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**FEDERAL GOVERNMENT EXPENDITURES
ON SCIENTIFIC ACTIVITIES
FISCAL YEAR 1958-59**

DOMINION BUREAU OF STATISTICS
Business Finance Division
Operations Section

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DOMINION BUREAU OF STATISTICS

Business Finance Division

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FISCAL YEAR 1958-59

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PREFACE

This publication, prepared by the Dominion Bureau of Statistics in cooperation with the National Research Council, presents in tabular form an estimate of the magnitude of the scientific activities undertaken by the Federal Government in 1959 and provides an indication of the relative size of the 1960 program.

It covers data in terms of total expenditure in scientific activities, the organizations performing the work, the various scientific fields covered and the number of professional and technical personnel involved in research-development. This is the first formal survey of Federal Government expenditures on research and scientific activities since 1947.

The concepts and definitions as well as the questionnaire were prepared following the advice and consultations of senior officials and scientists of the National Research Council and other departments. Questionnaires sent were such that they embraced all Federal Government costs on all scientific activities including those performed by other organizations. In addition, they included payment of salaries made to professional and non-professional personnel, other direct costs and an estimated share of overhead costs. The scientific activities included the conduct of research and development, including planning and administering of research-development; capital expenditures on research-development plant, scientific data collection; scientific information and scholarship and fellowship programs.

The assistance of the Federal Government Departments and agencies who have cooperated by submitting reports is gratefully acknowledged.

August, 1960.

WALTER E. DUFFETT,
Dominion Statistician.

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SECTION I

General Review

This is a report on Federal Government funds applied to scientific activities for the fiscal years 1958-59¹ and 1959-60.² Questionnaires were sent to various government departments believed to conduct scientific activities and the favourable respondents represented a total of 19 departments and agencies of the Federal Government.

Briefly, for the fiscal year 1959-60 an estimated \$212.3 million was to be applied on Federal Government scientific activities as against \$222.6 million in the previous year (1958-59),¹ a decrease of 4.6%.

This decrease was due for the most part to a decline in development contracts for the armed forces. The civilian branches of the government which includes all departments and agencies except the Department of National Defence³ actually showed an increase of 16.3% from \$127.0 million in 1958-59 to \$147.7 million in 1959-60. Including the Defence Research Board, the increase would be 14.1% from \$156.3 million in 1958-59 to \$178.3 million in 1959-60.

Approximately 93% (\$207.5 million out of a total of \$222.6 million) of the funds for scientific activities constituted "Department or Agency funds available as a result of annual estimates". The remainder of the funds were made available through other sources such as funds received directly from non-federal sources, net transfers of funds within the government, etc. For 1959-60, Department or Agency funds available as a result of annual estimates to total funds available for scientific activities was estimated to be \$202.0 million or 95% of the total \$212.3 million. However, department or agency funds available according to annual estimates would decrease by \$5.6 million for 1959-60, from \$207.6 million in 1958-59 to \$202.0 million in 1959-60.

The bulk of Federal Government funds for scientific activities was for intramural performance,⁴ 72.9% and 83.2% (or \$162.3 million and \$176.7 million) of the total for 1958-59 and 1959-60. Federal Government funds for extramural⁵ scientific

activity are substantially less in 1959-60, profit organizations receiving \$21.1 million as against \$48.7 million for 1958-59. On the other hand, more funds are available for educational institutions, \$12.1 million as against \$9.5 million for 1958-59. Federal Government expenditure on research-development for the civilian departments amounted to \$95.8 million for 1959-60, an increase of \$15 million, or 18.6% from the previous year.

Funds for the physical sciences rose from \$45.5 million to \$55.4 million, an increase of \$9.9 million, with the larger portion of this increase \$7.0 million going to the engineering group (from \$20.4 million to \$27.4 million). The physical sciences, excluding engineering, increased from \$25.1 million to \$28.0 million, or by \$2.9 million. The expenditure for the life sciences increased from \$35.3 million to \$40.4 million, or by \$5.1 million; the most significant relative increase being for the medical sciences.

Capital expenditures on research-development plant covering all departments and agencies, including the Defence Research Board but excluding the armed forces, increased by \$2.4 million, from \$30.6 million to \$33.0 million in 1959-60. Five departments and agencies provided the bulk of funds for research-development plant, namely the Atomic Energy of Canada Limited, Defence Research Board, the Department of Agriculture, the Department of Mines and Technical Surveys and National Research Council. These departments spent 90.9% and 93.5% of total funds for research-development plant, for the years 1958-59 and 1959-60. The armed forces development being largely in the form of contracts require very little research-development plant expenditure on the part of the Federal Government.

Funds for other scientific activities, i.e. scientific data collection, scientific information and scholarship and fellowship programs amounted to a total of \$23.5 million for all departments and agencies in 1958-59. For the year 1959-60, an additional \$4 million is expected for this group, making a total of \$27.5 million. This represents 10.6% and 13.0% of total funds for all scientific activities for each year. Excluding the Department of National Defence, funds for other scientific activities amounted to \$21.2 million and \$25.2 million for the fiscal years 1958-59 and 1959-60, or 16.7% and 17.1% of total funds for all scientific activities, respectively.

There were a total of 17,191 persons employed in all scientific activities. The civilian departments including the Defence Research Board provided 15,091 personnel or 87.8%. The armed forces made up for the remaining 2,100 personnel or 12.2%.

Detailed data on personnel breakdown were not made available for personnel employed in all scientific activities, except for those employed in the conduct of research-development, including planning and administering of research-development. The latter represent the largest component of all scientific activities, 90% of the total, in terms of expenditures.

¹ **Actual** — Based on expenditures or payments made and accounted for in annual reports for the fiscal year ending March 31, 1959.

² **Estimates** — Based on the requirements for the fiscal year ending March 31, 1960, tabled in the House of Commons.

³ Includes the Defence Research Board and the armed forces (Army, Navy and Air force). The Defence Research Board is responsible for scientific research. The armed forces do development work, administer development contracts and collect scientific data.

⁴ **Intramural Performance** — scientific activities carried on by personnel directly employed by the departments and agencies concerned.

⁵ **Extramural Performance** — scientific activities performed by non-federal employees at outside facilities but financed by the Federal Government.

Federal Funds for Scientific Activities, Fiscal Years 1958-59 and 1959-60

Departments and agencies	All scientific activities				Conduct of research-development including planning and administering of research-development			
	1958-59	1959-60	Increase	Decrease	1958-59	1959-60	Increase	Decrease
	millions of dollars		per cent		millions of dollars		per cent	
(a) All departments and agencies	222.6	212.3		4.6	168.4	151.8		9.9
(b) All departments and agencies (excluding armed forces, including D.R.B.)	156.3	178.3	14.1		104.0	119.6	15.0	
(c) All departments and agencies (excluding armed forces and D.R.B.)	127.0	147.7	16.3		80.8	95.8	18.6	
	Capital expenditures on research-development plant				Other scientific activities ¹			
	1958-59	1959-60	Increase	Decrease	1958-59	1959-60	Increase	Decrease
	millions of dollars		per cent		millions of dollars		per cent	
(a) All departments and agencies	30.7	33.0	7.5		23.5	27.5	17.0	
(b) All departments and agencies (excluding armed forces, including D.R.B.)	30.6	33.0	7.8		21.7	25.7	18.4	
(c) All departments and agencies (excluding armed forces and D.R.B.)	25.0	26.7	6.8		21.2	25.2	18.9	

¹ Includes scientific data collection, scientific information, scholarship and fellowship programs.

Federal Government Funds for the Conduct of Research-Development

The bulk of Federal Government funds for scientific activities is directed to the conduct of research-development, including planning and administering of research-development.

For the year 1959-60, Federal Government funds for the conduct of research-development, including planning and administering of research-development, for all departments and agencies, was estimated at \$151.8 million an anticipated decrease of \$16.6 million or 9.9% from the previous year (\$168.4 million), representing 75.7% and 71.5% of total funds for all scientific activities for the years 1958-59 and 1959-60, respectively.

Excluding the Department of National Defence, Federal Government funds for conduct of research-development including the planning and administering of research-development anticipated for 1959-60 was \$95.8 million, an increase of \$15 million or 18.9% compared to the year previous (\$80.8 million), representing 63.6% and 64.9% of these funds for all scientific activities for 1958-59 and 1959-60.

Including the Defence Research Board but excluding the armed forces, Federal Government funds for the conduct of research-development show an increase for the fiscal year 1959-60, of \$15.6 million or 15% from \$104.0 million for 1958-59 to \$119.6 million for 1959-60, representing in each year 66.5% and 67.1% of funds applied for scientific activities.

Capital Expenditures on Research-Development Plant

The second largest Federal Government expenditure on scientific activities is for the construction, acquisition, major repairs or alterations, etc., of plant and equipment for use in research-development activities. Capital expenditures on research-development plant amounted to \$30.7 million in 1958-59 and \$33.0 million in 1959-60, an increase of \$2.3 million. These expenditures represented 13.8% (1958-59) and 15.5% (1959-60) of total funds applied for scientific activities, and together with Federal Government funds for the conduct of research-development represented 89.4% and 87.0% of total funds for scientific activities for 1958-59 and 1959-60, respectively.

FEDERAL GOVERNMENT EXPENDITURES ON SCIENTIFIC ACTIVITIES 1958-59 AND 1959-60

MILLIONS
OF
DOLLARS

240

220

200

180

160

140

120

100

80

60

40

20

0

ALL DEPARTMENTS
AND AGENCIES

ALL DEPARTMENTS AND AGENCIES
EXCLUDING ARMED FORCES
INCLUDING DEFENCE RESEARCH BOARD

ALL DEPARTMENTS AND AGENCIES
EXCLUDING ARMED FORCES
AND DEFENCE RESEARCH BOARD

OTHER SCIENTIFIC
ACTIVITIES

CAPITAL EXPENDITURES ON
RESEARCH-DEVELOPMENT
PLANT

CONDUCT OF
RESEARCH-DEVELOPMENT,
INCLUDING PLANNING
AND ADMINISTERING OF
RESEARCH-DEVELOPMENT

1958-59

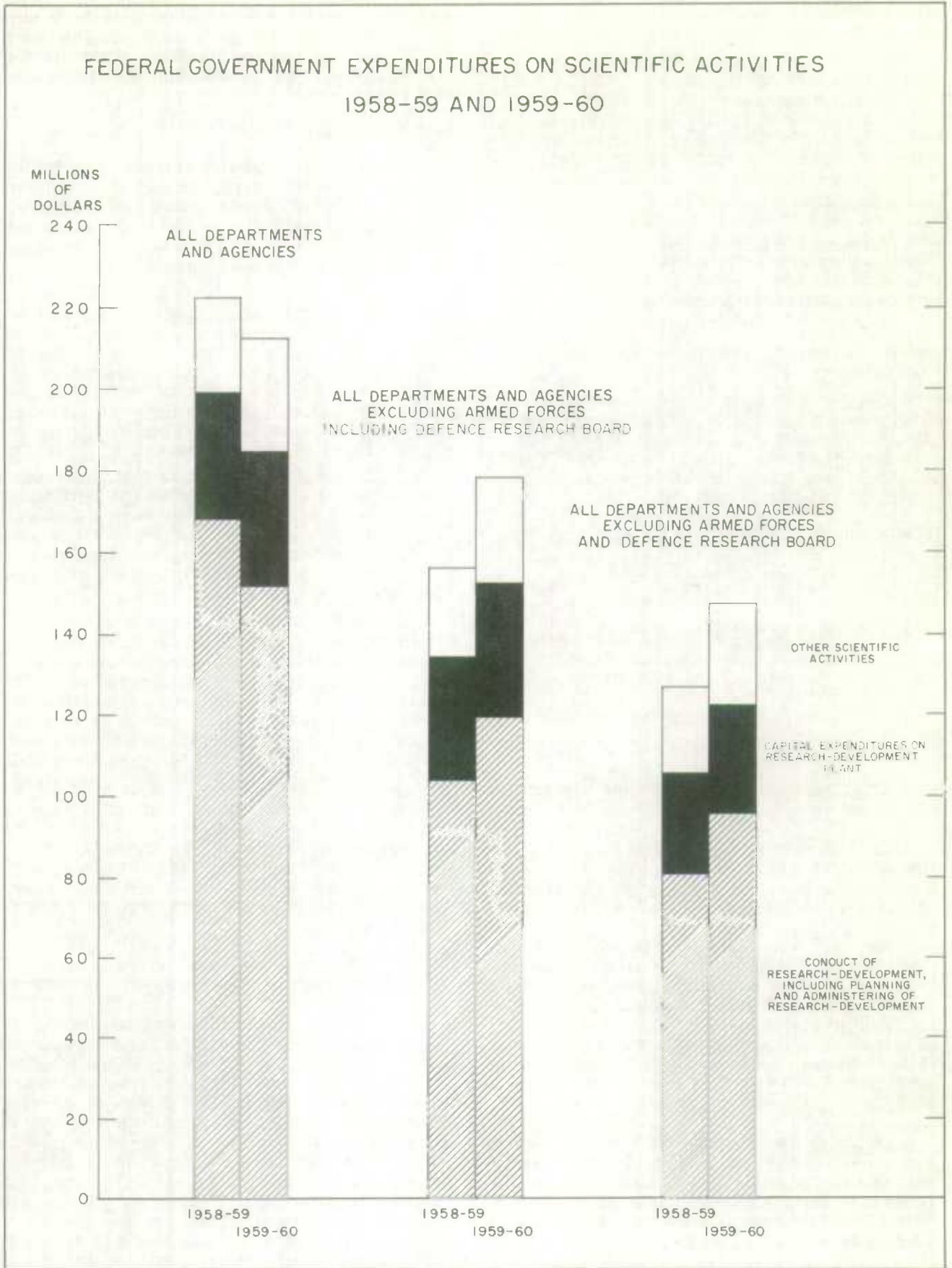
1959-60

1958-59

1959-60

1958-59

1959-60



The exclusion of the armed forces does not affect these figures since the armed forces development is done mainly through contract.

