARIO	14	(9)	62	(58)	1	(1)	92	(46)	10	(9)	3	(6)	10	(13)	2	(2)	2	(2)	195	(17)
NCR	56	(34)	_	_	94	(82)	19	(10)	6	(5)	43	(88)	16	(22)	167	(81)	155	(95)	520	(45)
PRAIRIES	49	(30)	44	(42)	10	(9)	36	(18)	6	(5)	-	-	8	(11)	12	(6)	.4	_	167	(14)
B.C., YUK. & N.W. T.	11	(7)	_	_	4	(3)	20	(10)	27	(24)	1	(2)	6	(8)	5	(2)	.5	_	74	(6)
TOTAL	163	(100)	107	(100)	115	(100)	201	(100)	114	(100)	49	(100)	75	(100)	206	(100)	163	(100)	1152	(100)

NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING.

PERSONNEL ENGAGED IN ACTIVITIES IN THE NATURAL SCIENCES
BY REGION AND SELECTED DEPARTMENTS, 1981-82
(PERSON YEARS AND %)

REGION	AGRIC.		AECL		EMR		ENV.		F&O		NHW		DND		NRC		OTHERS		TOTAL	
	P-Y	%	P-Y	%	P-Y	%	P-Y	%	P-Y	%	P-Y	%	P-Y	%	P-Y	%	P-Y	%	P-Y	%
ATLANTIC	461	(11)	_	_	98	(4)	486	(11)	992	(46)	15	(1)	210	(11)	89	(3)	-	-	2,351	(10)
QUEBEC	372	(9)	_	_	_	_	358	(8)	44	(2)	51	(4)	635	(34)	71	(3)	48	(2)	1,579	(7)
ONTARIO	358	(9)	1,904	(72)	25	(1)	1,754	(40)	207	(10)	77	(6)	247	(13)	42	(1)	_	_	4,614	(20)
NCR	1,409	(34)	_	_	1,890	(83)	394	(9)	296	(14)	1,162	(86)	437	(24)	2,383	(85)	1,879	(97)	9,850	(42)
PRAIRIES	1,260	(30)	750	(28)	187	(8)	860	(20)	152	(7)	24	(2)	177	(10)	116	(4)	_	_	3,526	(15)
B.C., YUK. & N.W. T.	307	(7)	_	_	75	(3)	487	(11)	484	(22)	25	(2)	137	(7)	100	(4)	4	(-)	1,619	(7)
TOTAL	4,168	(100)	2,654	(100)	2,275	(100)	4,339	(100)	2,175	(100)	1354	(100)	1,843	(100)	2,801	(100)	1,930	(100)	23,539	(100)

NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING.

FEDERAL EXPENDITURES IN R&D IN THE NATURAL SCIENCES,
BY REGION AND SECTOR OF PERFORMANCE, 1981-82
(MILLIONS OF DOLLARS AND %)

REGION

	FEDERAL GOV'T		CND. INDUSTRY		CND. UNIVERSITIES		OTHER CND. PERFORMERS		TOTAL	
	$	%	$	%	$	%	$	%	$	%
ATLANTIC	75	(10)	9	(4)	21	(7)	5	(12)	110	(8)
QUEBEC	60	(8)	68	(29)	72	(23)	1	(2)	201	(15)
ONTARIO	113	(15)	88	(38)	110	(35)	5	(12)	316	(23)
NCR	364	(48)	32	(14)	12	(4)	-	-	408	(30)
PRAIRIES	112	(15)	16	(7)	50	(16)	30	(70)	208	(15)
B.C., YUK. N.W. TER.	42	(5)	19	(8)	47	(15)	2	(5)	110	(8)
TOTAL	766	(100)	232	(100)	312	(100)	43	(100)	1,353	(100)

NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING.

REGIONAL DISTRIBUTION OF 1981-82 FEDERAL SPENDING ON SELECTED PROGRAMS OF SCIENCE RELATED SUPPORT TO INDUSTRY
(MILLIONS OF DOLLARS AND %)

REGION	NRC				ITC				TOTALS	
	IRAP		CONTRACTS INC. PILP		EDP		DIPP			
ATLANTIC	0.8	(4)	1.6	(8)	1.4	(2)	-	-	3.8	(3)
QUEBEC	4.7	(19)	4.2	(21)	16.0	(26)	24.8	(73)	49.7	(36)
ONTARIO	13.7	(54)	7.9	(39)	26.0	(43)	7.5	(22)	55.1	(39)
NCR	2.1	(8)	2.9	(14)	8.9	(15)	1.4	(4)	15.3	(11)
PRAIRIES	1.4	(6)	2.2	(11)	4.5	(7)	-	-	8.1	(6)
B.C.,YUK. N.W. TER.	2.6	(10)	1.5	(7)	3.9	(6)	-	-	8.0	(6)
TOTALS(1)	25.3	(100)	20.2	(100)	60.7	(100)	33.8	(100)	140.0	(100)

NOTE : TOTALS MAY NOT ADD DUE TO ROUNDING.

PART C UNIVERSITY SCIENCE EXPENDITURES

Introduction

National estimates of R&D performed by Canadian universities are prepared annually by Statistics Canada. These estimates are based on a methodology which takes account of known direct funders of R&D (from the surveys of federal and provincial governments, industry and private non-profit organizations) and estimates of the value of the "free-time" intramural research performed by university faculty and paid for through the general operating and capital funds of the universities. There is no direct survey of university R&D and thus no way to verify the actual level of R&D performed or the distribution by field of science. This situation is not unusual, however, and the Canadian practice is typical of estimates prepared for university R&D in other countries.

Tables 1, 2 and 3 of section 1 show the sources of funds for university R&D, 1970-1982, for total, natural sciences and human sciences respectively. As a share of GNP, natural sciences R&D at universities has declined from 0.34% in 1970 to 0.24% in 1981. A decline on a slightly larger scale has occurred in the human sciences as well.

Measured in constant dollars, university R&D in the natural sciences has remained essentially flat, 1970-1982, increasing by 0.5% per year over this period. Human sciences R&D in constant dollars has declined by 0.6% per year in the same period.

Federal funding for natural sciences R&D has declined from 40% of the total in 1970 to 38% in 1982. In contrast, the federal share of human sciences R&D increased from 9% to 12.3% over this period.

Focussing on direct sponsorship of university R&D (natural and human sciences), Table 1 of section 2 shows the amounts involved and the distribution by funder. The federal share has declined from 74.2% in 1971-72 to 58.5% in 1980-81. Provincial governments and other sources (largely gifts and non-government grants) have increased in importance during the decade, growing at annual rates of 24% and 14% respectively. In comparison, Granting Council direct R&D funding has grown at about 11% per year and other federal department funding at about 2% per year.

The regional distribution of assisted research funds is shown in Table 2 of section 2 . Federal support has declined as a share of the total in all regions, except the Atlantic, over the 1972 to 1981 period, but there are wide variations between regions in the relative importance of federal funding. In the Atlantic provinces, the federal government provides some 88% of direct R&D funds compared to Quebec and Ontario with 52% and 57% respectively.

With respect to federal funding only, Table 3 of section 2 shows the distribution of federal funding of scientific activities (including RSA) by province for 1980-81, the most recent year available for the Statistics Canada -MOSST Regional Data Base-.

Table 1 of section 3 also shows federal funding of scientific activities at universities, but by funder. It is noteworthy that there has been a shift in relative importance from the federal departments to the Granting Councils during the 1970s. The Councils account for 82% of federal university support in 1982-83 compared to 74% in 1970-71.

TOTAL UNIVERSITY R&D BY SOURCE OF FUNDS
(HUMAN AND NATURAL SCIENCES)

SOURCE OF FUNDS		1970	1975	1977	1978	1979	1980	1981	1982
CURRENT DOLLARS (MIL.)	FEDERAL	125.7	159.2	192.7	216.3	227.5	284.6	347.2	393.6
	PROVINCIAL	32.2	44.3	61.1	69.8	70.2	87.8	98.3	110.2
	TOTAL GOVT.	157.9	203.5	253.8	286.1	297.7	372.4	445.5	503.8
	INDUSTRY	0.7	1.6	1.8	1.8	2.0	2.0	2.0	2.0
	PRIVATE NON-PROFIT	9.9	21.2	28.6	30.8	39.2	48.4	55.7	64.0
	UNIVERSITIES	239.3	368.0	450.9	486.6	540.6	575.5	651.9	684.5
	FOREIGN	0.6	3.8	5.8	6.2	7.4	8.3	8.3	8.3
	TOTAL	408.4	598.1	740.9	811.5	881.9	1006.6	1127.4	1262.6
PER CENT DISTRIB.	FEDERAL	30.8	26.6	26.0	26.7	25.7	28.3	30.8	31.2
	PROVINCIAL	7.9	7.4	8.2	8.6	7.9	8.7	8.7	8.7
	TOTAL GOVT.	38.7	34.0	34.3	35.3	33.6	37.0	39.5	39.9
	INDUSTRY	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2
	PRIVATE NON-PROFIT	2.4	3.7	3.9	3.8	4.4	4.8	4.9	5.1
	UNIVERSITIES	58.6	61.4	60.9	60.0	61.0	57.2	54.7	54.2
	FOREIGN	0.1	0.6	0.8	0.8	0.7	0.8	0.7	0.7
	TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: SCIENCE STATISTICS CENTRE, STATISTICS CANADA, R&D IN THE HIGHER EDUCATION SECTOR 1982 ESTIMATES, MIMEOGRAPHED NOTE, NOV 1982.

NATURAL SCIENCES UNIVERSITY R&D BY SOURCE OF FUNDS

SOURCE OF FUNDS

		1970	1975	1977	1978	1979	1980	1981	1982
CURRENT DOLLARS (MIL.)	FEDERAL	115.9	139.6	171.1	190.3	200.6	254.1	312.6	351.2
	PROVINCIAL	24.8	30.9	42.8	48.9	49.2	60.8	68.1	76.3
	TOTAL GOVT.	140.7	170.5	213.9	239.2	249.8	314.9	380.7	427.5
	INDUSTRY	0.6	1.4	1.6	1.6	1.8	1.8	1.8	1.8
	PRIVATE NON-PROFIT	9.8	20.8	28.0	30.1	38.0	46.6	53.6	61.6
	UNIVERSITIES	141.3	235.1	284.9	310.5	348.4	360.9	376.0	419.6
	FOREIGN	0.6	3.8	5.8	6.2	7.4	8.3	8.3	8.3
	TOTAL	293.0	431.6	534.2	587.6	645.4	732.5	820.4	918.8
PER CENT DISTRIB.	FEDERAL	39.6	32.3	32.0	32.4	31.1	34.7	38.1	38.2
	PROVINCIAL	8.5	7.2	8.0	8.3	7.6	8.3	8.3	8.3
	TOTAL GOVT.	48.0	39.5	40.0	40.7	38.7	43.0	46.4	46.5
	INDUSTRY	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2
	PRIVATE NON-PROFIT	3.3	4.8	5.2	5.1	5.9	6.4	6.5	6.7
	UNIVERSITIES	48.2	54.5	53.3	52.8	54.0	49.3	45.7	45.7
	FOREIGN	0.2	0.9	1.1	1.1	1.1	1.1	1.0	0.9
	TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: SCIENCE STATISTICS CENTRE, STATISTICS CANADA, R&D IN THE HIGHER EDUCATION SECTOR - 1982 ESTIMATES, MIMEOGRAPHED NOTE, NOV 1982.

HUMAN SCIENCES UNIVERSITY R&D BY SOURCE OF FUNDS

SOURCE OF FUNDS		1970	1975	1977	1978	1979	1980	1981	1982
CURRENT DOLLARS (MIL.)	FEDERAL	9.8	19.6	21.6	26.0	26.9	30.5	34.6	42.4
	PROVINCIAL	7.4	13.4	18.3	20.9	21.0	27.0	30.2	33.9
	TOTAL GOVT.	17.2	33.0	39.9	46.9	47.9	57.5	64.8	76.3
	INDUSTRY	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	PRIVATE NON-PROFIT	0.1	0.4	0.6	0.7	1.2	1.8	2.1	2.4
	UNIVERSITIES	98.0	132.9	166.0	176.1	192.2	214.6	239.9	264.9
	FOREIGN	-	-	-	-	-	-	-	-
	TOTAL	115.4	166.5	206.7	223.9	241.5	274.1	307.0	343.8
PER CENT DISTRIB.	FEDERAL	8.5	11.8	10.4	11.6	11.1	11.1	11.3	12.3
	PROVINCIAL	6.4	8.0	8.9	9.3	8.7	9.9	9.8	9.9
	TOTAL GOVT.	14.9	19.8	19.3	20.9	19.8	21.0	21.1	22.2
	INDUSTRY	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	PRIVATE NON-PROFIT	0.1	0.2	0.3	0.3	0.5	0.7	0.7	0.7
	UNIVERSITIES	84.9	79.8	80.3	78.7	79.6	78.2	78.1	77.0
	FOREIGN	-	-	-	-	-	-	-	-
	TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: SCIENCE STATISTICS CENTRE, STATISTICS CANADA, R&D IN THE HIGHER EDUCATION SECTION - 1982 ESTIMATES, MIMEOGRAPHED NOTE, NOV 1982.

SOURCES OF SPONSORED RESEARCH FUNDS TO CANADIAN UNIVERSITIES
($ MILLIONS)

		FEDERAL GOVERNMENT		OTHER FUNDERS		TOTAL
		RESEARCH COUNCILS	DEPART-MENTS	PROVINCIAL GOVERNMENTS	OTHER SOURCES	
FUNDS PROVIDED	1971-72	95.1	38.5	12.2	34.2	180.0
	1972-73	98.4	36.5	18.6	37.5	191.0
	1973-74	104.7	38.1	26.1	38.9	207.8
	1974-75	109.0	41.6	31.4	51.7	233.7
	1975-76	123.4	35.8	41.4	53.0	253.6
	1976-77	142.1	27.8	48.1	61.7	279.7
	1977-78	150.6	42.1	54.1	72.2	319.0
	1978-79	173.9	42.4	63.2	90.3	369.8
	1979-80	188.3	39.2	67.8	109.2	404.5
	1980-81	237.5	47.1	87.0	115.0	486.6
	1981-82	287.9	59.4	-	-	-
	1982-83	326.3	67.3	-	-	-
PER CENT DISTRIBUTION	1971-72	52.8	21.4	6.8	19.0	100.0
	1972-73	51.5	19.1	9.7	19.6	100.0
	1973-74	50.4	18.3	12.6	18.7	100.0
	1974-75	46.6	17.8	13.4	22.1	100.0
	1975-76	48.7	14.1	16.3	20.9	100.0
	1976-77	50.8	9.9	17.2	22.1	100.0
	1977-78	47.2	13.2	17.0	22.6	100.0
	1978-79	47.0	11.5	17.1	24.4	100.0
	1979-80	46.6	9.7	16.8	27.0	100.0
	1980-81	48.8	9.7	17.9	23.6	100.0
	1981-82	-	-	-	-	-
	1982-83	-	-	-	-	-
AVERAGE GROWTH RATE	1972-81	10.7	2.3	24.4	14.4	11.7

SOURCE: MOSST, FEDERAL SCIENCE SURVEY AND CAUBO, UNIVERSITY FINANCIAL STATISTICS.

(a) NOTE: TRIUMF PAYMENTS INCLUDED IN FEDERAL DEPARTMENTS.

(b) (-) INDICATES DATA NOT AVAILABLE.

REGIONAL DISTRIBUTION OF SPONSORD R & D FUNDS
($ MILLIONS)

		ATLANTIC				QUEBEC				ONTARIO				WEST			
		FED.	PROV.	OTHER.	TOTAL	FED.	PROV.	OTHER	TOTAL	FED.	PROV.	OTHER	TOTAL	FED.	PROV.	OTHER	TOTAL
$ MILLIONS	1972	7.0	0.3	1.4	8.7	28.6	6.2	8.4	43.2	48.4	4.1	18.4	70.9	33.5	3.3	7.5	44.4
	1973	6.6	1.1	1.6	9.4	31.8	9.0	6.5	47.3	48.1	4.5	21.2	73.8	34.2	4.2	8.2	46.6
	1974	7.5	0.9	1.9	10.4	34.4	9.1	10.3	53.8	49.2	11.9	16.9	78.0	36.9	4.2	9.8	50.8
	1975	8.5	0.5	3.1	12.1	37.1	10.7	11.7	59.4	56.6	13.8	24.2	94.6	39.3	6.5	12.8	58.6
	1976	12.0	0.4	1.9	14.3	41.9	14.2	12.4	68.5	58.0	17.2	26.1	101.4	43.0	9.7	12.6	65.3
	1977	13.6	0.7	1.7	15.9	40.8	17.1	15.3	73.2	63.1	19.3	30.0	112.5	46.6	11.0	14.7	72.3
	1978	15.8	0.9	2.8	19.4	47.1	17.9	22.2	87.2	75.4	23.4	29.3	128.1	52.3	11.9	17.9	82.1
	1979	20.9	0.6	2.8	24.3	51.4	19.8	22.9	94.1	76.4	28.4	41.7	146.5	59.9	14.4	22.9	97.2
	1980	23.9	0.9	4.2	29.1	55.5	21.7	26.3	103.5	91.9	29.0	48.8	169.7	62.7	16.2	29.8	108.7
	1981	34.7	1.0	3.8	39.6	62.7	26.7	31.1	120.5	112.5	30.4	54.8	197.7	76.5	28.9	25.3	130.7
% DISTRIBUTION	1972	81.1	2.9	16.0	100.0	66.2	14.4	19.4	100.0	68.3	5.7	26.0	100.0	75.5	7.5	17.0	100.0
	1973	71.0	11.9	17.1	100.0	67.2	19.0	13.8	100.0	65.2	6.1	28.8	100.0	73.5	8.9	17.6	100.0
	1974	72.8	8.8	18.4	100.0	64.0	17.0	19.1	100.0	63.0	15.3	21.7	100.0	72.5	8.2	19.3	100.0
	1975	70.7	3.9	25.4	100.0	62.5	17.9	19.6	100.0	59.9	14.6	25.6	100.0	67.0	11.2	21.8	100.0
	1976	83.9	2.6	13.4	100.0	61.2	20.7	18.1	100.0	57.3	17.0	25.8	100.0	65.9	14.8	19.3	100.0
	1977	85.1	4.1	10.8	100.0	55.8	23.4	20.8	100.0	56.1	17.2	26.7	100.0	64.4	15.2	20.3	100.0
	1978	81.0	4.7	14.2	100.0	54.0	20.6	25.5	100.0	58.9	18.2	22.9	100.0	63.7	14.5	21.8	100.0
	1979	85.9	2.4	11.7	100.0	54.6	21.0	24.3	100.0	52.1	19.4	28.5	100.0	61.6	14.8	23.5	100.0
	1980	82.2	3.2	14.6	100.0	53.6	21.0	25.4	100.0	54.2	17.1	28.8	100.0	57.7	14.9	27.5	100.0
	1981	87.8	2.6	9.6	100.0	52.0	22.2	25.8	100.0	56.9	15.4	27.7	100.0	58.5	22.1	19.4	100.0

SOURCE: CAUBO, UNIVERSITY FINANCIAL STATISTICS

(a) NOTE: CAUBO DATA MAY DIFFER IN THE TOTAL NUMBER OF INSTITUTIONS REPORTING EACH YEAR. FEDERAL FUNDS DIFFER FROM FEDERAL SURVEY DATA DUE TO FISCAL YEAR DIFFERENCES AND THE TIMING OF THE RECEIPT OF FUNDS.

REGIONAL DISTRIBUTION OF FEDERAL UNIVERSITY FUNDS
1980-81

TOTAL SCIENTIFIC ACTIVITIES

	$ MILLIONS					% DISTRIBUTION				
	MRC	NSERC	SSHRC	OTHER	TOTAL	MRC	NSERC	SSHRC	OTHER	TOTAL
NEWFOUNDLAND	1.3	2.8	0.4	0.8	5.3	1.7	1.8	1.2	1.5	1.7
P.E.I.	-	0.1	0.1	-	0.2	-	0.1	0.3	-	0.1
NOVA SCOTIA	2.7	5.9	0.9	2.1	11.5	3.5	3.9	2.8	4.0	3.7
NEW BRUNSWICK	0.0	3.2	0.2	0.8	4.2	0.0	2.1	0.7	1.5	1.3
QUEBEC	25.0	30.3	5.6	9.3	70.1	32.3	19.9	17.5	17.9	22.4
ONTARIO	27.4	58.2	10.1	11.9	107.7	35.5	38.2	31.6	22.9	34.3
MANITOBA	5.1	6.2	0.4	2.6	14.3	6.6	4.1	1.3	5.1	4.6
SASKATCHEWAN	2.0	5.7	0.3	1.2	9.1	2.6	3.7	1.0	2.3	2.9
ALBERTA	6.5	14.0	0.9	1.9	23.3	8.5	9.2	3.0	3.6	7.4
B.C.	5.1	19.4	2.3	17.2	44.0	6.6	12.8	7.2	33.0	14.0
NAT. CAP. REGION	1.9	6.5	1.4	2.4	12.2	2.5	4.3	4.3	4.6	3.9
UNALLOCATED	0.3	0.1	9.3	1.9	11.6	0.4	0.1	29.2	3.7	3.7
TOTAL	77.3	152.3	31.9	52.1	313.6	100.0	100.0	100.0	100.0	100.0

SOURCE: SCIENCE ADDENDA, REGIONAL DATA BASE, 1980-81.

(a) NOTE: REGIONAL DATA BASE MAY DIFFER SLIGHTLY FROM THE MAIN ESTIMATES DATA BASE.

