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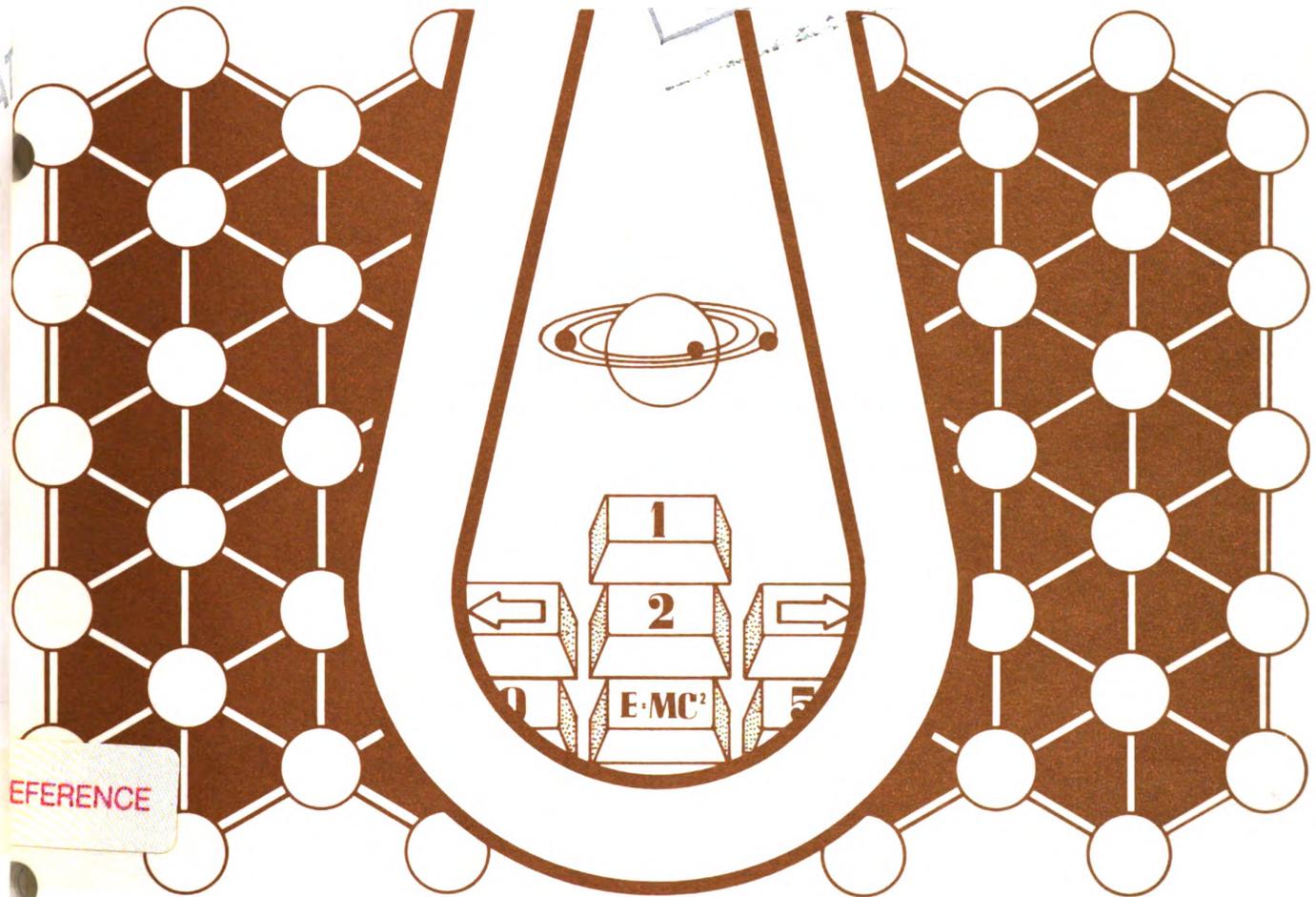
Special Studies
Series P-23,
No. 135

U.S. Department
of Commerce
BUREAU OF
THE CENSUS

Selected
Characteristics of
Persons in

Engineering:

1978



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Series P-23, No. 135
Issued June 1984

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Characteristics of
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by
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SYMBOLS USED IN TABLES

—	Represents zero.
X	Not applicable.
Z	Less than 0.05 percent.
*	Based on fewer than 20 sample cases.
27+	The median fell in the category 27 weeks or more.

Related Materials

Statistics from a related survey, the 1972 Professional, Technical, and Scientific Manpower Survey, are found in U.S. Bureau of the Census, Technical Paper No. 33, *Characteristics of Persons in Engineering and Scientific Occupations: 1972*, and U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 45, *Persons in Engineering, Scientific, and Technical Occupations: 1970 and 1972*.

The Census Bureau report based on the results of the 1974 National Survey of Scientists and Engineers is U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 53, *Selected Characteristics of Persons in Fields of Science or Engineering: 1974*. The Census Bureau report based on the 1976 survey is U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 76, *Selected Characteristics of Persons in Fields of Science or Engineering: 1976*. This is the seventh report in a series of reports based on the 1978 survey; the first report in the Series was U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 108, *Selected Characteristics of Persons in Physical Science: 1978*.

For a list of the National Science Foundation reports based on the above-mentioned 1972 and 1974 surveys, see National Science Foundation, *Characteristics of the National Sample of Scientists and Engineers 1974, Part III* (NSF 76-330); and National Science Foundation, *U.S. Scientists and Engineers: 1974* (NSF 76-329). Two National Science Foundation reports based on the results of the 1976 National Survey of Natural and Social Scientists and Engineers are Science Resources Studies Highlights, *National Sample of Scientists and Engineers: Changes in Employment, 1972-1974 and 1974-1976* (NSF 77-322); and *Characteristics of Experienced Scientists and Engineers, 1976* (NSF 78-305). A National Science Foundation report containing results from the 1978 survey, along with other data from the Manpower Characteristics System, is *U.S. Scientists and Engineers 1978* (NSF 90-304).

SELECTED CHARACTERISTICS OF PERSONS IN ENGINEERING: 1978

INTRODUCTION

The statistics in this report are based on the 1978 survey in a series of biennial surveys known as the National Sample of Scientists and Engineers. The series was sponsored by the National Science Foundation and conducted by the Bureau of the Census. The series began with the 1972 Professional, Technical, and Scientific Manpower Survey, with follow-up surveys of persons from the 1972 survey conducted in 1974, 1976, and 1978. All persons in the National Sample were experienced workers who either had jobs in 1970 or were looking for jobs; new entrants into the labor force since 1970 were not included. Thus, almost all of the sample persons were 30 years old and over in 1978. In addition, the fields of science and engineering in the National Sample were limited to persons who met strict educational, occupational, and professional qualifications. For these reasons, persons in the 1978 National Sample represented approximately 1.5 million scientists and engineers, only a part of the Nation's total scientific and engineering work force. (The Department of Labor estimated that, based on occupational qualifications alone, there were 2.4 million scientists and engineers in the United States in 1978).¹

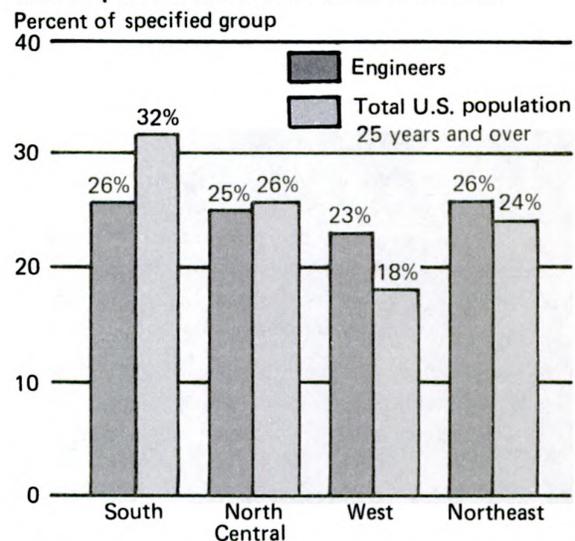
This report is the seventh and final in a series of reports based on the 1978 survey. Profiled here are the 721,158 persons represented in the National Sample's field of engineers.

COMPOSITION (Table 1)

- Nearly all (99.6 percent) of the engineers represented in the National Sample were men. In addition, most of the engineers in the sample were White (about 96 percent). Only about 2 percent of the engineers were Chinese, Japanese, or Korean, and less than 1 percent were Black. A small percentage (1.5 percent) reported their ethnic origin as Hispanic.
- The median age of the engineers was 47 years in 1978.
- The engineers represented in the National Sample were more likely to live in the West and less likely to live in the South in 1978 than the general population of the United States 25 years and over (figure 1).² The proportions of engineers who lived in the Northeast and the North Central were similar to those of the general population.
- There were 17 fields of science or engineering (S/E) represented in the National Sample (figure 2). These fields

are more strictly defined categories than occupations. In general, to be classified into a specific field, a person had

FIGURE 1.
Region of Residence of Engineers and U.S. Population 25 Years and Over: 1978
Percent of specified group



Source: Table 1, and Current Population Reports, Population Characteristics, Geographical Mobility: March 1975 to March 1978, Series P-20, No. 331.

FIGURE 2.
Fields of Science or Engineering (S/E) in the National Sample

Computer specialists	
Engineers	
Mathematical specialists	Environmental scientists
Mathematicians	Earth scientists
Statisticians	Atmospheric scientists
	Oceanographers
Life scientists	
Agricultural scientists	Psychologists
Biologists	Social scientists
Medical scientists	Economists
	Sociologists and anthropologists
Physical scientists	Other social scientists
Chemists	
Physicists and astronomers	
Other physical scientists	

¹U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 26, No. 1, January 1979.

²Data on the geographic distribution of the U.S. population 25 years old and over are found in: Current Population Reports, Series P-20, No. 331, *Geographical Mobility: March 1975 to March 1978*.

to have at least two of the following three characteristics: (1) employment in one of a set of specified occupations, (2) an academic degree among a set of specified academic disciplines, and (3) self-identification within a set of specified professions. Because of these criteria, it was possible for persons in each field to be distributed among a spectrum of occupations. Not surprisingly, a large proportion of the engineers employed in February 1978 were working in engineering occupations (about 80 percent). Specifically, about 20 percent worked as electrical and electronic engineers, 18 percent as mechanical engineers, and 12 percent as civil and architectural engineers; 9 percent were employed in "other engineering" occupations. Seventeen percent of the employed engineers worked as managers and administrators.

EDUCATION AND TRAINING (Table 2)

- As their highest academic degree, about 68 percent of the engineers held bachelor degrees, about 23 percent had master's degrees, and about 6 percent had doctorate degrees. About 2 percent of the engineers did not have an academic degree. According to the criteria developed by the National Science Foundation, engineering was the only field in the National Sample that could include persons without an academic degree.
- Engineers were more likely to have a bachelor's degree and less likely to have a doctorate degree than persons in the

scientific fields, with the exception of the computer specialists, who were similar to engineers.

- Not surprisingly, 87 percent of the engineers majored for their highest degree in the academic field of engineering. Interestingly, about 3 percent reported business and commerce as the major field of study.
- Supplementary training programs (such as on-the-job and employer training programs) gave engineers the opportunity to maintain or improve their skills. About 48 percent of the engineers took advantage of these programs in 1977.³

PROFESSIONAL EXPERIENCE AND GROWTH OF THE FIELD (Table 3)

- Most of the engineers have been involved in professional work, though not necessarily as engineers, for a number of years. About 96 percent of the engineers had more than 5 years of professional experience, 85 percent had over 10 years, and 49 percent had more than 20 years. The median number of years of professional experience for persons in the field was 21.
- The figures in the lower percent distribution of table A shows the interfield mobility between 1976 and 1978 of persons in the National Sample. Among persons who were

³Note that the categories of supplemental training are not mutually exclusive: the same person may have received more than one kind.

Table A. Field of Science or Engineering in 1978, by Field of Science or Engineering in 1976

(Numbers in thousands)

Field of science or engineering in 1976	Total national sample in 1978	In field of science or engineering in 1978			Not in S/E field in 1978
		Total	Engineers	Other S/E field	
Total national sample in 1976.....	1,350	1,138	721	417	211
In S/E field in 1976.....	1,119	1,029	660	370	90
Engineers.....	707	660	649	11	47
Other S/E field.....	412	368	10	358	43
Not in S/E field in 1976.....	173	64	32	32	109
Did not report in 1976.....	57	45	30	15	12
PERCENT DISTRIBUTION					
Total national sample in 1976.....	100.0	100.0	100.0	100.0	100.0
In S/E field in 1976.....	82.9	90.4	91.5	88.7	42.7
Engineers.....	52.4	58.0	90.0	2.6	22.3
Other S/E field.....	30.5	32.3	1.4	85.9	20.4
Not in S/E field in 1976.....	12.8	5.6	4.4	7.7	51.7
Did not report in 1976.....	4.2	4.0	4.1	3.6	5.7
Total national sample in 1976.....	100.0	84.3	53.4	30.9	15.6
In S/E field in 1976.....	100.0	92.0	59.0	33.1	8.0
Engineers.....	100.0	93.4	91.8	1.6	6.6
Other S/E field.....	100.0	89.3	2.7	86.9	10.4
Not in S/E field in 1976.....	100.0	37.0	18.5	18.5	63.0
Did not report in 1976.....	100.0	78.9	52.6	26.3	21.1

Source: Table 3 and unpublished data from the 1978 National Sample of Scientists and Engineers.

in the engineering field in 1976, about 92 percent were also engineers in 1978; about 7 percent were outside S/E fields altogether, and about 2 percent were in some other S/E field. The upper percent distribution of table A shows the engineering field in 1978 in terms of its 1976 components.

- About 33 percent of the engineers employed in February 1978 and February 1976 changed jobs⁴ during the 2-year period; for about two-fifths (38 percent) of these job changers, the change in jobs involved a change in detailed occupations. Of engineers employed in February 1978 and January 1974, 49 percent changed jobs during the 4-year period; of these, 42 percent changed detailed occupations. Finally, of the engineers employed in February 1978 and January 1972, 60 percent changed jobs during the 6-year period; of these, 43 percent⁵ changed detailed occupations. (figure 3).

Labor Force Participation (Table 4)

- In February 1978, 92 percent of the engineers were in the labor force. Of those not in the labor force, 94 percent were retired.
- The unemployment rate (the number unemployed as a percent of those in the labor force) for engineers was 1.0 percent (table 8). By comparison, the national unemployment rate of male professional, technical, and kindred

⁴That is, changed employers or remained with the same employer, but had a significant change in their duties, level of responsibility, or occupation.

⁵There is some evidence that the 42 percent who changed detailed occupations during the 4-year period is different from the 43 percent who changed detailed occupations during the 6-year period.

workers 25 years old and over in February 1978 (not seasonally adjusted) was 1.5 percent. ⁶

- Ninety-eight percent of employed engineers had full-time jobs. About 83 percent of the engineers who worked part time in February 1978 were not seeking full-time employment (table C). Of those employed full time, 96 percent held engineering or scientific positions.
- About 3.5 percent of the engineers experienced unemployment at one time or another in calendar year 1977. Engineers with unemployment spent a median of 12 weeks seeking employment in 1977. Approximately 23 percent of the engineers with unemployment sought work for 27 weeks or more in 1977.
- The majority of the employed engineers were concentrated in two industry groups in 1978: manufacturing

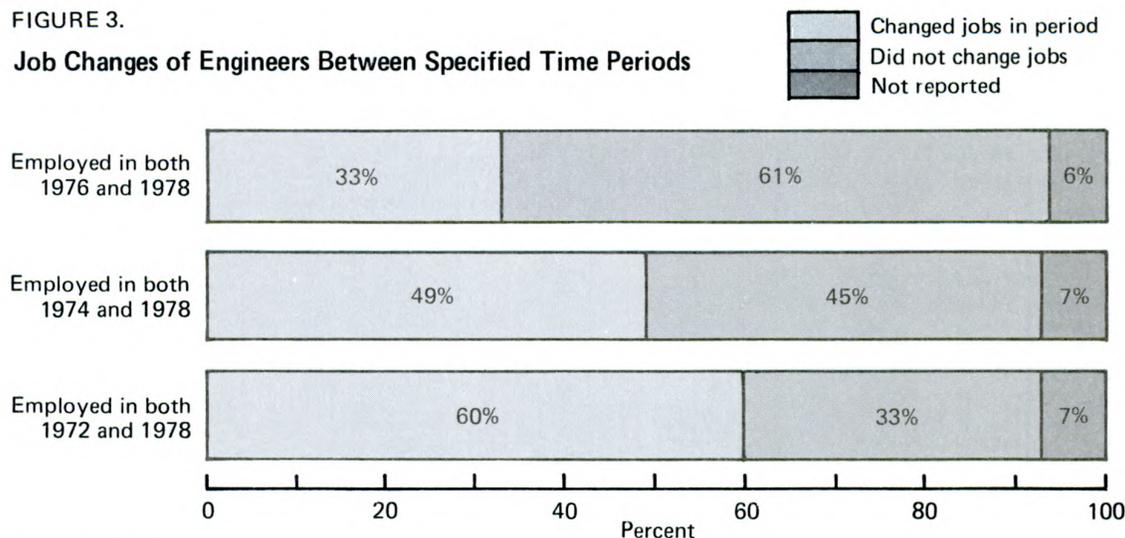
Table B. Employment Status of Engineers in February 1978

Employment status	Engineers	
	Number	Percent
Total in labor force in February 1978.....	663,317	100.0
Employed.....	656,897	99.0
Unemployed.....	6,420	1.0

Source: Table 4.

⁶U.S. Department of Labor, Bureau of Labor Statistics, unpublished Current Population Survey data.

FIGURE 3. Job Changes of Engineers Between Specified Time Periods



Source: Table 3.

Table C. Full- and Part-time Work Status of Engineers in 1978 Employed in February 1978

Full- and part-time work status	Engineers	
	Number	Percent
Total employed in February 1978.....	656,897	100.0
Full time.....	645,162	98.2
Part time.....	10,840	1.7
Seeking full-time work....	1,356	12.5
Not seeking full-time work	9,009	83.0
Not reported.....	475	4.4
Full or part time not reported.....	895	0.1

Source: Table 4.

(about 51 percent), with the largest proportion (12 percent) in the electronic machinery and computing equipment industry; and services, except education and health, (about 21 percent) with, not surprisingly, a heavy concentration in engineering and architectural services (about 15 percent).

- The 1978 survey asked persons to describe the type of organization of their principal employment or post-doctoral appointment. Among the engineers employed in February 1978, 76 percent specified their employer's organization as a (private) business or industry and 16 percent as "Federal, State, or local government."
- When asked to identify their primary work activity, 35 percent of the engineers employed in February 1978 specified management or administration, about 29 percent reported research and development, and about 17 percent indicated production and inspection.
- The engineers in the national Sample were asked to choose, from among a list of topics of critical national interest, the problem to which they devoted the most professional time. The largest proportions of engineers listed national defense (17 percent), energy and fuel (16 percent), and environmental protection and pollution control (12 percent). However, about 34 percent of the engineers

either indicated that the inquiry was not applicable to them or did not report involvement in topics.

- The Federal government supported or sponsored at least some of the work of 41 percent of the engineers. The Department of Defense funded 22 percent, the Department of Transportation and NASA funded about 6 percent each, and the Department of Energy funded 5 percent.

INCOME (Table 5)

- The median basic annual salary rate of engineers employed full time in February 1978 was \$27,275. Although not strictly comparable with these figures, the median earnings in 1977, as estimated from the CPS,⁷ for male professional, technical, and kindred workers, 14 years old and over, who worked year round full time, was \$18,224; the comparable figure for women was \$11,995. Male year-round full-time workers 25 years old and over with 4 or more years of college (regardless of occupation) had mean earnings in 1977 of \$21,441; those with 5 or more years of college had mean earnings of \$25,782.⁸
- Results from the 1976 survey of the National Sample of Scientists and Engineers showed a median basic annual salary in February 1976 of engineers employed full time in February 1976 of \$23,176. Thus, the median basic annual salary of full-time employed engineers rose by \$4,099 over the 2-year period. However, when the 1976 and 1978 basic annual salaries are expressed in constant 1977 dollars, the increase is approximately \$1,180⁹ or an average of 2.2 percent per year.

⁷U.S. Department of Commerce, Bureau of the Census, Current Population Reports, *Money Income in 1977 of Families and Persons in the United States*, Series P-60, No. 118.

⁸The CPS concept "earnings" includes more sources of remuneration than does the National Sample concept of "basic annual salary." There are also other differences between the National Sample's basic annual salary concept and the CPS earnings concept, including differences in reference periods and data collection procedures. Also, "medians" of salary distributions are calculated differently from "means" of earnings distributions; thus "median" data may not be entirely comparable with "mean" data. CPS figures for 1977 are cited because 1977 is the full year most nearly comparable with the reference year for the 1978 National Sample question on basic annual salary.

⁹The 1976-1978 comparisons in terms of constant 1977 dollars must be approached cautiously. Problems are introduced into the comparisons by, among other things, the way the basic annual salary data are defined and collected, the differences between the nonresponse adjustment procedures of the 1976 and 1978 surveys, and the difficulty of establishing appropriate time periods for the constant dollar computations.

Table 1. Occupation, Professional Identification, and Selected Characteristics of Engineers: 1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Occupation, professional identification, and selected characteristics	Engineers		Occupation, professional identification, and selected characteristics	Engineers	
	Number	Percent		Number	Percent
Total.....	721,158	100.0	OCCUPATION IN 1978		
Male.....	718,041	99.6	Total employed in February 1978.	656,897	100.0
Female.....	3,117	0.4	Computer specialists.....	3,263	0.5
Under 30 years.....	6,367	0.9	Computer systems analysts.....	1,062	0.2
30 to 34 years.....	78,369	10.9	Computer scientists.....	643	(Z)
35 to 39 years.....	115,409	16.0	Computer programmers.....	270	(Z)
40 to 44 years.....	114,702	15.9	Other computer fields.....	1,288	0.2
45 to 49 years.....	111,327	15.4	Engineers.....	521,995	79.5
50 to 54 years.....	112,804	15.6	Aeronautical and astronautical.....	23,467	3.6
55 to 59 years.....	83,567	11.6	Agricultural.....	3,449	0.5
60 to 64 years.....	48,692	6.8	Chemical.....	31,019	4.7
65 to 69 years.....	29,729	4.1	Civil and architectural.....	80,482	12.3
70 years and over.....	20,191	2.8	Electrical and electronic.....	133,286	20.3
Median age.....	47	(X)	Industrial.....	23,217	3.5
RESIDENCE IN 1978			Mechanical.....	115,067	17.5
Total.....	721,158	100.0	Metallurgical and materials.....	14,846	2.3
United States.....	715,592	99.2	Mining, petroleum, and geological...	10,061	1.5
Northeast.....	186,495	25.9	Nuclear.....	5,611	0.9
New England.....	56,110	7.8	Environmental and sanitary.....	11,572	1.8
Middle Atlantic.....	130,385	18.1	Operations research/systems.....	10,817	1.6
North Central.....	171,475	23.8	Other engineering fields.....	59,102	9.0
East North Central.....	128,258	17.8	Mathematicians and statisticians.....	2,126	0.3
West North Central.....	43,217	6.0	Mathematicians.....	17	(Z)
South.....	189,797	26.3	Statisticians.....	47	(Z)
South Atlantic.....	95,988	13.3	Actuaries.....	55	(Z)
East South Central.....	29,528	4.1	Operations research.....	2,006	0.3
West South Central.....	64,276	8.9	Life scientists.....	243	(Z)
West.....	167,829	23.3	Agricultural scientists.....	78	(Z)
Mountain.....	36,232	5.0	Biological scientists.....	-	-
Pacific.....	131,598	18.2	Biochemists.....	15	(Z)
Outlying areas.....	215	(Z)	Biophysicists.....	-	-
Foreign countries.....	5,351	0.7	Medical scientists.....	133	(Z)
Not reported.....	-	-	Other life scientists.....	17	(Z)
RACE			Physical scientists.....	430	(Z)
Total.....	721,158	100.0	Chemists.....	110	(Z)
White.....	694,073	96.2	Physicists and astronomers.....	108	(Z)
Black.....	5,249	0.7	Other physical scientists.....	212	(Z)
American Indian.....	567	(Z)	Environmental scientists.....	123	(Z)
Chinese, Japanese, Korean.....	17,278	2.4	Earth scientists.....	109	(Z)
All other races.....	3,990	0.6	Atmospheric scientists.....	15	(Z)
HISPANIC HERITAGE			Oceanographers.....	-	-
Total.....	721,158	100.0	Psychologists.....	-	-
Hispanic.....	10,617	1.5	Social scientists.....	135	(Z)
Not Hispanic.....	685,711	95.1	Economists.....	123	(Z)
Not reported.....	24,830	3.4	Sociologists and anthropologists....	-	-
			Other social scientists.....	12	(Z)

Table 1. Occupation, Professional Identification, and Selected Characteristics of Engineers: 1978—Continued

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Occupation, professional identification, and selected characteristics	Engineers		Occupation, professional identification, and selected characteristics	Engineers	
	Number	Percent		Number	Percent
OCCUPATION IN 1978--Continued			PROFESSIONAL IDENTIFICATION IN 1978		
			Total.....	721,158	100.0
Health occupations.....	108	(Z)	Computer specialists.....	2,404	0.3
Physician or surgeon.....	-	-	Engineers.....	610,043	84.6
Dental technician.....	-	-	Mathematicians and statisticians.....	2,196	0.3
Medical technician.....	52	(Z)	Life scientists.....	170	(Z)
Other health occupations.....	55	(Z)	Physical scientists.....	1,431	0.2
			Environmental scientists.....	223	(Z)
Technicians and technologists, except medical.....	3,332	0.5	Psychologists.....	14	(Z)
Teachers ¹	698	0.1	Social scientists.....	60	(Z)
Administrators and managers.....	111,803	17.0	Health occupations.....	200	(Z)
Other occupations.....	11,172	1.7	Technicians, except medical.....	1,009	0.1
Not reported.....	1,468	0.2	Teachers.....	141	(Z)
			Administrators.....	87,833	12.2
			All other occupations.....	1,908	0.3

¹College or university teachers of science or engineering are excluded from teachers and included in occupation corresponding to subject taught.

Table 2. Selected Educational Characteristics of Engineers: 1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Selected educational characteristics	Engineers		Selected educational characteristics	Engineers	
	Number	Percent		Number	Percent
HIGHEST DEGREE HELD			MAJOR FIELD OF STUDY FOR HIGHEST DEGREE HELD--Continued		
Total.....	721,158	100.0	Earth, space, and marine sciences.....	2,564	0.4
With a degree.....	703,533	97.6	Psychology.....	697	(Z)
Associate.....	10,816	1.5	Economics.....	825	0.1
Bachelor's.....	487,560	67.6	Sociology and anthropology.....	282	(Z)
Master's.....	164,359	22.8	Other social sciences.....	2,092	(Z)
Doctorate.....	39,606	5.5	Business and commerce.....	19,832	2.8
Professional/medical.....	1,074	0.1	All other fields.....	12,291	1.7
Other.....	117	(Z)	All fields below BA.....	11,233	1.6
No degree.....	17,625	2.4	Field not reported.....	5,790	0.8
Not reported.....	-	-			
MAJOR FIELD OF STUDY FOR HIGHEST DEGREE HELD			SUPPLEMENTAL TRAINING IN 1977 ¹		
Total.....	703,533	100.0	Total.....	721,158	100.0
Computer science and systems analysis..	1,693	0.2	With supplemental training in 1977....	345,070	47.8
Engineering.....	613,502	87.2	On-the-job training.....	175,239	24.3
Mathematical sciences.....	7,101	1.0	Military training applicable to		
Agricultural sciences.....	1,534	0.2	civilian occupations.....	5,592	0.8
Biological sciences.....	1,076	0.2	Extension or correspondence courses.	33,934	4.7
Medical sciences.....	850	0.1	Employer training programs.....	157,136	21.8
Chemistry.....	7,907	1.1	Adult education center.....	41,589	5.8
Physics and astronomy.....	14,265	2.0	Other training.....	70,802	9.8
			No supplemental training in 1977.....	303,943	42.1
			Not reported.....	72,145	10.0

¹Sum of types of training may exceed total with training because of multiple response.

Table 3. Years of Professional Experience, Field of Science or Engineering in 1976, and Job Mobility of Engineers: 1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Professional experience, field in 1976, and job mobility	Engineers		Professional experience, field in 1976, and job mobility	Engineers	
	Number	Percent		Number	Percent
YEARS OF PROFESSIONAL EXPERIENCE			FIELD OF SCIENCE OR ENGINEERING IN 1976--Continued		
Total.....	721,158	100.0	Psychologists.....	36	(Z)
With years of professional experience reported.....	701,008	97.2	Social scientists.....	239	(Z)
Less than 1 year.....	2,035	0.3	Economists.....	87	(Z)
1 to 5 years.....	5,801	0.8	Sociologists and anthropologists....	101	(Z)
6 to 10 years.....	78,138	10.8	Other social scientists.....	51	(Z)
11 to 15 years.....	121,261	16.8	Not in a field in 1976.....	32,027	4.4
16 to 20 years.....	142,387	19.7	Did not report in 1976.....	29,544	4.1
21 to 25 years.....	106,737	14.8			
26 to 30 years.....	130,696	18.1	JOB MOBILITY		
31 to 35 years.....	43,418	6.0	Total employed in February 1978..	656,897	100.0
36 to 40 years.....	46,337	6.4	Employed in February 1976.....	612,467	93.2
41 years or more.....	24,200	3.4	Job change since 1976.....	200,861	30.6
Median years of professional experience	21	(X)	Occupation change.....	77,146	11.7
Years of professional experience not reported.....	20,149	2.8	No occupation change.....	121,715	18.5
			Occupation change not reported....	2,001	0.3
FIELD OF SCIENCE OR ENGINEERING IN 1976			Same job in 1976 and 1978.....	373,042	56.8
Total.....	721,158	100.0	Not reported.....	38,564	5.9
Computer specialists.....	3,698	0.5	Not employed or employment status not reported in February 1976.....	44,431	6.8
Engineers.....	649,191	90.0	Employed in January 1974.....	621,710	94.6
Mathematical specialists.....	830	0.1	Job change between 1974 and 1978....	303,396	46.2
Mathematicians.....	639	0.1	Occupation change.....	126,157	19.2
Statisticians.....	190	(Z)	No occupation change.....	177,069	27.0
Life scientists.....	478	0.1	Occupation change not reported....	169	(Z)
Agricultural scientists.....	191	(Z)	Same job in 1974 and 1978.....	277,468	42.2
Biologists.....	188	(Z)	Not reported.....	40,847	6.2
Medical scientists.....	99	(Z)	Not employed or employment status not reported in January 1974.....	35,188	5.4
Physical scientists.....	4,251	0.6	Employed in 1972.....	637,726	97.1
Chemists.....	1,923	0.3	Job change between 1972 and 1978....	383,929	58.4
Physicists and astronomers.....	1,635	0.2	Occupation change.....	166,285	25.3
Other physical scientists.....	693	0.1	No occupation change.....	217,432	33.1
Environmental scientists.....	863	0.1	Occupation change not reported....	213	(Z)
Earth scientists.....	830	0.1	Same job in 1972 and 1978.....	211,940	32.3
Atmospheric scientists.....	18	(Z)	Not reported.....	41,857	6.4
Oceanographers.....	15	(Z)	Not employed or employment status not reported in 1972.....	19,171	2.9

Table 4. Employment Status and Selected Job-Related Characteristics of Engineers: 1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Employment status and selected job-related characteristics	Engineers		Employment status and selected job-related characteristics	Engineers	
	Number	Percent		Number	Percent
EMPLOYMENT STATUS IN FEBRUARY 1978			INDUSTRY IN 1978--Continued		
Total.....	721,158	100.0	Manufacturing.....	334,052	50.9
In labor force.....	663,317	92.0	Primary metal industries.....	14,749	2.2
Employed.....	656,897	91.1	Fabricated metal industries.....	18,800	2.9
Full time.....	645,162	89.5	Machinery, except electrical.....	26,632	4.1
Part time.....	10,840	1.5	Electrical machinery, equipment, and supplies.....	25,061	3.8
Seeking full-time work.....	1,356	0.2	Electronic machinery and computing equipment.....	78,851	12.0
Not seeking full-time work.....	9,009	1.2	Aircraft and aircraft parts.....	41,130	6.3
Not reported.....	475	(Z)	Motor vehicles and motor vehicle equipment.....	22,714	3.5
Full or part time not reported.....	895	0.1	Ordnance.....	26,468	4.0
Unemployed.....	6,420	0.9	Chemicals and allied products.....	33,232	5.1
Not in labor force.....	57,840	8.0	Petroleum refining and related industries.....	15,150	2.3
Retired.....	54,164	7.5	Other manufacturing.....	31,264	4.8
Student.....	541	(Z)	Transportation, communications, and other public utilities.....	34,118	5.2
Family responsibilities.....	587	(Z)	Wholesale and retail trade.....	5,639	0.9
Could not find work.....	607	(Z)	Finance, insurance, and real estate... ..	2,961	0.5
Other.....	1,941	0.3	Educational institutions.....	21,720	3.3
FULL-TIME EMPLOYMENT IN SCIENCE OR ENGINEERING IN 1978			College or university.....	17,319	2.6
Total employed full time in February 1978.....	645,162	100.0	Other.....	4,401	0.7
In science or engineering.....	619,385	96.0	Health services.....	1,940	0.3
Not in science or engineering.....	24,363	3.8	Services, except education and health. Engineering and architectural services.....	137,167	20.9
Preferred nonscience or nonengineering.....	3,524	0.5	Research institutions.....	96,654	14.7
Promoted out of science or engineering.....	10,678	1.7	Other.....	29,209	4.4
Pay better in nonscience or nonengineering.....	1,782	0.3	Public administration.....	11,304	1.7
Locational preference.....	1,304	0.2	Federal.....	45,093	6.9
Science or engineering position not available.....	1,837	0.3	Other.....	18,204	2.8
Other reason.....	4,496	0.7	Military.....	25,250	3.8
Reason not reported.....	743	0.1	Other industries.....	1,638	0.2
Not reported.....	1,414	0.2	Not reported.....	31,061	4.7
UNEMPLOYMENT IN CALENDAR YEAR 1977			TYPE OF EMPLOYER IN 1978		
Total.....	721,158	100.0	Total employed in February 1978.....	656,897	100.0
Unemployed in calendar year 1977.....	25,099	3.5	Business or industry.....	497,863	75.8
1 to 4 weeks.....	5,363	0.7	Educational institutions.....	29,869	4.5
5 to 10 weeks.....	5,475	0.8	Junior or 2-year college, technical institute.....	3,553	0.5
11 to 14 weeks.....	2,884	0.4	Medical school.....	363	(Z)
15 to 26 weeks.....	3,819	0.5	4-year college or university, except medical school.....	25,290	3.8
27 weeks or more.....	5,693	0.8	Elementary or secondary school system	663	0.1
Median weeks of unemployment.....	12	(X)	Hospital or clinic.....	982	0.1
Weeks of unemployment not reported... ..	1,865	0.3	Nonprofit organization.....	9,464	1.4
Not unemployed in calendar year 1977... ..	678,793	94.1	U.S. military service/commissioned groups.....	2,428	0.4
Not reported.....	17,266	2.4	Government.....	105,877	16.1
INDUSTRY IN 1978			Federal.....	60,615	9.2
Total employed in 1978.....	656,897	100.0	State.....	21,168	3.2
Agriculture, forestry, and fisheries... ..	3,402	0.5	Local or other.....	24,094	3.7
Mining and petroleum extraction.....	11,053	1.7	International agency.....	504	(Z)
Construction.....	24,309	3.7	Other.....	1,042	0.2
			Not reported.....	8,870	1.4

Table 4. Employment Status and Selected Job-Related Characteristics of Engineers: 1978—Continued

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Employment status and selected job-related characteristics	Engineers		Employment status and selected job-related characteristics	Engineers	
	Number	Percent		Number	Percent
PRIMARY WORK ACTIVITY IN 1978			NATIONAL INTEREST TOPICS ¹		
Total employed in February 1978..	656,897	100.0	Crime prevention and control.....	1,878	0.3
Research and development.....	190,027	28.9	Food production and technology.....	11,800	1.6
Basic research.....	3,401	0.5	Energy and fuel.....	114,972	15.9
Applied research.....	22,233	3.4	Other mineral resources.....	6,223	0.9
Development.....	93,267	14.2	Community development and services....	15,066	2.1
Design.....	71,126	10.8	Housing.....	14,773	2.0
Management or administration.....	229,350	34.9	Other.....	46,120	6.4
Research and development.....	81,763	12.4	Not applicable.....	180,104	25.0
Other.....	147,587	22.5	Not reported.....	62,634	8.7
Teaching and training.....	15,756	2.4	FEDERAL SUPPORT IN 1978 ²		
Production and inspection.....	112,176	17.1	Total employed in February 1978..		
Quality control.....	24,565	3.7	With Federal support.....	270,161	41.1
Operations.....	69,758	10.6	Department of Agriculture.....	7,332	1.1
Distribution-sales.....	17,853	2.7	Department of Commerce.....	6,945	1.1
Consulting.....	37,462	5.7	Department of Defense.....	146,332	22.3
Clinical diagnosis.....	703	0.1	Department of Energy.....	34,893	5.3
Consulting.....	36,760	5.6	Department of Health, Education, and Welfare.....	7,426	1.1
Report writing, statistical work, and computer applications.....	35,546	5.4	Department of Housing and Urban Development.....	11,865	1.8
Report writing.....	20,170	3.1	Department of the Interior.....	7,483	1.1
Statistical work.....	6,507	1.0	Department of Justice.....	555	(Z)
Computer applications.....	8,869	1.4	Department of Labor.....	698	0.1
Other activities.....	27,403	4.2	Department of Transportation.....	38,491	5.9
Not reported.....	9,178	1.4	Agency for International Development	2,143	0.3
NATIONAL INTEREST TOPICS ¹			Environmental Protection Agency.....	23,112	3.5
Total.....	721,158	100.0	NASA.....	42,120	6.4
Health.....	11,742	1.6	National Science Foundation.....	6,984	1.1
Education.....	17,349	2.4	Nuclear Regulatory Commission.....	5,758	0.9
Teaching.....	14,432	2.0	Other department or agency.....	14,014	2.1
Other.....	2,917	0.4	Agency not known.....	4,124	0.6
Environmental protection, pollution control.....	84,024	11.7	Agency not reported.....	2,257	0.3
Space.....	29,470	4.1	No Federal support.....	357,701	54.5
National defense.....	125,001	17.3	Federal support not known.....	19,708	3.0
			Not reported.....	9,328	1.4

¹Area of national concern in which persons devoted the largest proportion of professional time.²Sum of individual agencies support may exceed total with Federal support because of multiple response.

Table 5. Basic Annual Salary Rate of Full-Time Employed Engineers: 1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Salary	Engineers		Salary	Engineers	
	Number	Percent		Number	Percent
Total employed full time in February 1978.....	645,162	100.0	With salary reported ¹ --Continued		
			\$20,000 to \$24,999.....	150,202	23.3
			\$25,000 to \$29,999.....	162,712	25.2
With salary reported ¹	603,181	93.5	\$30,000 to \$39,999.....	172,201	26.7
Less than \$8,000.....	929	0.1	\$40,000 to \$49,999.....	37,829	5.9
\$8,000 to \$9,999.....	1,137	0.2	\$50,000 and over.....	22,107	3.4
\$10,000 to \$14,999.....	9,207	1.4	Median salary.....(dollars)..	\$27,275	(X)
\$15,000 to \$19,999.....	46,855	7.3	Salary not reported.....	41,981	6.5

¹Refers to salary for job held during the week of February 12-18, 1978.

Appendix A. Definitions and Explanations

The 1978 National Survey of Natural and Social Scientists and Engineers was the fourth survey based on the 1970 population of scientists and engineers. It was conducted by the Bureau of the Census for the National Science Foundation. The first survey, the 1972 Professional, Technical, and Scientific Manpower Survey,¹ was conducted among a nationwide sample of approximately 150,000 persons who were recorded in the 1970 Census of Population as being in the experienced civilian labor force in 1 of 63 engineering, scientific, or related occupations. The survey also included a small sample of persons who had completed 4 or more years of college, but were not in any of the specified occupations. Based on responses in the 1972 survey and on criteria established by the National Science Foundation, approximately 50,000 persons from the 1972 survey sample (excluding the small sample of college graduates) were chosen as the sample for the series of longitudinal surveys known as the National Sample of Scientists and Engineers. The 1978 National Survey of Natural and Social Scientists and Engineers was the third survey in this longitudinal series; it was preceded by surveys in 1976 and 1974.²

Questionnaires for the 1978 survey were mailed in February 1978. After all data collection activities, 81 percent of the sample (approximately 40,800 persons) completed their questionnaires. The 19 percent who did not complete their questionnaires included persons who refused to participate, the deceased, and persons who returned questionnaires with insufficient information to permit processing. For an analysis of response, see appendix E.

The estimates derived for this survey were prepared by using a ratio estimation procedure and an adjustment for nonresponse in 1978. For each sample case for which a completed questionnaire was obtained, the information from the 1978 survey was matched with the 1972 survey data and the 1970 census data for the same person. Weights applied to samples cases in the 1972 survey were then used to weight the resultant matched data file. The weighting procedure for the 1972 survey involved first the preparation of a preliminary estimate by weighting the results for each sample person by the reciprocal of the probability of selection. As a second

step, these weights were adjusted by applying a factor for certain age-sex-race cells within each occupation category. Within each of the cells, the factor was computed as the ratio of the 1970 census count to the preliminary estimate. The final 1972 weight was this factor multiplied by the inverse of the probability of selection for each person. To the extent that the data being tabulated and the estimated count of persons in the cells are positively correlated, the ratio estimate procedure will improve the reliability of the estimate. A discussion of the reliability of the estimates, including a description of the standard errors of totals and percentages, is presented in appendix B.

A nonresponse adjustment was done in 1978 to reduce the bias in the survey estimates due to the high nonresponse rate in 1978. This adjustment was done separately for in-scope³ and out-of-scope⁴ persons, and included an adjustment for the mortality in the longitudinal sample from 1972 to 1978. The first step in the nonresponse adjustment was to adjust the nonrespondents for mortality from 1972 to 1978 by means of mortality tables for age-race-sex groups. The second step was to determine the estimated proportion of nonrespondents that were in-scope and out-of-scope. To estimate these proportions, an intensive follow-up was conducted to obtain interviews for a subsample of the 1978 nonrespondents. This follow-up showed that approximately 80 percent of the nonrespondents were in-scope and the remaining 20 percent were out-of-scope. The final step was to determine a nonresponse adjustment factor for different age-race-sex cells. Within each of the cells, the factor was computed as the ratio of the weighted count, using the 1972 weights, of the estimated total (i.e., respondent and nonrespondent) in-scope or out-of-scope persons, divided by the weighted count of the respondent in-scope or out-of-scope persons.

The final weight for the 1978 survey was the product of the 1972 weight and the appropriate 1978 nonresponse adjustment factor.

The definitions for many of the characteristics shown in this report are self-explanatory or can best be understood by referring to the appropriate 1978 questionnaire items or reference lists (appendixes C and D). An explanation of the other subjects is provided below.

Age in 1978. The reference period for age in 1978 was April 1978. The age classification is based on the age of the person at his or her last birthday. The median age is that age that

¹For a description of the 1972 survey and related matters, see U.S. Bureau of the Census, *Characteristics of Persons in Engineering and Scientific Occupations: 1972*, Technical Paper No. 33, U.S. Government Printing Office, Washington, D.C., 1974.

²Results from the 1974 survey were published in U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 53, *Selected Characteristics of Persons in Fields of Science or Engineering: 1974*, U.S. Government Printing Office, Washington, D.C., 1975; results from the 1976 survey were published in U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 76, *Selected Characteristics of Persons in Fields of Science or Engineering: 1976*, U.S. Government Printing Office, Washington, D.C., 1978.

³"In-scope" means "in a field of science or engineering."

⁴"Out-of-scope" refers to the category "not in a field of science or engineering."

divides the distribution into two equal parts, one-half being older than the median age and one-half younger. Median ages were divided from an estimation process that distributed the subject populations into 5-year age groups.

Race. The data on race are based on responses in the 1970 Census of Population. The "other races" category includes all races not included in the specific categories listed.

Divisions of the United States. The divisions of the United States comprise the following States:

New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont

Middle Atlantic: New York, New Jersey, Pennsylvania

East North Central: Illinois, Indiana, Michigan, Ohio, Wisconsin.

West North Central: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota.

South Atlantic: Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia.

East South Central: Alabama, Kentucky, Mississippi, Tennessee.

West South Central: Arkansas, Louisiana, Oklahoma, Texas.

Mountain: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming.

Pacific: Alaska, California, Hawaii, Oregon, Washington.

Outlying areas of the United States include Puerto Rico, Guam, Virgin Islands, American Samoa, and Canal Zone.

Fields of science and engineering. Science or engineering (S/E) fields are categories established by the survey sponsor, the National Science Foundation, to identify persons who could be classified as engineers or scientists under most definitions. In general, to be classified into one of the fields, a person had to have at least two of the following three characteristics: (1) employment in the field, (2) attainment of a specified educational level in an academic discipline related to the field, or (3) self-identification, based upon total education and experience, as being in the field. More detailed information on the criteria for membership in a scientific and technical field is given in U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 76, *Selected Characteristics of Persons in Fields of Science or Engineering: 1976*, U.S. Government Printing Office, