



NEW ISSUE

**RESEARCH AND EXPERIMENTAL
DEVELOPMENT
ALL SECTOR SUMMARY
AUSTRALIA
1978-79**

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(INCORPORATING RESULTS FOR THE PRIVATE NON-PROFIT SECTOR)

AUSTRALIAN BUREAU OF STATISTICS Canberra

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DEVELOPMENT**

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1978-79**

(incorporating results for the Private Non-profit Sector)

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MAIN FEATURES

The estimate of gross expenditure on research and experimental development (GERD) carried out in Australia during 1978-79 was \$1,054m at current prices. This represents a 21% increase in expenditure compared with 1976-77. At constant (average 1974-75) prices there was no change in GERD between those two years.

Of the \$1,054m current price estimate of 1978-79 GERD, business enterprises accounted for \$246m (23%), general government organisations \$470m (45%), higher education organisations \$326m (31%), and private non-profit organisations \$13m (1%). General government sources funded \$806m (76%), business enterprises sources funded \$217m (21%), and other Australian and overseas sources funded \$30m (3%).

The total manpower effort devoted to R&D carried out in Australia during 1978-79 was 40,684 man-years. This represents a decrease of 4% compared with 1976-77. Of the total manpower effort, business enterprises accounted for 8,626 man-years (21%), general government organisations 15,462 man-years (38%), higher education organisations 16,050 man-years (39%) and private non-profit organisations 546 man-years (1%).

EXPLANATORY NOTES

Introduction

This publication presents summary statistics on the level and distribution of expenditure and manpower resources devoted to research and experimental development (R&D) carried out by enterprises, organisations within the Business Enterprise, General Government, Higher Education and Private Non-profit Sectors in Australia during 1978-79 (for the Higher Education Sector the statistics relate to the 1978 calendar year). These statistics are shown in Tables 1 to 10. In addition, detailed R&D statistics in respect of the Private Non-profit Sector are presented in Tables 13 to 18; they are the first compiled and published by the ABS in respect of this Sector.

2. Summary statistics of payments and receipts for technical know-how (Table 11) and summary statistics of patent applications lodged and patents granted (Table 12) are also shown in this publication.

3. Apart from the data relating to the Private Non-profit Sector, data shown in this publication, together with more detailed results, have been previously published by the ABS on a Sector basis (see paragraph 31 for details of publications).

Data sources

4. Most of the statistics presented in this publication were derived from data collected in the Survey of Research and Experimental Development in respect of the year ended 30 June 1979 (year ended 31 December 1978 for the Higher Education Sector).

5. The source of all data relating to the Private Non-profit Sector was the 1978-79 Survey of Research and Experimental Development. Copies of the survey forms used for this Sector are shown as Appendixes A and B. Information relating to data sources for the other sectors is contained in the individual sector publications (see paragraph 31).

6. The 1976-77 statistics shown in Tables 1 to 3 were derived from a similar survey conducted by the (then) Department of Science and the Environment. A number of revisions have been made to the 1976-77 statistics since they were first published.

Definitions

7. *Research and experimental development* is defined in accordance with the Organisation for Economic Co-operation and Development (OECD) standard as comprising 'creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications'.

8. To be classified as R&D, an activity should contain an appreciable amount of novelty or innovation, should have investigation as a primary objective, and should have a potential to produce results that recognisably increase mankind's stock of knowledge. The concept of novelty is not associated with the actual creation of something which, although new, is made by artistry or by application of techniques that have already been established for that class of object. R&D ceases and pre-production begins when work is no longer experimental.

9. R&D activity extends to substantial modifications to existing products or processes. However, some activities sometimes regarded as R&D are *excluded* except where they are used primarily for the support of specific R&D programs or to develop new techniques. Examples of these types of activities are provided on page 2 of Appendix A.

10. *R&D expenditure* includes capital expenditure on the acquisition (less disposals) of fixed tangible assets such as land, buildings, vehicles, plant, machinery and equipment, and current expenditure on such items as wages, salaries, materials, fuels, rent and leasing, repairs and maintenance, data processing, etc., and a proportion of expenditure on general services and overhead costs attributable to the R&D effort.

11. *Gross expenditure on R&D (GERD)* relates to the total of R&D expenditures incurred by all enterprises/organisations in the various Sectors.

12. The item *man years of effort on R&D* includes the effort of researchers, technicians and other staff directly supporting R&D. *Overhead staff*, i.e. administrative and general service employees such as personnel officers, canteen staff, pay clerks, janitors, cleaners, groundsman, etc., whose work indirectly supports R&D, are excluded.

13. The definitions of other data items used in the 1978-79 survey are also provided in Appendixes A and B.

Sector classification

14. The sector classification used in the compilation of these statistics is adapted from the guidelines specified by the OECD for use in the conduct of R&D studies. Four institutional sectors are recognised: Business Enterprises, General Government, Higher Education and Private Non-profit.

- (a) *Business Enterprise Sector* includes all firms, organisations and institutions (private and public sector) whose primary activity is the production of goods or services for sale to the general public at a price intended approximately to cover at least the cost of production. It includes the private non-profit institutions mainly serving business enterprises.
- (b) *General Government Sector* includes government departments and other authorities engaged in administration, defence and regulation of public order, promotion of economic growth and welfare and technological development, provision of health, cultural, recreational and other social and community services free of charge or at prices which do not fully cover their costs of production. Also included are other non-profit organisations wholly or mainly financed and controlled by public authorities or which primarily serve government bodies and unincorporated government enterprises producing goods and services for the government itself. Excluded are public sector enterprises mainly engaged in higher education (e.g. universities and colleges of advanced education), trading or financial activities.
- (c) *Higher Education Sector* includes all universities, colleges of advanced education (CAE) and other institutions of post-secondary education, whatever their source of finance or legal status. It also includes all research institutes, experimental stations and clinics operating under the direct control of, or administered by, or associated with, higher education establishments.
- (d) *Private Non-profit Sector* includes private or semi-public organisations which are not established primarily with the aim of making a profit, and private individuals or households. Non-profit organisations which mainly serve or are wholly or mainly financed and controlled by organisations within the other sectors are excluded from this sector.

Coverage

15. The main exclusions from the survey coverage are:
- (a) *Business Enterprise Sector*-Enterprises mainly engaged in agriculture, forestry, fishing and hunting (i.e. industries in Division A of the ASIC, 1978 edition).

- (b) *General Government Sector*-Local government organisations.

- (c) *Higher Education Sector*-Technical and Further Education (TAFE) colleges and other post-secondary institutions apart from Universities and CAE's.

16. The main reasons for excluding these organisations is that, in general, their contribution to R&D is very low.

17. There are no coverage exclusions in respect of the Private Non-profit Sector. More detailed information relating to the coverage of each of the other sectors is contained in the individual sector publications (see paragraph 31).

Socio-economic objective and field of science classifications

18. Statistical information for the General Government, Higher Education and Private Non-profit Sectors is classified by both socio-economic objective and field of science.

19. Respondents in the General Government, Higher Education and Private Non-profit Sectors were asked to classify each of their R&D projects or programs to a particular socio-economic objective and then to report the manpower and expenditure devoted to those projects or programs (except for Universities which were not required to report any expenditure amounts).

20. R&D programs are classified to socio-economic objectives according to the ultimate purpose of the program (which may not necessarily be the immediate objectives of the researcher). For example, an R&D program concerned with the development of a new type of rolling stock as part of a re-organisation of the nation's railways may involve several short term objectives, but as the ultimate objective is improved transportation the R&D program would be classified to transport.

21. Respondents in the General Government and Private Non-profit Sectors also classified their R&D programs to fields of science.

22. The classification to fields of science was done according to the field which was associated with the technique(s) actually used in the investigation. For example, in the case of an R&D program concerned with investigating the structure of plant tissues by electron microscopy, the technique being used in the investigations is associated with the physical sciences field, but the program would be classified to biological sciences as this is the major field of concern of the R&D program.

23. The ABS classified Higher Education Sector departmental returns to fields of science according to the fields which were applicable to the topic of concern of each department.

24. For a more detailed description and explanation of socio-economic objective and field of science classifications please contact the ABS.

Australian Standard Industrial Classification (ASIC)

25. Most of the statistical information in respect of the Business Enterprise Sector is classified by industry of enterprise in accordance with the 1978 edition of the Australian Standard Industrial Classification (ASIC). Each enterprise is classified by the ABS to the industry in which it mainly operates even though one or more of its component establishments (factories, shops, etc.) may be classified to other industries. For further comment see the *Australian Standard Industrial Classification, 1978, Volume 1* (1201.0).

Constant price estimates

26. Estimates of total R&D expenditure for 1976-77 and 1978-79 are shown at both current and constant (average 1974-75) prices in Table 1. In concept, constant price estimates are measures from which the direct effects of price change have been eliminated. Although expressed in monetary terms, the constant price measures shown in this publication vary only with changes in the underlying quantities in inputs purchased (including labour). In effect, quantities of broadly defined categories of inputs are weighted by their prices in the base year (1974-75). Because the measures relate to input quantities, they do not reflect changes in the efficiency with which labour, capital and other inputs are used.

27. The estimates of the wages, salaries and other labour cost components of these constant price estimates were obtained by multiplying, for each broad category of labour, the quantity (man years) of labour used in each period by the relevant average labour cost in the base period. The non-labour cost components were estimated by deflating each current price value by a composite price index of relevant materials or capital expenditure items. In revaluing R&D expenditure, extensive use has been made of price series used in deriving constant price national accounts estimates.

28. For a more comprehensive description of constant price concepts and estimation procedures see *Australian National Accounts, Gross Product by Industry at Current and Constant Prices, 1977-78* (5211.0), Section C, page 4.

Reliability of statistics

29. Many respondents had to make estimates when completing the survey questionnaire because they did not record data on R&D activity separately. Additionally, the OECD standard definition of R&D used for the survey differs in some respects from what particular respondents may regard as research and development.

30. In addition to the general qualifications outlined above, the statistics in respect of individual sectors are subject to specific qualifications. For example, in the Higher Education Sector, university R&D expenditure data have been entirely estimated. For more information about the estimation procedures used for universities R&D expenditure data and specific qualifications relating to data for other sectors refer to the individual sector publications (see paragraph 31).