FEDERAL EXPENDITURES ON SCIENTIFIC ACTIVITIES
AT CANADIAN UNIVERSITIES

		1970-71	1979-80	1980-81	1981-82	1982-83
EXPENDITURES (MILL. $)	TOTAL	142.4	256.1	320.0	390.3	441.2
	. FEDERAL DEPARTMENTS (*)	37.1	49.0	56.9	71.0	79.5
	. RESEARCH COUNCILS	105.4	207.1	263.1	319.3	361.7
	. SSHRC	13.7	28.1	33.3	36.6	45.1
	. NSERC	61.7	113.1	152.3	187.7	209.5
	. MRC	30.0	65.9	77.5	95.0	107.1
PER CENT DISTRIBUTION	TOTAL	100.0	100.0	100.0	100.0	100.0
	. FEDERAL DEPARTMENTS (*)	26.1	19.1	17.8	18.2	18.0
	. RESEARCH COUNCILS	74.0	80.9	82.2	81.8	82.0
	. SSHRC	9.6	11.0	10.4	9.4	10.2
	. NSERC	43.3	44.2	47.6	48.1	47.5
	. MRC	21.1	25.7	24.2	24.3	24.3

SOURCE: MOSST, FEDERAL SCIENCE EXPENDITURES AND PERSONNEL, 1970-71 TO 1982-83

(a) * Includes TRIUMF expenditures.

GRANTING COUNCIL BUDGETS
($ MILLIONS)

	MRC		NSERC		SSHRC		TOTAL	
	($)	(% INCR.)	($)	(% INCR.)	($)	(% INCR.)	($)	(% INCR.)
1976-77	51.9	-	87.6	-	28.9	-	168.4	-
1977-78	57.9	11.6	99.3	13.4	30.2	4.5	187.4	11.3
1978-79	64.2	10.9	111.7	12.5	33.7	11.6	209.6	11.8
1979-80	70.1	9.2	121.0	8.3	35.9	6.5	227.0	8.3
1980-81	82.0	17.0	162.6	34.4	41.7	16.2	286.3	26.1
1981-82	100.2	22.2	201.5	23.9	46.6	11.8	348.3	21.7
1982-83	113.0	12.8	226.5	12.4	56.8	21.9	396.3	13.8

SOURCE: MAIN ESTIMATES (BLUE BOOK) AND COUNCIL ANNUAL REPORTS.

COUNCIL PROGRAM BUDGETS IN CURRENT AND CONSTANT DOLLARS
(BUDGETS EXCLUDE ADMINISTRATION)

	NSERC		MRC		SSHRC		TOTAL	
	$ CURRENT	$ 1971	$ CURRENT	$ 1971	$ CURRENT	$ 1971	$ CURRENT	$ 1971
1970-71	65.8	67.9	34.0	35.1	18.2	18.8	118.0	121.8
1971-72	67.5	67.5	35.6	35.6	18.1	18.1	121.2	121.2
1972-73	66.5	63.3	37.5	35.7	18.6	17.7	122.6	116.8
1973-74	68.6	59.9	40.4	35.3	20.3	17.7	129.3	112.8
1974-75	69.3	52.5	42.9	32.5	21.8	16.5	134.0	101.4
1975-76	79.0	54.0	47.4	32.4	24.7	16.9	151.1	103.3
1976-77	86.1	53.7	50.8	31.7	27.2	17.0	164.1	102.4
1977-78	97.7	57.0	56.7	33.1	28.5	16.6	182.9	106.7
1978-79	109.7	60.1	63.0	34.5	30.4	16.7	203.1	111.3
1979-80	118.4	58.8	68.7	34.1	32.3	16.0	219.4	109.0
1980-81	158.9	71.4	80.5	36.1	37.8	17.0	277.1	124.4
1981-82	197.0	81.0	98.4	40.4	42.2	17.3	337.8	138.8
1982-83	220.8	82.7	110.9	41.6	51.4	19.3	383.1	143.5

SOURCE: TABLE 2 SECTION 3.

MRC PROGRAM BUDGETS
($ THOUSANDS)

	70/71	71/72	72/73	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80-81	81-82
CAPACITY												
Research grants	22,479	23,568	23,837	26,242	27,333	30,318	32,841	39,123	43,179	46,315	55,321	67,195
DEVELOPMENT												
Regional schools	1,230	853	988	762	957	1,003	1,245	1,105	1,522	2,100	1,875	2,147
Gen. research grants	1,215	815	820	820	624	624	703	703	703	820	820	1,070
Areas of national concern	-	-	-	-	-	-	-	-	573	605	609	312
COLLABORATION:												
Groups	544	941	1,941	2,499	3,626	4,002	4,937	3,923	5,070	4,269	5,399	6,738
Program grants	-	-	-	-	-	-	472	1,016	962	1,815	2,109	2,780
Workshops	-	-	47	49	24	37	7	14	2	14	34	39
Vist. professorships	-	11	14	11	10	10	15	14	22	18	19	22
France/Canada Exchg.	-	-	-	-	-	-	-	-	8	34	43	46
FACILITIES & SPECIAL OPPORTUNITIES												
Special projects	264	460	511	423	615	664	565	302	260	371	379	1,106
Visiting scientists	202	145	163	206	89	83	-	39	65	73	85	100
President's fund	-	-	-	-	-	-	-	38	25	37	79	106
Travel grants	15	10	20	15	11	19	18	40	24	22	24	8
Activities	127	255	123	112	145	157	157	173	173	182	205	302
MANPOWER												
Career investigators	1,661	1,674	1,723	1,871	1,951	2,215	2,338	2,399	2,479	2,645	2,669	2,876
Scholarships	1,776	2,016	2,175	2,372	2,351	2,634	2,486	2,400	2,302	2,612	2,947	3,923
Res. professorships	-	-	-	-	-	-	-	37	45	9	32	105
Centennial fellowsh.	261	274	310	253	311	304	276	246	239	424	402	478
Fellowships	2,895	3,135	3,463	3,400	3,621	4,099	3,761	3,742	3,724	4,511	5,308	6,330
Training grants	-	-	-	53	65	77	57	60	60	67	78	85
Studentships	1,033	1,086	1,013	963	919	972	970	1,063	1,166	1,359	1,660	2,165
Summer scholarships	260	410	312	308	210	215	-	281	376	374	378	477
TOTAL	33,962	35,653	37,460	40,359	42,862	47,433	50,848	56,718	63,002	68,676	80,475	98,410

SOURCE: MRC ANNUAL REPORTS

NSERC PROGRAM BUDGETS
($ MILLIONS)

	70/71	71/72	72/73	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82
PEER ADJUDICATED GRANTS												
Individual Operating Grants	39.0	39.3	39.5	40.9	42.1	48.9	52.1	62.3	68.4	73.7	83.0	88.6
Group Operatg. Grants	2.3	2.5	2.5	2.5	2.5	3.0	6.9	3.5	3.2	3.1	3.5	4.1
Equipment	3.5	3.5	2.6	3.2	2.4	3.0	2.5	4.9	4.1	4.9	12.9	17.3
Major Equipment	1.1	1.2	1.5	1.5	0.4	1.2	1.8	1.1	1.4	1.7	7.0	10.6
Travel	-	0.3	0.2	0.3	0.4	0.7	0.4	0.2	0.2	0.2	.2	0.2
General Res. Grants	2.9	3.0	3.0	2.9	3.5	3.5	3.7	3.9	4.7	5.0	5.9	7.0
Univ. Resrch. Fellow.	-	-	-	-	-	-	-	-	-	-	1.0	1.9
Phys. & Astro. Specl.	-	-	-	-	-	-	-	-	-	-	0.4	-
DEVELOPMENTAL GRANTS												
Negotiated Developm.	3.9	3.8	4.0	4.1	3.7	4.0	3.6	3.1	2.9	0.1	0.5	4.9
Strategic Grants	-	-	-	-	-	-	-	2.3	7.4	10.7	17.8	21.6
PRAI & Spec. Projects	0.0	0.7	1.1	1.2	1.4	0.8	0.3	0.3	0.5	1.0	1.1	1.9
Major Installation	0.3	0.5	0.3	-	0.2	0.1	0.5	0.6	0.9	1.2	1.2	5.0
Special CORE Grants	-	-	-	-	-	-	-	-	1.0	1.1	1.2	1.3
Forestry & Spec. studies	0.1	0.0	0.1	0.1	0.1	-	0.0	0.2	0.1	0.2	0.1	0.2
Regional Development	-	1.0	1.1	1.2	1.6	1.6	1.5	1.9	2.0	1.9	2.1	2.1
Spec. Assistance to Small Univ.	-	-	-	0.3	0.3	0.3	0.3	0.3	-	-	-	0.6
HIGHLY QUALIFIED MANP. TRAINING												
Post-graduate	8.0	7.9	7.0	6.9	7.0	8.3	8.9	9.1	8.9	9.7	13.0	16.5
Post-doctoral	1.3	1.5	1.7	2.0	2.1	2.2	2.1	2.4	2.8	2.7	3.2	3.1
Senior Level	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	1.3	5.8
Undergraduate	-	-	-	-	-	-	-	-	-	-	2.1	2.6
NATIONAL &INTERNATIONAL ACTIVITIES												
National	0.8	0.9	0.8	0.9	1.0	1.0	0.8	0.9	0.9	1.0	1.2	1.3
International	1.6	1.5	1.1	0.5	0.3	0.3	0.4	0.4	0.2	0.2	0.2	0.3
TOTAL	64.8	67.5	66.5	68.6	69.3	79.0	86.1	97.7	109.7	118.4	158.9	196.9

SOURCE: NSERC ANNUAL REPORTS

SSHRC PROGRAM BUDGETS
($ THOUSANDS)

	70/71	71/72	72/73	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82
INDEPENDENT RESEARCH												
Research grants	4,345	3,662	4,171	4,862	5,352	5,696	5,246	6,204	8,273	7,069	8,045	11,061
Leave fellowships	1,269	1,712	2,382	2,930	3,267	3,780	3,813	3,995	3,573	4,678	4,279	3,839
Negotiated grants	-	-	-	-	-	1,238	3,299	2,202	4,213	4,916	5,629	5,287
General res. grants	-	-	-	-	289	1,244	1,006	-	1,210	1,292	2,684	1,127
Post-doctoral fellowships	-	240	250	270	233	-	-	-	-	-	809	1,816
RESERCH CAPACITY:												
Doctoral fellowships	11,316	10,949	8,800	9,125	8,740	8,800	9,736	10,159	9,127	8,344	8,423	9,041
M.A. & Leger scholarships	-	-	400	502	573	650	750	703	560	778	822	830
STRATEGIC PROGRAMS:	-	-	-	-	-	-	-	-	-	1,360	1,876	3,729
RESEARCH COMMUNICTIONS:												
Publications	496	745	1,220	1,299	1,785	1,617	1,870	1,945	1,853	2,340	2,502	2,516
Learned societies	172	309	467	312	487	559	489	540	614	623	860	441
Conferences	397	364	470	740	669	517	597	377	633	690	1,092	1,373
INTERNATIONAL:	-	-	-	-	-	-	-	-	178	371	615	815
OTHER:	243	122	418	279	430	572	358	2,355	117	78	120	275
TOTAL	18,481	18,225	18,996	20,598	22,255	25,245	27,522	30,835	30,468	32,539	37,757	42,150

SOURCE: SSHRC ANNUAL REPORTS

ACTIVITIES AT CANADIAN UNIVERSITIES

	(MILLIONS OF CURRENT $)		(CHANGE BASED ON PER CENT PER YEAR)	
	1970-71	1982-83	CURRENT $	CONSTANT $
GRANTING COUNCILS TOTAL	105.4	361.7	10.8	1.9
SSHRC	13.7	45.1	10.4	1.5
NSERC	61.7	209.5	10.7	1.8
MRC	30.0	107.1	11.2	2.2
FEDERAL DEPARTMENTS	37.1	79.5	6.6	-2.1
TOTAL FEDERAL	142.4	441.2	9.9	1.0

SOURCE: TABLE 1 SECTION 3.