Excluding the Defence Research Board as well as the armed forces, the expenditures for the remaining departments and agencies rose from \$25.0 million in 1958-59 to \$26.7 million in 1959-60, an increase of \$1.7 million or 6.8%. The proportion of Federal Government funds for capital expenditure on research-development plant to total funds, excluding the armed forces and the Defence Research Board, for all scientific activities would be 19.7% and 18.1%, respectively. This, combined with Federal Government funds for the conduct of research-development, represents 83.3% and 83.0% of funds for scientific activities.

Federal Government Funds for Other Scientific Activities

Funds for other scientific activities⁶ amounted to a total of \$23.5 million in 1958-59 and \$27.5 million for 1959-60, for all departments and agencies. Of these amounts, 8.1% and 9.7% respectively (\$18.1 million and \$20.6 million) represented funds for scientific data collection.

The proportion of funds for scientific data collection to total funds for scientific activities is greater for the civilian departments, 12.9% and 12.8% (\$16.4 and \$18.9 million) respectively.

Funds allocated for scientific information for all departments and agencies amounted to \$4.1 and \$4.9 million for 1958-59 and 1959-60. Excluding the armed forces and the Defence Research Board, the amounts are \$3.5 million and \$4.3 million for this activity, respectively.

⁶ Includes scientific data collection, scientific information and scholarship and fellowship programs.

Federal funds for scholarship and fellowship programs amounted to \$1.3 million in 1958-59 with an anticipated \$2.0 million for 1959-60. The armed forces and the Defence Research Board did not allocate funds for scholarship and fellowship programs.

Source of Funds

Departments or agencies engaged in scientific activities provided directly through their budgets more than 90% of the total funds made available. The remaining funds are, by and large, accounted for by departments not directly engaged in research but providing the necessary support.

It is necessary to take into account this indirect support of scientific activities because of the large amounts involved and the way in which this support may vary from one department or agency to another. To illustrate, expenditures on capital structures are sometimes carried on the budget of the Department of Public Works and sometimes by the Department or Agency performing scientific activity.

For all departments and agencies, department or agency funds amounted to \$207.5 million in 1958-59 and \$202.0 million in 1959-60, a decrease of \$5.5 million. Excluding the armed forces and the Defence Research Board, department and agency funds amounted to \$115.7 million and \$139.0 million, respectively, an increase of \$23.3 million.

The cost of individual support by other units, departments or agencies, which includes the relevant costs of overhead, maintenance and superannuation, and costs and salaries incurred on behalf of agencies and departments engaged in scientific activities, amounted to \$11.1 million in 1958-59 and \$9.5 million in 1959-60. Excluding the armed forces and Defence Research Board, \$8.5 and \$6.7 million represent cost of individual support for 1958-59 and 1959-60.

Funds Available for Scientific Activities in the Federal Government, Fiscal Years 1958-59 and 1959-60

Source of funds	All departments and agencies excluding armed forces and D.R.B.		Total all departments and agencies	
	1958-59	1959-60	1958-59	1959-60
	millions of dollars			
Funds available from:				
Departmental or agency funds available as a result of annual estimates	115.7	139.0	207.5	202.0
Cost of indirect support by other units, departments or agencies	8.5	6.7	11.1	9.5
Transfers from other units of the department or agency	—	—	0.9	0.5
Transfers from other departments or agencies	2.9	4.3	3.5	4.3
Funds received directly from non-federal government sources	0.6	0.7	0.6	0.7
Other sources	2.4	1.2	2.4	1.2
Sub-totals	130.1	151.9	226.0	218.2
Less:				
Transfers to other units of the department or agency	—	—	0.3	0.3
Transfers to other departments or agencies	0.2	1.0	0.2	2.4
Support provided non-scientific activities	2.9	3.2	2.9	3.2
Sub-totals	3.1	4.2	3.4	5.9
Totals, funds available for scientific activities	127.0	147.7	222.6	212.3

Federal Government Expenditures on the Conduct of Research-development

Federal expenditures on the conduct of research-development including planning and administering of research-development amounted to \$168.4 million in 1958-59 with a decrease of 9.9% or \$16.6 million for 1959-60, making a total of \$151.8 million for that year. Total funds for research and development cannot be broken down by scientific field due to absence of information for the armed forces.

Federal expenditures on the conduct of research-development, for all departments and agencies, excluding the armed forces but including the Defence Research Board, was \$104.0 million in 1958-59 and \$119.5 million for 1959-60, an increase of \$15.5 million for that year. In 1958-59, \$66.6 million out of a total of \$104.0 million went for the physical sciences,⁷ (64.0%) and \$37.4 million (36.0%) went for the life sciences.⁷ Excluding

⁷ Definitions of the physical and life sciences are given on page 43.

the Defence Research Board as well as the armed forces, out of \$80.8 million for conduct of research-development in 1958-59, \$45.5 million (56.3%) went for the physical sciences and \$35.3 million (43.7%) went for the life sciences.

In 1959-60, Federal Government funds for the conduct of research-development including the Defence Research Board, excluding the armed forces, amounted to \$119.5 million. Of this, \$77.0 million (64.4%) was for the physical sciences and \$42.5 million (35.6%) was for the life sciences. Excluding the Defence Research Board as well as the armed forces, out of a total of \$95.8 million, \$55.4 million (57.8%) was for the physical sciences and \$40.4 million (42.2%) was for the life sciences. The additional \$21.6 million for the physical sciences (from \$55.4 to \$77.0 million) as against an additional \$2.1 million for the life sciences (from \$40.4 to \$42.5 million), when the Defence Research Board is included, indicates the importance of the physical sciences for that agency.

Federal Government Expenditures on the Conduct of Research-development by Scientific Fields, Fiscal years, 1958-59 and 1959-60

	1958-59			1959-60		
	All departments and agencies excluding armed forces and D.R.B.	All departments and agencies excluding armed forces including D.R.B.	Total all departments and agencies	All departments and agencies excluding armed forces and D.R.B.	All departments and agencies excluding armed forces including D.R.B.	Total all departments and agencies
Millions of dollars						
Physical sciences	45.5	66.6	..	55.4	77.0	..
Life sciences	35.3	37.4	..	40.4	42.5	..
Totals, life and physical sciences....	80.8	104.0	168.4	95.8	119.5	157.8
Per cent of total						
Physical sciences	56.3	64.0	..	57.8	64.4	..
Life sciences	43.7	36.0	..	42.2	35.6	..
Totals, life and physical sciences..	100.0	100.0	100.0	100.0	100.0	100.0

.. Figures not available.

Federal Government Expenditures on Research-Development, by Scientific Fields

The following table provides a more detailed breakdown of Federal Government expenditures on the conduct of research-development (including the

planning and administering of research-development) within the two groups of sciences for the civilian departments only. Such information was not available for the armed forces and the Defence Research Board. Details by Department or agency are to be found in Tables 9, 10 and 11.

**Federal Government Expenditures on Research-Development, by Scientific Fields
Excluding the Armed Forces and the Defence Research Board, Fiscal Years 1958-59 and 1959-60**

Scientific fields	1958-59	1959-60
	millions of dollars	
Physical sciences:		
1. Engineering:		
Chemical	3.5	4.4
Civil	2.3	2.6
Electrical	4.8	5.9
Mechanical	8.1	9.6
Other (chiefly electronics and aeronautical)	1.7	4.9
Sub-totals	20.4	27.4
2. Other physical sciences:		
Chemistry	6.4	7.3
Physics	7.0	8.2
Geology, geophysics and other earth sciences	4.1	4.3
Metallurgy	4.9	5.3
Mathematics	0.1	0.1
Other physical sciences	2.6	2.8
Sub-totals	25.1	28.0
Totals, physical sciences	45.5	55.4
Life sciences:		
Medicine	4.5	5.9
Agriculture	23.0	25.4
Biology	7.8	9.1
Totals, life sciences	35.3	40.4
Totals, life and physical sciences	80.8	95.8

Although the proportion of funds allocated for the physical sciences and life sciences was about the same for the two years examined for all departments and agencies, excluding the armed forces and the Defence Research Board, i.e. 56% covered research-development in the physical sciences and 44% covered research-development in the life sciences, the proportion of funds spent for total engineering as against total other physical sciences in the "Physical Sciences" group increased in the year 1959-60. In the year 1958-59, out of a total \$45.5 million covering research-development in the physical sciences, 44% went for engineering and 55% went for other physical sciences (or 25% and 31% of the total life and physical sciences); whereas, in the year following (1959-60), out of a total estimated figure of \$55.4 million for research-development covered by the physical sciences, about half of this amount covers the engineering

groups and the other half represents the "other physical sciences groups", i.e. 49% and 50% respectively (or 28% and 29% of the total life and physical sciences).

Funds for engineering went up \$7.0 million in 1959-60, from \$20.4 to \$27.4 million. Funds for the remainder of the physical sciences rose \$2.9 million, from \$25.1 to \$28.0 million, making a total estimated increase of \$9.9 million for total physical sciences from \$45.5 to \$55.4 million.

Although funds for total engineering increased from \$20.4 to \$27.4 million, the greatest increase was in the Electronic and Aeronautical engineering. Extraordinary expenditures made by the Post Office and the Department of Defence Production were responsible for most of the increase in these two latter fields.

Federal Government Expenditures on Research-Development by Scientific Fields Excluding the Armed Forces and the Defence Research Board, Fiscal Years 1958 - 59 and 1959 - 60

	1958 - 59		1959 - 60	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
Physical sciences:				
1. Engineering	20.4	25.2	27.4	28.6
2. Other physical sciences	25.1	31.1	28.0	29.2
Sub-totals	45.5	56.3	55.4	57.8
Life sciences	35.3	43.7	40.4	42.2
Totals, life and physical sciences	80.8	100.0	95.8	100.0

Allocation of Expenditures for Engineering, Excluding the Armed Forces and the Defence Research Board, Fiscal Years 1958 - 59 and 1959 - 60

	1958 - 59		1959 - 60	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
Physical sciences (engineering only):				
Chemical	3.5	17.2	4.4	16.1
Civil	2.3	11.3	2.6	9.5
Electrical	4.8	23.5	5.9	21.5
Mechanical	8.1	39.7	9.6	35.0
Others	1.7	8.3	4.9	17.9
Totals, engineering	20.4	100.0	27.4	100.0

Physical Sciences—Other than Engineering.— For the physical sciences other than engineering, the proportion of funds allocated for the various fields of sciences, such as chemistry, physics, geology, geophysics, etc., to the total remained relatively unchanged for the fiscal year 1959-60, as compared to the year previous.