Related publications

31. Users may also wish to refer to the following publications:

Research and Experimental Development, Business Enterprises, Australia, 1978-79 (8104.0)

Research and Experimental Development, General Government Organisations, Australia, 1978-79 (8109.0)

Research and Experimental Development, Higher Education Organisations, 1978 (8111.0)

Project SCORE, Research and Development in Australia, 1976-77 (Department of Science and the Environment, Canberra, Australia, 1980), presents statistics relating to all sectors.

Project SCORE, Research and Development in Australia, 1973-74, Volumes 1 and 2 (Department of Science, Canberra, Australia, 1976), presents statistics relating to all sectors.

Research and Experimental Development, Energy Production, Utilisation and Conservation, All Sectors, Australia, 1979-80

Trends in Industrial R&D in Selected OECD Member Countries, 1967-75 (OECD, Paris 1978 (SPT (78) 20)) contains statistics from other OECD countries which are broadly comparable with those in this publication.

Science and Technology Statement 1980-81 (Department of Science and Technology, Canberra, Australia, 1981).

The Measurement of Scientific and Technical Activities ('Frascati Manual') OECD, Paris, 1981

32. Current publications produced by the ABS are listed in the *Catalogue of Publications, Australia* (1101.0). The ABS also issues, on Tuesdays and Fridays, a *Publications Advice* (1105.0) which lists publications to be released in the next few days. The Catalogue and Publications Advice are available from any ABS office.

Symbols and other usage

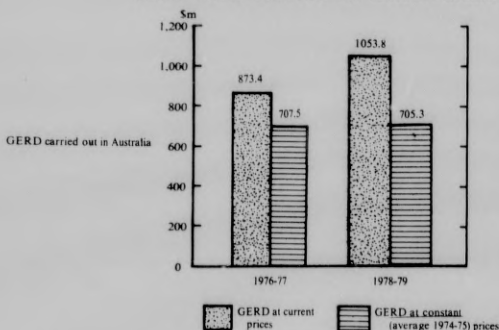
n.e.c. not elsewhere classified

n.a. not available

— nil or less than half the final digit shown

33. Where figures have been rounded, discrepancies may occur between sums of the component items and totals.

FIGURE 1. GROSS EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (GERD) CARRIED OUT IN AUSTRALIA, 1976-77 AND 1978-79
GERD AT CURRENT AND CONSTANT (AVERAGE 1974-75) PRICES (a)



(a) See paragraphs 26 to 28 of the Explanatory Notes.

FIGURE 2. GROSS EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (GERD) CARRIED OUT IN AUSTRALIA, 1976-77 AND 1978-79
GERD AS A PERCENTAGE OF GROSS DOMESTIC PRODUCT

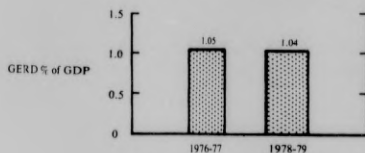
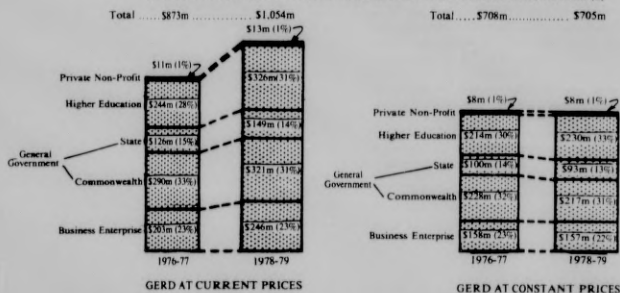


FIGURE 3. GROSS EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (GERD) CARRIED OUT IN AUSTRALIA, 1976-77 AND 1978-79
GERD BY SECTOR (a) AT CURRENT AND CONSTANT (AVERAGE 1974-75) PRICES (b)



(a) See paragraphs 14 to 17 of the Explanatory Notes.

(b) See paragraphs 26 to 28 of the Explanatory Notes.

TABLE 1. GROSS EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (GERD) CARRIED OUT IN AUSTRALIA, 1976-77 AND 1978-79
GERD BY SECTOR(a) AT CURRENT AND CONSTANT (AVERAGE 1974-75) PRICES(b)
(\$ m)

Sector(a)	1976-77	1978-79
AT CURRENT PRICES		
Business enterprise	202.8	245.8
General government—		
Commonwealth	289.5	321.2
State	126.3	148.7
Higher education	244.1	325.5
Private non-profit	10.7	12.6
Total	873.4	1,053.8
AT CONSTANT (AVERAGE 1974-75) PRICES(b)		
Business enterprise	157.5	157.3
General government—		
Commonwealth	228.1	217.3
State	99.8	92.8
Higher education	213.7	229.5
Private non-profit	8.4	8.4
Total	707.5	705.3

(a) See paragraphs 14 to 17 of the Explanatory notes. (b) See paragraphs 26 to 28 of the Explanatory notes.

FIGURE 4. GROSS EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (GERD) CARRIED OUT IN AUSTRALIA, 1976-77 AND 1978-79
GERD BY TYPE OF EXPENDITURE

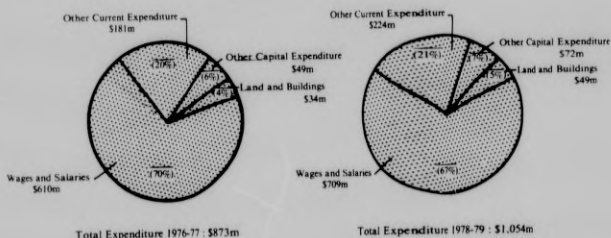
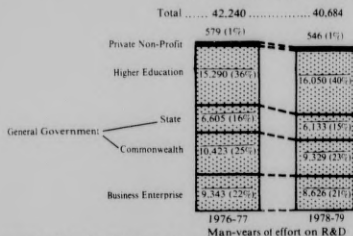


TABLE 2. GROSS EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (GERD) CARRIED OUT IN AUSTRALIA, 1976-77 AND 1978-79
GERD BY SECTOR(a) BY TYPE OF EXPENDITURE
(\$ '000)

Sector(a)	1976-77					1978-79				
	Land and buildings	Other capital expenditure	Wages and salaries	Other current expenditure	Total	Land and buildings	Other capital expenditure	Wages and salaries	Other current expenditure	Total
Business enterprise	6,411	12,809	134,632	48,962	202,815	4,731	21,353	153,246	66,510	245,841
General government—										
Commonwealth	12,364	19,054	194,896	63,174	289,488	31,821	17,638	200,122	71,605	321,187
State	6,979	5,990	88,820	24,540	126,329	3,720	7,937	107,764	29,282	148,703
Higher education	8,500	10,007	184,190	41,358	244,055	8,064	24,177	239,917	53,356	325,514
Private non-profit	104	844	7,098	2,667	10,712	260	837	8,044	3,424	12,566
Total	34,358	48,704	609,636	106,701	873,397	48,596	71,942	709,093	224,177	1,053,811

(a) See paragraphs 14 to 17 of the Explanatory notes.

FIGURE 5. RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D) MANPOWER EFFORT IN AUSTRALIA, 1976-77 AND 1978-79
R & D MANPOWER BY SECTOR



(a) See paragraphs 14 to 17 of the Explanatory Notes.

FIGURE 6. RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D) MANPOWER EFFORT IN AUSTRALIA, 1976-77 AND 1978-79
R & D MANPOWER AS A PERCENTAGE OF CIVILIAN LABOUR FORCE (CLF)

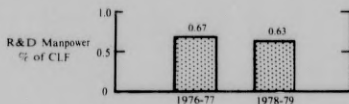
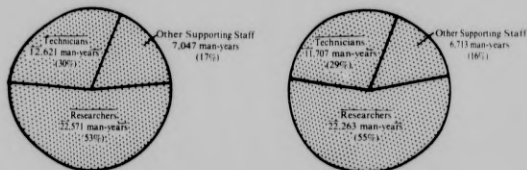


FIGURE 7. RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D) MANPOWER EFFORT IN AUSTRALIA, 1976-77 AND 1978-79
R&D MANPOWER BY TYPE OF MANPOWER



Total R&D Manpower 1976-77: 42,240 man-years

Total R&D Manpower 1978-79: 40,684 man-years

TABLE 3. RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D) MANPOWER EFFORT IN AUSTRALIA, 1976-77 AND 1978-79
R&D MANPOWER BY SECTOR(a) BY TYPE OF MANPOWER (man-years)

Sector(a)	1976-77			1978-79			Total
	Researchers	Technicians	Other supporting staff	Researchers	Technicians	Other supporting staff	
Business enterprise	4,080	3,677	1,586	9,343	3,649	3,171	8,626
General government—							
Commonwealth	4,284	3,632	2,508	10,423	4,054	3,315	9,329
State	2,662	1,963	1,980	6,605	2,401	1,941	6,133
Higher education	11,285	3,189	815	15,290	11,894	3,132	16,050
Private non-profit	260	160	158	579	265	148	546
Total	22,571	12,621	7,047	42,240	22,263	11,707	40,684

(a) See paragraphs 14 to 17 of the Explanatory notes.

TABLE 4. GROSS EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (GERD) CARRIED OUT IN AUSTRALIA, 1978-79
GERD BY SECTOR(a) BY SOURCE OF FUNDS
(\$' 000)

Sector(a)	Source of funds						Total
	Commonwealth government	State government	Business enterprise	Higher education	Private non-profit	Other Australian sources and overseas	
Business enterprise	25,308	1,368	209,486	26	459	9,193	245,841
General government—							
Commonwealth	316,166	362	2,263	54	64	2,278	321,187
State	10,456	132,946	2,468	66	1,040	1,726	148,703
Higher education	309,412	3,879	2,865	—	7,574	1,784	325,514
Private non-profit	4,644	1,551	389	234	3,945	1,803	12,566
Total	665,986	140,106	217,471	380	13,082	16,784	1,053,811

(a) See paragraphs 14 to 17 of the Explanatory notes.

TABLE 5. GROSS EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (GERD) CARRIED OUT IN AUSTRALIA, 1978-79
GERD BY SECTOR(a) BY TYPE OF ACTIVITY(b)
(\$' 000)

Sector(a)	Type of activity(b)				Total
	Pure basic research	Strategic basic research	Applied research	Experimental development	
Business enterprise	3,781	7,005	81,364	153,692	245,841
General government—					
Commonwealth	15,651	83,027	169,776	52,733	321,187
State	4,237	8,152	122,035	14,279	148,703
Higher education	165,239	59,354	80,566	20,355	325,514
Private non-profit	3,482	1,773	7,262	48	12,566
Total	192,390	159,311	461,003	241,107	1,053,811

(a) See paragraphs 14 to 17 of the Explanatory notes. (b) See page 8 of Appendix B.

TABLE 6. GROSS EXPENDITURE ON RESEARCH AND EXPERIMENTAL DEVELOPMENT (GERD) CARRIED OUT IN AUSTRALIA, 1978-79
GERD BY SECTOR(a) BY STATE
(\$' 000)

Sector(a)	State									Total
	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Overseas	
Business enterprise	90,644	106,257	20,690	15,527	5,851	3,752	2,670	449	—	245,841
General government—										
Commonwealth	82,184	104,678	22,961	45,484	9,743	2,451	883	50,241	2,542	321,187
State	46,514	28,191	34,708	10,473	23,774	5,011	—	9	23	148,703
Higher education	101,291	69,766	35,723	30,562	21,672	6,536	—	59,964	—	325,514
Private non-profit	4,047	8,350	57	30	19	16	5	34	8	12,566
Total	324,680	317,242	114,159	102,076	61,059	17,766	3,558	110,697	2,573	1,053,811

(a) See paragraphs 14 to 17 of the Explanatory notes.

TABLE 7. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT IN AUSTRALIA, 1978-79
RESEARCHER EFFORT BY SECTOR(a) BY STATE
(man-years)

Sector(a)	State									Total
	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Overseas	
Business enterprise	1,269	1,636	345	244	70	61	1	9	14	3,649
General government—										
Commonwealth	981	1,327	208	588	115	25	9	782	20	4,054
State	679	504	576	233	307	102	—	—	—	2,401
Higher education	3,617	3,358	1,339	1,129	871	247	—	1,332	—	11,894
Private non-profit	86	173	2	2	1	1	—	1	—	265
Total	6,632	6,998	2,470	2,196	1,364	436	10	2,124	34	22,263

(a) See paragraphs 14 to 17 of the Explanatory notes.

TABLE 8. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT IN AUSTRALIA(a), 1978-79
R&D EXPENDITURE AND R&D MANPOWER BY SOCIO-ECONOMIC OBJECTIVE(b) BY SECTOR(c)

Socio-economic objective(b)	Expenditure (\$'000)					Manpower (man-years)				
	General government					General government				
	Common-wealth	State	Higher education	Private non-profit	Total	Common-wealth	State	Higher education	Private non-profit	Total
National security (defence)	89,166	—	270	—	89,436	3,826	—	10	—	3,836
Economic development—										
Agriculture	50,971	102,268	25,837	30	179,106	1,193	4,129	1,384	1	6,707
Forestry and fisheries	11,315	13,834	1,982	75	27,206	254	659	114	1	1,028
Mining (prospecting)—										
energy sources	1,866	447	325	—	2,638	58	12	17	—	87
other	10,047	25	1,059	—	11,131	269	1	61	—	331
Mining (extraction)—										
energy sources	827	—	317	—	1,144	24	—	18	—	42
other	5,548	144	1,787	—	7,479	134	6	94	—	234
Manufacturing	47,038	1,133	11,177	—	59,348	1,029	42	657	—	1,728
Construction	6,498	36	1,979	—	8,513	204	2	97	—	303
Energy	19,667	319	8,981	10	28,977	462	9	411	1	883
Transport	1,580	5,648	2,301	68	9,597	29	172	131	3	335
Communications	360	—	2,223	—	2,583	15	—	125	—	140
Economic services n.e.c.	11,152	890	12,177	169	24,388	321	50	612	6	989
Total economic development	166,870	124,743	70,146	352	362,111	3,991	5,082	3,721	13	12,807
Community welfare—										
Urban and regional planning	1,153	200	2,519	35	3,907	30	10	152	4	196
Environment	28,405	6,651	4,681	9	39,746	616	242	230	—	1,088
Health	10,364	5,864	56,894	9,979	83,101	334	299	2,284	448	3,365
Education	212	1,619	11,411	1,554	14,796	7	65	585	65	722
Welfare	877	284	3,262	61	4,484	42	15	157	4	218
Community services n.e.c.	1,081	957	8,084	2	10,124	38	45	365	1	449
Total community welfare	42,092	15,576	86,851	11,641	156,160	1,067	675	3,773	522	6,037
Advancement of knowledge—										
Earth, ocean and atmosphere n.e.c.	3,597	4,358	17,587	150	25,692	132	213	996	3	1,344
General advancement of knowledge	19,462	6,027	150,658	422	174,569	313	163	7,551	9	8,036
Total advancement of knowledge	23,059	8,385	168,245	572	200,261	445	376	8,547	12	9,380
Total	321,187	148,703	325,514	12,566	807,970	9,329	6,133	16,050	546	32,058

(a) Excludes business enterprises.

(b) See paragraphs 18 to 24 of the Explanatory notes.

(c) See paragraphs 14 to 17 of the Explanatory notes.

TABLE 9. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT IN AUSTRALIA(a), 1978-79
R&D EXPENDITURE AND R&D MANPOWER BY FIELD OF SCIENCE(b) BY SECTOR(c)

Socio-economic objective(b)	Expenditure (\$'000)					Manpower (man-years)				
	General government					General government				
	Common-wealth	State	Higher education	Private non-profit	Total	Common-wealth	State	Higher education	Private non-profit	Total
Natural sciences—										
Physical sciences	34,754	1,131	34,437	105	70,427	819	48	1,496	2	2,365
Chemical sciences	19,921	1,429	23,919	112	45,381	484	48	1,202	2	1,736
Biological sciences	30,424	13,137	56,485	2,277	102,323	664	568	2,771	83	4,086
Earth sciences	36,451	4,901	13,585	21	54,958	887	220	741	—	1,848
Engineering and applied sciences	134,885	7,192	36,161	187	178,425	4,756	229	2,007	6	6,998
Agricultural sciences	52,323	111,118	24,706	36	188,183	1,225	4,554	1,274	2	7,055
Medical sciences	4,458	4,895	45,217	7,898	62,468	180	240	1,649	370	2,439
Total natural sciences	313,217	143,803	234,511	10,636	702,167	9,013	5,905	11,140	465	26,523
Social sciences and humanities—										
Economics	2,343	659	12,122	134	15,258	120	37	469	3	629
Education	464	1,661	10,989	1,557	14,671	18	64	777	65	924
Management	1,409	262	1,034	—	2,705	42	11	52	—	105
Political science	—	68	4,775	—	4,843	—	3	236	—	239
Sociology	925	474	4,660	91	6,150	29	23	264	8	324
Information science	1,152	398	57,421	9	62,173	47	20	3,112	1	3,312
Other social sciences and humanities	1,677	1,378	—	138	3,193	59	68	—	5	132
Total social sciences and humanities	7,970	4,900	91,003	1,930	105,803	316	227	4,910	81	5,534
Total	321,187	148,703	325,514	12,566	807,970	9,329	6,133	16,050	546	32,058

(a) Excludes business enterprises.

(b) See paragraphs 18 to 24 of the Explanatory notes.

(c) See paragraphs 14 to 17 of the Explanatory notes.

TABLE 10. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT BY BUSINESS ENTERPRISES, AUSTRALIA, 1978-79
R&D EXPENDITURE AND R&D MANPOWER BY INDUSTRY OF ENTERPRISE(a)

Industry of enterprise (1978 edition of ASIC's)		Expenditure	Manpower	Enterprises
ASIC code	Description	\$'000	man-years	number
11-15	Mining (excl. services to mining)	9,732	315	17
	Manufacturing—			
21	Food, beverages and tobacco	16,082	545	84
23-24	Textiles, clothing and footwear	1,359	42	22
25	Wood, wood products and furniture	1,592	55	24
26	Paper, paper products and printing	4,117	144	14
27	Chemical, petroleum and coal products	35,231	1,381	118
28	Non-metallic mineral products	4,162	155	27
29	Basic metal products	20,899	776	35
31	Fabricated metal products	4,530	198	81
32	Transport equipment	15,629	604	47
334	Photographic, professional and scientific equipment	6,667	230	16
335	Appliances and electrical equipment	33,118	1,234	120
336	Industrial machinery and equipment	8,808	388	128
33	Total other machinery and equipment	48,594	1,851	264
34	Miscellaneous manufacturing	5,893	210	58
C	Total manufacturing	158,087	5,960	774
	Other industries—			
E	Construction	2,664	75	30
F	Wholesale and retail trade	11,377	390	112
63	Property and business services	14,241	472	169
8461	Research and scientific institutions	13,289	460	29
(b)	Other n.e.c.	36,451	956	55
16, D-L	Total other industries	78,022	2,352	395
	Total all industries(c)	245,841	8,626	1,186

(a) See paragraph 25 of the Explanatory notes. (b) ASIC codes 16, D, 61-62, 8141-8306, 8462-9364. (c) Excludes ASIC Division A.

TABLE 11. PAYMENTS AND RECEIPTS FOR TECHNICAL KNOW-HOW, AUSTRALIA, 1978-79
PAYMENTS AND RECEIPTS BY SECTOR(a) BY TYPE OF TECHNICAL KNOW-HOW
(\$'000)

Sector(a)	Payments for technical know-how			Receipts for technical know-how		
	Patent licence fees and royalties	Other technical know-how	Total	Patent licence fees and royalties	Other technical know-how	Total
Business enterprise	71,008	59,170	130,178	5,322	10,078	15,399
General government—						
Commonwealth	251	—	251	174	9	183
State	1	—	1	10	—	10
Higher education(b)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Private non-profit	—	28	28	—	15	15
Total	71,260	59,198	130,458	5,506	10,102	15,607

(a) See paragraphs 14 to 17 of the Explanatory notes. (b) Not collected.

TABLE 12. PATENT ACTIVITY, AUSTRALIA, JULY 1977 TO JUNE 1979
PATENT APPLICATIONS LODGED AND PATENTS GRANTED BY SECTOR(a)

Sector(a)	Patent applications lodged in Australia	Patents granted in Australia	Patent applications lodged abroad	Patents granted abroad
Business enterprise	985	497	2,536	1,220
General government—				
Commonwealth	108	60	373	159
State	3	2	7	1
Higher education(b)	n.a.	n.a.	n.a.	n.a.
Private non-profit	—	—	—	—
Total	1,096	559	2,916	1,380

(a) See paragraphs 14 to 17 of the Explanatory notes. (b) Not collected.

TABLE 13. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT BY PRIVATE NON-PROFIT ORGANISATIONS(a), AUSTRALIA, 1978-79
DETAILS OF R&D EXPENDITURE BY SOCIO-ECONOMIC OBJECTIVE(b)
(\$'000)

Socio-economic objective(b)	Major field of science(b)			Type of expenditure				Type of activity(c)		
	Total expenditure	Natural sciences	Social sciences	Land and buildings	Other capital expenditure	Wages and salaries	Other current expenditure	Pure basic research	Strategic basic research	Applied Experimental research development
National security (defence)	—	—	—	—	—	—	—	—	—	—
Economic development—										
Agriculture	30	30	—	—	2	28	—	—	—	30
Forestry and fisheries	75	—	75	—	7	53	15	—	—	75
Mining (prospecting)— energy sources	—	—	—	—	—	—	—	—	—	—
other	—	—	—	—	—	—	—	—	—	—
Mining (extraction)— energy sources	—	—	—	—	—	—	—	—	—	—
other	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—
Construction	—	—	—	—	—	—	—	—	—	—
Energy	10	10	—	1	1	8	—	—	10	—
Transport	68	68	—	—	—	54	14	—	30	38
Communications	—	—	—	—	—	—	—	—	—	—
Economic services n.e.c.	169	33	136	2	4	133	30	—	—	169
Total economic development	352	141	212	3	14	276	59	—	40	312
Community welfare—										
Urban and regional planning	35	—	35	—	—	32	3	—	—	35
Environment	9	3	6	—	—	6	3	—	—	9
Health	9,979	9,958	21	38	630	6,437	2,874	3,205	1,494	5,250
Education	1,554	—	1,554	220	40	1,008	286	—	—	1,554
Welfare	61	—	61	—	1	51	9	—	1	42
Community services n.e.c.	2	2	—	—	—	—	2	—	—	2
Total community welfare	11,641	9,964	1,677	258	672	7,534	3,177	3,205	1,495	6,893
Advancement of knowledge—										
Earth, ocean and atmosphere n.e.c.	150	150	—	—	53	31	66	—	134	16
General advancement of knowledge	422	381	41	—	98	204	121	278	104	41
Total advancement of knowledge	572	531	41	—	151	234	187	278	238	57
Total	12,566	10,636	1,930	260	837	8,044	3,424	3,482	1,773	7,262

(a) See paragraphs 14 to 17 of the Explanatory notes. (b) See paragraphs 18 to 24 of the Explanatory notes. (c) See page 8 of Appendix B.

TABLE 14. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT BY PRIVATE NON-PROFIT ORGANISATIONS(a), AUSTRALIA, 1978-79
R&D EXPENDITURE BY FIELD OF SCIENCE(b) BY TYPE OF EXPENDITURE AND TYPE OF ACTIVITY(c)
(\$' 000)

Field of science(b)	Type of expenditure					Type of activity(c)			
	Total expenditure	Land and buildings	Other capital expenditure	Wages and salaries	Other current expenditure	Pure basic research	Strategic basic research	Applied research	Experimental development
Natural sciences—									
Physical sciences	105	—	27	45	33	76	28	1	—
Chemical sciences	112	1	28	51	33	76	32	4	—
Biological sciences	2,277	11	186	1,516	564	175	630	1,441	30
Earth sciences	21	—	5	9	7	15	6	—	—
Engineering and applied sciences	187	—	28	112	47	76	58	52	—
Agricultural sciences	36	—	4	30	2	5	2	30	—
Medical sciences	7,898	29	510	4,969	2,390	3,059	1,015	3,823	—
Total natural sciences	10,636	40	788	6,732	3,076	3,482	1,772	5,351	30
Social sciences and humanities—									
Economics	134	—	—	104	30	—	—	134	—
Education	1,557	220	40	1,010	287	—	—	1,557	—
Management	—	—	—	—	—	—	—	—	—
Political science	—	—	—	—	—	—	—	—	—
Sociology	91	—	1	78	12	—	—	78	13
Information science	9	—	—	8	1	—	1	3	5
Other social sciences and humanities	138	—	7	112	18	—	—	138	—
Total social sciences and humanities	1,930	220	49	1,312	349	—	1	1,911	18
Total	12,566	260	837	8,044	3,424	3,482	1,773	7,262	48

(a) See paragraphs 14 to 17 of the Explanatory notes.

(b) See paragraphs 18 to 24 of the Explanatory notes.

(c) See page 8 of Appendix B.

TABLE 15. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT BY PRIVATE NON-PROFIT ORGANISATIONS(a).
AUSTRALIA, 1978-79
R&D MANPOWER BY SOCIO-ECONOMIC OBJECTIVE(b) BY MAJOR FIELD OF SCIENCE(b) AND TYPE OF EMPLOYEE
(man-years)

Socio-economic objective(b)	Major field of science(b)			Type of employee		
	Total man-years	Natural sciences	Social sciences	Researchers	Technicians	Other supporting staff
National security (defence)	—	—	—	—	—	—
Economic development—						
Agriculture	1	1	—	1	—	—
Forestry and fisheries	1	—	1	—	1	—
Mining (prospecting)—						
energy sources	—	—	—	—	—	—
other	—	—	—	—	—	—
Mining (extraction)—						
energy sources	—	—	—	—	—	—
other	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—
Construction	—	—	—	—	—	—
Energy	1	1	—	—	1	—
Transport	3	3	—	2	—	1
Communications	—	—	—	—	—	—
Economic services n.e.c.	6	3	4	3	2	1
Total economic development	13	8	5	6	4	3
Community welfare—						
Urban and regional planning	4	—	4	3	—	1
Environment	—	—	—	—	—	—
Health	448	447	1	208	133	108
Education	65	—	65	39	8	17
Welfare	4	—	4	3	—	1
Community services n.e.c.	1	1	—	—	1	—
Total community welfare	522	448	74	253	141	127
Advancement of knowledge—						
Earth, ocean and atmosphere n.e.c.	3	3	—	2	—	1
General advancement of knowledge	9	7	2	4	3	2
Total advancement of knowledge	12	10	2	6	3	3
Total	546	465	81	265	148	133

(a) See paragraphs 14 to 17 of the Explanatory notes. (b) See paragraphs 18 to 24 of the Explanatory notes.

TABLE 16. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT BY PRIVATE NON-PROFIT ORGANISATIONS(a).
AUSTRALIA, 1978-79
R&D MANPOWER BY FIELD OF SCIENCE(b) BY TYPE OF EMPLOYEE
(man-years)

Field of science(b)	Type of employee			Total
	Researchers	Technicians	Other supporting staff	
Natural sciences—				
Physical sciences	1	1	—	2
Chemical sciences	1	—	—	2
Biological sciences	40	30	14	83
Earth sciences	—	—	—	—
Engineering and applied sciences	3	1	1	6
Agricultural sciences	1	1	—	2
Medical sciences	170	105	95	370
Total natural sciences	215	139	111	465
Social sciences and humanities—				
Economics	1	1	1	3
Education	40	8	17	65
Management	—	—	—	—
Political science	—	—	—	—
Sociology	6	—	2	8
Information science	1	—	—	1
Other social sciences and humanities	3	—	2	5
Total social sciences and humanities	50	9	21	81
Total	265	148	133	546

(a) See paragraphs 14 to 17 of the Explanatory notes. (b) See paragraphs 18 to 24 of the Explanatory notes.

TABLE 17. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT BY PRIVATE NON-PROFIT ORGANISATIONS(a), AUSTRALIA, 1978-79
R&D EXPENDITURE AND R&D MANPOWER BY STATE

State or Territory	Total expenditure (\$'000)	Type of employee (man-years)			Total
		Researchers	Technicians	Other supporting staff	
New South Wales	4,047	86	61	22	169
Victoria	8,350	173	85	108	366
Queensland	57	2	1	1	4
South Australia	30	2	1	1	4
Western Australia	19	1	—	1	2
Tasmania	16	1	—	—	1
Northern Territory	5	—	—	—	—
Australian Capital Territory	34	1	—	1	2
Overseas	8	—	—	—	—
Total	12,566	265	148	133	546

(a) See paragraphs 14 to 17 of the Explanatory notes.

TABLE 18. RESEARCH AND EXPERIMENTAL DEVELOPMENT CARRIED OUT BY PRIVATE NON-PROFIT ORGANISATIONS(a), AUSTRALIA, 1978-79
R&D EXPENDITURE BY SOCIO-ECONOMIC OBJECTIVE(b) BY STATE
(5'000)

Socio-economic objective(b)	State									Total
	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Overseas	
National security (defence)	—	—	—	—	—	—	—	—	—	—
Economic development—										
Agriculture	30	—	—	—	—	—	—	—	—	30
Forestry and fisheries	75	—	—	—	—	—	—	—	—	75
Mining (prospecting)—	—	—	—	—	—	—	—	—	—	—
energy sources	—	—	—	—	—	—	—	—	—	—
other	—	—	—	—	—	—	—	—	—	—
Mining (extraction)—	—	—	—	—	—	—	—	—	—	—
energy sources	—	—	—	—	—	—	—	—	—	—
other	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—
Construction	—	—	—	—	—	—	—	—	—	—
Energy	—	10	—	—	—	—	—	—	—	10
Transport	—	68	—	—	—	—	—	—	—	68
Communications	—	—	—	—	—	—	—	—	—	—
Economic services n.e.c.	120	29	19	—	—	—	—	—	1	169
Total economic development	225	108	19	—	—	—	—	—	1	352
Community welfare—										
Urban and regional planning	—	35	—	—	—	—	—	—	—	35
Environment	—	—	—	—	—	9	—	—	—	9
Health	3,429	6,477	25	30	19	—	—	—	—	9,979
Education	—	1,554	—	—	—	—	—	—	—	1,554
Welfare	12	42	—	—	—	7	—	—	—	61
Community services n.e.c.	—	—	2	—	—	—	—	—	—	2
Total community welfare	3,441	8,108	27	30	19	16	—	—	—	11,641
Advancement of knowledge—										
Earth, ocean and atmosphere n.e.c.	—	134	11	—	—	—	5	—	—	150
General advancement of knowledge	381	—	—	—	—	—	—	34	7	422
Total advancement of knowledge	381	134	11	—	—	—	5	34	7	572
Total	4,047	8,350	57	30	19	16	5	34	8	12,566

(a) See paragraphs 14 to 17 of the Explanatory notes. (b) See paragraphs 18 to 24 of the Explanatory notes.