GROWTH IN FUNDING OF DIRECT R&D COSTS
AT CANADIAN UNIVERSITIES 1971-72 TO 1980-81

	CHANGE BASED ON	
	CURRENT $	CONSTANT $
FEDERAL SUPPORT (R&D)	8.8	-0.5
PROVINCIAL AND OTHER SUPPORT (R&D)	17.8	-7.2

SOURCE: TABLE 1 SECTION 2.

BUDGETS OF THE GRANTING COUNCILS
($ MILLIONS)

	NSERC			MRC			SSHRC		
	PROGRAM	ADMIN.	TOTAL	PROGRAM	ADMIN.	TOTAL	PROGRAM	ADMIN.	TOTAL
1970-71	65.8	-	65.8	34.0	0.4	34.4	18.2	0.7	18.9
1971-72	67.5	-	67.5	35.6	0.5	36.1	18.1	0.8	18.9
1972-73	66.5	-	66.5	37.5	0.6	38.1	18.6	1.0	19.6
1973-74	68.6	0.9	69.5	40.4	0.7	41.1	20.3	1.5	21.8
1974-75	69.3	1.0	70.3	42.9	1.0	43.9	21.8	1.7	23.5
1975-76	79.0	1.5	80.5	47.4	1.1	48.5	24.7	1.6	26.3
1976-77	86.1	1.5	87.6	50.8	1.1	51.9	27.2	1.7	28.9
1977-78	97.7	1.6	99.3	56.7	1.2	57.9	28.5	1.7	30.2
1978-79	109.7	2.6	111.7	63.0	1.2	64.2	30.4	3.3	33.7
1979-80	118.4	2.3	120.7	68.7	1.4	70.1	32.3	3.6	35.9
1980-81	158.9	3.4	162.3	80.5	1.4	81.9	37.8	3.9	41.7
1981-82	197.0	4.3	201.3	98.4	1.8	100.2	42.2	4.4	46.6
1982-83	238.8	5.7	244.5	110.9	2.0	112.9	51.4	5.3	56.7

SOURCE: MAIN ESTIMATES AND COUNCIL ANNUAL REPORTS.

GRADUATE DEGREES AWARDED
1972 TO 1980

FIELDS OF STUDY

	1972	1973	1974	1975	1976	1977	1978	1979	1980
EDUCATION	1,830	2,074	2,120	2,316	2,511	2,767	2,980	3,023	3,031
HUMANITIES AND FINE ARTS	2,567	2,599	2,384	2,495	2,328	2,442	2,464	2,322	2,163
SOCIAL SCIENCES	3,569	3,850	3,911	4,311	4,669	4,832	4,859	4,834	5,035
AGRICULTURE AND BIOLOGICAL SCIENCES	836	770	723	773	817	894	924	846	878
ENGINEERING AND APPLIED SCIENCES	1,245	1,263	1,197	1,142	1,172	1,295	1,320	1,343	1,249
MATHEMATICS AND PHYSICAL SCIENCES	1,481	1,482	1,299	1,256	1,245	1,310	1,265	1,116	1,101
HEALTH	464	521	458	504	503	541	642	664	701
MULTIDISCIPLINE	0	0	0	0	0	0	0	6	12
TOTAL	11,992	12,559	12,092	12,738	13,245	14,081	14,454	14,154	14,170

SOURCE: STATISTICS CANADA CAT. NOS. 81-204 AND 81-211 1972-1980

FULL-TIME GRADUATE ENROLMENT
1972-73 TO 1980-81

FIELDS OF STUDY	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81
EDUCATION	2,547	2,754	2,728	3,194	3,383	3,442	3,434	3,576	3,515
HUMANITIES & FINE ARTS	6,585	6,395	6,855	6,883	7,029	7,332	7,228	7,227	6,973
SOCIAL SCIENCES	9,312	9,910	10,522	11,267	11,658	12,010	12,142	12,156	12,180
AGRICULTURE & BIOLOGICAL SCIENCES	2,206	2,343	2,241	2,633	3,017	2,992	2,886	3,017	3,138
ENGINEERING & APPLIED SCIENCES	3,016	2,891	3,065	3,304	3,214	3,204	3,046	2,956	3,345
MATHEMATICS & PHYSICAL SCIENCES	4,104	3,834	3,729	3,899	3,918	3,653	3,486	3,565	3,435
HEALTH	1,095	1,154	1,301	1,401	1,482	1,541	1,798	1,968	2,056
OTHER	462	259	855	594	164	224	255	106	100
TOTAL	29,327	29,540	31,296	33,175	33,865	34,398	34,275	34,571	34,742

SOURCE: STATISTICS CANADA CAT. NO. 81-204 1972-1980.

MASTERS DEGREES AWARDED
1972 TO 1980

FIELDS OF STUDY

	1972	1973	1974	1975	1976	1977	1978	1979	1980
EDUCATION	1,721	1,952	1,992	2,161	2,354	2,594	2,823	2,830	2,826
HUMANITIES AND FINE ARTS	2,359	2,366	2,116	2,211	2,075	2,175	2,198	2,031	1,922
SOCIAL SCIENCES	3,338	3,560	3,586	3,940	4,259	4,475	4,436	4,426	4,622
AGRICULTURE AND BIOLOGICAL SCIENCES	593	511	474	528	613	667	682	611	659
ENGINEERING AND APPLIED SCIENCES	987	973	902	857	991	1,097	1,102	1,123	1,067
MATHEMATICS AND PHYSICAL SCIENCES	957	925	821	831	864	935	877	798	767
HEALTH	313	343	305	382	398	436	517	530	564
MULTIDISCIPLINE	-	-	-	-	-	-	-	2	5
TOTAL	10,268	10,630	10,196	10,910	11,554	12,379	12,635	12,351	12,432

SOURCE: STATISTICS CANADA CAT. NOS. 81-204 AND 81-211 1972-1980

DOCTORATE DEGREES AWARDED
1972 TO 1980

FIELDS OF STUDY

	1972	1973	1974	1975	1976	1977	1978	1979	1980
EDUCATION	109	122	128	155	157	173	157	193	205
HUMANITIES AND FINE ARTS	208	233	268	301	253	267	266	291	241
SOCIAL SCIENCES	231	290	325	371	410	357	423	408	413
AGRICULTURE AND BIOLOGICAL SCIENCES	243	259	249	245	204	227	242	235	219
ENGINEERING AND APPLIED SCIENCES	258	290	295	209	181	198	218	220	182
MATHEMATICS AND PHYSICAL SCIENCES	524	557	478	425	381	375	388	318	334
HEALTH	151	178	153	122	105	105	125	134	137
MULTIDISCIPLINE	-	-	-	-	-	-	-	4	7
TOTAL	1,724	1,928	1,896	1,828	1,691	1,702	1,818	1,803	1,738

SOURCE: STATISTICS CANADA CAT. NOS. 81-204 AND 81-211 1972-1980

PART D INDUSTRY SCIENCE EXPENDITURES

Introduction

The major inputs to the innovation process are the financial and human resources allocated to research and developement. In 1981, the share of R&D performed by the Industry sector accounted for about 50% of Canada's gross expenditures on R&D . The employment of R&D personnel in industry has varied from one-fifth of one per cent to one-quarter of one percent of the total number of persons employed in the economy. The data presented here are selected to reflect the state of science and technology in Canadian industry.

Section 1 consists of data on R&D expenditures at the total industry level and within manufacturing. Information on the sources of funds as well as on regional distribution are included . Section 2 presents data on R&D personnel and its distribution by region. A brief comparison at the international level is available in section 3.

FUNDING OF INDUSTRIAL R&D
PERCENTAGE DISTRIBUTION BY FUNDERS

	GOVT			IDY	FOREIGN
	FED	PROV	TOTAL		
1963	16	-	16	80	4
1964	17	-	17	77	6
1965	18	-	18	73	9
1966	16	-	16	77	7
1967	14	-	14	81	5
1968	14	0	14	81	4
1969	14	0	14	82	4
1970	15	0	15	80	5
1971	16	0	16	78	6
1972	16	0	16	78	6
1973	16	0	16	77	6
1974	14	0	14	81	5
1975	12	1	13	81	6
1976	12	2	14	80	6
1977	11	3	14	80	6
1978	10	3	13	83	5
1979	8	2	11	83	7
1980	9	2	11	83	6
1981	9	2	11	84	6
1982 (a)	9	1	10	84	6

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE, MAY 1982.

(a) Preliminary

The industry sector has generally provided between 77% and 84% of the funds for its own R&D. Federal funds accounted for approximately 17% of industrial R&D funds in the mid-1960's but this has declined to 9% in recent years. Foreign sources have remained in the 5%-7% range over the entire period.**

**From Section 2, 1981 Science Indicators Manual, Policy Research Group, Industry Branch, MOSST.

TOTAL INTRAMURAL R&D EXPENDITURE BY INDUSTRIES
(AS A PERCENTAGE OF GNP)

	PRIMARY	MANUFACTURING	SERVICES	TOTAL
1971	0.02	0.43	0.05	0.50
1972	0.03	0.37	0.05	0.44
1973	0.02	0.34	0.04	0.41
1974	0.02	0.35	0.05	0.42
1975	0.03	0.34	0.06	0.42
1976	0.02	0.32	0.06	0.40
1977	0.02	0.32	0.07	0.41
1978	0.02	0.34	0.07	0.44
1979	0.05	0.38	0.07	0.49
1980	0.05	0.40	0.07	0.51
1981	0.05	0.46	0.07	0.57

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE, JUNE 1982 AND BANK OF CANADA REVIEW, AUGUST 1982.

The ratio of industrial intramural R&D expenditure to GNP declined from about 0.5% in 1971 to 0.41% in 1976 but then picked up again to reach 0.57% by 1981. Intramural R&D expenditures by both primary and service industries were fairly stable untill 1978, but in primary industries they increased substantially in 1979 onward. The manufacturing industries' total intramural R&D expenditure dropped from 0.43% of GNP in 1971 to 0.32% in 1976 but finished off strongly in the late 1970's to again account for 0.40% of GNP.

TOTAL INTRAMURAL R&D EXPENDITURE IN 1980
(% DISTRIBUTION BY REGION)

		QUE	ONT	ALTA	B.C.	OTHER(a)
PRIMARY		5	11	69	7	9
MFG	CHEMICAL	12	52	25	1	3
	WOOD	35	29	0	32	3
	METALS	26	55	-	-	-
	MACH & TRANSP	40	53	0	2	5
	ELECTRICAL	18	77	-	4	-
	OTHER	18	82	-	-	0
	TOTAL	24	54	13	4	5
SERVICES		22	57	5	7	9
TOTAL		23	54	12	5	5

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE, AUG 1981.

(a) INCLUDES THE YUKON AND NORTH WEST TERRITORIES.

At the total level, Quebec and Ontario accounted for over 77% of total intramural R&D. This pattern holds in both manufacturing and service industries. However, in primary industries, Alberta and the "other" provinces account for over 80%.

Within manufacturing, the only two industries in which Quebec and Ontario did not totally dominate were chemical and wood based industries. In chemical based industries, Alberta was responsible for 29% of total intramural R&D expenditure. As expected, B.C. accounted for a significant share in the wood based industries.**

**From Section 3, 1981 Science Indicators Manual, Policy Research Group, Industry Branch.

INTRAMURAL R&D EXPENDITURE IN MANUFACTURING
(% DISTRIBUTION)

INDUSTRIES(a)	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982(b)
FOOD	4	5	4	4	4	5	4	4	4	3	3	3
RUBBER	1	-	2	1	1	1	1	1	1	1	1	1
TEXTILES	1	-	1	1	1	1	1	1	1	1	1	1
WOOD BASED	5	5	5	5	6	16	5	5	5	5	5	5
PRI MET(FE)*	2	2	2	2	2	2	2	2	2	2	1	1
PRI MET(NF)*	7	8	7	7	8	9	8	6	6	7	6	3
MET FAB	2	2	2	2	2	2	2	2	2	2	1	1
BUS MACH*	5	6	5	5	3	3	3	3	3	4	4	4
OTHER MACH*	6	6	6	6	7	6	6	5	6	5	4	4
AIRC & PTS*	9	11	15	11	10	12	14	17	16	15	16	16
OTHER TRANS*	2	4	4	3	3	3	3	3	3	3	3	3
COMMUNIC*	34	24	23	24	23	23	22	22	22	22	22	27
OTHER ELECTR*	c	4	6	5	5	5	4	4	5	5	4	4
NON-MET MIN	1	1	2	2	1	1	1	1	1	1	1	1
PETROLEUM	4	5	5	8	8	8	11	12	12	11	16	13
DRUGS*	4	5	5	5	4	4	4	4	4	4	3	4
OTHER CHEM*	8	8	8	8	8	8	7	7	7	7	7	6
SCI INSTR*	1	-	2	2	1	1	1	1	1	1	1	1
OTHER MFG*	1	-	1	1	1	1	1	1	1	1	1	1
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE, JUNE 1982.

(a) INCLUDES 3-DIGIT (MARKED WITH *) AS WELL AS 2-DIGIT SIC.
(b) PRELIMINARY.
(c) INCLUDED IN COMMUNICATIONS EQUIPMENT.

A substantial portion of manufacturing's R&D is performed by four industries: aircraft and parts; communications equipment; petroleum products; and other chemical products. The most noticeable change in shares between 1971 and 1981 has been the increase which occurred in both aircraft and parts and petroleum products.**

**From Section 4, 1981 Science Indicators Manual, Policy Research Group, Industry Branch, MOSST.

FUNDING OF MANUFACTURING'S INTRAMURAL R&D IN 1980
PERCENTAGE DISTRIBUTION BY SOURCES OF FUNDS

INDUSTRIES (a)	CDN PERFOR.	FED GOVT	OTHER CDN	FOREIGN
FOOD BEV & TOBAC	85.0	12.5	-	-
RUBBER & PLASTIC	92.3	-	-	-
TEXTILES	100.0	-	-	-
WOOD BASED	58.5	13.9	27.2	1.5
PRIM MET (FE)*	95.0	-	-	-
PRIM MET (NON-FE)*	86.2	-	-	-
METAL FABRIC	80.0	-	-	-
BUSINESS MACH*	32.7	10.2	-	-
OTHER MACHINERY*	85.7	9.5	1.6	3.2
AIRCR & PARTS*	81.3	14.0	2.3	2.9
OTHER TRANS EQ*	91.9	-	-	-
COMMUNICATIONS*	69.6	8.1	12.3	10.0
OTHER ELECT PROD*	83.1	13.6	1.7	1.7
NON-MET MINERALS	77.8	-	-	-
PETROLEUM PROD	88.6	-	6.8	4.6
DRUGS & MEDICINE*	80.9	4.3	2.1	14.9
OTHER CHEM PROD*	92.5	5.0	1.3	1.3
SCI & PROF EQUIP*	64.3	21.4	7.1	-
OTHER MFG*	87.5	12.5	-	-
TOTAL	78.3	8.1	6.5	7.1

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE, SEPT. 1981.

(a) INCLUDES 3-DIGIT (MARKED WITH *) AS WELL AS 2-DIGIT SIC.

In 1979, federal funds accounted for 10-20% of R&D in the food; wood based; business machines; other machinery; aircraft and parts; other electrical products; and other manufacturing industries. Federal funds were particularly important for the scientific instruments industry (30%). Foreign funds accounted for about 15% of R&D funds in the non-metallic minerals, petroleum products, and pharmaceuticals industries, and almost 40% in business machinery.**

**From Section 4, 1981 Science Indicators Manual, Policy Research Group, Industry Branch, MOSST.

NUMBER OF PERSONS ENGAGED IN R&D
(% DISTRIBUTION)

	PRIMARY	MANUFACTURING	SERVICES	TOTAL
1961	4	91	5	100
1963	5	89	6	100
1965	4	94	2	100
1967	3	93	3	100
1969	3	93	4	100
1971	4	91	6	100
1973	4	87	9	100
1975	4	86	10	100
1977	4	82	14	100
1979	4	83	13	100
1980	4	82	14	100

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE AND STC CAT. 71-001.

In terms of the three industry groups, manufacturing has employed over 80% of total R&D personnel but its share has been declining over the years. Manufacturing's share of R&D personnel dropped from a peak of 93.6% in 1965 to 82% in 1980. The service industries, meanwhile, have climbed from a low of 2.3% in 1965 to 14% in 1980. The primary industries' share of R&D personnel has been relatively steady at 4%.

DISTRIBUTION OF R&D PERSONNEL
IN PERCENTAGES OF TOTAL EMPLOYMENT

	PRIMARY	MANUFACTURING	SERVICES	TOTAL
1961	0.009	0.177	0.010	0.195
1963	0.011	0.197	0.014	0.222
1965	0.010	0.215	0.005	0.230
1967	0.008	0.235	0.008	0.251
1969	0.008	0.227	0.010	0.245
1971	0.008	0.212	0.013	0.234
1973	0.009	0.190	0.019	0.218
1975	0.010	0.199	0.022	0.232
1977	0.008	0.183	0.032	0.223
1979	0.010	0.197	0.031	0.237
1980	0.011	0.211	0.036	0.363

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE AND STC CAT. 71-001.

The number of persons engaged in R&D as a percentage of total employed in the economy has not varied a great deal between 1961 and 1980. The number of R&D employees fluctuated from 0.20% to 0.36% of total employment in the economy. Since the late 1960's, however, this stability at the aggregate level has been characterized by a noticeable decline in manufacturing and an accompanying increase in services.

R&D PERSONNEL IN MANUFACTURING
(% DISTRIBUTION)

	1961	1963	1965	1967	1969	1971	1973	1975	1977	1979	1980
FOOD	3	4	3	3	3	3	4	5	5	5	5
RUBBER	1	2	2	2	2	1	1	1	2	2	2
TEXTILE	1	2	2	2	2	1	1	1	1	1	1
WOOD	7	7	9	8	7	7	6	6	6	6	7
PRIM MET	8	9	6	7	9	10	11	11	8	8	7
MET FAB	2	3	2	2	2	1	2	2	2	2	2
MACHINERY	5	6	4	5	6	7	9	12	11	10	11
TRANSP	21	12	16	14	14	11	12	12	14	17	16
ELECTRIC	22	26	27	30	31	33	29	28	29	30	29
NON-MET MIN	1	2	1	1	1	1	1	1	1	1	1
PETROLEUM	3	3	4	4	4	4	4	4	4	5	5
CHEMICAL	19	19	18	17	15	15	15	14	14	12	12
MISC	4	6	6	5	5	6	5	2	2	2	2
TOTAL	100	100	100	100	100	100	100	100	100	100	100

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE.

The six manufacturing industries with the largest share of R&D expenditures (electrical products, chemical, transportation equipment, primary metals, machinery, and petroleum industries) employed about 80% of total personnel. The remaining 20% of R&D personnel were distributed across all other manufacturing industries. The electrical products industry's share of total R&D personnel increased from 22% in 1961 to 29% in 1980. The only other industry to show a significant increase in the share of R&D personnel was the machinery industry which employed 5% in 1961 and 11% by 1980.

REGIONAL DISTRIBUTION OF R&D PERSONNEL IN 1980
(% BY REGION)

		QUE	ONT	ALTA	B.C.	OTHER(a)	TOTAL
PRIMARY		10	26	46	12	5	100
MFG	CHEMICAL	28	60	8	1	3	100
	WOOD	39	30	-	28	2	100
	METALS	29	63	-	-	-	100
	MACH & TRANSP	36	55	1	2	7	100
	ELECTRICAL	19	75	-	4	-	100
	OTHER	17	82	-	-	-	100
	TOTAL	28	62	3	4	3	100
SERVICES		23	57	4	8	8	100
TOTAL		26	58	5	5	4	100

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE, JUNE 1982.

(a) INCLUDES THE YUKON AND NORTH WEST TERRITORIES.

The employment of R&D personnel is concentrated in Quebec and Ontario. In both manufacturing and service industries, these two provinces accounted for over 80% of total R&D personnel. In primary industries, Alberta accounted for 46% while Ontario had 26%.

As mentioned above, Quebec and Ontario had the largest share of R&D personnel in the manufacturing industries. In particular, Ontario generally accounted for over 60% of each industry's total R&D personnel. Notable exceptions occurred in wood based industries where British Columbia employed 28% and in machinery and transportation equipment industries where Quebec and Ontario employed 36% and 55% respectively.

REGIONAL DISTRIBUTION OF R&D PERSONNEL IN 1980
(% DISTRIBUTION BY INDUSTRY)

		QUE	ONT	ALTA	B.C.	OTHER(a)	TOTAL
PRIMARY		2	2	44	11	6	4
	CHEMICAL	21	20	34	5	13	20
	WOOD	8	3	-	29	3	5
	METALS	-	-	-	-	-	-
MFG	MACH & TRANSP	30	20	2	8	40	22
	ELECTRICAL	18	32	-	23	-	25
	OTHER	-	-	-	-	-	2
	TOTAL	17	82	-	-	-	82
SERVICES		12	13	12	21	31	14
TOTAL		100	100	100	100	100	100

SOURCE: BASED ON DATA FROM SCIENCE STATISTICS CENTRE, JUNE 1982.