Of the five groups of sciences under physical sciences other than engineering (See table below) the largest expenditure is for chemistry and the smallest is for mathematics.

Allocation of Expenditures for the Physical Sciences other than Engineering Excluding the Armed Forces and the Defence Research Board, Fiscal Years 1958 - 59 and 1959 - 60

	1958 - 59		1959 - 60	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
Physical sciences (Other than engineering):				
Chemistry	6.4	25.5	7.3	26.1
Physics	7.0	27.9	8.2	29.3
Geology, geophysics and other earth sciences	4.1	16.3	4.3	15.3
Metallurgy	4.9	19.5	5.3	18.9
Mathematics	0.1	0.4	0.1	0.4
Other physical sciences	2.6	10.4	2.8	10.0
Totals	25.1	100.0	28.0	100.0

Life Sciences.—As indicated above, federal expenditures, excluding Defence Research Board and the Armed Forces, on the life sciences amounted to about 42% or 43% of the total, or \$35.3 million in 1958-59 and \$40.4 million in 1959-60. Expendi-

tures for all three fields in the life sciences showed an increase, however expenditures for the medical sciences showed a relatively greater increase, as illustrated in the following table.

Allocation of Expenditures in the Life Sciences Excluding the Armed Forces and the Defence Research Board, Fiscal Years 1958-59 and 1959-60

	1958-59		1959-60	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
Life sciences:				
Medicine	4.5	12.7	5.9	14.6
Agriculture	23.0	65.2	25.4	62.9
Biology	7.8	22.1	9.1	22.5
Totals, life sciences	35.3	100.0	40.4	100.0

Capital Expenditures on Research-Development Plant

Capital expenditures on research-development plant for all departments and agencies, excluding the armed forces, was \$30.6 million for 1958-59 and \$33.0 million for 1959-60. This represents 19.6% and 18.5% of total funds for scientific activities. The armed forces scientific activity being chiefly in the form of development contracts does not require significant federal capital investment.

Including the armed forces, capital expenditures on research-development plant amount to \$30.7 million for 1958-59 and \$33.0 million for 1959-60, representing 15% and 17% of total funds on scientific activities.

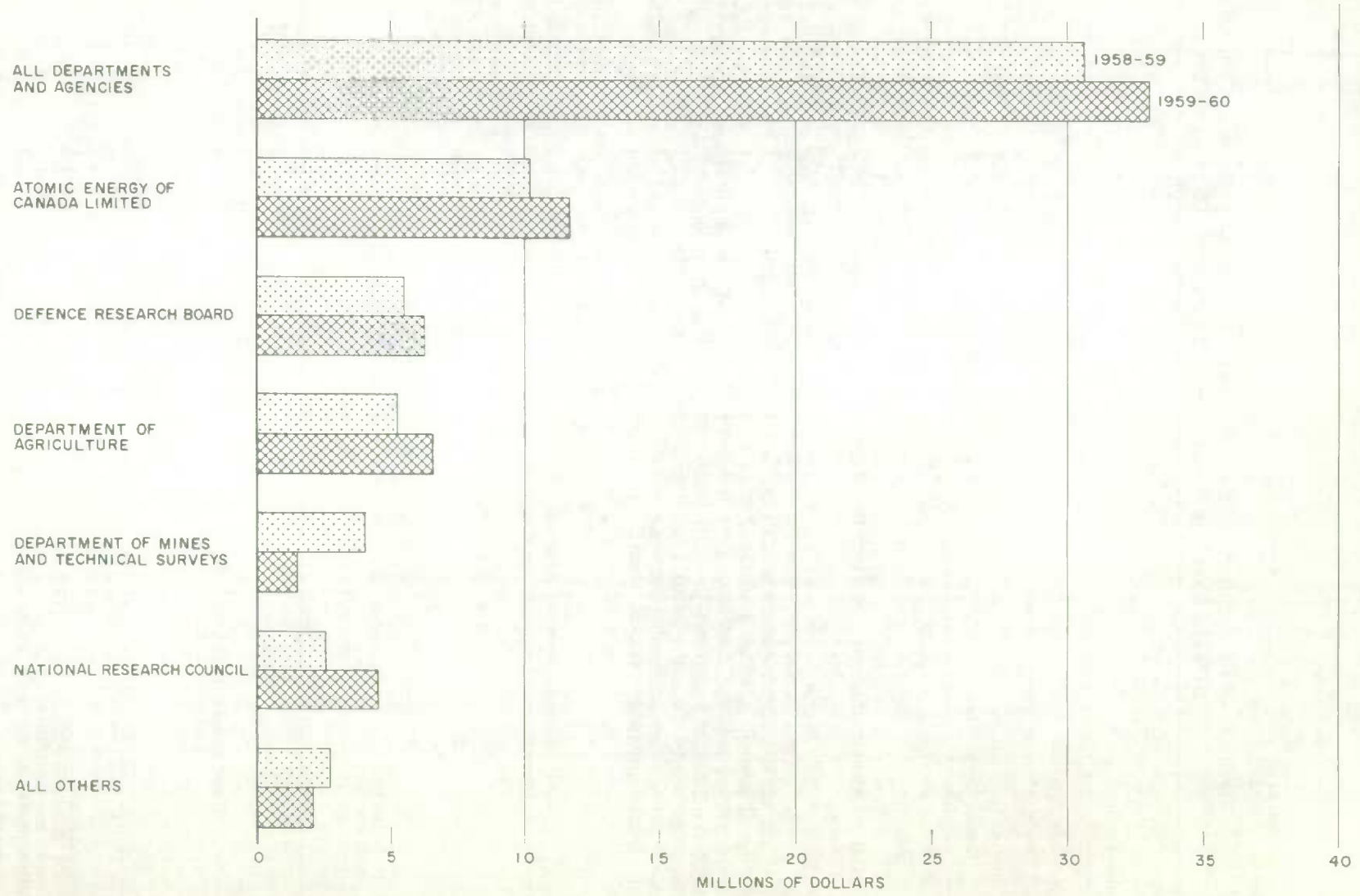
Funds for the Atomic Energy of Canada Limited, Defence Research Board and the Department of Agriculture, accounted for \$21.1 million (68.7%) in 1958-59 and \$24.7 million (74.8%) of total funds on research-development plant.

Capital Expenditures on Research-development Plant, Fiscal Years 1958-59 and 1959-60

Department or agency	1958-59		1959-60	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
Agriculture	5.3	17.3	6.7	20.3
Atomic Energy	10.2	33.2	11.7	35.5
Defence Production	0.4	1.3	—	—
External Affairs (NATO Science Fellowships)	—	—	—	—
Fisheries (excl. Fish. Res. Brd. of Canada)	0.1	0.3	0.2	0.6
Fisheries Research Board of Canada	1.4	4.6	1.1	3.3
Mines and Technical Surveys	4.1	13.4	1.6	4.9
National Film Board	—	—	—	—
National Health and Welfare	0.3	1.0	0.5	1.5
National Research Council	2.7	8.8	4.6	13.9
Northern Affairs and National Resources	0.4	1.3	0.2	0.6
Post Office	—	—	—	—
Trade and Commerce (Brd. of Grain Comm.)	0.1	0.3	—	—
Transport	—	—	0.1	0.3
Veterans Affairs	—	—	—	—
Central Mortgage and Housing Corporation	—	—	—	—
The St. Lawrence Seaway Authority	—	—	—	—
Defence Research Board	5.6	18.2	6.3	19.1
Sub-totals	30.6	99.7	33.0	100.0
Armed forces	0.1	0.3	—	—
Grand totals	30.7	100.0	33.0	100.0

CAPITAL EXPENDITURES ON RESEARCH-DEVELOPMENT PLANT

1958-59 — 1959-60



Capital Expenditures on Research-development Plant, Fiscal Years 1958-59 and 1959-60

Departments and agencies	1958-59		1959-60	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
	\$	%	\$	%
Atomic Energy	10.2	33.2	11.7	35.5
Defence Research Board.....	5.6	18.2	6.7	20.3
Agriculture	5.3	17.3	6.3	19.1
Sub-totals	21.1	68.7	24.7	74.9
Add:				
Mines and Technical Surveys	4.1	13.4	1.6	4.9
National Research Council	2.7	8.8	4.6	13.9
Sub-totals	6.8	22.2	6.2	18.8
Totals, five departments and agencies	27.9	90.9	30.9	93.7
Remaining departments and agencies	2.8	9.1	2.1	6.3
Totals, all departments and agencies	30.7	100.0	33.0	100.0

Including the Department of Mines and Technical Surveys and the National Research Council with the first three mentioned above, the proportion of Capital Expenditures on research-development plant to the total would be 90.9% (\$27.9 million) for 1958-59 and 93.7% (\$30.9 million) for 1959-60.

The remaining departments and agencies accounted for only 9.1% (\$2.8 million) of total funds applied for research-development plant for 1958-59, and 6.3% (\$2.1 million) of total funds applied for research-development plant for 1959-60. The magnitude of capital expenditures on research-development plant for the Department of Mines and Technical Surveys and the National Research Council differed in 1960. For Mines and Technical Surveys, capital expenditures on research-development plant amounted to \$4.1 million in 1958-59 and \$1.6 million in 1959-60, a decrease of \$2.5 million. For National Research Council, this item amounted to \$2.7 million in 1958-59 and \$4.6 million in 1959-60, an increase of \$1.9 million.

Federal Government Funds for Research-Development by Type of Organization Performing Scientific Activity

Intramural Performance viz. Extramural Performance, 1958-59.— The largest portion of federal government funds on scientific activities is for intramural performance, most of which is directed to the conduct of research-development. For all departments and agencies in the year 1958-59, out of a total of \$222.6 million federal funds on all scientific activities, \$162.3 million (72.9%) covered intramural performance.⁸ The remaining \$60.3 million or 27.1% was for extramural performance.⁹

⁸ "Intramural" denotes expenditures for research-development in government installations performed by federal, civilian and military personnel.

⁹ "Extramural" which includes profit organizations, educational institutions and other, denotes expenditures for research-development financed by the Federal Government but performed by non-Federal employees at outside facilities. Most of the funds for educational institutions are grants in aid of research.

**Federal Government Expenditures on Scientific Activities,
Type of Organization, Fiscal Year 1958-59**
(Extramural and Intramural Performance)

Type of organization performing scientific activity	All departments and agencies excluding armed forces and D.R.B.		All departments and agencies including armed forces including D.R.B.		Total all departments and agencies	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
	\$	%	\$	%	\$	%
Reporting unit	117.0	92.1	142.4	91.1	162.3	72.9
Profit organizations	0.8	0.7	2.3	1.5	48.7	21.9
Educational institutions	7.4	5.8	9.5	6.1	9.5	4.3
Others (including non-profit organizations)	1.8	1.4	2.1	1.3	2.1	0.9
Totals	127.0	100.0	156.3	100.0	222.6	100.0

Excluding the armed forces but including the Defence Research Board, out of a total of \$156.3 million, \$142.4 million (91.1%) was for intramural performance, leaving the remaining \$13.9 million (8.9%) for extramural performance. While, excluding the armed forces and the Defence Research Board, out of a total of \$127.0 million, \$117.0 million (92.1%) was for intramural performance with the remaining \$10.0 million (7.9%) for extramural performance.

The Defence Research Board expenditure between intramural and extramural are somewhat similar to that of the civilian agencies. The armed forces on the other hand have research done for them by Defence Research Board and a large amount of development work done under contract by profit organizations. The armed forces administrative development contracts and develop modifications and changes in existing or new equipment, as well as

collect scientific data in cooperation with civilian departments.

Intramural Performance viz. Extramural Performance, 1959-60. - For all department and agencies for the fiscal year 1959-60, out of a total of \$212.3 million, federal funds on scientific activities, \$176.7 million (83.2%) went for intramural performance, leaving the remaining \$35.6 million (16.8%) for extramural performance. If the armed forces are excluded but Defence Research Board included, out of a total of \$178.3 million, \$156.9 million (88.0%) covered intramural performance, leaving the remaining \$21.4 million (12.0%) for extramural performance. While, excluding the armed forces and Defence Research Board, out of a total of \$147.7 million, \$129.6 million (87.7%) covered intramural performance, leaving the balance of \$18.1 million (12.3%) for extramural performance.

