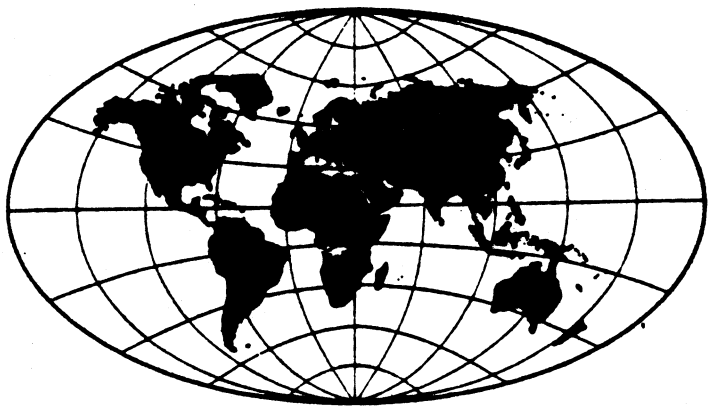
SCIENTISTS AND ENGINEERS IN AUSTRALIA: 1991

by

David Zaslow



International Programs Center
Population Division
U.S. Bureau of the Census
Washington, D.C. 20233-8860

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EXECUTIVE SUMMARY

The typical member of the group "Scientists and Engineers (S/E)" in Australia is male, in his mid-thirties, and likely to be engaged in science. The average S/E in Australia works in the service sector and holds a bachelor degree. This characterization is not monolithic, since females account for a significant share of S/E, particularly among the scientist occupation categories. Female S/E generally are younger than their male colleagues, suggesting that females may account for an increased share of S/E in the future.

Australia has far fewer scientists and engineers, relative to its labor force, than do many leading industrial countries. In 1991, Australia had just 10.4 scientists and engineers per 1,000 members of the labor force (Table AU-1(91) and Australian Bureau of Statistics, 1994, p. 147)[1]. In contrast, Japan had 38 scientists and engineers, the U.S. had 29.3 S/E, and France had 24.4 S/E, per 1,000 members of the labor force, in 1990 (Figure 1). Whether Australia's supply of scientists and engineers is sufficient for its needs is unclear, but a survey by the Australian Bureau of Statistics of enterprises in the "other machinery and equipment" sector (a leading employer of engineers) revealed that most firms obtained their advanced technological equipment from abroad (Australian Bureau of Statistics, 1994, p. 681). Efforts to overcome any shortages, at least in the engineering professions, have focussed upon encouraging females to enter these fields in far greater numbers than has already taken place (Rice and Lloyd, 1991, p. xiv).

This "snapshot" description of S/E in Australia, as well as the graphic presentation and tables to follow, is based upon information from the 1991 Australian Population Census and other Australian sources, and follows previous reports by this office on scientists and engineers in various countries around the world.

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[1] The concentration of scientists and engineers is derived from the S/E in the 1991 population census and the labor force during the 1991-1992 fiscal year.

PREFACE

The International Programs Center conducts economic and demographic studies, some of which are issued as Staff Papers. A complete list is included at the end of this report. The use of data not generated by the U.S. Bureau of the Census precludes performing the same statistical reviews the Bureau does on its own data.

We are grateful to the Australian Bureau of Statistics for their assistance in providing the special census tabulations upon which the tables and charts in this report are based. Within the International Programs Center, thanks are due to Andrea Miles for her assistance in preparing tables for Australia and to Lois Darmohray for secretarial support. Any shortcomings in the report are the responsibility of the author.

Comments and questions regarding this study should be addressed to Marc Rubin, Eurasia Branch, International Programs Center, U.S. Bureau of the Census, Washington, D.C. 20233; telephone (301) 457-1362.

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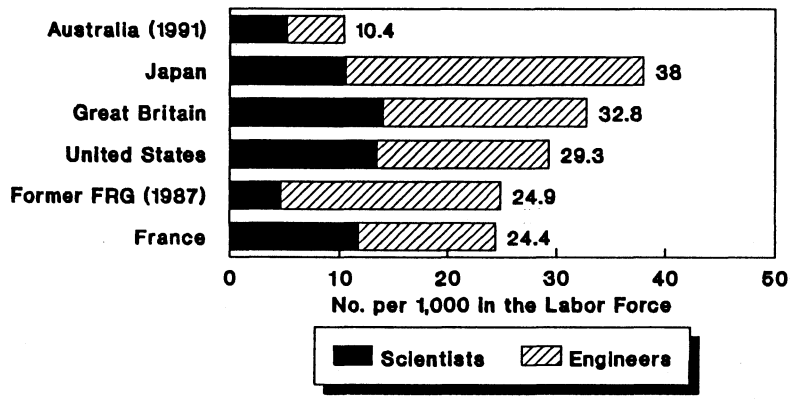
INTRODUCTION

This report presents statistics on scientists and engineers for Australia, based on data derived from the 1991 census. It begins with a graphic comparison among countries, including the United States. This is followed by sections describing new data for Australia. In the table, data tables provide detailed information upon which the graphic presentation is based. Users who wish to more closely compare data presented in this report with those of other countries should consult the list of CIR/IPC Staff Papers, in the back of this report. The most recent publication is "Scientists and Engineers in Industrialized Societies: Data Available as of 1992."

Figure 1. Scientists and Engineers per 1,000 Members of the Labor Force, for Selected Countries: 1990



Source: Jamison, 1992, p. 3; Table AU-1(91); Australian Bureau of Statistics, 1994, p. 172.

Natural science is the largest of the scientist and engineer fields.

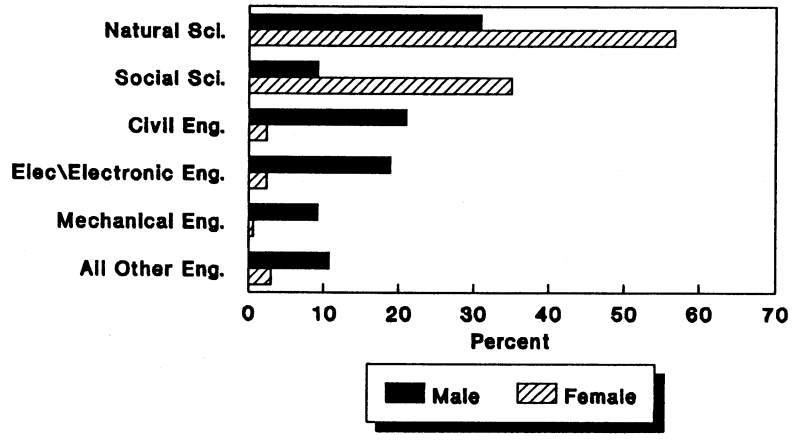
Within the employment category "Scientists and Engineers" in Australia, those with specialization in natural science predominate[2] (Figure 2). Over 22,000 males and 9,000 females, accounting for 36 percent of the employment category, work in the natural sciences, including life sciences, chemistry, geology, geophysics, physics, and medical testing. All told, the categories listed in Figure 2 represent 80,966 scientists and engineers (90.7 percent of all S/E). Males are more evenly distributed among the S/E occupations than are females. Natural scientists, the largest group of male S/E, account for 31 percent of all male S/E (Figure 3), compared to 57 percent of female S/E. Among males, there are also large numbers of civil engineers and electric/electronics engineers. Since another 35 percent of female S/E are social scientists, very few members of their sex are represented in engineering, where males numerically dominate.

Figure 2. Scientists and Engineers, by Specialty and Sex, for Australia: 1991

Source: Table AU-1 (91).

[2] See Table AU(1) for a list of occupations that are included in this report on scientists and engineers.

Figure 3. Distribution of Scientists and Engineers by Specialty and Sex, for Australia: 1991



Source: Table AU-1(91).

Most scientists and engineers are fairly young, with comparatively little age difference among occupation groups.

Scientists and engineers in their thirties are the largest group of scientists and engineers (approximately one-third of all S/E) by decade of age. The median ages of the scientist and engineer occupational categories diverge marginally from the group median of 36.7 years (Table AU-1(91)). Economists, with a median age of 33.9 years, and psychologists, at 40.1 years, represent the extremes of the median ages.

The median ages of the occupation fields differ considerably by sex. In all S/E fields (but particularly among engineers), women are younger, on average, than their male colleagues (Figure 4). For both sexes, most S/E are between ages 25 and 44, but the under 25 cohort represents a larger share for women than for men (Table AU-1(91)).

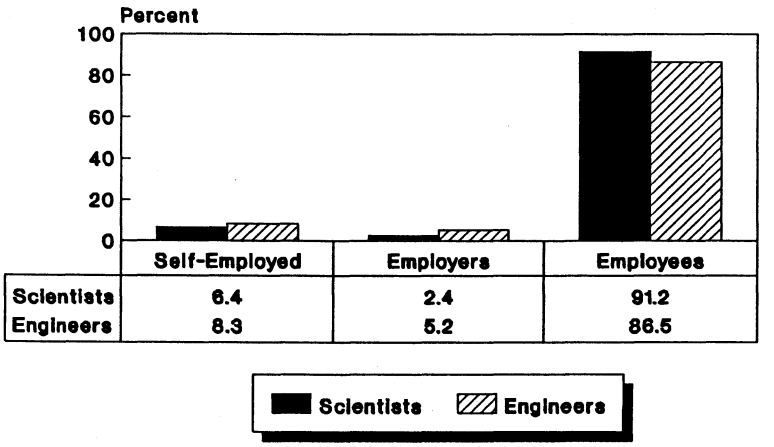
Figure 4. Median Age of Scientists and Engineers, by Sex, for Australia: 1991

Source: Table AU-1(91).