(a) INCLUDES OTHER REMAINING PROVINCES, YUKON, AND NORTH WEST TERRITORIES.

For Canada as a whole, 82% of R&D personnel are employed in manufacturing industries. This same distribution is reflected in both Quebec and Ontario. Likewise, manufacturing accounts for the bulk of R&D employment in B.C. and the other remaining provinces. However, there is a noticeable difference in Alberta where a substantial proportion (44%) is employed in primary industries.

% DISTRIBUTION BY PERFORMING SECTOR (a)

		CAN	DEN	FRA	GER	JAP	NOR	SWE	U.K.	U.S.
1967	IDY	39	43	51	64	53	-	75	63	-
	GOVT	36	23	33	16	12	-	9	25	-
	OTHER	25	35	16	19	34	-	16	11	-
1969	IDY	39	-	54	65	59	-	70	64	-
	GOVT	33	-	29	15	11	-	11	25	-
	OTHER	27	-	-	17	20	30	-	19	12
1971	IDY	35	-	56	64	58	-	68	-	-
	GOVT	31	-	27	14	12	-	9	-	-
	OTHER	34	-	17	22	29	-	23	-	-
1973	IDY	35	45	58	61	59	-	67	-	66
	GOVT	34	25	25	16	14	-	8	-	16
	OTHER	32	30	17	23	27	-	25	-	18
1975	IDY	39	-	60	63	57	48	69	60	66
	GOVT	31	-	23	16	12	20	8	26	15
	OTHER	32	-	17	20	31	32	23	14	19
1977	IDY	37	-	60	65	58	47	71	-	67
	GOVT	30	-	23	16	12	18	9	-	15
	OTHER	33	-	17	19	30	34	20	-	18
1979	IDY	43	51	59	65	58	49	70	-	68
	GOVT	26	22	24	17	12	18	8	-	14
	OTHER	31	27	17	18	30	32	22	-	18

SOURCE: BASED ON DATA OECD, SCIENCE AND TECHNOLOGY INDICATORS, DSTE/SPR/83-05.

(a) DUE TO ROUNDING, SECTORS MAY NOT ADD TO 100%.
\- DATA NOT AVAILABLE.

The industry sector has performed between 40% and 55% of total R&D in Norway and Denmark and between 35% and 43% in Canada. In France, the share of industrial R&D has grown from 51% to 60%. The share of government-performed R&D has consistently been highest in Canada, accounting for about one-third of total R&D and has tended to exceed 20% in four other countries.**

**From Section 9, 1981 Science Indicators Manual, Policy Research Group, Industry Branch, MOSST.

GERD FUNDED BY GOVERNMENT
(% OF TOTAL R&D)

	1967	1969	1971	1973	1975	1977	1979
CANADA	53.4	53.3	49.0	52.0	46.7	46.1	41.2
DENMARK	55.5	-	28.9	28.3	29.7	29.5	29.8
FRANCE	59.7	55.2	50.9	48.6	45.5	43.4	42.2
GERMANY (a)	45.0	41.8	46.5	49.7	47.4	44.2	46.8
JAPAN	-	-	28.9	28.3	29.7	29.5	29.8
NORWAY	-	-	-	-	59.1	61.7	59.8
SWEDEN	42.1	40.2	40.8	42.2	39.1	38.2	37.9
U.K.	49.3	51.3	-	-	52.9	-	-
U.S.	-	-	-	56.4	54.8	53.9	51.9

SOURCE: OECD, SCIENCE AND TECHNOLOGY INDICATORS OSTI/SPR/82-05.

\- DATA NOT AVAILABLE.

The bulk of funds for each country's GERD originate from national sources. In Canada, foreign funds account for less than 3% of R&D funds. In terms of national sources, the government has generally accounted for over 40% of GERD in the United States, Canada, France, Germany, and the United Kingdom. Except for the United Kingdom, the share of government funding has declined since 1967. Government funding in Norway, Denmark, Sweden, and Japan also showed a marked decline.**

**From Section 9, 1981 Science Indicators Manual, Policy Research Group, Industry Branch, MOSST.

INDUSTRIAL R&D FUNDED BY GOVERNMENT
(% OF TOTAL INDUSTRIAL R&D)

	1967	1969	1971	1973	1975	1977	1979
CANADA	14.3	14.2	16.4	16.3	12.9	13.7	10.7
DENMARK	-	-	-	2.1	6.6	8.2	11.2
FRANCE	40.3	35.1	31.5	31.3	28.0	25.3	21.6
GERMANY	17.4	13.2	18.2	19.2	18.0	15.8	21.2
JAPAN*	-	-	2.0	2.0	1.7	1.9	1.4
NORWAY	-	-	-	-	21.1	24.2	24.1
SWEDEN	26.5	18.7	18.2	18.5	15.9	15.3	12.8
U.K.*	18.7	20.3	-	-	30.9	-	-
U.S.	51.5	46.2	41.8	38.3	35.6	35.2	32.8

SOURCE: BASED ON DATA FROM OECD, SCIENCE AND TECHNOLOGY INDICATORS, DSTI/SPR/82-05.

\- DATA NOT AVAILABLE.
* FISCAL YEAR.

In the United States, France, and United Kingdom, the government finances over 20% of industrial R&D. However, both the United States and France showed significant declines in government support of industrial R&D between 1967 and 1979. Government funding varies between 10% and 25% of industrial R&D in Norway, Germany, Sweden, and Canada, while in Japan, government funds were barely noticeable. Denmark, meanwhile, showed a significant increase after 1973.

GOVERNMENT FUNDS AS SHARE OF R&D IN 1977
(% OF TOTAL R&D IN EACH INDUSTRY)

	ELECTR	CHEM	PETRO	AIRCR	OTHER TRANSP	METALS	MACH	OTHER MFG	TOTAL MFG
CANADA	14.0	5.5	2.2	27.0	12.2	6.0	13.4	12.4	12.5
DENMARK	1.5	1.8	x	x	1.0	1.1	1.9	4.9	2.8
FRANCE	22.9	6.8	7.5	62.8	0.9	5.9	6.7	4.5	21.8
GERMANY	12.8	3.1	1.3	56.2	2.1	30.6	10.2	10.1	12.0
JAPAN	0.9	0.2	0.2	x	6.8	1.4	1.3	0.3	1.8
NORWAY	15.2	9.2	30.9	x	23.5	10.8	18.6	21.7	15.9
SWEDEN	7.7	1.1	x	x	37.7	2.9	9.3	6.4	13.3
U.K. (a)	44.3	x	x	82.2	x	2.2	8.2	x	x
U.S.	45.3	9.0	8.1	77.6	13.8	7.7	14.5	12.4	34.9

SOURCE: BASED ON DATA FROM "INTERNATIONAL STATISTICAL YEAR 1977", OECD.

(a) DATA FOR 1975.

x DATA NOT AVAILABLE.

The extent of government support varies a great deal across the selected countries. However, Japan does stand out in that a very small share of its R&D is financed by the government, regardless of the industry. In comparing different industries, government funds account for a significantly higher proportion of R&D in the aircraft industry across all countries, with the highest ratios occurring in the U.K. (82.2%) and the U.S. (77.6%).**

**From Section 9, 1981 Science Indicators Manual, Policy Research Group, Industry Branch, MOSST.

1977 DISTRIBUTION OF GOVERNMENT R&D FUNDS IN MANUFACTURING
(% DISTRIBUTION BY INDUSTRY)

	ELECTR	CHEM	PETRO	AIRCR	OTHER TRANSP	METALS	MACH	OTHER MFG	TOTAL MFG
CANADA	30.6	5.1	1.7	31.1	2.1	5.3	10.3	13.7	100
DENMARK	7.6	14.5	x	x	2.3	0.7	13.5	61.4	100
FRANCE	31.3	5.1	1.2	57.6	0.5	1.1	1.2	2.0	100
GERMANY	30.4	7.4	0.1	36.5	2.3	7.8	11.5	4.1	100
JAPAN	13.1	2.6	0.1	x	68.6	7.0	6.4	2.2	100
NORWAY	26.8	9.4	2.5	x	9.1	9.7	22.6	19.9	100
SWEDEN	12.7	1.0	x	x	63.9	2.0	13.7	6.7	100
U.K. (a)	34.4	1.8	x	58.7	2.2	0.2	1.9	0.5	100
U.S.	26.7	2.9	0.7	54.4	4.7	0.7	5.7	4.2	100

SOURCE: BASED ON DATA FROM "INTERNATIONAL STATISTICAL YEAR 1977", OECD.

(a) DATA FOR 1975.

x DATA NOT AVAILABLE.

The distribution of government R&D funds in manufacturing follows a similar pattern across all selected countries. Government funds are concentrated in two industries: electrical/electronics and transportation equipment (primarily in aircraft). In France, the United Kingdom, and the United States, over 90% of government funds went to the electrical/electronics and transportation equipment industries. These same industries received over 60% of government R&D expenditures in Canada, France, and Germany.**

**From Section 9, 1981 Science Indicators Manual, Policy Research Group, Industry Branch, MOSST.

PART E CANADIAN SPACE INDUSTRY

Introduction

This part consists of data collected from 48 companies whose space-related sales represented, in 1981, over 95% of the total Canadian industry space-related sales.

The figures shown on the following tables have been extracted from the Canadian Space Industry Information Bank maintained by the ICS secretariat and cannot be correlated directly with the data found in the Industry section of this Data Catalogue.

It should be noted that the sales figures for 1982 are estimated sales for that year. The sales figures for 1983 1984 and 1985 are projections made by the Companies themselves.

The 48 companies surveyed employed 2,333 people in the space sector in 1982.