**Federal Government Expenditures on Scientific Activities, by Type of Organization,
Fiscal Year 1959 - 60**
(Extramural and Intramural Performance)

Type of organization performing scientific activity	All departments and agencies excluding armed forces and D.R.B.		All departments and agencies excluding armed forces including D.R.B.		Total all departments and agencies	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
	\$	%	\$	%	\$	%
Reporting unit	129.6	87.7	156.9	88.0	176.7	83.2
Profit organizations	5.7	3.9	6.9	3.9	21.1	10.0
Educational institutions	10.1	6.8	12.1	6.8	12.1	5.7
Others (including non-profit organizations).....	2.3	1.6	2.4	1.3	2.4	1.1
Totals	147.7	100.0	178.3	100.0	212.3	100.0

Funds for intramural performance for 1959-60 declined from 92% to 88% for all departments and agencies, excluding Defence Research Board and the armed forces. The decline in proportions are

due to the relatively greater expenditures for extramural scientific activity incurred by the Post Office, Department of Defence Production and Atomic Energy Limited.

Extramural Scientific Activity for the Fiscal Year 1958 - 59

Type of organization performing scientific activity (extramural performance only)	All departments and agencies excluding armed forces and D.R.B.		All departments and agencies excluding armed forces including D.R.B.		Total all departments and agencies	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
	\$	%	\$	%	\$	%
Profit organizations	0.8	8.0	2.3	16.6	48.7	80.8
Educational institutions	7.4	74.0	9.5	68.3	9.5	15.7
Others (including non-profit organizations).....	1.8	18.0	2.1	15.1	2.1	3.5
Totals	10.0	100.0	13.9	100.0	60.3	100.0

Extramural Scientific Activity for the Fiscal Year 1959 - 60

Type of organization performing scientific activity (extramural performance only)	All departments and agencies excluding armed forces and D.R.B.		All departments and agencies excluding armed forces including D.R.B.		Total all departments and agencies	
	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total	Millions of dollars	Per cent of total
	\$	%	\$	%	\$	%
Profit organizations.....	5.7	31.5	6.9	32.2	21.1	59.3
Educational institutions.....	10.1	55.8	12.1	56.6	12.1	34.0
Others (including non-profit organizations).....	2.3	12.7	2.4	11.2	2.4	6.7
Totals	18.1	100.0	21.4	100.0	35.6	100.0

Extramural Performance of Scientific Activity, Fiscal Years 1958 - 59 and 1959 - 60

All Departments and Agencies.— Federal funds for extramural performance amounted to \$60.3 million in 1958-59 and \$35.6 million in 1959-60, for all departments and agencies. This decrease of \$24.7 million, is due to the decline in development contracts for the armed forces.

In 1958-59, \$48.7 million (80.8%) out of \$60.3 million was for profit organizations, \$48.3 million being for the conduct of research-development, (See Table). The remaining \$9.5 million, or 15.7%, mostly grants in aid of research and scholarships, was for educational institutions and \$2.1 million or 3.5% for other organizations, including non-profit institutions. In 1959-60, \$21.1 million (59.3%) out of \$35.6 million went for profit organizations, leaving the remainder of \$12.1 million or 34.0% for educational institutions and \$2.4 million (6.7%) for other institutions.¹⁰

All Departments and Agencies Including Defence Research Board but Excluding the Armed Forces.— Federal funds for extramural performance, including Defence Research Board but excluding the armed forces, amounted to \$13.9 million in 1958-59 and \$21.4 million in 1959-60, an increase of \$7.5 million. Out of \$13.9 million in 1958-59, \$2.3 million (16.6%) was for profit organizations, \$9.5 million (68.3%) for educational institutions and \$2.1 million (15.1%) for other institutions. In 1959-60, funds for profit organizations were \$6.9 million (32.2%) out of a total of \$21.4 million. Funds for educational institutions were \$12.1 million (56.6%) and \$2.4 million (11.2%) went to other institutions.

All Departments and Agencies Excluding Defence Research Board and the Armed Forces.— Excluding the armed forces and Defence Research

¹⁰ A few of these institutions are affiliated with educational institutions.

Board, in 1958-59, out of \$10.0 million for extramural scientific activities, \$0.8 million (8%) went to profit organizations, \$7.4 million (74.0%) to educational institutions and \$1.8 million (18.0%) to other institutions. In 1959-60, out of \$18.1 million, \$5.7 million (31.5%) went to profit organizations. The remainder, \$10.1 million (55.8%) and \$2.3 million (12.7%) went to educational institutions and other institutions.

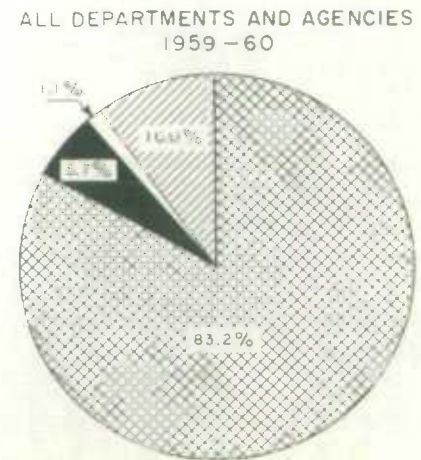
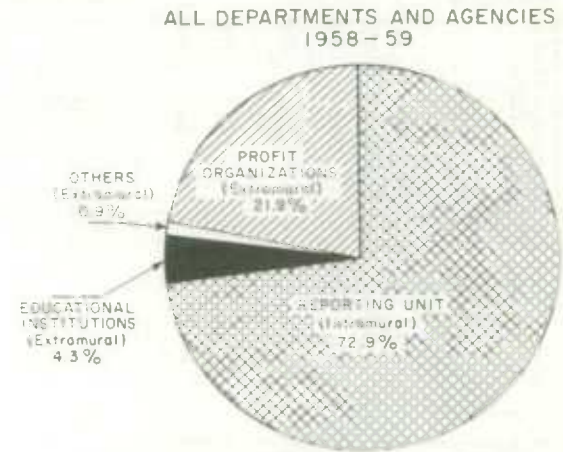
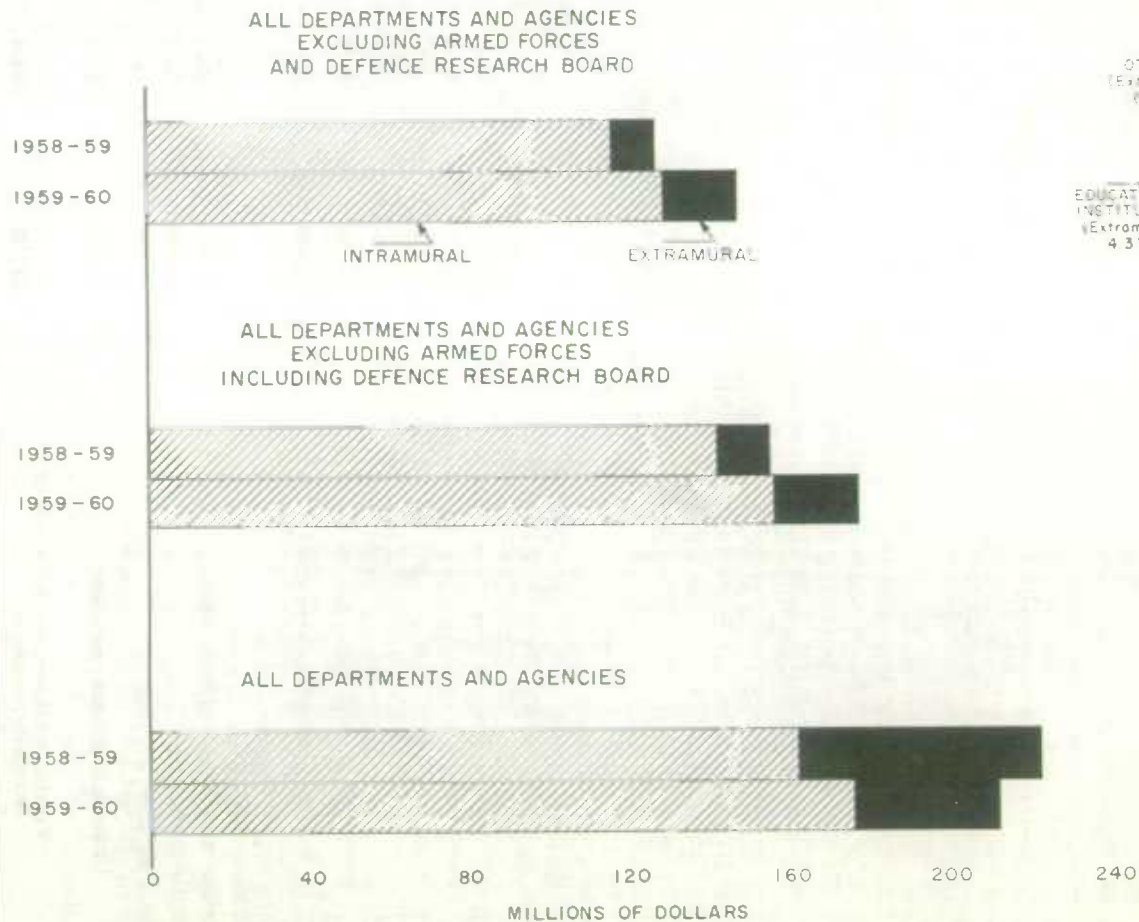
The greater proportion of federal funds directed to profit organizations in 1959-60, was due to the increase in expenditures by the Post Office Department, Defence Production and Atomic Energy of Canada Ltd.

Level of Training of Professional Scientists Employed in the Conduct of Research-development

For the fiscal year 1958-59, a total of 14,698 persons were employed on the conduct of research-development by Federal departments and agencies, excluding the armed forces. Of this total, professional personnel number 3,871 (26.3%) and supporting personnel made up for the remaining 10,827 (73.7%). Excluding the armed forces and Defence Research Board, professional personnel represent 3,289 (27.9%) out of a total of 11,783, leaving the balance of 8,494 (72.1%) representing the supporting personnel.

For all departments and agencies, excluding the armed forces but including the Defence Research Board, out of a total of 3,871 professional scientists, 1,504 (38.8%) had Bachelor degrees, 994 (25.7%) had Master degrees and 1,373 (35.5%) had Doctorate degrees. Excluding the armed forces and Defence Research Board, out of a total of 3,289 professional scientists, 1,275 (38.8%) had Bachelor degrees, 820 (24.9%) had Master degrees and 1,194 (36.3%) had Doctorate degrees.

FEDERAL GOVERNMENT EXPENDITURES ON SCIENTIFIC ACTIVITIES
INTRAMURAL AND EXTRAMURAL PERFORMANCE
FISCAL YEARS 1958-59 AND 1959-60



Personnel Employed in the Conduct of Research-development as of March 31, 1959

	All departments and agencies excluding armed forces and D.R.B.				All departments and agencies excluding armed forces including D.R.B.			
	Level of training			Total	Level of training			Total
	Bachelor	Master	Doctorate		Bachelor	Master	Doctorate	
Professional personnel:								
Physical scientists:								
Engineers	415	101	41	557	505	143	55	703
Others	336	188	540	1,064	433	273	634	1,340
Sub-totals	751	289	581	1,621	938	416	689	2,043
Life scientists	425	469	478	1,372	430	492	513	1,435
Others	99	62	135	296	136	86	171	393
Sub-totals	524	531	613	1,668	566	578	684	1,828
Totals, professional personnel	1,275	820	1,194	3,289	1,504	994	1,373	3,871
Supporting personnel:								
Research-development technicians ..				2,908				3,680
Skilled craftsmen				1,481				1,587
Other supporting personnel.....				4,105				5,560
Totals, supporting personnel				8,494				10,827
Totals, employed in the con- duct of research-development				11,783¹				14,698¹

¹ In addition, the armed forces employed about 2,000 personnel in the conduct of research-development.