The vast majority of scientists and engineers are employees.

Overall, nearly 89 percent of scientists and engineers are employees (primarily those paid in salary or wages, or who are unpaid family members), with a small proportion who are either self-employed or employers. Specifically, 91.2 percent of scientists and 86.5 percent of engineers are employees (Figure 5). The vast majority of these are salary and wage earners, with a small share (one-tenth of one percent) of unpaid family employees. The share of employees among females is not appreciably higher than for males (92 percent versus 88 percent). Among those who are not employees, most are self-employed, rather than employers, particularly among females (Table AU-2(91)).

Figure 5. Distribution of Scientists and Engineers by Status of Employment, for Australia: 1991



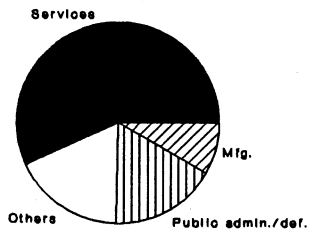
	Self-Employed	Employers	Employees
Scientists	6.4	2.4	91.2
Engineers	8.3	5.2	86.5

Source: Table AU-2(91).

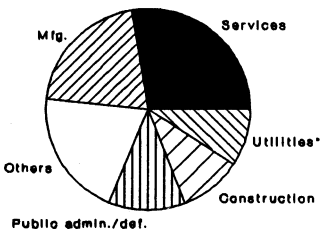
Service industries dominate employment of S/E.

The largest share (42 percent) of scientists and engineers work in service industries[3]. More specifically, most scientists (57 percent) and a large portion of engineers (28 percent) work in the service industries (Figure 6 and Tables AU-3(91) and AU-5(91)). Most other industries employ minor shares of scientists and engineers, except for public administration and defense, which employs 17 percent of scientists, and manufacturing, which employs 21 percent of engineers.

Figure 6. Scientists and Engineers by Industry, for Australia: 1991



Scientists



Engineers

* Electricity, Water, and Gas.
Source: Tables AU-3(91) and AU-5(91).

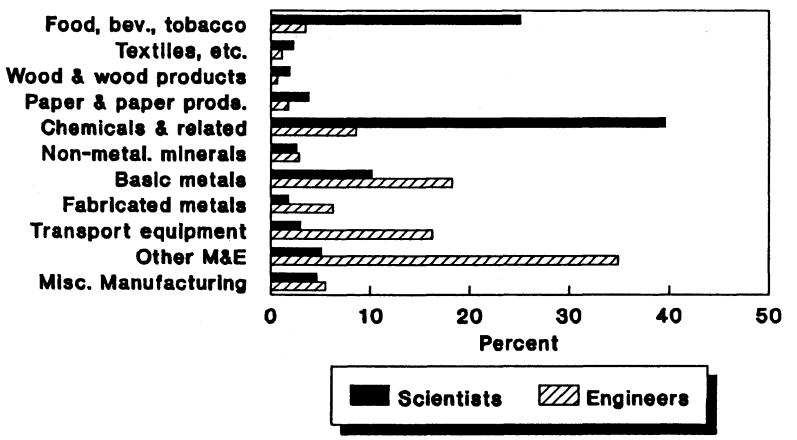
[3] The service industries are listed in Figure 8.

Chemicals, foods, and other machinery & equipment dominate among S/E in manufacturing.

Employment of scientists and engineers in manufacturing is concentrated within a few industries. Almost two-thirds (65 percent) of scientists in manufacturing work in the chemicals and related products and in the foods, beverages, and tobacco industries (Figure 7 and Table AU-4(91)). By far, the largest share of engineers work in the other machinery and equipment industries category (35 percent), followed by basic metals and transport equipment (18 percent and 16 percent, respectively).

The employment structure of scientists and engineers varies somewhat from the breakdown of research and development (R&D) expenditures by manufacturing enterprises. However, the manufacturing field with the largest R&D expenditures employed more engineers than any other, and the manufacturing category that ranked second in R&D outlays employed more scientists than any other. In fiscal year 1991-1992[4], the other machinery and equipment categories accounted for 35 percent of all R&D expenditures by manufacturing, followed by the chemicals and related products sector, with 16 percent of R&D spending (Australian Bureau of Statistics, 1994, p. 672).

Figure 7. Distribution of Scientists and Engineers in Manufacturing Industries, for Australia: 1991



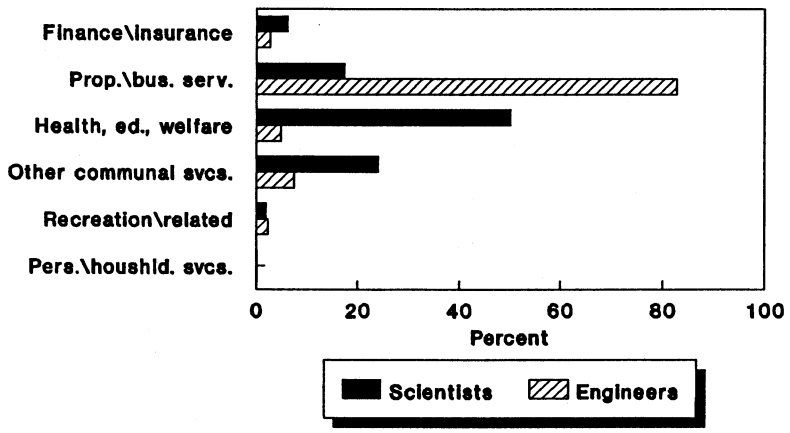
Source: Table AU-4(91).

[4] Fiscal years in Australia run from July 1 to June 30, and in this case are called fiscal 1991-1992.

Employment of scientists in the service industries is more widespread than for engineers.

Several service industries, particularly health, education and welfare, other communal services, and property and business services employ significant numbers of scientists (Figure 8). Employment of engineers in the service industries is more concentrated, with 83 percent of engineers employed in property and business services.

Figure 8. Distribution of Scientists and Engineers in Service Industries, for Australia: 1991

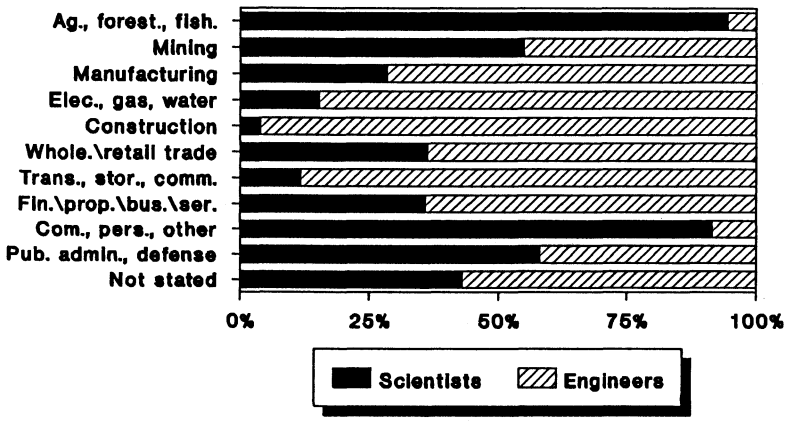


Source: Table AU-5(91).

Many industries primarily employ either scientists or engineers.

In their employment of S/E, most industries tend to favor either scientists or engineers (Figure 9)[5]. Since scientists and engineers study different disciplines (reported later in this report, in Figure 13), and develop different skills, the fact that many industries primarily hire scientists or engineers reflects the types of skills that each industry considers most relevant to improving its production processes or provision of services. The agriculture, forestry and fishing industry, and the communal, personal, and other services industry heavily favor scientists. In contrast, manufacturing, electricity, gas, water, construction, transportation, storage, and communication are highly skewed towards employment of engineers. The remaining industries have somewhat more equal employment of scientists and engineers.

Figure 9. Scientists and Engineers Within Industry Groups, for Australia: 1991

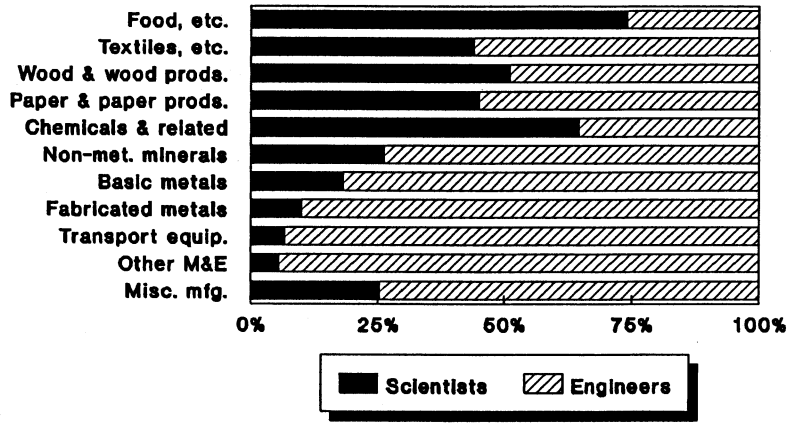


Source: Table AU-3(91).