YEAR	GROWTH TREND		REGIONAL DISTRIBUTION							
	TOTAL SALES SPACE RELATED $M	GROWTH PER YEAR %	ATLANTIC PROV. $M	ATLANTIC PROV. %	QUEBEC $M	QUEBEC %	ONTARIO $M	ONTARIO %	WEST $M	WEST %
1981	123	-	1	0	26	21	77	62	19	15
1982	182	48	0	0	56	31	97	53	28	15
1983	290	59	0	0	114	39	135	46	40	14
1984	327	13	1	0	117	36	148	45	61	19
1985	380	16	1	0	144	38	164	43	71	19

DOMESTIC SALES VERSUS EXPORT SALES

YEAR	TOTAL SALES SPACE RELATED $M	DOMESTIC SALES $M	DOMESTIC SALES %	EXPORT SALES $M	EXPORT SALES %
1981	123	54	44	69	56
1982	182	68	38	113	62
1983	290	86	30	203	70
1984	327	153	47	175	53
1985	380	195	51	186	49

SPACE SEGMENT VERSUS GROUND SEGMENT SALES

YEAR	TOTAL SALES SPACE RELATED $M	SPACE SEGMENT SALES $M	SPACE SEGMENT SALES %	GROUND SEGMENT SALES $M	GROUND SEGMENT SALES %
1981	123	73	59	50	41
1982	182	107	59	75	41
1983	290	166	57	124	43
1984	327	176	54	152	46
1985	380	212	56	169	44

YEAR	SALES PERFORMED BY CANADIAN CONTROLLED COMPANIES			CANADIAN VALUE ADDED	
	TOTAL SALES SPACE RELATED $M	CANADIAN CONTROLLED COMPANIES $M	%	$M	%
1981	123	110	90	98	80
1982	182	156	86	145	79
1983	290	253	87	226	78
1984	327	288	88	257	78
1985	380	334	88	298	78

PART F SCIENCE EXPENDITURES OF OTHER PERFORMING SECTORS

The Provincial Research Organizations, 1980

Eight provincial research institutes are surveyed: the Nova Scotia Research Foundation; the New Brunswick Research and productivity Council; the Centre de Recherche industrielle du Quebec; the Ontario Research Foundation; the Manitoba Research Council; the Saskatchewan Research Council; the Alberta Research Council; and the British Columbia Research Council. All are non-profit organizations and have been established by their respective provincial governments to provide technical support to primary and secondary industries and assist in the exploitation of provincial natural resources.

In 1980, as has been the case since data on the activities of the research institutes have been collected (1965), provincial governments are the largest single source of funds for most institutes.

Canadian industry is a significant source of funds for several institutes, especially the New Brunswick Research and Productivity Council, the Saskatchewan Research Council, the Ontario Research Foundation and the British Columbia Research Council.

The research organizations account for a small proportion of the total scientific activities conducted in Canada, less than 1% of the estimates expenditures for R&D in 1980. It would be a mistake, however, to measure their importance in purely monetary terms. These organizations play a significant role in the transfer of technology from laboratory to production unit, acting as an interface between science and business.

TOTAL EXPENDITURES ON SCIENTIFIC ACTIVITIES (1973-1981)
BY THE PROVINCIAL RESEARCH ORGANIZATIONS

EXPENDITURES

(MILLIONS OF DOLLARS)

		1973	1974	1975	1976	1977	1978	1979	1980	1981
CURRENT EXP.	INTRAMURAL	0	0	0	0	0	0	0	0	0
	WAGES AND SALARIES	14	16	20	23	25	29	35	41	50
	OTHER	8	11	12	13	11	16	21	25	29
	SUB-TOTAL	22	27	32	36	36	45	56	67	79
CAPITAL EXP.	EXTRAMURAL	1	0	1	0	6	1	1	1	2
	LAND AND BUILDINGS	0	1	2	0	1	1	1	2	3
	EQUIPMENT	2	2	2	4	2	4	6	6	8
	SUB-TOTAL	2	3	4	4	3	5	7	8	11
	TOTAL	25	30	37	40	45	51	64	75	92

SOURCE:

CURRENT EXPENDITURES BY APPLICATION, 1973-1981

APPLICATION

(PER CENT)

	1973	1974	1975	1976	1977	1978	1979	1980	1981
NATURAL RESOURCES	13	14	11	11	11	11	11	11	14
PRIMARY INDUSTRIES	12	12	16	20	22	22	25	25	25
SECONDARY INDUSTRIES	45	40	41	37	34	34	32	37	36
CONSTRUCTION INDUSTRIES	2	2	2	3	3	2	3	3	3
SERVICE INDUSTRIES	2	3	2	3	3	3	4	5	4
UTILITIES	6	6	6	5	4	6	6	5	5
ENVIRONMENT	16	18	18	18	16	14	11	11	10
OTHER	4	5	4	3	7	8	8	3	3
TOTAL	100	100	100	100	100	100	100	100	100

SOURCE:

CURRENT EXPENDITURES BY SCIENTIFIC ACTIVITY, 1972-1981

ACTIVITY

(PER CENT)

	1973	1974	1975	1976	1977	1978	1979	1980	1981
SCIENTIFIC RESEARCH	25	24	21	25	26	24	22	21	20
DEVELOPMENT	32	30	33	33	33	30	32	36	38
RESOURCE SURVEYS	9	12	12	8	7	5	6	6	7
ANALYSIS AND TESTING	10	10	12	13	13	19	19	19	18
INDUSTRIAL ENGINEERING	8	7	6	5	5	5	5	5	5
OTHER	16	17	16	16	16	17	16	13	12
TOTAL	100	100	100	100	100	100	100	100	100

SOURCE:

CURRENT EXPENDITURES, BY SCIENTIFIC ACTIVITY, BY INSTITUTE, 1980

PROVINCIAL RESEARCH ORGANIZATION

(THOUSANDS OF DOLLARS)

	SCIENTIFIC RESEARCH	DEVEL-OPMENT	RESOURCE SURVEYS	ANALYS. & TESTING	INDST. ENGIN.	OTHER (a)	TOTAL
NOVA SCOTIA	362	1085	394	526	329	591	3,287
NEW BRUNSWICK	728	422	0	1,237	121	508	3,016
QUEBEC	818	7,394	0	2,384	115	806	11,517
ONTARIO	3,400	5,200	0	4,730	316	750	14,396
MANITOBA	222	667	0	445	445	445	2,224
SASKATCHEWAN	2,551	921	779	1,275	496	1,064	7,096
ALBERTA	4,752	7,327	2,970	1,386	1,188	2,179	19,802
BRITISH COLUMBIA	1,516	1,026	0	885	359	2,619	6,405
TOTAL, CANADA	14,349	24,042	4,143	12,868	3,369	8,962	67,733

SOURCE: SSC BULLETIN

(a) FEASIBILITY STUDIES, $3,642 THOUSAND; LIBRARY AND TECHNICAL INFORMATION $3,037 THOUSAND; INDUSTRIAL INNOVATION, $1,925 THOUSAND; AND OTHER, $358 THOUSAND.

TYPES AND SOURCES OF FUNDS, 1973-1980

TYPE AND SOURCE OF FUNDS

		(PER CENT)							
		1973	1974	1975	1976	1977	1978	1979	1980
PROV. GOV.	SUBSIDIES & GRANTS	56	54	38	47	45	43	37	44
	CONTRACTS	9	12	11	17	16	19	21	16
FED. GOV.	SUBSIDIES & GRANTS	1	1	2	0	0	1	0	0
	CONTRACTS	11	8	7	6	7	7	5	7
	CANADIAN INDUSTRY CONTRACTS	19	19	21	22	25	23	26	24
	OTHER CANADIAN SOURCES	2	4	20	6	5	7	8	6
	FOREIGN CONTRACTS	2	2	1	2	2	0	3	3
	TOTAL	100	100	100	100	100	100	100	100

SOURCE: SSC BULLETIN

SOURCES AND TYPES OF FUNDS, BY INSTITUTE, 1980

(THOUSANDS OF DOLLARS)

	SUBSIDIES AND GRANTS		CONTRACTS					
	PROVINCIAL GOVERNMENT	FEDERAL GOVERNMENT	PROVINCIAL GOVERNMENT	FEDERAL GOVERNMENT	CANADIAN INDUSTRY	OTHER CANADIAN SOURCES (a)	FOREIGN SOURCES (b)	TOTAL
NOVA SCOTIA	1,300	0	315	630	778	212	378	3,613
NEW BRUNSWICK	600	0	479	641	1,329	19	114	3,182
QUEBEC	8,082	0	680	351	1,971	1,127	0	12,211
ONTARIO	3,291	0	355	2,088	6,594	3,110	1,160	16,798
MANITOBA	4,080	0	0	0	81	0	0	4,161
SASKATCHEWAN	2,728	0	468	493	3,678	124	0	7,491
ALBERTA	11,561	0	8,744	230	848	0	239	21,622
BRITISH COLUMBIA	1,481	0	855	679	2,878	503	388	6,784
TOTAL CANADA	33,123	0	12,096	5,112	18,157	5,095	2,279	75,862

SOURCE: SSC BULLETIN

(a) MAINLY OWN FUNDS, OTHER CONTRACTS AND ROYALTIES.

(b) MAINLY CONTRACTS FROM FOREIGH INDUSTRY.

EMPLOYEES OF THE PROVINCIAL RESEARCH ORGANIZATIONS
BY PROVINCE, 1973-1980

PROVINCE	1973	1974	1975	1976	1977	1978	1979	1980
NOVA SCOTIA	80	86	86	94	92	99	104	109
NEW BRUNSWK.	61	61	66	62	62	74	74	79
QUEBEC	190	169	185	203	215	243	286	298
ONTARIO	297	283	280	284	287	313	340	358
MANITOBA	6	7	10	10	8	8	22	23
SASKATCHEWN.	98	120	123	119	139	177	175	225
ALBERTA	250	279	314	337	337	392	443	461
BRITISH COL.	138	151	138	137	134	123	130	157
TOTAL	1,120	1,156	1,202	1,246	1,273	1,429	1,574	1,710

SOURCE: SSC BULLETIN DECEMBER 1980

DISTRIBUTION OF PERSONNEL, 1980

(NUMBER OF PEOPLE)

PROVINCIAL RESEARCH ORGANIZATION	SCIENTIST AND ENGINEERS				SUPPORTING PERSONNEL			TOTAL PERS.
	BACHELORS	MASTERS	DOCTORS	TOTAL	TECHNICIANS	WORKERS	ADMINISTRATIVE	
NOVA SCOTIA	18	11	11	40	36	15	18	109
NEW BRUNSWICK	10	5	12	27	29	15	16	79
QUEBEC	94	22	10	126	78	39	55	298
ONTARIO	50	22	36	108	137	38	75	358
MANITOBA	9	1	5	15	3	0	5	23
SASKATCHEWAN	29	32	17	78	128	0	19	225
ALBERTA	55	65	78	198	166	10	87	461
BRITISH COLB.	50	17	17	84	34	5	34	157
TOTAL, CANADA	315	175	186	676	611	114	309	1,710
1979	291	153	186	630	559	98	287	1,574
1978	236	116	151	503	528	59	339	1,429
1977	215	118	156	489	421	35	328	1,273
1976	196	125	155	476	411	40	319	1,246
1975	178	131	140	449	401	37	315	1,202
1974	185	104	157	446	381	31	298	1,156
1973	190	112	140	442	363	29	286	1,120
1972	157	107	137	401	329	16	291	1,037

SOURCE: SSC BULLETIN

THE SURVEY OF PRIVATE NON-PROFIT ORGANIZATIONS

THE PRIVATE NON-PROFIT SECTOR IS THE SMALLEST OF THOSE USED IN CALCULATING THE TOTAL NATIONAL EXPENDITURES ON SCIENTIFIC RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D). FOR EXAMPLE, IN 1979 TOTAL NATIONAL EXPENDITURES ON R&D ARE ESTIMATED TO HAVE BEEN ABOUT 2.6 BILLION. THE PRIVATE NON-PROFIT SECTOR PERFORMED LESS THAN 1% OF THAT TOTAL, ALTHOUGH IT PROBABLY FUNDS NEARLY 13% OF THE R&D CARRIED OUT IN THE HEALTH FIELD IN THE UNIVERSITIES.