Personnel Employed in the Conduct of Research-development for the Fiscal Year 1958 - 59

	All departments and agencies excluding armed forces and D.R.B.		All departments and agencies excluding armed forces including D.R.B.	
	Number	Per cent	Number	Per cent
Professional personnel:				
Physical scientists:				
Engineers	557	4.7	703	4.8
Others	1,064	9.0	1,340	9.1
Sub-totals	1,621	13.7	2,043	13.9
Life scientists	1,372	11.7	1,435	9.8
Others	296	2.5	393	2.7
Sub-totals	1,668	14.2	1,828	12.5
Totals, professional personnel	3,259	27.9	3,871	26.4
Supporting personnel:				
Research-development technicians	2,908	24.7	3,680	25.0
Skilled craftsmen	1,481	12.6	1,587	10.8
Other supporting personnel	4,105	34.8	5,560	37.8
Totals, supporting personnel	8,494	72.1	10,827	73.6
Totals, employed in the conduct of re- search-development	11,783	100.0	14,698	100.0

As illustrated in the following table, six departments and agencies employed the largest portion of professional scientists. For all departments and agencies, excluding the armed forces but including

the Defence Research Board, these departments had 3,469 professional scientists employed in the conduct of research-development, representing 89.6% out of a total of 3,871.

Departments and agencies	Number of professional scientists
Agriculture	1,141
National Research Council	613
Defence Research Board	582
Mines and Technical Surveys	486
Atomic Energy of Canada Ltd.	363
Northern Affairs and National Resources	284
Totals	3,469 (89.6% of 3,871)

The following table shows, in order of magnitude, the major departments and agencies excluding the armed forces who provided the largest portion

of professional scientists employed in the conduct of research-development, according to their level of training:

Major Departments and Agencies (Excluding the Armed Forces) Employing Professional Scientists for the Fiscal Year 1958-59

Bachelor Degrees		Master Degrees		Doctorate Degrees	
Agriculture	359	Agriculture	403	Agriculture	379
Defence Research Board	229	Defence Research Board	174	National Research Council	347
Mines and Technical Surveys	229	National Research Council	117	Defence Research Board	179
Atomic Energy of Canada Ltd.	201	Mines and Technical Surveys	87	Mines and Technical Surveys	170
Northern Affairs and Nat. Res.	164	Northern Affairs and Nat. Res.	86	Atomic Energy of Canada Ltd. ...	113
National Research Council	149	Fish. Res. Board	58	Fish. Res. Board	84
National Health and Welfare	86	Atomic Energy of Canada Ltd.	49	Northern Affairs and Nat. Res. ...	34
				Veterans Affairs	29
				National Health and Welfare	26
Total	1,417	Total	974	Total	1,361
	(94.2% of 1,504)		(98.0% of 994)		(99.1% of 1,373)

Distribution of Professional Personnel Employed in Various Scientific Fields

About half (49.3% or 1,521) of the professional scientists employed by all departments and agencies (excluding armed forces and Defence Research Board) were physical scientists, 1,372 (41.7%) were

life scientists and 296 (9.0%) were administrators of research-development or performed other scientific duties relating to the conduct of research-development. Including the Defence Research Board, the proportion of life scientists to the total would decline slightly since they employed a relatively larger number of engineers and physicists.

Scientific field	All departments and agencies excluding armed forces and D.R.B.		All departments and agencies excluding armed forces including D.R.B.	
	Number	Per cent	Number	Per cent
Physical scientists:				
Engineers	557	16.9	703	18.2
Other physical scientists	1,064	32.4	1,340	34.6
Sub-totals	1,621	49.3	2,043	52.8
Life scientists	1,372	41.7	1,435	37.0
Others	296	9.0	393	10.2
Sub-totals	1,668	50.7	1,828	47.2
Totals	3,289	100.0	3,871	100.0

Supporting Personnel Employed in the Conduct of Research-development

Excluding the armed forces, a total of 10,827 supporting personnel was employed in the conduct of research-development. Almost one-third (34.0% or 3,680) were employed as research-development technicians,¹¹ 14.6% or 1,587 as skilled craftsmen¹²

and the remaining half (51.4% or 5,560) as other supporting personnel.¹³

¹¹ Technicians are employed as laboratory technicians and assistants, draftsmen, etc., and assist scientists and engineers in research-development work.

¹² Skilled craftsmen are workers specially trained for research-development work, such as glass blowers, machinists, model-makers, etc.

¹³ Other supporting personnel involves all persons employed whose pay is included in the cost of the conduct of research-development.

Supporting personnel	Number	Per cent of total
Research-development technicians	3,680	34.0
Skilled craftsmen	1,587	14.6
Other supporting personnel	5,560	51.4
Totals	10,827	100.0

SECTION II

STATISTICAL TABLES

TABLE 1. Federal Government Expenditures on All Scientific Activities, by Scientific Activity Component and Organization, Fiscal Years 1958-59 and 1959-60

Scientific activity component	1958-59						1959-60					
	Total funds applied	Organization performing research					Total funds applied	Organization performing research				
		Report- ing unit	Profit organi- zation	Educa- tional institu- tions	Other non- profit institu- tions	Others		Report- ing unit	Profit organi- zation	Educa- tional institu- tions	Other non- profit institu- tions	Others
thousands of dollars												
Scientific research-development:												
Total conduct of research-development including planning and administering research-development	168,357	111,146	48,265 ¹	7,792	1,017	137	151,788	119,498	21,123	9,788	1,098	280
Capital expenditures on research-development plant	30,684	29,558	415	631	80	-	33,038	32,211	50	682	96	-
Sub-totals	199,041	140,704	48,680	7,423	1,097	137	184,826	151,709	21,173	10,470	1,194	280
Other scientific activities:												
Scientific data collection	18,071	17,242	-	2	-	827	20,577	19,721	-	2	-	854
Scientific information	4,113	4,059	-	-	3	50	4,911	4,908	-	-	3	-
Scholarship and fellowship programs	1,329	303	-	1,016	10	-	2,002	338	-	1,612	10	42
Sub-totals	23,513	21,604	-	1,018	13	877	27,490	24,967	-	1,614	13	896
Totals, funds applied	222,554	162,309	48,680	9,441	1,110	1,014	212,316	176,676	21,173	12,084	1,207	1,176

¹ Does not include research charges made on procurement contracts.
Note: Detail will not necessarily add to total because of rounding.

TABLE 2. Federal Government Expenditures on Scientific Activities, by Scientific Activity Component and Organization, (Excluding Armed Forces and D.R.B.) Fiscal Years 1958-59 and 1959-60

Scientific activity component	1958-59						1959-60 (estimated)					
	Total funds applied	Organization performing research					Total funds applied	Organization performing research				
		Report- ing unit	Profit organi- zations	Educa- tional institu- tions	Other non- profit institu- tions	Others		Report- ing unit	Profit organi- zations	Educa- tional institu- tions	Other non- profit institu- tions	Others
thousands of dollars												
Scientific research-development:												
Total conduct of research-development including planning and administering research-development	80,817	73,346	425 ¹	6,192	717	137	95,768	80,599	5,703	8,188	998	280
Capital expenditures on research-development plant	24,990	24,364	415	131	80	-	26,730	26,302	50	282	96	-
Sub-totals	105,807	97,710	840	6,323	797	137	122,498	106,901	5,753	8,470	1,094	280
Other scientific activities:												
Scientific data collection	16,426	15,597	-	2	-	827	18,935	18,079	-	2	-	854
Scientific information	3,463	3,409	-	-	4	50	4,261	4,258	-	-	3	-
Scholarship and fellowship programs	1,329	303	-	1,016	10	-	2,002	338	-	1,612	10	42
Sub-totals	21,218	19,309	-	1,018	14	877	25,198	22,675	-	1,614	13	896
Totals, funds applied	127,025	117,020	840	7,341	810	1,014	147,696	129,576	5,753	10,084	1,107	1,176

¹ Does not include research charges made on procurement contracts.
Note: Detail will not necessarily add to total because of rounding.

TABLE 3. Federal Government Expenditures on Scientific Activities, by Department or Agency, Fiscal Year 1958-59

Department or agency	Total funds applied	Scientific research-development			Other scientific activities			
		Conduct of research-development	Capital expenditures on research-development	Sub-total	Scientific data collection	Scientific information	Scholarship and fellowship program	Sub-total
thousands of dollars								
Agriculture:								
Administration branch	160	—	—	—	—	160	—	160
Production and Marketing Branch	1,015	1,015	—	1,015	—	—	—	—
Research Branch	26,038	20,488	5,300	25,788	—	250	—	250
Sub-totals	27,213	21,504	5,300	26,804	—	410	—	410
Atomic energy:								
Atomic Energy Control Board	400	400	—	400	—	—	—	—
Atomic Energy of Canada Limited	27,545	17,400	10,141	27,541	—	—	5	5
Sub-totals	27,945	17,800	10,141	27,941	—	—	5	5
Defence production	416	—	416	416	—	—	—	—
External Affairs (NATO Science Fellowships)	—	—	—	—	—	—	—	—
Fisheries (excluding Fisheries Research Board of Canada):								
Conservation and Development Service	112	34	78	112	—	—	—	—
Industrial Development Service	465	381	43	424	40	—	—	40
Inspection and Consumer Service	21	6	—	6	15	—	—	15
Sub-totals	597	421	121	542	55	—	—	55
Fisheries Research Board of Canada	5,711	4,251	1,435	5,686	—	—	25	25
Mines and Technical Surveys:								
Dominion Observatories Branch	1,515	866	509	1,375	98	42	—	140
Geographical Branch	334	287	3	290	—	44	—	44
Geological Survey of Canada	6,180	1,414	3,316	4,730	1,010	390	50	1,450
Mines Branch	3,743	3,454	253	3,707	—	36	—	36
Polar Continental Shelf Project	78	59	3	62	16	—	—	16
Surveys and Mapping Branch	15,205	—	—	—	13,952	1,254	—	15,206
Sub-totals	27,055	6,080	4,084	10,164	15,076	1,765	50	16,892
National Film Board	36	28	8	36	—	—	—	—
National Health and Welfare	3,062	2,751	311	3,062	—	—	—	—
National Research Council	27,160	22,208	2,683	24,891	—	1,033	1,236	2,269
Northern Affairs and National Resources:								
Northern Co-ordination and Research Centre	23	6	—	6	2	—	14	16
National Parks Branch	595	565	15	580	3	13	—	16
Water Resources Branch	1,614	1,614	—	1,614	—	—	—	—
Forestry Branch	3,732	2,398	393	2,791	903	38	—	941
National Museum of Canada	285	89	—	89	—	196	—	196
Sub-totals	6,249	4,671	408	5,079	908	247	14	1,169
Post Office	195	195	—	195	—	—	—	—
Trade and Commerce (Board of Grain Commissioners)	325	119	74	193	130	2	—	132
Transport (Air Services):								
Telecommunications Division	264	7	—	7	257	—	—	257
Meteorological Division	202	193	9	202	—	—	—	—
Sub-totals	466	200	9	209	257	—	—	257
Veterans Affairs	324	323	—	323	—	—	—	—
Central Mortgage and Housing Corporation	148	143	—	143	—	5	—	5
The St. Lawrence Seaway Authority	123	123	—	123	—	—	—	—
Totals	127,025	80,817	24,990	105,807	16,426	3,463	1,329	21,219
National Defence (excluding Defence Research Board)	66,229	64,340	94	51,434	1,644	150	—	1,794
Defence Research Board	29,300	23,200	5,600	28,800	—	500	—	500
Totals, all departments and agencies	222,554	168,357	30,684	186,041	18,071	4,113	1,329	23,513

Note: Detail will not necessarily add to total because of rounding.

TABLE 4. Federal Government Expenditures on Scientific Activities, by Department or Agency, Fiscal Year 1959-60

Department or agency	Total funds applied	Scientific research-development			Other scientific research-development			
		Conduct of research-development	Capital expenditures on research-development	Sub-total	Scientific data collection	Scientific information	Scholarship and fellowship program	Sub-total
thousands of dollars								
Agriculture:								
Administration Branch	166	—	—	—	—	166	—	166
Production and Marketing Branch	1,146	1,146	—	1,146	—	—	—	—
Research Branch	29,758	22,691	6,721	29,412	—	346	—	346
Sub-totals	31,069	23,837	6,721	30,558	—	512	—	512
Atomic Energy:								
Atomic Energy Control Board	650	540	110	650	—	—	—	—
Atomic Energy of Canada Limited	32,130	20,550	11,547	32,097	—	—	33	33
Sub-totals	32,780	21,090	11,657	32,747	—	—	33	33
Defence Production	2,800	2,750	50	2,800	—	—	—	—
External Affairs (NATO Science Fellowships)	42	—	—	—	—	—	42	42
Fisheries (excluding Fisheries Research Board of Canada):								
Conservation and Development Service	149	42	107	149	—	—	—	—
Industrial Development Service	699	525	111	636	63	—	—	63
Inspection and Consumer Service	7	4	—	4	3	—	—	3
Sub-totals	855	571	218	789	66	—	—	66
Fisheries Research Board of Canada	5,909	4,831	1,053	5,884	—	—	25	25
Mines and Technical Surveys:								
Dominion Observatories Branch	1,275	303	805	1,108	129	38	—	167
Geographical Branch	363	293	13	306	—	58	—	58
Geological Survey of Canada	3,931	1,659	485	2,144	1,330	407	50	1,787
Mines Branch	4,003	3,688	270	3,958	—	45	—	45
Polar Continental Shelf Project	954	376	50	426	528	—	—	528
Surveys and Mapping Branch	17,157	—	—	—	15,515	1,642	—	17,157
Sub-totals	27,684	6,318	1,623	7,941	17,503	2,191	50	19,742
National Film Board	29	21	8	29	—	—	—	—
National Health and Welfare	4,310	3,842	468	4,310	—	—	—	—
National Research Council	32,824	25,161	4,604	29,765	—	1,219	1,840	3,059
Northern Affairs and National Resources:								
Northern Co-ordination and Research Centre	20	6	—	6	1	—	12	13
National Parks Branch	692	660	8	668	5	19	—	24
Water Resources Branch	2,095	2,095	—	2,095	—	—	—	—
Forestry Branch	3,793	2,578	212	2,790	938	64	—	1,002
National Museum of Canada	329	93	—	93	—	236	—	236
Sub-totals	6,928	5,434	220	5,654	943	320	12	1,275
Post Office	1,028	1,028	—	1,028	—	—	—	—
Trade and Commerce (Board of Grain Commissioners)	323	140	50	190	130	3	—	133
Transport (Air Services):								
Telecommunications Division	314	20	—	20	294	—	—	294
Meteorological Division	279	221	59	280	—	—	—	—
Sub-totals	593	241	59	300	294	—	—	294
Veterans Affairs	350	350	—	350	—	—	—	—
Central Mortgage and Housing Corporation	172	156	—	156	—	17	—	173
The St. Lawrence Seaway Authority	—	—	—	—	—	—	—	—
Totals	147,696	95,768	26,730	122,498	18,935	4,261	2,002	25,198
National Defence (excluding Defence Research Board)	34,020	32,220	8	19,228	1,642	150	—	1,792
Defence Research Board	30,600	23,800	6,300	30,100	—	500	—	500
Totals, all departments and agencies	212,316	151,788	33,038	171,826	20,577	4,911	2,002	27,490

Note: Detail will not necessarily add to total because of rounding.

TABLE 5. Federal Government Expenditures on All Scientific Activities, by Department or Agency and Organization, Fiscal Years 1958-59 and 1959-60

Department or agency	1958-59					1959-60				
	Total funds applied	Organization performing research				Total funds applied	Organization performing research			
		Reporting unit	Profit organizations	Educational institutions	Others ¹		Reporting unit	Profit organizations	Educational institutions	Others ¹
thousands of dollars										
Agriculture:										
Administration Branch	160	160	—	—	—	166	166	—	—	—
Production and Marketing Branch	1,015	1,015	—	—	—	1,146	1,146	—	—	—
Research Branch	26,038	25,852	—	134	52	29,758	29,570	—	185	2
Sub-totals	27,213	27,027	—	134	52	31,069	30,882	—	185	2
Atomic Energy:										
Atomic Energy Control Board	400	—	—	400	—	650	—	—	650	—
Atomic Energy of Canada Limited	27,545	27,107	396	42	—	32,130	30,157	1,922	50	—
Sub-totals	27,945	27,107	396	442	—	32,780	30,157	1,922	700	—
Defence Production	416	—	416	—	—	2,800	—	2,800	—	—
External Affairs (NATO Science Fellowships)	—	—	—	—	—	42	—	—	—	42
Fisheries (excluding Fisheries Research Board of Canada):										
Conservation and Development Service	112	112	—	—	—	149	149	—	—	—
Industrial Development Service	465	457	—	8	—	699	667	—	15	17
Inspection and Consumer Service	21	21	—	—	—	7	7	—	—	—
Sub-totals	597	590	—	8	—	855	823	—	15	17
Fisheries Research Board of Canada	5,711	5,711	—	—	—	5,909	5,909	—	—	—
Mines and Technical Surveys:										
Dominion Observatories Branch	1,515	1,510	—	2	4	1,275	1,269	—	2	4
Geographical Branch	334	330	—	4	—	363	359	—	4	—
Geological Survey of Canada	6,180	6,180	—	—	—	3,931	3,931	—	—	—
Mines Branch	3,743	3,743	—	—	—	4,003	4,003	—	—	—
Polar Continental Shelf Project	78	78	—	—	—	954	954	—	—	—
Surveys and Mapping Branch	15,205	15,205	—	—	—	17,157	17,157	—	—	—
Sub-totals	27,055	27,046	—	6	4	27,694	27,675	—	6	4
National Film Board	36	36	—	—	—	29	29	—	—	—
National Health and Welfare	3,062	1,117	—	1,232	713	4,310	1,656	—	1,629	1,025
National Research Council	27,160	21,597	—	5,502	61	32,824	25,224	—	7,537	63
Northern Affairs and National Resources:										
Northern Co-ordination and Research Centre	23	13	—	—	10	20	10	—	—	10
National Parks Branch	595	595	—	—	—	691	691	—	—	—
Water Resources Branch	1,614	1,502	—	—	112	2,095	1,875	—	—	220
Forestry Branch	3,732	2,906	—	—	827	3,793	2,939	—	—	854
National Museum of Canada	285	285	—	—	—	329	329	—	—	—
Sub-totals	6,249	5,301	—	—	948	6,928	5,844	—	—	1,084
Post Office	195	169	17	—	9	1,028	—	1,028	—	—
Trade and Commerce (Board of Grain Commissioners)	325	324	1	—	—	323	322	—	—	—
Transport (Air Services):										
Telecommunications Division	264	264	—	—	—	314	314	—	—	—
Meteorological Division	202	202	—	—	—	279	279	—	—	—
Sub-totals	466	466	—	—	—	593	593	—	—	—
Veterans Affairs	324	306	—	17	—	350	338	—	12	—
Central Mortgage and Housing Corporation	148	111	1	—	36	172	124	2	—	47
The St. Lawrence Seaway Authority	123	113	10	—	—	—	—	—	—	—
Totals	127,025	117,020	840	7,341	1,824	147,696	129,576	5,753	10,084	2,283
National Defence (excluding Defence Research Board)	66,228	19,888	46,340	—	—	34,020	19,800	14,220	—	—
Defence Research Board	29,300	25,400	1,500	2,100	300	30,600	27,300	1,200	2,000	100
Totals, all departments and agencies	222,554	162,309	48,680	9,441	2,124	212,316	176,676	21,173	12,084	2,383

¹ Includes other non-profit organizations and other governments.

Note: Detail will not necessarily add to total because of rounding.

TABLE 6. Federal Government Expenditures on Conduct of Research-development, by Department or Agency and Organization Performing Research, Fiscal Years 1958-59 and 1959-60

Department or agency	1958-59					1959-60				
	Total conduct of research-development	Organization performing research				Total conduct of research-development	Organization performing research			
		Reporting unit	Profit organizations	Educational institutions	Others ¹		Reporting unit	Profit organizations	Educational institutions	Others ¹
thousands of dollars										
Agriculture:										
Administration Branch	—	—	—	—	—	—	—	—	—	—
Production and Marketing Branch	1,015	1,015	—	—	—	1,146	1,146	—	—	—
Research Branch	20,488	20,352	—	134	2	22,691	22,504	—	185	2
Sub-totals	21,504	21,367	—	134	2	23,837	23,649	—	185	2
Atomic Energy:										
Atomic Energy Control Board	400	—	—	400	—	540	—	—	540	—
Atomic Energy of Canada Limited	17,400	16,962	396	42	—	20,550	18,578	1,922	50	—
Sub-totals	17,800	16,962	396	442	—	21,090	18,578	1,922	590	—
Defence Production	—	—	—	—	—	2,750	—	2,750	—	—
External Affairs (NATO Science Fellowships).....	—	—	—	—	—	—	—	—	—	—
Fisheries (excluding Fisheries Research Board of Canada):										
Conservation and Development Service	34	34	—	—	—	42	42	—	—	—
Industrial Development Service	381	374	—	8	—	525	493	—	15	17
Inspection and Consumer Service	6	6	—	—	—	4	4	—	—	—
Sub-totals	421	413	—	8	—	571	539	—	15	17
Fisheries Research Board of Canada.....	4,251	4,251	—	—	—	4,831	4,831	—	—	—
Mines and Technical Surveys:										
Dominion Observatories Branch	866	866	—	—	—	302	302	—	—	—
Geographical Branch.....	287	284	—	4	—	293	289	—	4	—
Geological Survey of Canada.....	1,414	1,414	—	—	—	1,659	1,659	—	—	—
Mines Branch.....	3,454	3,454	—	—	—	3,688	3,688	—	—	—
Polar Continental Shelf Project	59	59	—	—	—	376	376	—	—	—
Surveys and Mapping Branch	—	—	—	—	—	—	—	—	—	—
Sub-totals	6,080	6,077	—	4	—	6,318	6,314	—	4	—
National Film Board	28	28	—	—	—	21	21	—	—	—
National Health and Welfare	2,751	1,017	—	1,101	633	3,842	1,456	—	1,458	929
National Research Council	22,208	17,661	—	4,486	61	25,161	19,173	—	5,925	63
Northern Affairs and National Resources:										
Northern Co-ordination and Research Centre	6	6	—	—	—	6	6	—	—	—
National Parks Branch	565	565	—	—	—	660	660	—	—	—
Water Resources Branch.....	1,614	1,502	—	—	112	2,095	1,875	—	—	220
Forestry Branch.....	2,398	2,398	—	—	—	2,578	2,578	—	—	—
National Museum of Canada.....	69	89	—	—	—	93	93	—	—	—
Sub-totals	4,671	4,559	—	—	112	5,433	5,213	—	—	220
Post Office.....	195	169	17	—	9	1,028	—	1,028	—	—
Trade and Commerce (Board of Grain Commissioners)	119	118	1	—	—	140	139	1	—	—
Transport (Air Services):										
Telecommunications Division	7	7	—	—	—	20	20	—	—	—
Meteorological Division	193	193	—	—	—	221	221	—	—	—
Sub-totals	200	200	—	—	—	241	241	—	—	—
Veterans Affairs	323	306	—	17	—	350	338	—	12	—
Central Mortgage and Housing Corporation.....	143	106	1	—	36	156	107	2	—	47
The St. Lawrence Seaway Authority.....	123	113	10	—	—	—	—	—	—	—
Totals	80,817	73,346	425	6,192	854	95,768	80,598	5,703	8,188	1,260
National Defence (excluding Defence Research Board)	64,340	18,000	46,340	—	—	32,220	18,000	14,220	—	—
Defence Research Board	23,200	19,800	1,500	1,600	300	23,800	20,900	1,200	1,600	100
Totals, all departments and agencies	168,357	111,146	48,265	7,792	1,154	151,786	119,498	21,123	9,788	1,378

¹ Includes other non-profit organizations and other governments.
 Note: Detail will not necessarily add to total because of rounding.

TABLE 8. Federal Government Expenditures on Scientific Information Distributed by Department or Agency and Organization, Fiscal Years 1958-59 and 1959-60

Department or agency	1958-59			1959-60		
	Total funds applied	Performing organization		Total funds applied	Performing organization	
		Reporting unit (within agency)	Others ¹		Reporting unit (within agency)	Others ¹
thousands of dollars						
Agriculture:						
Administration Branch	160	160	—	166	166	—
Production and Marketing Branch	—	—	—	—	—	—
Research Branch	250	200	50	346	346	—
Sub-totals	410	360	50	512	512	—
Atomic Energy:						
Atomic Energy Control Board	—	—	—	—	—	—
Atomic Energy of Canada Limited	—	—	—	—	—	—
Sub-totals	—	—	—	—	—	—
Defence Production	—	—	—	—	—	—
External Affairs (NATO Science Fellowships)	—	—	—	—	—	—
Fisheries (excluding Fisheries Research Board of Canada):						
Conservation and Development Service	—	—	—	—	—	—
Industrial Development Service	—	—	—	—	—	—
Inspection and Consumer Service	—	—	—	—	—	—
Sub-totals	—	—	—	—	—	—
Fisheries Research Board of Canada	—	—	—	—	—	—
Mines and Technical Surveys:						
Dominion Observatories Branch	42	38	4	38	35	4
Geographical Branch	44	44	—	58	58	—
Geological Survey of Canada	390	390	—	407	407	—
Mines Branch	36	36	—	45	45	—
Polar Continental Shelf Project	—	—	—	—	—	—
Surveys and Mapping Branch	1,294	1,294	—	1,642	1,642	—
Sub-totals	1,765	1,762	4	2,190	2,187	4
National Film Board	—	—	—	—	—	—
National Health and Welfare	—	—	—	—	—	—
National Research Council	1,033	1,033	—	1,219	1,219	—
Northern Affairs and National Resources:						
Northern Co-ordination and Research Centre	—	—	—	—	—	—
National Parks Branch	13	13	—	19	19	—
Water Resources Branch	—	—	—	—	—	—
Forestry Branch	38	38	—	64	64	—
National Museum of Canada	196	196	—	236	236	—
Sub-totals	247	247	—	320	320	—
Post Office	—	—	—	—	—	—
Trade and Commerce (Board of Grain Commissioners)	2	2	—	3	3	—
Transport (Air Services):						
Telecommunications Division	—	—	—	—	—	—
Meteorological Division	—	—	—	—	—	—
Sub-totals	—	—	—	—	—	—
Veterans Affairs	—	—	—	—	—	—
Central Mortgage and Housing Corporation	5	5	—	17	17	—
The St. Lawrence Seaway Authority	—	—	—	—	—	—
Totals	3,463	3,409	54	4,261	4,258	4
National Defence (excluding Defence Research Board)	150	150	—	150	150	—
Defence Research Board	500	500	—	500	500	—
Totals, all departments and agencies	4,113	4,059	54	4,911	4,908	4

¹ Including profit organizations and educational institutions.

Note: Detail will not necessarily add to total because of rounding.

TABLE 7. Federal Government Expenditures on Data Collection on Natural Phenomena, by Department or Agency and Organization, Fiscal Years 1958-59 and 1959-60

Department or agency	1958-59			1959-60		
	Total funds applied	Performing organization		Total funds applied	Performing organization	
		Reporting unit (within agency)	Others ¹		Reporting unit (within agency)	Others ¹
thousands of dollars						
Agriculture:						
Administration Branch	-	-	-	-	-	-
Production and Marketing Branch	-	-	-	-	-	-
Research Branch	-	-	-	-	-	-
Sub-totals	-	-	-	-	-	-
Atomic Energy:						
Atomic Energy Control Board	-	-	-	-	-	-
Atomic Energy of Canada Limited	-	-	-	-	-	-
Sub-totals	-	-	-	-	-	-
Defence Production	-	-	-	-	-	-
External Affairs (NATO Science Fellowships)	-	-	-	-	-	-
Fisheries (excluding Fisheries Research Board of Canada):						
Conservation and Development Service	40	40	-	63	63	-
Industrial Development Service	15	15	-	3	3	-
Inspection and Consumer Service	-	-	-	-	-	-
Sub-totals	55	55	-	66	66	-
Fisheries Research Board of Canada	-	-	-	-	-	-
Mines and Technical Surveys:						
Dominion Observatories Branch	98	96	2	129	127	2
Geographical Branch	-	-	-	-	-	-
Geological Survey of Canada	1,010	1,010	-	1,330	1,330	-
Mines Branch	-	-	-	-	-	-
Polar Continental Shelf Project	16	16	-	529	529	-
Surveys and Mapping Branch	13,952	13,952	-	15,516	15,516	-
Sub-totals	15,076	15,074	2	17,503	17,501	2
National Film Board	-	-	-	-	-	-
National Health and Welfare	-	-	-	-	-	-
National Research Council	-	-	-	-	-	-
Northern Affairs and National Resources:						
Northern Co-ordination and Research Centre	2	2	-	1	1	-
National Parks Branch	3	3	-	4	4	-
Water Resources Branch	-	-	-	-	-	-
Forestry Branch	903	76	827	938	84	854
National Museum of Canada	-	-	-	-	-	-
Sub-totals	908	82	827	943	89	854
Post Office	-	-	-	-	-	-
Trade and Commerce (Board of Grain Commissioners)	130	130	-	130	130	-
Transport (Air Services):						
Telecommunications Division	257	257	-	294	294	-
Meteorological Division	-	-	-	-	-	-
Sub-totals	257	257	-	294	294	-
Veterans Affairs	-	-	-	-	-	-
Central Mortgage and Housing Corporation	-	-	-	-	-	-
The St. Lawrence Seaway Authority	-	-	-	-	-	-
Totals	16,426	15,597	829	18,935	18,079	856
National Defence (excluding Defence Research Board)	1,644	1,644	-	1,642	1,642	-
Defence Research Board	-	-	-	-	-	-
Totals, all departments and agencies	18,071	17,242	829	20,577	19,721	856

¹ Including profit organizations and educational institutions.

Note: Detail will not necessarily add to total because of rounding.

**TABLE 9. Federal Government Expenditures on Research-development in the Life Sciences,
by Department or Agency, Fiscal Years 1958-59 and 1959-60**

Department or agency	1958-59			1959-60				
	Total life sciences	Medicine	Agriculture	Biology	Total life sciences	Medicine	Agriculture	Biology
thousands of dollars								
Agriculture:								
Administration Branch	—	—	—	—	—	—	—	—
Production and Marketing Branch	1,015	—	1,015	—	146	—	146	—
Research Branch	20,308	—	20,308	—	22,465	—	22,465	—
Sub-totals	21,323	—	21,323	—	23,611	—	23,611	—
Atomic Energy:								
Atomic Energy Control Board	—	—	—	—	—	—	—	—
Atomic Energy of Canada Limited	870	174	—	696	1,027	205	—	822
Sub-totals	870	174	—	696	1,027	205	—	822
Defence Production	—	—	—	—	—	—	—	—
External Affairs (NATO Science Fellowships)	—	—	—	—	—	—	—	—
Fisheries (excluding Fisheries Research Board of Canada):								
Conservation and Development Service	19	—	—	19	23	—	—	23
Industrial Development Service	76	—	—	76	53	—	—	53
Inspection and Consumer Service	5	—	—	5	4	—	—	4
Sub-totals	101	—	—	101	80	—	—	80
Fisheries Research Board of Canada	3,048	—	—	3,048	3,701	—	—	3,701
Mines and Technical Surveys:								
Dominion Observatories Branch	—	—	—	—	—	—	—	—
Geographical Branch	—	—	—	—	—	—	—	—
Geological Survey of Canada	—	—	—	—	—	—	—	—
Mines Branch	—	—	—	—	—	—	—	—
Polar Continental Shelf Project	—	—	—	—	19	—	—	19
Surveys and Mapping Branch	—	—	—	—	—	—	—	—
Sub-totals	—	—	—	—	19	—	—	19
National Film Board	—	—	—	—	—	—	—	—
National Health and Welfare	2,614	2,614	—	—	3,535	3,535	—	—
National Research Council	4,553	1,420	—	3,133	5,370	1,800	—	3,570
Northern Affairs and National Resources:								
Northern Co-ordination and Research Centre	3	—	—	3	2	—	—	2
National Parks Branch	565	—	—	565	660	—	—	660
Water Resources Branch	—	—	—	—	—	—	—	—
Forestry Branch	1,686	—	1,556	131	1,816	—	1,682	135
National Museum of Canada	89	—	—	89	93	—	—	93
Sub-totals	2,343	—	1,556	787	2,571	—	1,682	890
Post Office	—	—	—	—	—	—	—	—
Trade and Commerce (Board of Grain Commissioners)	119	—	119	—	140	—	140	—
Transport (Air Services):								
Telecommunications Division	—	—	—	—	—	—	—	—
Meteorological Division	—	—	—	—	—	—	—	—
Sub-totals	—	—	—	—	—	—	—	—
Veterans Affairs	323	323	—	—	349	349	—	—
Central Mortgage and Housing Corporation	—	—	—	—	—	—	—	—
The St. Lawrence Seaway Authority	—	—	—	—	—	—	—	—
Totals	35,294	4,531	22,998	7,765	40,402	5,890	25,432	9,081
National Defence (excluding Defence Research Board)	—	—	—	—	—	—	—	—
Defence Research Board	2,088 ¹	—	—	—	2,142 ¹	—	—	—
Totals, all departments and agencies	37,382¹	4,531	22,998	7,765	42,546¹	5,890	25,432	9,081

¹ Breakdown not available for D.R.B.

Note: Detail will not necessarily add to total because of rounding.

TABLE 10. Federal Government Expenditures on Research-development in the Physical Sciences, by Department or Agency, Fiscal Year 1958-59

Department or agency	Total physical sciences	All engineering ¹	Chemistry	Physics	Geology geophysics and other earth sciences	Metallurgy	Mathematics	Other physical sciences
thousands of dollars								
Agriculture:								
Administration Branch	—	—	—	—	—	—	—	—
Production and Marketing Branch	—	—	—	—	—	—	—	—
Research Branch	180	120	—	—	—	—	60	—
Sub-totals	180	120	—	—	—	—	60	—
Atomic Energy:								
Atomic Energy Control Board	400	—	50	265	—	35	—	50
Atomic Energy of Canada Limited	16,530	7,482	2,088	4,872	—	2,088	—	—
Sub-totals	16,930	7,482	2,138	5,137	—	2,123	—	50
Defence Production	—	—	—	—	—	—	—	—
External Affairs (NATO Science Fellowships)	—	—	—	—	—	—	—	—
Fisheries (excluding Fisheries Research Board of Canada):								
Conservation and Development Service	14	14	—	—	—	—	—	—
Industrial Development Service	305	305	—	—	—	—	—	—
Inspection and Consumer Service	—	—	—	—	—	—	—	—
Sub-totals	320	320	—	—	—	—	—	—
Fisheries Research Board of Canada	1,203	383	510	—	298	—	13	—
Mines and Technical Surveys:								
Dominion Observatories Branch	866	—	—	—	494	—	—	372
Geographical Branch	287	—	—	—	—	—	—	287
Geological Survey of Canada	1,414	—	85	57	1,273	—	—	—
Mines Branch	3,454	691	—	—	—	2,763	—	—
Polar Continental Shelf Project	59	18	—	—	41	—	—	—
Surveys and Mapping Branch	—	—	—	—	—	—	—	—
Sub-totals	6,080	709	85	57	1,808	2,763	—	659
National Film Board	28	28	—	—	—	—	—	—
National Health and Welfare	138	—	83	55	—	—	—	—
National Research Council	17,655	10,523	3,360	1,710	2,000	50	12	—
Northern Affairs and National Resources:								
Northern Co-ordination and Research Centre	2	—	—	1	1	—	—	—
National Parks Branch	—	—	—	—	—	—	—	—
Water Resources Branch	1,614	—	—	—	—	—	—	1,614
Forestry Branch	712	459	219	17	—	—	17	—
National Museum of Canada	—	—	—	—	—	—	—	—
Sub-totals	2,328	459	219	18	1	—	17	1,614
Post Office	195	195	—	—	—	—	—	—
Trade and Commerce (Board of Grain Commissioners)	—	—	—	—	—	—	—	—
Transport (Air Services):								
Telecommunications Division	7	7	—	—	—	—	—	—
Meteorological Division	193	—	—	—	—	—	—	193
Sub-totals	200	7	—	—	—	—	—	193
Veterans Affairs	—	—	—	—	—	—	—	—
Central Mortgage and Housing Corporation	143	143	—	—	—	—	—	—
The St. Lawrence Seaway Authority	123	25	—	—	49	—	—	49
Totals	45,523	20,393	6,394	6,976	4,156	4,936	102	2,566
National Defence (excluding Defence Research Board)	—	—	—	—	—	—	—	—
Defence Research Board	21,112 ²	—	—	—	—	—	—	—
Totals, all departments and agencies	66,635²	20,393	6,394	6,976	4,156	4,936	102	2,566

¹ Includes chemical, civil, electrical and other engineering.

² Breakdown not available for D.R.B.

Note: Detail will not necessarily add to total because of rounding.

TABLE 11. Federal Government Expenditures on Research-development in the Physical Sciences, by Department or Agency, Fiscal Year 1959 - 60

Department or agency	Total physical sciences	All engineering	Chemistry	Physics	Geology geophysics and other earth sciences	Metallurgy	Mathematics	Other physical sciences
thousands of dollars								
Agriculture:								
Administration Branch	-	-	-	-	-	-	-	-
Production and Marketing Branch	-	-	-	-	-	-	-	-
Research Branch	226	161	-	-	-	-	65	-
Sub-totals	226	161	-	-	-	-	65	-
Atomic Energy:								
Atomic Energy Control Board	540	-	68	377	-	42	-	54
Atomic Energy of Canada Limited	19,522	9,658	2,260	5,343	-	2,260	-	-
Sub-totals	20,062	9,658	2,328	5,720	-	2,302	-	54
Defence Production	2,750	2,750	-	-	-	-	-	-
External Affairs (NATO Science Fellowships)	-	-	-	-	-	-	-	-
Fisheries (excluding Fisheries Research Board of Canada):								
Conservation and Development Service	18	18	-	-	-	-	-	-
Industrial Development Service	473	473	-	-	-	-	-	-
Inspection and Consumer Service	-	-	-	-	-	-	-	-
Sub-totals	491	491	-	-	-	-	-	-
Fisheries Research Board of Canada	1,130	242	483	-	387	-	19	-
Mines and Technical Surveys:								
Dominion Observatories Branch	302	-	-	-	157	-	-	145
Geographical Branch	293	-	-	-	-	-	-	293
Geological Survey of Canada	1,659	-	116	83	1,460	-	-	-
Mines Branch	3,688	738	-	-	-	2,950	-	-
Polar Continental Shelf Project	357	38	-	-	319	-	-	-
Surveys and Mapping Branch	-	-	-	-	-	-	-	-
Sub-totals	6,299	775	116	83	1,836	2,950	-	438
National Film Board	21	21	-	-	-	-	-	-
National Health and Welfare	307	38	192	77	-	-	-	-
National Research Council	19,791	11,475	3,982	2,243	2,000	71	20	-
Northern Affairs and National Resources:								
Northern Co-ordination and Research Centre	5	-	-	-	5	-	-	-
National Parks Branch	-	-	-	-	-	-	-	2,095
Water Resources Branch	2,095	-	-	-	-	-	-	-
Forestry Branch	762	502	215	27	-	-	18	-
National Museum of Canada	-	-	-	-	-	-	-	-
Sub-totals	2,862	502	215	27	5	-	18	2,095
Post Office	1,026	1,028	-	-	-	-	-	-
Trade and Commerce (Board of Grain Commissioners)	-	-	-	-	-	-	-	-
Transport (Air Services):								
Telecommunications Division	20	20	-	-	-	-	-	-
Meteorological Division	221	-	-	-	-	-	-	221
Sub-totals	241	20	-	-	-	-	-	221
Veterans Affairs	-	-	-	-	-	-	-	-
Central Mortgage and Housing Corporation	156	156	-	-	-	-	-	-
The St. Lawrence Seaway Authority	-	-	-	-	-	-	-	-
Totals	55,365	27,318	7,317	8,150	4,328	5,324	122	2,808
National Defence (excluding Defence Research Board)	-	-	-	-	-	-	-	-
Defence Research Board	21,658 ¹	-	-	-	-	-	-	-
Totals, all departments and agencies	77,023¹	27,318	7,317	8,150	4,328	5,324	122	2,808

¹ Includes chemical, civil, electrical, mechanical and other engineering.

² Breakdown not available for D.R.B.

Note: Detail will not necessarily add to total because of rounding.

TABLE 12. Number of Professional Scientists Employed in the Conduct of Research-development, by Field and Level of Training, as of March 31, 1959

Field of scientific training	All departments and agencies excluding armed forces and D.R.B.				All departments and agencies including armed forces, including D.R.B.			
	Level of training				Level of training			
	Bachelor	Master	Doctorate	Total	Bachelor	Master	Doctorate	Total
Physical scientists:								
Engineers, chemical	66	15	17	98	78	19	17	114
Engineers, civil	28	21	—	49	29	21	—	50
Engineers, electrical	69	15	10	94	122	41	18	181
Engineers, mechanical	100	27	7	134	115	31	7	153
Engineers, other	153	23	7	183	162	31	13	206
Sub-totals	416	101	41	558	506	143	55	704
Chemists	134	39	217	390	151	58	251	460
Physicists	66	49	168	283	128	95	219	442
Geologists, geophysicists and other earth scientists	72	49	104	225	74	50	104	228
Metallurgists	34	8	18	60	36	9	19	64
Mathematicians	5	11	15	31	19	27	20	66
Other physical scientists	25	32	18	75	25	34	21	80
Sub-totals	336	188	540	1,064	433	273	634	1,340
Totals, physical scientists	752	289	581	1,622	939	416	689	2,044
Life scientists:								
Medical scientists	9	—	55	64	10	12	75	97
Agricultural scientists	381	397	335	1,113	381	397	335	1,113
Biologists	35	72	88	195	39	83	103	225
Totals, life scientists	425	469	478	1,372	430	492	513	1,435
Administrators (of research-development)	60	55	106	221	76	57	119	252
Others	39	7	29	75	60	29	52	141
Totals, professional scientists	1,276	820	1,194	3,290	1,505	994	1,373	3,872

SECTION III

QUESTIONNAIRE

DEFINITIONS

A. Concepts of Scientific Activities:

Scientific activities include all activities in the natural sciences concerned with the creation of new knowledge, new applications of knowledge to useful purposes, or the furtherance of both the creation of new knowledge or new applications. It does not include routine application of scientific knowledge or skills except when these are related to the creation and furtherance of new knowledge or applications. Specific categories of scientific activities to be included are as follows:

- (a) Conduct of research-development including the planning and administering of research-development.
- (b) Capital expenditures on research-development plant.
- (c) Scientific data collection.
- (d) Scientific information.
- (e) Scholarship and fellowship programs.

Scientific research and development. Scientific research is here defined as systematic and intensive study directed toward fuller knowledge of the phenomenon or subject. Development is use of knowledge to create new methods, processes, systems, devices and materials, exclusive of design and production engineering. The term "research-development" includes the actual conduct of research-development and also all indirect incidental or related costs resulting from or necessary to it. It excludes routine testing.

1. **Conduct of research-development including the planning and administering of research-development** includes research development work done by the reporting unit or financed by the reporting unit through contracts, grants-in-aid or similar arrangements; testing and evaluation through prototype stage, or pilot plants under the control of the unit; research on techniques and methods associated with the other scientific activities described below; planning and administering of research-development even when segregated from the conduct of research-development. It excludes routine testing.
2. **Capital expenditures on research-development plant** includes acquisition, construction, major repairs to or alterations in structures, works, equipment or facilities, for use in research-development activities at federal or non-federal sites. These may be borne by the budget of the reporting department or agency or on the budget of another department or agency.
3. **Scientific data collection** includes the collection of scientific data on natural phenomena where such data have general use such as for mapping; collection of geologic, hydrologic, geomagnetic, meteorologic and other physical data; collection of entomological specimens and other biological data. Exclude data collection done in the course of carrying out a specific research-development project or program as this activity should be included under the conduct of research-development. Exclude also data collection done solely for internal operating purposes. If, however, these data are made available for general use, additional costs of material and personnel are to be included. The presentation of these data in reports, maps and other publications is included under dissemination of scientific information described below.
4. **Scientific information** includes library operations, translation, procurement and publication services in connection with information required in or resulting from scientific activities; standardization of terminology and the making of scientific or technical glossaries; and the support, including travel allowances, of scientific conferences and symposia.

5. **Scholarship and fellowship programs** are to include costs of scholarships and fellowships granted to governmental or non-governmental recipients who are or will be engaged in a scientific activity, and the administration costs of these programs.

B. Fields of Science:

1. **Physical Sciences** include (a) physical sciences proper, that is, those sciences concerned primarily with the understanding of the natural phenomena associated with non-living things such as physics, chemistry and the earth sciences; (b) mathematics which includes those sciences employing logical reasoning with the aid of symbols and concerned with the development of methods of operations employing such symbols, such as mathematics, pure and applied; statistical methods; and computer research, exclusive of engineering; (c) engineering sciences, that is, those sciences which are concerned with studies directed toward developing scientific principles or toward making specific scientific principles usable in engineering practice such as metallurgy, chemical engineering, civil engineering, electrical engineering, mechanical engineering, etc.; and (d) other physical sciences which includes any other sciences dealing with non-living matter which cannot be classified under the given headings.

2. **Life Sciences** include (a) medicine, which comprises those sciences that, apart from the clinical aspects of professional medicine, are concerned primarily with the utilization of scientific principles in understanding human diseases and in maintaining and improving human health; (b) agriculture which comprises those sciences directed primarily toward understanding and improving agricultural productivity such as agronomy, animal husbandry, forestry, horticulture, range management, soil culture, etc.; (c) biology, which comprises all life sciences other than those listed in (a) and (b) above which deal with life processes and any work done in other disciplines primarily for the purpose of understanding life processes.

Note: Where there is difficulty in classifying work into the listed fields of science, estimates of the amount done in each field should be based on the number and relative cost of the type of scientists or engineers engaged in the work.

C. Organizational Units:

1. **Reporting Unit:** Any unit to which questionnaire is sent.
2. **Department or Agency:** All divisions of government classified as such by the Financial Administration Act plus agency corporations named in Schedule C to that Act.

D. Supporting Personnel:

1. **Research-development technicians:** Technical personnel having high school graduation or equivalent and additional technical training, who assist scientists and engineers in research-development work (i.e. laboratory technicians and assistants, draftsmen, etc.).
2. **Skilled craftsmen:** Workers in positions requiring specialized training and experience and who are engaged in research-development work (i.e. glass blowers, machinists, model-makers, etc.).
3. **Other supporting personnel:** All other persons whose pay is included in the cost of the conduct of research-development.

INSTRUCTIONS

A. General Instructions:

All funds received for and applied to scientific activities administered by the department or agency should be reported. Include also those funds administered by other departments or agencies for the benefit of these scientific activities such as funds for superannuation, buildings and capital equipment. Full costs are to be reported including all indirect costs which are not normally prorated to these activities. This would include a portion of overhead and maintenance costs, and other functions supporting scientific activity. Overhead costs at remote sites are to include net costs of requisite services such as housing, restaurants, etc. Pay and allowances of military personnel should be included. Exclude costs not attributable to a reporting unit unless the department or agency is wholly engaged in scientific activities. Other costs to be excluded are: non-reimbursable services normally provided, such as those of the Civil Service Commission; imputed depreciation not charged against available funds; support of non-scientific activity and salaries of civilian personnel assigned on a non-reimbursable basis. Estimates, based where possible on concrete indices such as the number of scientific personnel, may be made where the information required is not available from departmental records.

B. Explanations of Specific Phrases Used:

Question 1(a), Departmental or agency funds available as a result of annual estimates. Enter here the monies received directly from

parliamentary appropriations or the figures used in compiling the estimates for your department.

(b). **Cost of indirect support by other units, departments or agencies** is to include: capital and equipment costs borne by other departments or agencies; relevant costs of overhead, maintenance and superannuation; and costs of services and salaries, such as military pay and allowances, which are incurred on behalf of your scientific activities.

(c). **Transfers from other units of your department or agency** are to include all such transfers of funds for scientific services. No entry is to be made if report is completed at department or agency level.

(f). **Other** is to include any other source of funds such as, for crown corporations, funds from prior years.

(i). **Support provided non-scientific activities** includes any portion of the funds shown in 1(a) to (f) which were devoted directly or indirectly to the support of non-scientific activities.

Question 4, Cost of work done by non-federal government organizations on a non-contract or grant basis includes that portion of the cost of scientific activities performed for your unit by non-federal government organizations, which is covered by general grants rather than specific contracts.

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