[5] The categories Finance, property and business services, and communal, personal and other services comprise the "services" sector.

More specifically, among manufacturing industries, the food, beverages and tobacco, and the chemicals and related products industries employ significantly more scientists than engineers, while manufacturing related to non-metallic minerals, basic metals, fabricated metals, transport equipment, other machinery and equipment (M&E), and miscellaneous manufacturing heavily favor employment of engineers (Figure 10). The three remaining manufacturing industries (textiles, clothing and footwear, wood and wood products, and paper and paper products) have a fairly even balance between employment of scientists and engineers.

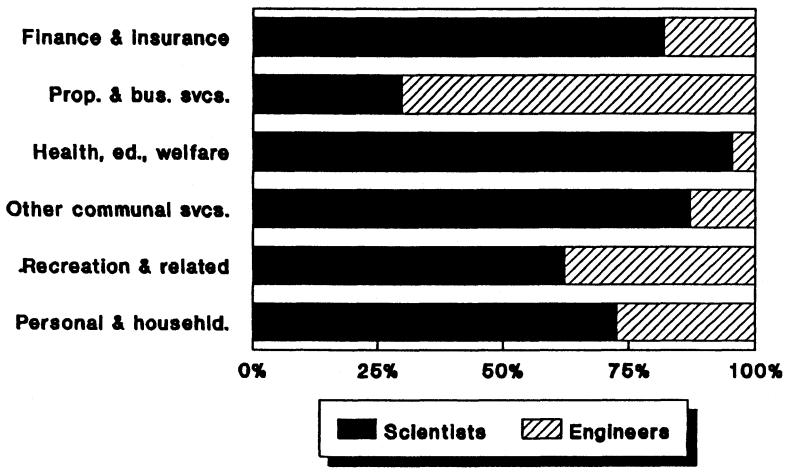
Figure 10. Scientists and Engineers Within Manufacturing Industries, for Australia: 1991



Source: Table AU-4(91).

Nearly all service industries are heavily skewed towards employment of scientists (Figure 11). Only property and business services employs more engineers than scientists.

Figure 11. Scientists and Engineers in Service Industries, for Australia: 1991

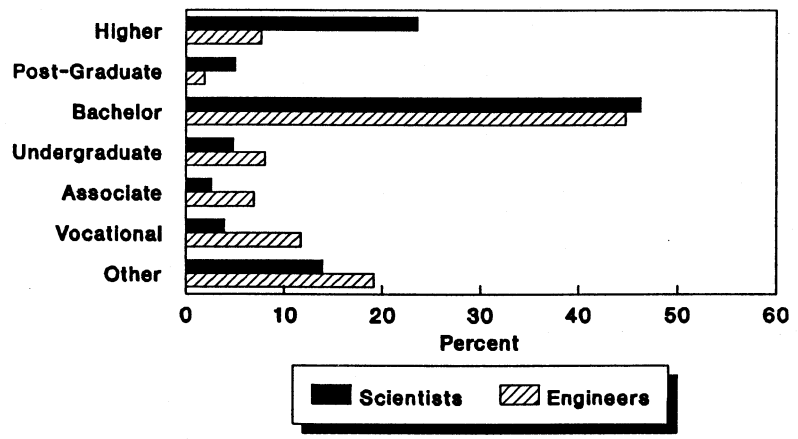


Source: Table AU-5(91).

Nearly half of S/E completed formal education with a bachelors degree.

The largest number of S/E leave school after earning a bachelors degree, which is equivalent to 3 years of full-time, post-secondary study[6]. In 1991, 45.5 percent of S/E reported a bachelors degree as their highest level of educational attainment. This share is representative of the S/E employment category as a whole, as there are nearly identical shares of scientists and of engineers reporting a bachelors degree as their highest level of education (46.3 percent of scientists and 44.8 percent of engineers) (Figure 12). A significant difference in educational attainment is apparent however, at levels above the bachelor degree. Nearly one-fourth of scientists had "higher" degrees, while 5 percent had a post-graduate diploma. By comparison, less than 10 percent of all engineers had either a post-graduate diploma or a higher degree, with engineers far more likely to report vocational training as their highest educational level.

Figure 12. Distribution of Scientists and Engineers by Level of Education, for Australia: 1991



Source: Table AU-6(91).

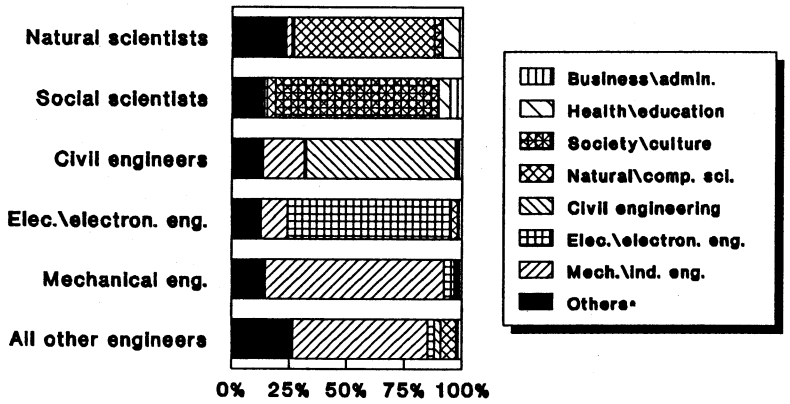
[6] An associate diploma requires 1 year of full-time, post-secondary study. An undergraduate diploma is earned after a 2 year course of study. A bachelor degree requires 3 years of full-time study. A post-graduate diploma requires 4 years of full-time study. A higher degree is any degree that requires more than 4 years of full-time, post-secondary study.

Most S/E are well placed, working in the field for which they trained, and most likely are not under-employed.

Although it is not always possible to directly link an academic discipline with an occupational field, most S/E apparently work in fields for which they studied (Figure 13 and Table AU-7(91)). This appears most likely for mechanical engineers, 78 percent of whom studied mechanical and industrial engineering at their highest level of education, and least likely for natural scientists, 61 percent of whom studied natural or computer science. There is an even closer link among employment field, occupation, and training within the service industries. For instance, three-fourths of the natural scientists employed in finance and insurance are mathematicians, statisticians, and actuaries (Table AU-5(91)).

S/E in Australia apparently are working for sufficient amounts of work-time in positions that are at their skill level. Under-employment, as defined in Australia in terms of amount of work-time (rather than intellectual challenge), is a minor problem for the economy as a whole. In May 1991, just 5.9 percent of employed Australians were working less than they desired (Labour Statistics, Australia, 1991, p. 66). It is possible that under-employment was no worse among S/E than among the entire employed population, and that S/E are working at their skill level.

Figure 13. Distribution of Scientists and Engineers by Field of Study in Australia: 1991



*Includes architecture and other fields which are too small to list.
Source: Table AU-7(91).

TABLES

Footnotes to the following tables:

[a]Total may vary among tables due to "randomization," a procedure used by the Australian Bureau of Statistics. It consists of making small random adjustments to data to prevent release of identifiable information in cells with small counts.
[b]Mathematicians, statisticians, and actuaries.
[c]Medical testing professionals.
[d]Not Further Defined, that is, the respondents stated only that they were a natural scientist; whereas Other Natural Scientists comprises occupations for which there were insufficient responses to merit individual categories.
[e]People who did not provide sufficient information to be coded in an appropriate category.
[f]People who do not have any qualifications.

Table AU-1(91)
Employed Scientists and Engineers, by Age and Sex, for Australia: 1991[a]

Sex and Occupation	Total	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Median age
Both sexes												
TOTAL SCIENTISTS AND ENGINEERS	89,292	9,836	14,913	15,044	14,215	13,468	9,494	5,791	3,514	2,097	920	36.7
SCIENTISTS	44,499	5,021	7,949	8,047	7,026	6,696	4,580	2,491	1,443	889	357	35.9
Natural scientists	31,991	3,648	5,985	5,887	4,932	4,620	3,221	1,830	1,013	639	216	35.5
Chemists	5,360	763	1,129	956	689	660	516	320	160	137	30	34.1
Geologists\geophysicists	4,400	367	908	796	765	700	422	220	117	76	29	35.8
Life scientists	9,385	940	1,567	1,702	1,414	1,370	1,034	647	379	222	110	36.7
Physicists	577	34	87	116	76	72	86	52	21	27	6	38.4
Math., stat., act.[b]	2,675	440	517	456	387	356	235	135	85	49	15	34.2
Med. test. prof.[c]	7,454	951	1,455	1,457	1,246	1,046	702	327	161	86	23	34.5
Natural scien. NFD[d]	87	0	22	15	9	16	16	6	3	0	0	38.6
Other natural scientists	2,053	153	300	389	346	400	210	123	87	42	3	37.7
Social scientists	12,508	1,373	1,964	2,160	2,094	2,076	1,359	661	430	250	141	36.8
Economists	2,160	332	420	419	335	295	180	89	51	21	18	33.9
Psychologists	4,739	217	510	753	876	1,022	693	312	177	111	68	40.1
Other social scientists	5,609	824	1,034	988	883	759	486	260	202	118	55	34.8
ENGINEERS	44,793	4,815	6,964	6,997	7,189	6,772	4,914	3,300	2,071	1,208	563	37.5
Civil engineers	15,656	1,329	2,079	2,188	2,854	2,730	1,895	1,182	742	431	226	38.9
Quantity surveyors	1,374	156	156	217	208	214	164	129	81	31	18	38.8
Chemical engineers	1,411	245	298	199	212	140	138	72	48	44	15	34.1
Electrical\electronic engineers	14,029	1,616	2,421	2,535	2,162	1,940	1,422	983	534	290	126	36.0
Mechanical engineers	6,782	767	989	993	927	987	757	567	414	262	119	38.5
Mining engineers	1,615	139	338	279	265	243	156	87	63	31	14	36.0
Metallurgists\materials scien.	1,929	317	371	282	276	260	165	121	82	49	6	34.9
Other engineers	1,997	246	312	304	285	258	217	159	107	70	39	37.4

Table AU-1(91)
Employed Scientists and Engineers, by Age and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Median age
Male												
TOTAL SCIENTISTS AND ENGINEERS	72,551	6,817	11,039	12,126	11,841	11,417	8,197	5,171	3,177	1,918	848	37.7
SCIENTISTS	29,146	2,430	4,447	5,356	4,820	4,727	3,328	1,895	1,133	719	291	37.4
Natural scientists	22,506	1,852	3,543	4,116	3,670	3,595	2,574	1,524	878	556	198	37.4
Chemists	3,970	416	698	689	550	564	461	283	151	128	30	36.7
Geologists\geophysicists	3,935	290	746	715	707	658	395	214	114	67	29	36.5
Life scientists	7,266	532	988	1,289	1,145	1,177	895	584	356	202	98	38.6
Physicists	521	28	70	101	70	69	80	52	21	24	6	39.4
Math., stat., act.[b]	1,703	215	313	279	266	246	165	103	70	31	15	35.8
Med. test. prof.[c]	3,333	266	510	729	629	511	362	168	79	62	17	36.3
Natural scien. NFD[d]	62	0	12	9	3	13	16	6	3	0	0	42.7
Other natural scientists	1,716	105	206	305	300	357	200	114	84	42	3	39.0
Social scientists	6,640	578	904	1,240	1,150	1,132	754	371	255	163	93	37.6
Economists	1,598	196	261	322	258	244	160	73	48	21	15	35.4
Psychologists	1,857	35	132	294	351	435	286	134	89	60	41	41.3
Other social scientists	3,185	347	511	624	541	453	308	164	118	82	37	36.0
ENGINEERS	43,405	4,387	6,592	6,770	7,021	6,690	4,869	3,276	2,044	1,199	557	37.8
Civil engineers	15,242	1,230	1,962	2,120	2,791	2,705	1,877	1,173	736	425	223	39.1
Quantity surveyors	1,294	133	137	197	202	211	164	129	75	28	18	39.5
Chemical engineers	1,276	185	260	181	202	134	135	72	48	44	15	35.3
Electric\electronic engineers	13,655	1,505	2,327	2,467	2,118	1,916	1,410	974	522	290	126	36.2
Mechanical engineers	6,676	734	961	987	906	981	751	564	411	262	119	38.6
Mining engineers	1,557	124	322	270	256	237	156	84	63	31	14	36.2
Metallurgists\materials scien.	1,799	260	329	260	273	254	165	121	82	49	6	35.9
Other engineers	1,906	216	294	288	273	252	211	159	107	70	36	37.8

Table AU-1(91)
Employed Scientists and Engineers, by Age and Sex for Australia: 1991--Continued

Sex and Occupation	Total	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Median age
Female												
TOTAL SCIENTISTS AND ENGINEERS	16,741	3,019	3,874	2,918	2,374	2,051	1,297	620	337	179	72	32.5
SCIENTISTS	15,353	2,591	3,502	2,691	2,206	1,969	1,252	596	310	170	66	32.9
Natural scientists	9,485	1,796	2,442	1,771	1,262	1,025	647	306	135	83	18	31.4
Chemists	1,390	347	431	267	139	96	55	37	9	9	0	29.0
Geologists\geophysicists	465	77	162	81	58	42	27	6	3	9	0	29.8
Life scientists	2,119	408	579	413	269	193	139	63	23	20	12	30.9
Physicists	56	6	17	15	6	3	6	0	0	3	0	31.7
Math., stat., act.[b]	972	225	204	177	121	110	70	32	15	18	0	31.6
Med. test. prof.[c]	4,121	685	945	728	617	535	340	159	82	24	6	33.0
Natural scien. NFD[d]	25	0	10	6	6	3	0	0	0	0	0	32.1
Other natural scientists	337	48	94	84	46	43	10	9	3	0	0	31.6
Social scientists	5,868	795	1,060	920	944	944	605	290	175	87	48	35.8
Economists	562	136	159	97	77	51	20	16	3	0	3	29.6
Psychologists	2,882	182	378	459	525	587	407	178	88	51	27	39.0
Other social scientists	2,424	477	523	364	342	306	178	96	84	36	18	32.9
ENGINEERS	1,388	428	372	227	168	82	45	24	27	9	6	28.6
Civil engineers	414	99	117	68	63	25	18	9	6	6	3	29.6
Quantity surveyors	80	23	19	20	6	3	0	0	6	3	0	29.5
Chemical engineers	135	60	38	18	10	6	3	0	0	0	0	26.0
Electric\electronic engineers	374	111	94	68	44	24	12	9	12	0	0	29.0
Mechanical eng.	106	33	28	6	21	6	6	3	3	0	0	28.6
Mining engineers	58	15	16	9	9	6	0	3	0	0	0	29.4
Metallurgists\materials scien.	130	57	42	22	3	6	0	0	0	0	0	26.0
Other engineers	91	30	18	16	12	6	6	0	0	0	3	29.3

Note: See footnotes at beginning of tables, p. 16.

Source: Special Tabulation by the Australian Bureau of Statistics.

Table AU-2 (91)
Employed Scientists and Engineers, by Employment Status and Sex, for Australia: 1991[a]

Sex and Occupation	Total	Self-employed	Employers	Employees		
				Total	Salary and wage earners	Unpaid
Both sexes						
TOTAL SCIENTISTS AND ENGINEERS	89,292	6,588	3,380	79,324	79,226	98
SCIENTISTS	44,499	2,860	1,070	40,569	40,504	65
Natural scientists	31,991	1,486	553	29,952	29,940	12
Chemists	5,360	96	54	5,210	5,210	0
Geologists\geophysicists	4,400	472	130	3,798	3,795	3
Life scientists	9,385	576	236	8,573	8,570	3
Physicists	577	24	6	547	544	3
Math., stat., act.[b]	2,675	70	41	2,564	2,561	3
Med. test. prof.[c]	7,454	75	18	7,361	7,361	0
Natural scientists NFD[d]	87	3	0	84	84	0
Other natural scientists	2,053	170	68	1,815	1,815	0
Social scientists	12,508	1,374	517	10,617	10,564	53
Economists	2,160	102	30	2,028	2,028	0
Psychologists	4,739	745	275	3,719	3,719	0
Other social scientists	5,609	527	212	4,870	4,817	53
ENGINEERS	44,793	3,728	2,310	38,755	38,722	33
Civil engineers	15,656	1,342	1,196	13,118	13,106	12
Quantity surveyors	1,374	184	147	1,043	1,043	0
Chemical engineers	1,411	96	34	1,281	1,281	0
Electrical\electronic engineers	14,029	938	420	12,671	12,662	9
Mechanical engineers	6,782	729	353	5,700	5,691	9
Mining engineers	1,615	172	69	1,374	1,374	0
Metallurgists\materials scien.	1,929	82	33	1,814	1,811	3
Other engineers	1,997	185	58	1,754	1,754	0

Table AU-2 (91)
Employed Scientists and Engineers, by Employment Status and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Self-employed	Employers	Employees		
				Total	Salary and wage earners	Unpaid
Male						
TOTAL SCIENTISTS AND ENGINEERS	72,551	5,499	3,131	63,921	63,888	33
SCIENTISTS	29,146	1,857	848	26,441	26,438	3
Natural scientists	22,506	1,248	490	20,768	20,768	0
Chemists	3,970	78	51	3,841	3,841	0
Geologists\geophysicists	3,935	423	121	3,391	3,391	0
Life scientists	7,266	482	206	6,578	6,578	0
Physicists	521	21	6	494	494	0
Math., stat., act.[b]	1,703	52	38	1,613	1,613	0
Med. test. prof.[c]	3,333	48	12	3,273	3,273	0
Natural scientists NFD[d]	62	3	0	59	59	0
Other natural scientists	1,716	141	56	1,519	1,519	0
Social scientists	6,640	609	358	5,673	5,670	3
Economists	1,598	87	30	1,481	1,481	0
Psychologists	1,857	269	168	1,420	1,420	0
Other social scientists	3,185	253	160	2,772	2,769	3
ENGINEERS	43,405	3,642	2,283	37,480	37,450	30
Civil engineers	15,242	1,307	1,178	12,757	12,745	12
Quantity surveyors	1,294	178	147	969	969	0
Chemical engineers	1,276	87	34	1,155	1,155	0
Electrical\electronic engineers	13,655	923	417	12,315	12,309	6
Mechanical engineers	6,676	726	353	5,597	5,588	9
Mining engineers	1,557	163	66	1,328	1,328	0
Metallurgists\materials scien.	1,799	82	33	1,684	1,681	3
Other engineers	1,906	176	55	1,675	1,675	0

Table AU-2 (91)
Employed Scientists and Engineers, by Employment Status and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Self-employed	Employers	Employees		
				Total	Salary and wage earners	Unpaid
Female						
TOTAL SCIENTISTS AND ENGINEERS	16,741	1,089	249	15,403	15,338	65
SCIENTISTS	15,353	1,003	222	14,128	14,066	62
Natural scientists	9,485	238	63	9,184	9,172	12
Chemists	1,390	18	3	1,369	1,369	0
Geologists\geophysicists	465	49	9	407	404	3
Life scientists	2,119	94	30	1,995	1,992	3
Physicists	56	3	0	53	50	3
Math., stat., act.[b]	972	18	3	951	948	3
Med. test. prof.[c]	4,121	27	6	4,088	4,088	0
Natural scientists NFD[d]	25	0	0	25	25	0
Other natural scientists	337	29	12	296	296	0
Social scientists	5,868	765	159	4,944	4,894	50
Economists	562	15	0	547	547	0
Psychologists	2,882	476	107	2,299	2,299	0
Other social scientists	2,424	274	52	2,098	2,048	50
ENGINEERS	1,388	86	27	1,275	1,272	3
Civil engineers	414	35	18	361	361	0
Quantity surveyors	80	6	0	74	74	0
Chemical engineers	135	9	0	126	126	0
Electrical\electronic engineers	374	15	3	356	353	3
Mechanical engineers	106	3	0	103	103	0
Mining engineers	58	9	3	46	46	0
Metallurgists\materials scien.	130	0	0	130	130	0
Other engineers	91	9	3	79	79	0

Note: See footnotes at beginning of tables, p. 16.

Source: Special Tabulation by the Australian Bureau of Statistics.

Table AU-3(91)
Employed Scientists and Engineers, by Industry Group and Sex, for Australia: 1991[a]

Sex and Occupation	Total	Agric., forestry, and fishing	Mining	Manufac-turing	Electricity, gas and water	Construction	Wholesale and retail trade	Transp., storage and communi-cation	Service Industry		Public admin. and defense	Not stated
									Finance, property and business services	Communal, personal and other services		
Both sexes												
TOTAL SCIENTISTS AND ENGINEERS	89,401	1,978	4,842	13,004	4,864	4,637	4,140	3,919	16,537	21,111	13,001	1,368
SCIENTISTS	44,492	1,869	2,664	3,689	744	181	1,501	454	5,936	19,321	7,545	588
Natural scientists	32,045	1,817	2,642	3,437	568	104	1,177	220	3,564	14,196	3,994	326
Chemists	5,392	21	266	2,482	224	21	408	35	537	1,107	202	89
Geologists\geophysicists	4,411	9	2,225	64	128	26	154	9	976	345	413	62
Life scientists	9,410	1,625	43	546	103	25	465	18	446	4,164	1,867	108
Physicists	559	0	9	32	0	0	6	13	25	411	54	9
Math., stat., act.[b]	2,686	8	18	92	29	19	47	118	979	596	774	6
Med. testing prof.[c]	7,432	6	0	144	0	0	83	12	164	6,769	227	27
Other natural scientists	2,155	148	81	77	84	13	14	15	437	804	457	25
Social scientists	12,447	52	22	252	176	77	324	234	2,372	5,125	3,551	262
Economists	2,153	26	19	39	72	17	61	43	564	354	923	35
Psychologists	4,728	3	0	6	9	3	18	42	180	3,906	496	65
Other social scientists	5,566	23	3	207	95	57	245	149	1,628	865	2,132	162
ENGINEERS	44,909	109	2,178	9,315	4,120	4,456	2,639	3,465	10,601	1,790	5,456	780
Civil engineers	15,667	40	134	719	1,364	2,866	242	548	5,367	354	3,780	253
Quantity surveyors	1,411	0	3	29	4	361	13	20	908	6	52	15
Electrical/electronic eng.	14,001	9	385	3,262	2,137	622	1,401	2,438	1,941	712	882	212
Chemical engineers	1,441	3	66	683	115	24	92	9	244	106	71	28
Mechanical engineers	6,778	25	262	2,635	385	515	566	282	1,411	214	270	213
Mining engineers	1,620	3	939	91	24	27	130	0	307	30	50	19
Metallurgists\materials sci.	2,010	3	373	968	54	15	63	26	180	257	56	15
Other engineers	1,981	26	16	928	37	26	132	142	243	111	295	25

Table AU-3(91)
Employed Scientists and Engineers, by Industry Group and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Agric., forestry, and fishing	Mining	Manufac-turing	Electricity, gas and water	Construction	Wholesale and retail trade	Transp., storage and communi-cation	Service Industry		Public admin. and defense	Not stated
									Finance, property and business services	Communal, personal and other services		
Male												
TOTAL SCIENTISTS AND ENGINEERS	72,609	1,763	4,445	11,647	4,556	4,491	3,660	3,647	14,341	12,127	10,833	1,099
SCIENTISTS	29,127	1,657	2,350	2,666	569	130	1,079	293	4,081	10,442	5,516	344
Natural scientists	22,548	1,631	2,334	2,540	471	83	914	163	2,710	8,316	3,140	246
Chemists	3,991	15	201	1,834	187	15	293	32	401	794	160	59
Geologists\geophysicists	3,937	6	2,015	61	116	26	132	9	861	280	372	59
Life scientists	7,290	1,468	34	413	76	22	402	15	335	2,867	1,575	83
Physicists	512	0	6	32	0	0	6	13	22	376	48	9
Math., stat., act.[b]	1,708	8	9	50	21	10	23	76	670	353	485	3
Med. testing prof.[c]	3,306	3	0	79	0	0	44	3	81	2,968	114	14
Other natural scientists	1,804	131	69	71	71	10	14	15	340	678	386	19
Social scientists	6,579	26	16	126	98	47	165	130	1,371	2,126	2,376	98
Economists	1,579	26	13	24	52	17	49	31	419	250	675	23
Psychologists	1,857	0	0	0	4	0	9	12	83	1,487	231	31
Other social scientists	3,143	0	3	102	42	30	107	87	869	389	1,470	44
ENGINEERS	43,482	106	2,095	8,981	3,987	4,361	2,581	3,354	10,260	1,685	5,317	755
Civil engineers	15,224	40	131	698	1,314	2,802	233	530	5,205	336	3,688	247
Quantity surveyors	1,329	0	3	29	4	346	13	17	850	6	52	9
Electrical/electronic eng.	13,650	9	376	3,164	2,083	618	1,380	2,363	1,890	703	862	202
Chemical engineers	1,303	3	63	609	101	24	92	9	225	87	62	28
Mechanical engineers	6,660	25	262	2,601	376	503	551	276	1,381	208	267	210
Mining engineers	1,566	3	910	85	24	27	123	0	298	27	50	19
Metallurgists\materials sci.	1,848	0	334	909	48	15	63	23	174	214	53	15
Other engineers	1,902	26	16	886	37	26	126	136	237	104	283	25

Table AU-3(91)
Employed Scientists and Engineers, by Industry Group and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Agric., forestry, and fishing	Mining	Manufac-turing	Electricity, gas and water	Construction	Wholesale and retail trade	Transp., storage and communi-cation	Service Industry		Public admin. and defense	Not stated
									Finance, property and business services	Communal, personal and other services		
Female												
TOTAL SCIENTISTS AND ENGINEERS	16,792	215	397	1,357	308	146	480	272	2,196	8,984	2,168	269
SCIENTISTS	15,365	212	314	1,023	175	51	422	161	1,855	8,879	2,029	244
Natural scientists	9,497	186	308	897	97	21	263	57	854	5,880	854	80
Chemists	1,401	6	65	648	37	6	115	3	136	313	42	30
Geologists\geophysicists	474	3	210	3	12	0	22	0	115	65	41	3
Life scientists	2,120	157	9	133	27	3	63	3	111	1,297	292	25
Physicists	47	0	3	0	0	0	0	0	3	35	6	0
Math., stat., act.[b]	978	0	9	42	8	9	24	42	309	243	289	3
Med. testing prof.[c]	4,126	3	0	65	0	0	39	9	83	3,801	113	13
Other natural scientists	351	17	12	6	13	3	0	0	97	126	71	6
Social scientists	5,868	26	6	126	78	30	159	104	1,001	2,999	1,175	164
Economists	574	0	6	15	20	0	12	12	145	104	248	12
Psychologists	2,871	3	0	6	5	3	9	30	97	2,419	265	34
Other social scientists	2,423	23	0	105	53	27	138	62	759	476	662	118
ENGINEERS	1,427	3	83	334	133	95	58	111	341	105	139	25
Civil engineers	443	0	3	21	50	64	9	18	162	18	92	6
Quantity surveyors	82	0	0	0	0	15	0	3	58	0	0	6
Electrical/electronic eng.	351	0	9	98	54	4	21	75	51	9	20	10
Chemical engineers	138	0	3	74	14	0	0	0	19	19	9	0
Mechanical engineers	118	0	0	34	9	12	15	6	30	6	3	3
Mining engineers	54	0	29	6	0	0	7	0	9	3	0	0
Metallurgists\materials sci.	162	3	39	59	6	0	0	3	6	43	3	0
Other engineers	79	0	0	42	0	0	6	6	6	7	12	0

Note: See footnotes at beginning of tables, p. 16.
Source: Australian Bureau of Statistics, unpublished data from the 1991 census.

Table AU-4(91)
Employed Scientists and Engineers, by Manufacturing Industry and Sex, for Australia: 1991[a]

Sex and Occupation	Total	Food, bev. and tobacco	Textiles, clothing and footwear	Wood and wood products	Paper products and printing	Chemical and related products	Non-metal mineral products	Basic metal products	Fabricated metal products	Transport equipment	Other machinery and equip.	Misc. manufac-turing
Both sexes												
TOTAL SCIENTISTS AND ENGINEERS	13,004	1,249	191	135	308	2,257	366	2,080	657	1,633	3,439	689
SCIENTISTS	3,689	925	84	69	139	1,459	96	378	66	110	188	175
Natural scientists	3,437	876	72	66	86	1,429	90	358	57	77	163	163
Chemists	2,482	627	50	14	50	1,116	59	277	45	35	78	131
Geologists/geophysicists	64	3	0	0	0	4	16	28	0	3	7	3
Life scientists	546	216	10	52	18	199	3	9	0	3	19	17
Physicists	32	0	0	0	0	3	0	3	0	6	14	6
Math., stat., act.[b]	92	18	3	0	12	6	3	26	0	18	3	3
Med. testing prof.[c]	144	9	6	0	0	87	6	0	3	0	33	0
Other natural scientists	77	3	3	0	6	14	3	15	9	12	9	3
Social scientists	252	49	12	3	53	30	6	20	9	33	25	12
Economists	39	3	3	0	9	9	0	3	6	3	3	0
Psychologists	6	0	0	0	3	0	0	0	0	0	3	0
Other social scientists	207	46	9	3	41	21	6	17	3	30	19	12
ENGINEERS	9,315	324	107	66	169	798	270	1,702	591	1,523	3,251	514
Civil engineers	719	26	6	13	3	37	86	94	181	91	149	33
Quantity surveyors	29	0	0	8	3	9	0	3	3	0	0	3
Electrical/electronic eng.	3,262	86	6	16	74	112	51	398	64	245	2,095	115
Chemical engineers	683	43	3	0	21	376	28	116	3	12	45	36
Mechanical engineers	2,635	114	26	15	56	149	66	397	207	763	653	189
Mining engineers	91	0	0	0	6	48	3	12	3	0	16	3
Metallurgist/materials sci.	968	3	9	3	0	33	25	637	78	79	49	52
Other engineers	928	52	57	11	6	34	11	45	52	333	244	83

Table AU-4(91)
Employed Scientists and Engineers, by Manufacturing Industry and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Food, bev. and tobacco	Textiles, clothing and footwear	Wood and wood products	Paper products and printing	Chemical and related products	Non-metal mineral products	Basic metal products	Fabricated metal products	Transport equipment	Other machinery and equip.	Misc. manufac-turing
Male												
TOTAL SCIENTISTS AND ENGINEERS	11,647	882	155	120	245	1,809	345	1,917	638	1,577	3,306	653
SCIENTISTS	2,666	567	60	54	79	1,075	84	300	53	92	151	151
Natural scientists	2,540	550	57	54	65	1,058	81	283	50	68	135	139
Chemists	1,834	377	41	8	41	850	56	220	38	32	61	110
Geologists/geophysicists	61	3	0	0	0	4	16	25	0	3	7	3
Life scientists	413	158	7	46	15	142	3	9	0	3	16	14
Physicists	32	0	0	0	0	3	0	3	0	6	14	6
Math., stat., act.[b]	50	6	3	0	3	3	0	14	0	15	3	3
Med. testing prof.[c]	79	3	3	0	0	42	3	0	3	0	25	0
Other natural scientists	71	3	3	0	6	14	3	12	9	9	9	3
Social scientists	126	17	3	0	14	17	3	17	3	24	16	12
Economists	24	0	0	0	6	9	0	3	0	3	3	0
Psychologists	0	0	0	0	0	0	0	0	0	0	0	0
Other social scientists	102	17	3	0	8	8	3	14	3	21	13	12
ENGINEERS	8,981	315	95	66	166	734	261	1,617	585	1,485	3,155	502
Civil engineers	698	26	6	13	3	37	83	88	175	85	149	33
Quantity surveyors	29	0	0	8	3	9	0	3	3	0	0	3
Electrical/electronic eng.	3,164	86	6	16	71	112	51	384	64	236	2,026	112
Chemical engineers	609	40	3	0	21	330	28	97	3	9	42	36
Mechanical engineers	2,601	114	23	15	56	149	66	389	207	752	641	189
Mining engineers	85	0	0	0	6	42	3	12	3	0	16	3
Metallurgists/materials sci.	909	3	6	3	0	27	19	599	78	79	46	49
Other engineers	886	46	51	11	6	28	11	45	52	324	235	77

Table AU-4(91)
Employed Scientists and Engineers, by Manufacturing Industry and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Food, bev. and tobacco	Textiles, clothing and footwear	Wood and wood products	Paper products and printing	Chemical and related products	Non-metal mineral products	Basic metal products	Fabricated metal products	Transport equipment	Other machinery and equip.	Misc. manufac-turing
Female												
TOTAL SCIENTISTS AND ENGINEERS	1,357	367	36	15	63	448	21	163	19	56	133	36
SCIENTISTS	1,023	358	24	15	60	384	12	78	13	18	37	24
Natural scientists	897	326	15	12	21	371	9	75	7	9	28	24
Chemists	648	250	9	6	9	266	3	57	7	3	17	21
Geologists/geophysicists	3	0	0	0	0	0	0	3	0	0	0	0
Life scientists	133	58	3	6	3	57	0	0	0	0	3	3
Physicists	0	0	0	0	0	0	0	0	0	0	0	0
Math., stat., act.[b]	42	12	0	0	9	3	3	12	0	3	0	0
Med. testing prof.[c]	65	6	3	0	0	45	3	0	0	0	8	0
Other natural scientists	6	0	0	0	0	0	0	3	0	3	0	0
Social scientists	126	32	9	3	39	13	3	3	6	9	9	0
Economists	15	3	3	0	3	0	0	0	6	0	0	0
Psychologists	6	0	0	0	3	0	0	0	0	0	3	0
Other social scientists	105	29	6	3	33	13	3	3	0	9	6	0
ENGINEERS	334	9	12	0	3	64	9	85	6	38	96	12
Civil engineers	21	0	0	0	0	0	3	6	6	6	0	0
Quantity surveyors	0	0	0	0	0	0	0	0	0	0	0	0
Electrical/electronic eng.	98	0	0	0	3	0	0	14	0	9	69	3
Chemical engineers	74	3	0	0	0	46	0	19	0	3	3	0
Mechanical engineers	34	0	3	0	0	0	0	8	0	11	12	0
Mining engineers	6	0	0	0	0	6	0	0	0	0	0	0
Metallurgist/materials sci.	59	0	3	0	0	6	6	38	0	0	3	3
Other engineers	42	6	6	0	0	6	0	0	0	9	9	6

Note: See footnotes at beginning of tables, p. 16.

Source: Australian Bureau of Statistics, unpublished data from the 1991 census.

Table AU-5(91)
Employed Scientists and Engineers, by Service Industry and Sex, for Australia: 1991[a]

Sex and Occupation	Total	Finance and insur-ance	Property and business services	Health, education and welfare	Other communal services	Recreation and related services	Personal and household services
Both sexes							
TOTAL SCIENTISTS AND ENGINEERS	37,648	1,893	14,644	13,286	7,011	759	55
SCIENTISTS	25,257	1,553	4,383	12,696	6,112	473	40
Natural scientists	17,760	1,017	2,547	8,430	5,408	336	22
Chemists	1,644	23	514	488	586	33	0
Geologists\geophysicists	1,321	74	902	170	169	6	0
Life scientists	4,610	68	378	1,410	2,555	183	16
Physicists	436	9	16	197	208	6	0
Math., stat. & act.[b]	1,575	748	231	372	186	38	0
Med. testing prof.[c]	6,933	83	81	5,728	992	46	3
Other natural scientists	1,241	12	425	65	712	24	3
Social scientists	7,497	536	1,836	4,266	704	137	18
Economists	918	336	228	150	198	3	3
Psychologists	4,086	35	145	3,589	289	28	0
Other social scientists	2,493	165	1,463	527	217	106	15
ENGINEERS	12,391	340	10,261	590	899	286	15
Civil engineers	5,721	98	5,269	173	107	68	6
Quantity surveyors	914	18	890	3	3	0	0
Electrical\electronic eng.	2,653	130	1,811	247	288	174	3
Chemical engineers	350	10	234	26	80	0	0
Mechanical engineers	1,625	50	1,361	82	100	26	6
Mining engineers	337	22	285	9	21	0	0
Metallurgist\materials sci.	437	6	174	30	215	12	0
Other engineers	354	6	237	20	85	6	0

Table AU-5(91)
Employed Scientists and Engineers, by Service Industry and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Finance and insur-ance	Property and business services	Health, education and welfare	Other communal services	Recreation and related services	Personal and household services
Male							
TOTAL SCIENTISTS AND ENGINEERS	26,468	1,402	12,939	6,285	5,232	570	40
SCIENTISTS	14,523	1,068	3,013	5,738	4,392	287	25
Natural scientists	11,026	730	1,980	4,061	4,021	218	16
Chemists	1,195	17	384	330	452	12	0
Geologists\geophysicists	1,141	59	802	127	147	6	0
Life scientists	3,202	59	276	731	1,995	128	13
Physicists	398	6	16	182	188	6	0
Math., stat. & act.[b]	1,023	537	133	200	133	20	0
Med. testing prof.[c]	3,049	40	41	2,444	499	25	0
Other natural scientists	1,018	12	328	47	607	21	3
Social scientists	3,497	338	1,033	1,677	371	69	9
Economists	669	237	182	97	150	0	3
Psychologists	1,570	14	69	1,351	121	15	0
Other social scientists	1,258	87	782	229	100	54	6
ENGINEERS	11,945	334	9,926	547	840	283	15
Civil engineers	5,541	98	5,107	161	104	65	6
Quantity surveyors	856	15	835	3	3	0	0
Electrical\electronic eng.	2,593	127	1,763	238	288	174	3
Chemical engineers	312	10	215	20	67	0	0
Mechanical engineers	1,589	50	1,331	76	100	26	6
Mining engineers	325	22	276	9	18	0	0
Metallurgist\materials sci.	388	6	168	20	182	12	0
Other engineers	341	6	231	20	78	6	0

Table AU-5(91)
Employed Scientists and Engineers, by Service Industry and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Finance and insur-ance	Property and business services	Health, education and welfare	Other communal services	Recreation and related services	Personal and household services
Female							
TOTAL SCIENTISTS AND ENGINEERS	11,180	491	1,705	7,001	1,779	189	15
SCIENTISTS	10,734	485	1,370	6,958	1,720	186	15
Natural scientists	6,734	287	567	4,369	1,387	118	6
Chemists	449	6	130	158	134	21	0
Geologists\geophysicists	180	15	100	43	22	0	0
Life scientists	1,408	9	102	679	560	55	3
Physicists	38	3	0	15	20	0	0
Math., stat. & act.[b]	552	211	98	172	53	18	0
Med. testing prof.[c]	3,884	43	40	3,284	493	21	3
Other natural scientists	223	0	97	18	105	3	0
Social scientists	4,000	198	803	2,589	333	68	9
Economists	249	99	46	53	48	3	0
Psychologists	2,516	21	76	2,238	168	13	0
Other social scientists	1,235	78	681	298	117	52	9
ENGINEERS	446	6	335	43	59	3	0
Civil engineers	180	0	162	12	3	3	0
Quantity surveyors	58	3	55	0	0	0	0
Electrical\electronic eng.	60	3	48	9	0	0	0
Chemical engineers	38	0	19	6	13	0	0
Mechanical engineers	36	0	30	6	0	0	0
Mining engineers	12	0	9	0	3	0	0
Metallurgist\materials sci.	49	0	6	10	33	0	0
Other engineers	13	0	6	0	7	0	0

Note: See footnotes at beginning of tables, p. 16.

Source: Australian Bureau of Statistics, unpublished data from the 1991 census.

Table AU-6(91)
Employed Scientists and Engineers, by Educational Attainment and Sex, for Australia: 1991[a]

Sex and Occupation	Total	Higher Degree	Post-Graduate Degree	Bachelor Degree	Under-Graduate Degree	Associate Degree	Skilled Vocational	Basic Vocational	Inadequately Described[e]	Not Applicable[f]	Not Stated
Both Sexes											
TOTAL SCIENTISTS AND ENGINEERS	89,292	13,888	3,063	40,653	5,706	4,247	5,167	1,807	823	9,062	4,876
SCIENTISTS	44,499	10,500	2,218	20,598	2,137	1,135	640	1,081	411	4,179	1,600
Natural scientists	31,991	7,341	996	15,141	1,625	937	539	899	318	2,987	1,208
Chemists	5,360	786	132	2,699	358	180	51	361	54	481	258
Geologists\geophysicists	4,400	1,186	127	2,578	91	32	19	32	18	212	105
Life scientists	9,385	2,217	276	3,872	595	228	343	233	76	1,201	344
Physicists	577	304	0	210	9	3	9	3	6	15	18
Math., stat., act.[b]	2,675	390	97	1,344	50	18	31	50	32	546	117
Med. test. prof.[c]	7,454	1,827	240	3,542	385	442	45	165	114	378	316
Natural scientists NFD[d]	87	37	3	38	3	0	0	3	0	3	0
Other natural scientists	2,053	594	121	858	134	34	41	52	18	151	50
Social scientists	12,508	3,159	1,222	5,457	512	198	101	182	93	1,192	392
Economists	2,160	575	93	1,261	21	9	3	6	3	138	51
Psychologists	4,739	1,829	632	1,793	173	6	9	9	37	123	128
Other social scientists	5,609	755	497	2,403	318	183	89	167	53	931	213
ENGINEERS	44,793	3,388	845	20,055	3,569	3,112	4,527	726	412	4,883	3,276
Civil engineers	15,656	1,447	444	7,455	1,524	904	822	189	103	1,639	1,129
Quantity surveyors	1,374	24	12	529	207	88	61	15	54	237	147
Chemical engineers	1,411	203	24	850	39	32	52	9	6	116	80
Electrical\electronic eng.	14,029	824	179	6,323	937	1,053	1,894	256	89	1,424	1,050
Mechanical engineers	6,782	332	85	2,484	561	593	1,181	129	75	801	541
Mining engineers	1,615	164	30	878	62	50	111	37	34	135	114
Metallurgists\materials sci.	1,929	259	37	848	120	256	70	9	12	250	68
Other engineers	1,997	135	34	688	119	136	336	82	39	281	147

Table AU-6(91)
Employed Scientists and Engineers, by Educational Attainment and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Higher Degree	Post-Graduate Degree	Bachelor Degree	Under-Graduate Degree	Associate Degree	Skilled Vocational	Basic Vocational	Inadequately Described[e]	Not Applicable[f]	Not Stated
Male											
TOTAL SCIENTISTS AND ENGINEERS	72,551	10,864	2,096	32,276	5,032	3,772	5,073	1,394	663	7,179	4,202
SCIENTISTS	29,146	7,588	1,272	12,924	1,508	705	582	683	254	2,601	1,029
Natural scientists	22,506	5,839	669	10,011	1,195	562	505	614	196	2,083	832
Chemists	3,970	646	100	1,886	331	127	51	277	42	324	186
Geologists\geophysicists	3,935	1,106	112	2,271	79	29	19	32	15	179	93
Life scientists	7,266	1,797	225	2,706	522	165	327	188	52	1,008	276
Physicists	521	287	0	183	6	3	9	3	0	12	18
Math., stat., act.[b]	1,703	308	52	870	19	9	25	12	26	303	79
Med. test. prof.[c]	3,333	1,169	90	1,377	113	195	36	56	43	124	130
Natural scientists NFD[d]	62	31	3	25	0	0	0	0	0	3	0
Other natural scientists	1,716	495	87	693	125	34	38	46	18	130	50
Social scientists	6,640	1,749	603	2,913	313	143	77	69	58	518	197
Economists	1,598	471	72	902	15	6	3	3	3	84	39
Psychologists	1,857	806	209	645	77	3	6	0	18	55	38
Other social scientists	3,185	472	322	1,366	221	134	68	66	37	379	120
ENGINEERS	43,405	3,276	824	19,352	3,524	3,067	4,491	711	409	4,578	3,173
Civil engineers	15,242	1,407	432	7,244	1,512	889	810	186	103	1,558	1,101
Quantity surveyors	1,294	21	9	503	201	82	61	15	54	204	144
Chemical engineers	1,276	185	24	755	39	32	52	9	6	100	74
Electrical\electronic eng.	13,655	794	179	6,148	916	1,050	1,879	250	89	1,324	1,026
Mechanical engineers	6,676	323	85	2,438	555	584	1,175	126	75	792	523
Mining engineers	1,557	158	27	841	62	50	111	37	34	132	105
Metallurgists\materials sci.	1,799	253	34	775	120	247	70	9	12	214	65
Other engineers	1,906	135	34	648	119	133	333	79	36	254	135

Table AU-6(91)
Employed Scientists and Engineers, by Educational Attainment and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Higher Degree	Post-Graduate Degree	Bachelor Degree	Under-Graduate Degree	Associate Degree	Skilled Vocational	Basic Vocational	Inadequately Described[e]	Not Applicable[f]	Not Stated
Female											
TOTAL SCIENTISTS AND ENGINEERS	16,741	3,024	967	8,377	674	475	94	413	160	1,883	674
SCIENTISTS	15,353	2,912	946	7,674	629	430	58	398	157	1,578	571
Natural scientists	9,485	1,502	327	5,130	430	375	34	285	122	904	376
Chemists	1,390	140	32	813	27	53	0	84	12	157	72
Geologists\geophysicists	465	80	15	307	12	3	0	0	3	33	12
Life scientists	2,119	420	51	1,166	73	63	16	45	24	193	68
Physicists	56	17	0	27	3	0	0	0	6	3	0
Math., stat., act.[b]	972	82	45	474	31	9	6	38	6	243	38
Med. test. prof.[c]	4,121	658	150	2,165	272	247	9	109	71	254	186
Natural scientists NFD[d]	25	6	0	13	3	0	0	3	0	0	0
Other natural scientists	337	99	34	165	9	0	3	6	0	21	0
Social scientists	5,868	1,410	619	2,544	199	55	24	113	35	674	195
Economists	562	104	21	359	6	3	0	3	0	54	12
Psychologists	2,882	1,023	423	1,148	96	3	3	9	19	68	90
Other social scientists	2,424	283	175	1,037	97	49	21	101	16	552	93
ENGINEERS	1,388	112	21	703	45	45	36	15	3	305	103
Civil engineers	414	40	12	211	12	15	12	3	0	81	28
Quantity surveyors	80	3	3	26	6	6	0	0	0	33	3
Chemical engineers	135	18	0	95	0	0	0	0	0	16	6
Electrical\electronic eng.	374	30	0	175	21	3	15	6	0	100	24
Mechanical engineers	106	9	0	46	6	9	6	3	0	9	18
Mining engineers	58	6	3	37	0	0	0	0	0	3	9
Metallurgists\materials sci.	130	6	3	73	0	9	0	0	0	36	3
Other engineers	91	0	0	40	0	3	3	3	3	27	12

Note: See footnotes at beginning of tables, p. 16.

Source: Special tabulation by the Australian Bureau of Statistics.

Table AU-7(91)
Employed Scientists and Engineers, by Field of Study at Highest Level and Sex, for Australia: 1991[a]

Sex and Occupation	Total	Business and admin-istration	Health	Education	Society and culture	Natural science	Computer science	Civil engineering	Electrical and electronic engineering	Mechanical and industrial engineering	Archi-tecture	Other
Both sexes												
TOTAL SCIENTISTS AND ENGINEERS	89,361	1,727	2,139	851	10,181	20,744	409	10,651	10,887	15,374	1,639	14,759
SCIENTISTS	44,563	1,103	2,118	762	9,996	19,850	163	258	248	852	185	9,028
Natural scientists	32,080	445	1,951	319	1,168	19,420	132	117	223	740	81	7,484
Chemists	5,385	29	76	38	31	4,324	16	0	10	242	7	612
Geologists\geophysicists	4,400	25	0	37	53	3,798	20	52	19	118	3	275
Life scientists	9,405	112	318	109	248	3,514	18	26	12	139	48	4,861
Physicists	560	0	6	0	4	462	3	3	26	22	0	34
Math., stat. & act.[b]	2,705	195	47	53	504	1,168	44	6	19	53	3	613
Med. testing prof.[c]	7,445	60	1,480	45	202	4,802	21	0	115	87	3	630
Other natural scientists	2,180	24	24	37	126	1,352	10	30	22	79	17	459
Social scientists	12,483	658	167	443	8,828	430	31	141	25	112	104	1,544
Economists	2,152	171	3	22	1,606	88	0	7	7	29	3	216
Psychologists	4,758	43	80	313	4,081	40	6	0	0	6	0	189
Other social scientists	5,573	444	84	108	3,141	302	25	134	18	77	101	1,139
ENGINEERS	44,798	624	21	89	185	894	246	10,393	10,639	14,522	1,454	5,731
Civil engineers	15,628	216	6	31	72	110	24	10,100	156	2,764	291	1,858
Quantity surveyors	1,384	22	0	0	0	9	0	57	3	37	1,014	242
Electrical\electronic eng.	14,017	182	3	27	58	204	180	29	9,931	1,605	68	1,730
Chemical engineers	1,430	20	0	0	3	113	8	41	18	1,082	6	139
Mechanical engineers	6,768	83	6	15	25	43	10	43	302	5,247	49	945
Mining engineers	1,626	26	3	6	10	128	7	75	39	1,158	10	164
Metallurgists\materials sci.	1,965	11	0	4	6	240	7	11	17	1,374	3	292
Other engineers	1,980	64	3	6	11	47	10	37	173	1,255	13	361

Table AU-7(91)
Employed Scientists and Engineers, by Field of Study at Highest Level and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Business and admin-istration	Health	Education	Society and culture	Natural science	Computer science	Civil engineering	Electrical and electronic engineering	Mechanical and industrial engineering	Archi-tecture	Other
Male												
TOTAL SCIENTISTS AND ENGINEERS	72,510	1,294	1,042	396	5,470	14,483	356	10,355	10,649	14,886	1,554	12,025
SCIENTISTS	29,124	691	1,024	316	5,297	13,643	123	232	235	772	162	6,629
Natural scientists	22,539	299	964	173	664	13,378	101	102	213	666	72	5,907
Chemists	3,978	26	41	21	12	3,222	13	0	10	198	7	428
Geologists\geophysicists	3,936	22	0	22	41	3,418	17	46	16	115	3	236
Life scientists	7,278	91	195	75	173	2,298	11	23	12	136	42	4,222
Physicists	513	0	3	0	4	421	3	3	23	22	0	34
Math., stat. & act.[b]	1,723	118	9	19	297	829	33	6	19	44	3	346
Med. testing prof.[c]	3,315	25	698	8	50	2,090	17	0	111	81	0	235
Other natural scientists	1,796	17	18	28	87	1,100	7	24	22	70	17	406
Social scientists	6,585	392	60	143	4,633	265	22	130	22	106	90	722
Economists	1,580	126	3	6	1,190	60	0	7	4	26	3	155
Psychologists	1,868	32	40	118	1,566	23	3	0	0	6	0	80
Other social scientists	3,137	234	17	19	1,877	182	19	123	18	74	87	487
ENGINEERS	43,386	603	18	80	173	840	233	10,123	10,414	14,114	1,392	5,396
Civil engineers	15,207	213	6	25	66	110	24	9,839	153	2,719	288	1,764
Quantity surveyors	1,300	16	0	0	0	6	0	57	3	37	968	213
Electrical\electronic eng.	13,647	176	3	27	58	193	173	26	9,727	1,582	58	1,624
Chemical engineers	1,292	20	0	0	3	105	5	41	18	974	6	120
Mechanical engineers	6,649	80	3	15	25	40	10	40	296	5,171	46	923
Mining engineers	1,572	26	3	3	10	123	4	75	36	1,122	10	160
Metallurgists\materials sci.	1,824	11	0	4	3	216	7	11	17	1,296	3	256
Other engineers	1,895	61	3	6	8	47	10	34	164	1,213	13	336

Table AU-7(91)
Employed Scientists and Engineers, by Field of Study at Highest Level and Sex, for Australia: 1991--Continued

Sex and Occupation	Total	Business and admin-istration	Health	Education	Society and culture	Natural science	Computer science	Civil engineering	Electrical and electronic engineering	Mechanical and industrial engineering	Archi-tecture	Other
Female												
TOTAL SCIENTISTS AND ENGINEERS	16,851	433	1,097	455	4,711	6,261	53	296	238	488	85	2,734
SCIENTISTS	15,439	412	1,094	446	4,699	6,207	40	26	13	80	23	2,399
Natural scientists	9,541	146	987	146	504	6,042	31	15	10	74	9	1,577
Chemists	1,407	3	35	17	19	1,102	3	0	0	44	0	184
Geologists\geophysicists	464	3	0	15	12	380	3	6	3	3	0	39
Life scientists	2,127	21	123	34	75	1,216	7	3	0	3	6	639
Physicists	47	0	3	0	0	41	0	0	3	0	0	0
Math., stat. & act.[b]	982	77	38	34	207	339	11	0	0	9	0	267
Med. testing prof.[c]	4,130	35	782	37	152	2,712	4	0	4	6	3	395
Other natural scientists	384	7	6	9	39	252	3	6	0	9	0	53
Social scientists	5,898	266	107	300	4,195	165	9	11	3	6	14	822
Economists	572	45	0	16	416	28	0	0	3	3	0	61
Psychologists	2,890	11	40	195	2,515	17	3	0	0	0	0	109
Other social scientists	2,436	210	67	89	1,264	120	6	11	0	3	14	652
ENGINEERS	1,412	21	3	9	12	54	13	270	225	408	62	335
Civil engineers	421	3	0	6	6	0	0	261	3	45	3	94
Quantity surveyors	84	6	0	0	0	3	0	0	0	0	46	29
Electrical\electronic eng.	370	6	0	0	0	11	7	3	204	23	10	106
Chemical engineers	138	0	0	0	0	8	3	0	0	108	0	19
Mechanical engineers	119	3	3	0	0	3	0	3	6	76	3	22
Mining engineers	54	0	0	3	0	5	3	0	3	36	0	4
Metallurgists\materials sci.	141	0	0	0	3	24	0	0	0	78	0	36
Other engineers	85	3	0	0	3	0	0	3	9	42	0	25

Note: See footnotes at beginning of tables, p. 16.

Source: Australian Bureau of Statistics, unpublished data from the 1991 census.

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