THE INSTITUTIONS ASSIGNED TO THIS SECTOR ARE GROUPED INTO FOUR TYPES: PRIVATE PHILANTHROPIC FOUNDATIONS, VOLUNTARY HEALTH ORGANIZATIONS, ASSOCIATIONS AND SOCIETIES AND RESEARCH INSTITUTES AND OPERATING FOUNDATIONS. ONLY THOSE WHICH SUPPORT R&D ARE INCLUDED.

THE PRIVATE PHILANTHROPIC FOUNDATIONS (SHOWN AS TYPE 1 ORGANIZATIONS IN THE TABLES) ARE ALMOST ENTIRELY SELF-FUNDED. THEY ARE MORE ACTIVE IN CHARITABLE AND EDUCATIONAL WORK IN R&D, WHICH IS SUPPORTED ENTIRELY IN OTHER SECTORS.

THE LARGER VOLUNTARY HEALTH ORGANIZATIONS (TYPE 2 ORGANIZATIONS) ARE GENERALLY CONCERNED WITH A SPECIFIC TOPIC (E.G., CANCER TREATMENT AND RESEARCH). MOST OF THEIR FUNDS COME FROM INDIVIDUALS AND ORGANIZATIONS THROUGH PERIODIC CAMPAIGNS OR BEQUEST THE SUPPORT OF MEDICAL R&D IN THE UNIVERSITIES ACCOUNTS FOR 85% OF THEIR EXPENDITURES.

ASSOCIATIONS AND SOCIETIES (TYPE 3 ORGANIZATIONS) ARE NOT USUALLY INVOLVED IN R&D. THE SURVEY FOUND ONLY TEN WHOCH DID SUPPORT R&D, LARGELY IN THE NON-MEDICAL FIELDS.

SEMI-PROVINCIAL GOVERNMENT ORGANIZATIONS, RESEARCH INSTITUTES AND OPERATING FOUNDATIONS (TYPE 4 ORGANIZATIONS) CONDUCT 98% OF THE INTRAMURAL R&D IN THE SECTOR, LARGELY IN THE MEDICAL SCIENCES.

IN ALL, 109 QUESTIONAIRES WERE MAILED TO ALL PRIVATE NON-PROFIT ORGANIZATIONS THOUGHT POSSIBLY SUPPORTING R&D. SEVENTY-SIX OF THE 102 RESPONDENTS DECLARED THAT THEY WERE INVOLVED IN R&D. THERE ARE 30 TYPE 1, 26 TYPE 2, 6 TYPE 3, AND 14 TYPE 4 ORGANIZATIONS WHOSE RETURNS WERE USED IN THE FOLLOWING TABLES.

PRIVATE NON-PROFIT ORGANIZATION SOURCES OF FUNDS
BY TYPE OF ORGANIZATION, 1980

	ORGANIZATION				
	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TOTAL
INTRAMURAL	29.0	11.9	3.4	7.6	51.9
FEDERAL GOVERNMENT	0.0	1.1	0.1	2.9	4.1
PROVINCIAL GOVERNMENTS	0.0	31.8	0.0	42.9	74.7
BUSINESS ENTERPRISES	0.0	26.0	0.6	0.8	4.0
OTHER	2.3	74.8	6.3	18.4	101.8
TOTAL FUNDING(a)	31.3	122.3	10.4	72.6	236.5
LESS UNSPENT FUNDING	-11.4	-25.6	-0.2	-0.6	-37.7
TOTAL EXPENDITURES	19.9	96.7	10.2	72.0	198.9

SOURCE: SSC BULLETIN

(a) FUNDS DUE TO INTERTYPE TRANSACTIONS HAVE BEEN EXCLUDED FROM THIS TABLE

TOTAL EXPENDITURES OF PNP ORGANIZATION ON SCIENTIFIC ACTIVITIES
BY TYPE OF ORGANIZATION AND ACTIVITY, 1980

		ORGANIZATION ($'000,000)				
		TYPE 1	TYPE 2	TYPE 3	TYPE 4	TOTAL
INTRAMURAL EXPENDITURES	R&D	0.0	6.5	0.5	17.2	24.2
	OTHER	2.3	26.3	9.4	48.2	86.2
	TOTAL	2.3	32.8	9.9	65.4	110.4
EXTRAMURAL EXPENDITURES(a)	R&D	4.6	42.6	0.1	1.1	48.4
	OTHER	13.0	21.3	0.2	5.5	40.0
	TOTAL	17.6	63.9	0.3	6.6	88.4
TOTAL EXPENDITURES	R&D	4.6	49.1	0.6	18.3	72.6
	OTHER	19.9	96.7	10.2	72.0	198.9
	TOTAL	19.9	96.7	10.2	72.0	198.9

SOURCE: SSC BULLETIN

(a) EXCLUDING PAYMENTS TO OTHER PRIVATE NON-PROFIT ORGANIZATIONS.

EXPENDITURES OF PNP ORGANIZATIONS ON R&D,
BY FIELD OF R&D, AND BY SECTOR OF PERFORMANCE, 1980

		ORGANIZATION ($000,000)				
		TYPE 1	TYPE 2	TYPE 3	TYPE 4	TOTAL
CURRENT EXPENDITURES (MEDICAL SCIENCES)	PRIVATE NON-PROFIT ORGANIZATIONS	0.0	6.0	0.0	15.7	21.7
	UNIVERSITIES	2.8	41.9	0.1	0.4	45.2
	TOTAL	2.8	47.9	0.1	16.1	66.9
(SOCIAL SCIENCES AND HUMANITIES)	PRIVATE NON-PROFIT ORGANIZATIONS	0.0	0.0	0.4	0.5	0.9
	UNIVERSITIES	1.0	0.0	0.0	0.4	1.5
	TOTAL	1.0	0.0	0.4	0.9	2.4
(OTHER SCIENCES)	PRIVATE NON-PROFIT ORGANIZATIONS	0.0	0.0	0.1	0.4	0.5
	UNIVERSITIES	0.1	0.0	0.0	0.0	0.1
	TOTAL	0.1	0.0	0.1	0.4	0.6
CAPITAL EXPENDITURES	PRIVATE NON-PROFIT ORGANIZATIONS	0.0	0.5	0.0	0.6	1.1
	UNIVERSITIES	0.7	0.7	0.0	0.2	1.6
	TOTAL	0.7	1.2	0.0	0.8	2.7
TOTAL EXPENDITURES	PRIVATE NON-PROFIT ORGANIZATIONS	0.0	6.5	0.5	17.2	24.2
	UNIVERSITIES	4.6	42.6	0.1	1.1	48.4
	TOTAL	4.6	49.1	0.6	18.3	72.6

SOURCE: SCC BULLETIN

G L O S S A R Y

Capital Expenditures
Includes acquisition of land, buildings and major equipment and renovations. It excluded depreciation. Covers actual purchases regardless of the period of financing or whether the item is a replacement or an addition to assets.

Contracts (R&D)
Payments to organizations outside the reporting sectors for the conduct of R&D and intended to benefit directly the reporting sector.

Current Expenditures
Includes salaries, personnel benefits, materials, minor equipment, utilities, maintenance, rents, proportional share of administrative overhead and computer services. It excludes depreciation.

Extramural Expenditure
Flow of funds from one sector (e.g. federal government, provincial government, industry, universities, private non-profit organization, foreign) to another. It is measured by the amount a performing sector reports having received from another sector(as in GERD) or by the amount a funding sector reports having paid to a performing sector (as in MOSST Federal Science Activities publication).

Foreign Sector
Institutions located outside Canada plus facilities of international organizations situated within the country. Canadian facilities (publicly or privately owned) located abroad are not include.

GERD (Gross Expenditures on Research and Development)
Total expenditures on R&D in the Natural Science (i.e.excluding R&D in the human sciences and all related scientific activities) performed over the calendar year within the country, including R&D funded by the foreign sector. It excludes payments abroad for the performance of R&D and the R&D performance of international organizations within the country.

Grants (R&D)
Awards to organizations outside the reporting sector for the conduct of R&D and intended to benefit the recipients rather than provide the reporting sector with goods, services or information.

Human Sciences
Disciplines concerned with human activities and conditions, e.g. political science, economics, commerce, sociology, anthropology, criminology, geography, history, psychology...

Innovation
Introduction of new things or methods; the alteration of what is established by the introduction of new elements or forms. The key stage in the process leading to the full evaluation and utilization of an invention.

Intramural Expenditures
Total expenditures for the performance of S&T within an organization, irrespective of the source of funds. It includes current and capital expenditures

Natural Sciences
Disciplines concerned with the natural world, e.g.mathematics, physics (mechanics, electronics, astronomy), chemistry, biology, botany, zoology, geology, meteorology, life (medicine, dentistry, pharmacy) and engineering (mining, mechanical, civil, electrical, chemical, geological aeronautical).

Non-program Costs
The proportional cost of central overhead or administrative services chargeable to an S&T activity. Examples are accommodation rental, maintenance, telecommunications, computer services, personnel management. The Federal Government's intramural expenditures quoted in our Federal Science Activities publication excludes non-program costs, whereas the corresponding figure in GERD includes them.

Performers
Sectors in which the S&T activity is conducted:(1) industry (including government corporations and public utilities); (2) universities (including associate industrial research institutes); (3) federal government; (4) provincial governments (including the provincial research councils and municipal governments; (5) Canadian non-profit institutions such as charitable foundations, scientific societies, and voluntary health organizations); (6)foreign performers (including foreign subsidiaries of Canadian firms - this category of performance is not included in GERD).

Related Scientific Activities
Activities which generally complement and extend R&D such as data collecting, testing and standardization, feasibility studies, education support, museum services, scientific libraries, patent offices, scientific publications, scientific conferences and scientific advisory services.

R&D (Research and Development)
Creative work undertaken on a systematic basis to increase the stock of of scientific and technical knowledge and to use such knoeledge in new applications. The work normally contains considerable novelty and uncertainty and seeks to develop a new product or process. it includes costs of non-R&D facilities such as testing grounds,specialized equip ment and materials. Although it is normally performed by specialized R&D units, it may also be performed by other organizations (e.g. a marine survey ship used for hydrological research or a geological survey team providing data for a geophysical research project).

Research Fellowships
Awards to individuals for advanced research training and experience. Awards intended primarily to support the education of the recipient should be reported as RSA.

Research Intensity
Amount of R&D performed within a compfany or industry measured (a) as a percentage of shipments or value added, (b) by the number of R&D personnel in proportion to total employment, or (c) by the average skill level of employees.

Space activities
Space activities include research or other operations conducted above 50 km altitude by means of rockets, ballons, satellites, manned space vehicules and including any associated ground-based activity.

'Technology Intensity
Level of technology embodied in an industry's product lines indicated by (a) the proportion of sales associated with the introduction of new products, (b) the number of invention patents received, and (c)the number of significant innovations pioneered.

University Sector
All post=secondary educational institutions and all research institutes, experimental stations and clinics associated with these institutions.