APPENDIX A
PLEASE RETAIN ONE COPY FOR YOUR OWN RECORDS
AUSTRALIAN BUREAU OF STATISTICS

FORM RD 4

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SURVEY OF RESEARCH AND EXPERIMENTAL DEVELOPMENT 1978-79
GENERAL GOVERNMENT AND PRIVATE NON-PROFIT ORGANISATIONS
ORGANISATION RETURN

The 1978-79 Survey of Research and Experimental Development is being conducted by the ABS as part of the Department of Science and the Environment's Project SCORE (Survey and Comparisons of Research Expenditures).

All figures in this return should relate to the organisation named on the address label above. In addition to completing this return, a further return (Form RD5) should be completed for EACH R&D programme carried out by your organisation during the year ended 30 June 1979.

If actual figures are not available from your accounts, please supply careful estimates.

Explanatory notes are provided on pages 5 and 6 of this return for your assistance. If you encounter any difficulty in interpreting the instructions or definitions on this return, please contact the ABS.

PLEASE FORWARD YOUR COMPLETED RETURNS FOR THIS ORGANISATION in the enclosed reply-paid envelope to reach the Department of Science and the Environment NOT LATER THAN The Department will micro-copy the return for its reference and then forward them to the ABS for statistical processing.

AUSTRALIAN BUREAU OF STATISTICS

TOTAL ORGANISATION EMPLOYMENT, at the last pay period in June 1979.

1. Report the number of employees of your organisation on the payroll for the last pay period in June 1979. Include part-time and casual employees.

.....
(NUMBER OF PERSONS)

Representative of your organisation who should be contacted if any queries arise regarding this return

Name of Representative Telephone No.
(BLOCK LETTERS) (STD CODE)

Position or title

Signature Date

Project SCORE

SCORE surveys are the only comprehensive source of statistical data on expenditure and manpower devoted to research and experimental development in Australia.

The data obtained from SCORE surveys provide important background for informed discussion in relation to current science and technology policy, including issues relating to economic planning, social welfare, education and the environment. Most industrialised nations have instituted regular surveys to obtain quantitative overviews of national research and experimental development (R&D) activity. Australia has so far conducted three such national surveys (in 1968-69, 1973-74 and 1976-77) and these are to be continued biennially.

INTERPRETATION OF THE DEFINITION OF RESEARCH AND EXPERIMENTAL DEVELOPMENT

This survey conforms to the standards for research and experimental development (R&D) statistics formulated by the Organisation for Economic Co-operation and Development (OECD). The OECD defines R&D as follows:

"Research and experimental development comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications".

Any activity classified as R&D should contain an appreciable amount of NOVELTY, it should have INVESTIGATION as a primary objective, and should have a potential to produce results that are sufficiently GENERAL for mankind's stock of knowledge (theoretical and/or practical) to be recognisably increased. The concept of novelty is not associated with the actual creation of something which, although new, is made by artistry or by application of techniques that have already been established for that class of object. For example, devising and validating a new econometric model is R&D, whereas the econometric modelling of economic systems for policy purposes, using established techniques, is not R&D.

R&D ceases when work is no longer experimental. Once its primary objective is no longer investigation, an activity can no longer be considered as R&D even though it could be regarded as an important part of the total innovative process.

Note that R&D extends to substantial modifications to existing processes, systems, services and products.

THE FOLLOWING ACTIVITIES, often regarded as research or development, are to be EXCLUDED, EXCEPT where they are used primarily for the support of specific R&D programmes or to develop new techniques.

- engineering and technical services
- scientific and technical information services
- general purpose data collection (i.e. data collection not undertaken as part of a specific research project — note that the development of a new or substantially modified type of statistical survey is considered to be R&D up to the end of the pilot test stage).
- standardisation and routine testing
- feasibility studies
- specialised routine medical care
- patent and licence work
- policy related studies

A. R&D PROJECTS UNDERTAKEN BY YOUR ORGANISATION, YEAR ENDED 30 JUNE 1979
(QUESTIONS 2-6)

Include R&D projects undertaken by your organisation on behalf of other organisations.

Exclude R&D projects undertaken on your behalf by other organisations (report this expenditure in Question 7), but include work done by others where it is in the form of a specialised service provided in support of an R&D project undertaken by your organisation (report this expenditure in 'other current expenditure' in Question 3).

Figures should relate to total manpower and expenditure costs attributable to R&D activity (as defined on page 2) carried out by your organisation. They should therefore comprise aggregations of data reported on Forms RD5 together with R&D costs which have not been attributed to individual research programmes.

2. MAN YEARS OF EFFORT ON R&D UNDERTAKEN BY YOUR ORGANISATION DURING THE YEAR ENDED 30 JUNE 1979
(see explanatory notes, page 5)

TYPE OF EMPLOYEE	Man years of effort attributable to R&D (report to one decimal place)
Researchers	(a)
Technicians	(a)
Other staff directly supporting R&D	(a)
Overhead staff providing indirect services to R&D	
TOTAL	

(a) represents an aggregation of the relevant data reported in Question 3 of Forms RD5.

3. TYPE OF EXPENDITURE (see explanatory notes, page 5)

Report only the expenditure by your organisation (see Question 6) attributable to R&D projects undertaken by your organisation during the year ended 30 June 1979.

Where significant expenditure is shared by R&D and non R&D activities (e.g. central administration costs, fuel, rates, computing expenses, etc.), the R&D proportion should be estimated and included in the relevant figure.

TYPE OF EXPENDITURE		Expenditure reported in Forms RD5 for individual research programmes \$	Other expenditure (not reported in Forms RD5) \$	Total \$
		1	2	3
CAPITAL EXPENDITURE on new and second hand fixed tangible assets, less value of disposals	Land, buildings, and other structures			
	Vehicles, plant, machinery and equipment			
CURRENT EXPENDITURE	Wages, salaries and other labour costs (including superannuation, holiday pay, etc.)			
	Other current expenditure (exclude depreciation provisions)			
TOTAL				

4. SOURCE OF FUNDS

Report the direct source of all funds receivable to finance expenditure on R&D projects which were undertaken by your organisation during the year ended 30 June 1979. Include funding from grants, contracts, commissions, etc.

Where you are unsure of the appropriate source category, please report under "Other Australian sources" and specify the name of the organisation providing the funds.

SOURCE	Funds reported in Forms RD5 for individual research programmes \$	Funds not directly associated with individual research programmes \$	Total \$
	1	2	3
Own funds (see explanatory notes, page 5)			
External sources within Australia			
— Private business enterprises			
— Public sector business enterprises			
— Commonwealth Government			
— State and local government			
— Universities and colleges			
— Private non-profit organisations			
— Donations and bequests from private individuals			
— Other Australian sources (specify)			
Overseas sources			
TOTAL			(c)

(c) to agree with Total in column 3 of Question 3 above.

5. TYPE OF FUNDING (see explanatory notes, page 5)

Report the total of all funds receivable to finance expenditure on R&D projects which were undertaken by your organisation during the year ended 30 June 1979 according to the type of funding.

Contracts commissions \$	Grants and donations \$	Own funds \$	Total \$
		(d)	(e)

(d) to agree with 'own funds' in Question 4 above; (e) to agree with Total in column 3 of Question 4 above.

6. CAPITAL EXPENDITURE INCURRED BY OTHER ORGANISATIONS ON YOUR BEHALF, YEAR ENDED 30 JUNE 1979.

- Report any expenditure incurred by other organisations or government departments on the purchase of fixed tangible assets for use by your organisation for R&D purposes.
- Where such assets are to be shared by R&D and non-R&D activities, report only the R&D proportion.
- Where capital items are leased for R&D purposes by your organisation, do not report the capital expenditure in this return, but include the leasing cost in 'Other current expenditure' in Question 3.

TYPE OF EXPENDITURE	Expenditure \$
CAPITAL EXPENDITURE on new and second hand fixed tangible assets, less value of disposals	Land, buildings, and other structures
	Vehicles, plant, machinery and equipment
TOTAL	

B. PAYMENTS BY YOUR ORGANISATION FOR R&D PROJECTS UNDERTAKEN ON BEHALF OF YOUR ORGANISATION BY OTHERS, YEAR ENDED 30 JUNE 1979

- Report amounts payable by your organisation specifically for R&D projects undertaken on your behalf during the year ended 30 June 1979 by other organisations either in Australia or overseas.
- Include payments made in the form of grants (e.g. to industrial research organisations) as well as contract or commission payments.
- Include sponsorship of post-graduate students at educational institutions where the results of research projects undertaken by the students are of direct interest to your organisation.
- Exclude payments for work done by others where it is in the form of a specialised service (e.g. analytical or engineering work contracted out) provided in support of an R&D project undertaken by your organisation (this expenditure should have been included in Question 3).

COUNTRY	Type of payment		
	Contracts and commissions \$	Grants and donations \$	Total \$
Australia			
Canada			
France			
Germany (Federal Republic of)			
Japan			
New Zealand			
U.K.			
U.S.A.			
Other (specify)			
TOTAL			

C. NUMBER OF PATENT APPLICATIONS LODGED AND PATENTS GRANTED DURING TWO YEARS, 1 JULY 1977 TO 30 JUNE 1979.

- Report patenting activity during the two years resulting from R&D projects undertaken at any time by your organisation (see explanatory notes, page 6).

COUNTRY	Patent applications lodged during 2 years		Patents granted during 2 years	
	Number of inventions, devices or innovations involved	Gross number of applications	Number of inventions, devices or innovations involved	Gross number of applications
Australia				
Abroad				
for office use only				

D. RECEIPTS AND PAYMENTS FOR LICENCES, PATENT RIGHTS OR OTHER TECHNICAL KNOW-HOW, YEAR ENDED 30 JUNE 1979

- Report amounts payable and receivable for technical know-how during the year ended 30 June 1979 (see explanatory notes, page 6)

COUNTRY	Amounts payable by your organisation for purchases of technical know-how		Amounts receivable by your organisation from sales of technical know-how	
	Patent licence fees & patent royalties \$	Other technical know-how \$	Patent licence fees & patent royalties \$	Other technical know-how \$
Australia				
Canada				
France				
Germany (Federal Republic of)				
Japan				
New Zealand				
U.K.				
U.S.A.				
Other (specify)				
TOTAL				

Please comment below if there are any special or unusual circumstances concerning the figures reported in this return (or difficulties encountered in completing it).

EXPLANATORY NOTES

- General Instructions**
- Figures reported should preferably be on an accrual basis of accounting, that is, they should relate to income earned during the year, whether received or not, and to expenditure incurred during the year, whether paid or not. However, if figures are not available on an accrual basis (as may be the case for many government organisations) please report figures on a cash basis.
 - Report all R&D activities whether or not assigned to separate research units of your organisation.
 - Figures reported should be for the period 1 July 1978 to 30 June 1979. However, if figures are not available on a June year basis from your accounts, please report all figures for the period of your accounting year (with the exception of Question 1 which should be reported on an end of June basis).

Question 2. MAN YEARS OF EFFORT ON R&D

Man years of effort: One person can work at the most one man year each year even though that person may have worked long hours and/or been extremely effective. For example, a full-time employee who devoted 40% of his working time to R&D during half of the survey year would contribute $0.4 \text{ man} \times 0.5 \text{ years} = 0.2 \text{ man years}$ to the R&D effort, even if his average working time per week were, say 60 hours.

Researchers, Technicians and Other Staff directly supporting R&D. *Include* the R&D effort of identifiable research groups, together with staff of units providing technical support to research groups. *Include* individual contributions to R&D by personnel not in research units.

Overhead Staff: Report the proportion of the effort of administration and general service personnel that is attributable to the indirect support of R&D.

Researchers refers to persons actually engaged in the conception and/or creation of new knowledge, products, processes, methods and systems. *Include* also executives and directors responsible for R&D programme content. *Exclude* executives and managers who are concerned primarily with budget and manpower constraints (these should be regarded as overhead staff).

Technicians refers to persons performing technical tasks in support of R&D, normally under the direction and supervision of a researcher. These tasks include assisting with or performing experiments (under supervision), tests and analyses; preparing materials and equipment for experiments, taking records, making calculations and preparing charts and graphs; maintaining and operating advanced machinery and equipment; interviewing in social science surveys; and computer programming.

Other Staff directly supporting R&D refers to skilled and unskilled craftsmen, secretarial and clerical staff working on or directly associated with R&D activity.

Overhead Staff refers to administrative and general service employees (e.g. personnel officers, canteen staff, pay clerks, janitors, cleaners, groundsmen) whose work indirectly supports R&D.

Question 3. TYPE OF EXPENDITURE

Capital Expenditure: Only expenditure incurred in the 1978-79 financial year on the acquisition (less disposal) of fixed tangible assets, either new or second-hand, with an expected life of greater than one year should be reported. A proportion of expenditure on assets used partly for R&D should be included.

Land, buildings and other structures: *Include* major alterations, but *exclude* repairs and maintenance (which should be reported in "Other current expenditure").

Current Expenditure

Wages, salaries and other labour costs refer to gross earnings before taxation and other deductions. *Include* overtime earnings, shift allowances, penalty rates, bonuses and commission payments to employees, holiday pay, payments to employees absent on long service leave, sick pay and similar payments, and employer contributions to superannuation and pension schemes. (In the case of Government departments *exclude* the employer contributions to superannuation and pension schemes where these contributions are paid by another organisation). An estimate of the proportion of the labour costs of overhead staff that is attributable to the support of R&D should be included.

Other current expenditure: *Include* expenditure on items such as materials, fuels, rent and leasing, repairs and maintenance, data processing, reference materials and special services in support of R&D (e.g. payments to outside organisations for use of specialised testing facilities). The estimated proportion of expenditure on general services and overhead costs attributable to the R&D effort should be included.

Question 4. SOURCE OF FUNDS

Own funds refer to funds available for the organisation's own use. It includes income from the sale of goods or services. In the case of government organisations, the "direct government vote" is the normal source of "own funds".

External sources refer only to funds receivable specifically for R&D activity.

Question 5. TYPE OF FUNDING

Contracts and commissions refer to funds receivable for specified R&D activity carried out by your organisation under contract or commission to other organisations.

Grants and donations refer to funds receivable specifically for R&D activity carried out by your organisation, but which involve no contractual obligations on the part of your organisation.

Question 8. PATENT APPLICATIONS LODGED AND PATENTS GRANTED

Patent applications lodged. *Exclude* applications for which only provisional specifications were provided.

Patents granted. Report the number of patents granted between 1 July 1977 and 30 June 1979, regardless of when the applications for those patents were lodged.

Number of inventions etc. Report the number of inventions, devices or innovations involved, irrespective of the number of countries in which applications were lodged or patents granted.

Gross number abroad. Report the total number of applications lodged or patents granted abroad. For example, if your organisation lodged applications for one invention in Canada, New Zealand and France and for a second invention in France and Spain, report "5" for Gross Number of Patent Applications Lodged Abroad.

Question 9. RECEIPTS AND PAYMENTS FOR TECHNICAL KNOW-HOW

Technical know-how is the specialised technical knowledge required to successfully implement a process or produce a product e.g. patent licences; technical data and information; scientific, technical, or engineering assistance that increases technical knowledge and understanding in your organisation.

Payments

Include only expenditure made directly to the holders of the technical know-how

Exclude other costs incurred by your organisation to obtain know-how e.g. overseas travel, subscriptions for periodicals.

Exclude cost of computer software and scientific, technical, or engineering services that are not aimed primarily at increasing the technical knowledge of your organisation. *Exclude* payments for specific R&D projects undertaken by others on your behalf and reported in Question 7.

Receipts

Exclude receipts for contract or commission work undertaken by your organisation on behalf of others.



APPENDIX B
PLEASE RETAIN ONE COPY FOR YOUR OWN RECORDS

FORM RDS

AUSTRALIAN BUREAU OF STATISTICS

Organisation

R&D Programme Title

FOR OFFICE USE ONLY

DC

FT

NOP

5

SURVEY OF RESEARCH AND EXPERIMENTAL DEVELOPMENT 1978-79
GENERAL GOVERNMENT AND PRIVATE NON-PROFIT ORGANISATIONS
R&D PROGRAMME RETURN

The 1978-79 Survey of Research and Experimental Development is being conducted by the ABS as part of the Department of Science and the Environment's Project SCORE (Survey and Comparisons of Research Expenditures).

This return, Form RDS, relates to a SINGLE R&D PROGRAMME, i.e. to a group of R&D projects each of which has the same predominant socio-economic objective (in terms of those listed on pages 6 and 7). You may complete one form per project, or one form in respect of a group of projects with the same socio-economic objective, whichever is more convenient.

Figures reported in this return should relate only to R&D activities (as defined by the OECD - see definition on page 2) which were undertaken by your organisation during the year ended 30 June 1979.

- Include R&D projects undertaken by your organisation on behalf of other organisations.
- Exclude R&D projects undertaken on your behalf by other organisations, but include work done by others where it is in the form of a specialised service provided in support of an R&D project undertaken by your organisation (report this expenditure in "other current expenditure" in Question 5).

You are required in this return to provide details of the manpower and expenditure costs of this R&D programme.

- The manpower questions (Questions 3 and 4) require you to report only the effort directly attributable to the programme.
- In the case of expenditure (Questions 5 to 7) you may also include a proportion of overheads, or other indirect costs, attributable to the programme where this is more convenient. However, BEFORE COMPLETING THIS RETURN, please discuss with your organisation contact officer the extent to which indirect costs are to be included.

If actual figures are not available from your accounts, please supply careful estimates.

Explanatory notes are provided on the back page of this return for your assistance. If you encounter any difficulty in interpreting the instructions or definitions in this return, please discuss them with your organisation contact officer. (Additional copies are available from your organisation contact officer if required).

PLEASE FORWARD YOUR COMPLETED RETURN TO YOUR CONTACT OFFICER NOT LATER THAN

Name of organisation contact officer Telephone No.

AUSTRALIAN BUREAU OF STATISTICS

Representative completing this return.

Name of Representative Telephone No.
(BLOCK LETTERS) (STD Code)

Signature Date

Project SCORE

SCORE surveys are the only comprehensive source of statistical data on expenditure and manpower devoted to research and experimental development in Australia.

The data obtained from SCORE surveys provide important background for informed discussions in relation to current science and technology policy, including issues relating to economic planning, social welfare, education and the environment. Most industrialised nations have instituted regular surveys to obtain quantitative overviews of national research and experimental development (R&D) activity. Australia has so far conducted three such national surveys (in 1968-69, 1973-74 and 1976-77) and these are to be continued biennially.

INTERPRETATION OF THE DEFINITION OF RESEARCH AND EXPERIMENTAL DEVELOPMENT

This survey conforms to the standards for research and experimental development (R&D) statistics formulated by the Organisation for Economic Co-operation and Development (OECD). The OECD defines R&D as follows:

"Research and experimental development comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications".

Any activity classified as R&D should contain an appreciable amount of NOVELTY, it should have INVESTIGATION as a primary objective, and should have a potential to produce results that are sufficiently GENERAL for mankind's stock of knowledge (theoretical and/or practical) to be recognisably increased. The concept of novelty is not associated with the actual creation of something which, although new, is made by artistry or by application of techniques that have already been established for that class of object. For example, devising and validating a new econometric model is R&D whereas the econometric modelling of economic systems for policy purposes, using established techniques, is not R&D.

R&D ceases when work is no longer experimental. Once its primary objective is no longer investigation, an activity can no longer be considered as R&D even though it could be regarded as an important part of the total innovative process.

Note that R&D extends to substantial modifications to existing processes, systems, services and products.

THE FOLLOWING ACTIVITIES, often regarded as research or development, are to be EXCLUDED, EXCEPT where they are used primarily for the support of specific R&D programmes or to develop new techniques.

- . engineering and technical services
- . scientific and technical information services
- . general purpose data collection (i.e. data collection not undertaken as part of a specific research project – note that the development of a new or substantially modified type of statistical survey is considered to be R&D up to the end of the pilot test stage).
- . standardisation and routine testing
- . feasibility studies
- . specialised routine medical care
- . patent and licence work
- . policy related studies

1. BRIEF DESCRIPTION OF R&D PROGRAMME

Briefly describe the R&D programme, details of which are reported in this return. Include reference to the aim or purpose of the programme.

2. DETAILED FIELD OF SCIENCE AND SOCIO-ECONOMIC OBJECTIVE (see explanatory notes on back page)

Classify this R&D programme to the most appropriate field of science (from the detailed list provided on page 5) and to the most appropriate socio-economic objective (from the list provided on pages 6 and 7).

Predominant field of science code	Predominant socio-economic objective code

3. MAN YEARS OF EFFORT DIRECTLY ATTRIBUTABLE TO THIS R&D PROGRAMME DURING THE YEAR ENDED 30 JUNE 1979 (see explanatory notes on back page)

Allocate the effort according to the broad field(s) of science in which the activity was conducted.

Man years of effort directly attributable to R&D programme (report to one decimal place)			
TYPE OF EMPLOYEE	Natural sciences	Social sciences and humanities	Total
Researchers			
Technicians			
Other staff directly supporting R&D			
TOTAL			

4. LOCATION OF EFFORT BY RESEARCHERS

Allocate the man years of effort spent on this R&D programme by researchers during the year ended 30 June 1979 according to the location of their effort.

LOCATION	Man years of effort by researchers (report to one decimal place)
New South Wales	
Victoria	
Queensland	
South Australia	
Western Australia	
Tasmania	
Northern Territory	
Australian Capital Territory	
Overseas	
TOTAL (to agree with Total Researchers' category in Q.3)	

5. TYPE OF EXPENDITURE (see explanatory notes on back page)

- Report only the direct expenditure (or include overheads to the extent agreed to with your organisation contact officer) incurred on this R&D programme by your organisation during the year ended 30 June 1979.
- Allocate expenditures according to the broad field(s) of science in which the associated R&D activity was conducted.
- Exclude any capital expenditure incurred by other organisations on your behalf.

TYPE OF EXPENDITURE		Expenditure		
		Natural Sciences \$	Social sciences and humanities \$	Total \$
CAPITAL EXPENDITURE on new and second hand fixed tangible assets, less value of disposals	Land, buildings, and other structures			
	Vehicles, plant, machinery and equipment			
CURRENT EXPENDITURE	Wages, salaries and other labour costs (including superannuation, holiday pay, etc.)			
	Other current expenditure (exclude depreciation provisions)			
TOTAL				

6. EXPENDITURE BY MAJOR FIELD OF SCIENCE (see explanatory notes on back page)

Allocate the total expenditure reported above in Question 5 between the major fields of science in which the associated R&D activity was conducted. Further details of the Field of Science classification are shown on page 5.

MAJOR FIELDS OF SCIENCE	Expenditure \$
Natural sciences	
Physical sciences	
Chemical sciences	
Biological sciences	
Earth sciences	
Engineering and applied sciences	
Agricultural sciences and forestry	
Medical sciences	
Total Natural sciences (to agree with appropriate Total in Q.5)	
Social sciences and humanities	
Economics	
Education	
Management	
Political science	
Sociology	
Information science	
Other (specify)	
Total Social sciences (to agree with appropriate Total in Q.5)	

7. TYPE OF ACTIVITY (see explanatory notes on back page)

Allocate the total expenditure reported above in Question 5 according to the type(s) of activity and according to the broad field(s) of science in which the activity was undertaken.

TYPE OF ACTIVITY	Expenditure		
	Natural sciences \$	Social sciences and humanities \$	Total \$
Basic research - Pure			
- Strategic			
Applied research			
Experimental development			
TOTAL (to agree with Totals in Q.5)			

Complete Questions 8 and 9 only if your organisation received funds from other organisations or individuals specifically for this R&D programme.

8. EXTERNAL SOURCE OF FUNDS

- Report the direct source of all external funds receivable specifically to finance expenditure for work which was undertaken on this R&D programme during the year ended 30 June 1979.
- Include funding from grants, contracts, commissions, etc.
- In the case of government organisations exclude funds receivable from the "direct government vote".
- Where you are unsure of the appropriate source category, please report under "Other Australian sources" and specify the name of the organisation providing the funds.

SOURCE	Funds \$
External sources within Australia	
- Private business enterprises	
- Public sector business enterprises	
- Commonwealth Government	
- State and local government	
- Universities and colleges	
- Private non-profit organisations	
- Donations and bequests from private individuals	
- Other Australian sources (specify)	
Overseas Sources (specify)	
TOTAL	

9. TYPE OF FUNDING (see explanatory notes on back page)

Report the funds receivable from outside the organisation specifically to finance expenditure on this R&D programme during the year ended 30 June 1979 according to the type of external funding.

Contracts and commissions \$	Grants and donations \$	Total (to agree with Total in Q.8) \$

FIELDS OF SCIENCE

Field	Code	Field	Code
PHYSICAL SCIENCES		ENGINEERING AND APPLIED SCIENCES	
Algebra	101P	Aeronautical engineering	181T
Analysis and functional analysis	102T	Aerospace engineering	182Z
Logic	103Z	Architecture	183C
Numerical analysis	104C	Chemical engineering	184G
Statistics and probability	106G	Computing science	185L
Other mathematics (please specify)	109A	Communications (including tele-)	186S
		Construction and civil engineering	187X
		Electrical and electronic engineering	188A
		Food technology	189E
High energy and nuclear physics	110S	Fuel and power technology	190X
Solid state physics	111X	Mechanical engineering	191A
Atomic physics	112A	Metallurgy and materials science	192E
Molecular and chemical physics	113E	Mining engineering	193K
Acoustics	114K	Nuclear engineering	194P
Electromagnetic phenomena	115P	Systems analysis (incl. operations research, control engineering)	195T
Fluid and plasma physics	116T	Textile technology	196Z
Mechanics, statistical mechanics and thermodynamics	117Z	Traffic engineering	197C
Theoretical physics	118C	Other engineering and applied sciences (please specify)	209K
Biophysics	119G		
Astronomy and astrophysics	120Z		
Other physical sciences (please specify)	129P		
		AGRICULTURAL SCIENCE AND FORESTRY	
		Agronomy	211E
		Animal husbandry and veterinary science	212K
		Entomology	213P
		Forestry	214T
		Plant physiology and pathology	215Z
		Soil science	216C
		Other agricultural sciences (please specify)	219S
		MEDICAL SCIENCES	
		(not further classified)	220G
		SOCIAL SCIENCES AND HUMANITIES	
		Accounting	231T
		Anthropology	232Z
		Arts	233C
		Economics	234G
		Education	235L
		Geography	236S
		History	237X
		Information science	238A
		Language	239E
		Law	240X
		Linguistics	241A
		Literature	242E
		Management	243K
		Music	244P
		Philosophy	245T
		Political science	246Z
		Psychology	247C
		Sociology	248G
		Other social sciences and humanities (please specify)	259T
		OTHER (please specify)	
			260K
CHEMICAL SCIENCES			
Physical chemistry	131K		
Organic chemistry	132P		
Inorganic chemistry	133T		
Analytical chemistry	134Z		
Theoretical chemistry	135C		
Other chemical sciences (please specify)	139X		
BIOLOGICAL SCIENCES			
Biochemistry	141S		
Botany	142X		
Entomology	143A		
Genetics	144E		
Human biology	145K		
Immunology	146P		
Microbiology	147T		
Molecular biology	148Z		
Psychology (biological aspects)	149C		
Physiology	150T		
Zoology	151Z		
Other biological sciences (please specify)	159K		
EARTH SCIENCES			
Atmospheric sciences	161E		
Geochemistry	162K		
Geology	163P		
Geophysics	164T		
Hydrology	165Z		
Meteorology	166C		
Oceanography	167G		
Planetology and selenology	168L		
Plate tectonics	169S		
Other earth sciences (please specify)	179Z		

SOCIO-ECONOMIC OBJECTIVES

Broad Objective Area	Objective	CODE
GENERAL ADVANCEMENT OF KNOWLEDGE	General advancement of knowledge	501A
AGRICULTURE	Animal	511G
	Plant	512L
	Other (please specify)	519T
FORESTRY	Forestry	521P
FISHERIES	Fisheries	531X
MINING (including resource assessment techniques, and relevant aspects of petroleum geology, geoscience technology, geotechnics, and mining engineering)	Extraction techniques - uranium	541O
	Extraction techniques - metallic minerals (other than uranium)	542G
	Extraction techniques - coal	543L
	Extraction techniques - oil and gas	544S
	Extraction techniques - other (please specify)	548P
	Prospecting & resource assessment techniques - uranium	551L
	Prospecting & resource assessment techniques - metallic minerals (other than uranium)	552P
	Prospecting & resource assessment techniques - coal	553T
	Prospecting & resource assessment techniques - oil and gas	554Z
	Prospecting & resource assessment techniques - other (please specify)	559X
MANUFACTURING		
Food, beverages & tobacco	Food	561S
	Beverages and malt	562X
	Tobacco	563A
Textiles, clothing and footwear	Textiles and textile products	564E
	Clothing and footwear	565K
Wood, wood products and furniture	Wood, wood products and furniture	566P
Paper, paper products, printing and publishing	Paper and paper products	567T
	Printing and allied industries	568Z
Chemical, petroleum and coal products	Chemical fertilisers	569C
	Industrial gases	570T
	Synthetic resins and rubber	571Z
	Organic industrial chemicals n.e.c.	572C
	Inorganic industrial chemicals n.e.c.	573G
	Paints	574L
	Pharmaceuticals	575S
	Veterinary products	576X
	Pesticides	577A
Non-metallic mineral products	Other chemicals, petroleum and coal products	578E
	Glass and glass products	579K
	Clay products and refractories	580A
	Cement and concrete products	581E
	Other non-metallic mineral products	582K
Basic metal products	Basic iron and steel	583P
	Basic non-ferrous metals and products	584T
Fabricated metal products	Structural and sheet metal products	585Z
	Other fabricated metal products	586C
Transport equipment	Motor vehicles and parts	587G
	Ships and boats	588L
	Railway rolling stock and locomotives	589S
	Aircraft	590G
	Transport equipment n.e.c.	591L
Other machinery and equipment	Photographic, professional and scientific equipment	592S
	Radio and T.V. receivers; audio equipment	593X
	Computers and electronic calculating machines	594A
	Other electronic equipment n.e.c.	595E
	Refrigerators and household appliances	596K
	Other electrical machinery and equipment n.e.c.	597P
	Agricultural machinery	598T
	Construction machinery	599Z
	Materials handling equipment	600E
	Other industrial machinery and equipment	601K
Miscellaneous manufacturing	Leather and leather products	602P
	Rubber products	603T
	Plastic and related products	604Z
	Other manufacturing	609X
ENERGY		
Production and utilisation of energy from	Oil and gas	611S
	Coal	612X
	Solar	613A
	Nuclear	614E
	Other primary sources	615K
Production and utilisation of synthetic fuels from	Coal	616P
	Biomass	617T
	Conservation of energy	618Z
Conservation of energy		
Other energy R&D (including supporting technologies such as electricity transmission and distribution, energy storage, energy systems analysis etc.)	Other energy R&D	619C

SOCIO-ECONOMIC OBJECTIVES

Broad Objective Area	Objective	CODE
TRANSPORT (other than aspects covered under MANUFACTURING)	Road accidents & safety	651T
	Other road	652T
	Railway	653C
	Water transport	654G
	Air transport	655L
	Multimodal transport	656S
	Intermodal materials handling	657X
	Other transport (please specify)	659E
COMMUNICATIONS (other than aspects covered under MANUFACTURING)	Telecommunications & broadcasting	661A
	Postal	662E
	Other (please specify)	669L
CONSTRUCTION (other than aspects covered under "non-metallic mineral products", "Fabricated metal construction materials", and "Construction & earthmoving machinery & equipment")	Construction	671G
WHOLESALE & RETAIL TRADE	Wholesale & retail trade	681P
BANKING, FINANCE & INSURANCE	Banking, finance & insurance	691X
HEALTH - Medical (Based on the W.H.O. International Classification of Diseases)	Infective and parasitic diseases	701T
	Neoplasms	702Z
	Endocrine, nutritional and metabolic diseases	703C
	Diseases of the blood and blood-forming organs	704G
	Mental disorders	705L
	Diseases of the nervous system and sense organs	706S
	Diseases of the circulatory system	707X
	Diseases of the respiratory system	708A
	Diseases of the digestive system (including oral)	709E
	Disease of the genito-urinary system	710X
	Complications of pregnancy, childbirth and the puerperium	711A
	Diseases of the skin and subcutaneous tissue	712E
	Diseases of the musculo-skeletal system and connective tissue	713K
	Pharmacology, toxicology	714P
	Other (please specify)	729T
HEALTH - Public	Health services	731P
	Environmental health	732T
	Occupational health	733Z
	Drug dependence (incl. alcoholism)	734C
	Other (please specify)	739A
WATER SUPPLY (except "water pollution" aspects)	Water supply	741X
WASTE DISPOSAL & RECYCLING (except aspects covered under ENERGY)	Sewage	751C
ENVIRONMENT (n.e.l.)	Other waste (please specify)	759F
	Protection and rehabilitation of natural environment	761K
	Protection of man-made environment	762P
INFORMATION TECHNOLOGY n.e.l.	ADP systems n.e.l.	811K
(including inter alia general ADP systems both hardware and general system software, but excluding those aspects covered under MANUFACTURING and COMMUNICATIONS as well as application of ADP systems in areas other than "information")	Other information media n.e.l.	812P
HOUSING (except CONSTRUCTION)	Information indexing and retrieval systems	813T
URBAN & REGIONAL PLANNING n.e.l.	Information reproduction n.e.l.	814Z
EDUCATION	General statistical methodology	815C
ECONOMY (including national, state and regional economic aspects)	Other information technology (please specify)	819X
WELFARE	Housing	821S
	Urban & regional planning	831Z
	Economy n.e.l.	841E
	Overseas trade	851L
	Productivity n.e.l.	852S
	Industrial relations	853X
	Unemployment/unemployed	854A
	Aboriginal welfare	861T
	Migrant welfare	862Z
	Aged persons	863C
	Youth/child welfare	864G
	Social services n.e.l.	865L
CONSUMER AFFAIRS	Consumer affairs	866S
ADMINISTRATION	Public administration	871A
LAW & ORDER	Law reform	881G
	Law enforcement	891P
RECREATION	Corrective services	892T
	Sport	893Z
	Culture	901L
	Paris	902S
	Other recreation	903X
FIRE	Fire protection	909Z
INTERNATIONAL	International relationships	911T
	R&D primarily for the benefit of other countries	921A
EARTH (except aspects covered under MINING and ENERGY)	Geology	922E
	Geophysics	931G
	Geochemistry	932L
	Cartography	933S
	Geomorphology	934X
	Hydrology	935A
	Other earth (please specify)	936Z
OCEAN (except aspects covered under FISHERIES)	Coastal & ocean engineering	939T
	Biological marine science n.e.l.	941P
	Other ocean (please specify)	942T
ATMOSPHERE	Meteorology	949A
	Atmospheric physics n.e.l.	951X
	Other atmosphere (please specify)	955A
REMOTE SENSING (as applied to natural processes and resources)	Remote sensing	959G
DEFENCE n.e.l. (Please use objectives other than DEFENCE where relevant, to indicate the nature of the R&D)	Defence n.e.l.	961C
OTHER R&D n.e.l.	Other R&D n.e.l. (please specify)	971K
		981S

EXPLANATORY NOTES

- General Instructions**
- Figures reported should preferably be on an accrual basis of accounting, that is, they should relate to income earned during the year, whether received or not, and to expenditure incurred during the year, whether paid or not. However if figures are not available on an accrual basis (as may be the case for many government organisations) please report on a cash basis.
 - Report all R&D activities associated with this programme whether or not assigned to separate research units of your organisation.
 - Figures reported should be for the period 1 July 1978 to 30 June 1979. However, if figures are not available on a June year basis from your accounts, please report all figures for the period of your accounting year.

Questions 2,3,5-7 FIELDS OF SCIENCE

The fields of science reported should be those in which the R&D was performed and not those being used. For example, in a programme concerned with investigating the structure of plant tissues by electron microscopy, the major field in which the R&D is being performed would be biological sciences, whereas the major field being used in the investigation would be physical science.

Question 2. PREDOMINANT SOCIO-ECONOMIC OBJECTIVE.

In answering Question 2 classify the research programme to the most appropriate socio-economic objective in the list provided on pages 6 and 7. The term "objective" refers to the ultimate national needs rather than to the immediate objectives of the researcher or organisation. The objective "General advancement of knowledge" should be used for those programmes for which this is the clear socio-economic objective (e.g. research into astronomy) together with those programmes that could contribute to several of the listed objectives in ways that do not allow one such objective to be selected as predominant.

Question 3. MAN YEARS OF EFFORT ON R&D

Man years of effort: One person can work at the most one man year each year even though that person may have worked long hours and/or been extremely effective. For example, a full-time employee who devoted 40% of his working time to R&D during half of the survey year would contribute $0.4 \text{ man} \times 0.5 \text{ years} = 0.2 \text{ man years}$ to the R&D effort, even if his average working time per week were, say, 60 hours.

Researchers, Technicians and Other Staff directly supporting R&D. Include the R&D effort of identifiable research groups, together with staff of units providing technical support to research groups. Include individual contributions to R&D by personnel not in research units.

Researchers refers to persons actually engaged in the conception and/or creation of new knowledge, products, processes, methods and systems. Include also executives and directors responsible for R&D programme content. Exclude executives and managers who are concerned primarily with budget and manpower constraints.

Technicians refers to persons performing technical tasks in support of R&D, normally under the direction and supervision of a researcher.

These tasks include assisting with or performing experiments (under supervision), tests and analyses; preparing materials and equipment for experiments, taking records, making calculations and preparing charts and graphs; maintaining and operating advanced machinery and equipment; interviewing in social science surveys; and computer programming.

Other Staff directly supporting R&D refers to skilled and unskilled craftsmen, secretarial and clerical staff working on or directly associated with R&D activity.

Question 5. TYPE OF EXPENDITURE

Capital Expenditure: Only expenditure incurred in the 1978-79 financial year on the acquisition (less disposal) of fixed tangible assets, either new or second-hand, with an expected life of greater than one year should be reported. A proportion of expenditure on assets used partly for R&D should be included.

Land, buildings and other structures: Include major alterations, but exclude repairs and maintenance (which should be reported in "Other current expenditure").

Current Expenditure

Wages, salaries and other labour costs refer to gross earnings before taxation and other deductions. Include overtime earnings, shift allowances, penalty rates, bonuses and commission payments to employees, holiday pay, payments to employees absent on long service leave, sick pay and similar payments, and employer contributions to superannuation and pension schemes. (In the case of government departments exclude the employer contributions to superannuation and pension schemes where the contributions are paid by another organisation).

Other current expenditure: Include expenditure on items such as materials, fuels, rent and leasing, repairs and maintenance, data processing, reference materials and special services in support of R&D (e.g. payments to outside organisations for use of specialised testing facilities).

Question 7. TYPE OF ACTIVITY

Basic Research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view.

Pure Basic Research is research which is carried out without looking for long term economic or social benefits other than advancement of knowledge. It includes all Humanities R&D.

Strategic Basic Research is research directed into specified broad areas in the expectation of useful discoveries. It provides the broad base of knowledge necessary for the solution of recognised practical problems.

Applied Research also refers to original investigation undertaken in order to acquire new knowledge. It is, however directed towards a specific practical aim or objective. Applied research is undertaken either to determine possible uses for the findings of basic research or to determine new methods or ways of achieving some specific and predetermined objectives.

Experimental Development refers to systematic work, drawing on existing knowledge gained from research and/or practical experience, that is directed to producing new materials, products and devices, to installing new processes and improving substantially those already produced or installed. In the social sciences experimental development may be defined as the process of translating knowledge gained through research into operational programmes including demonstration projects for testing and evaluation.

Question 9. TYPE OF FUNDING

Contracts and commissions refer to funds receivable specifically for this R&D programme under contract or commission to other organisations.

Grants and donations refer to funds, receivable specifically for this R&D programme, which involve no contractual obligations on the part of your organisation.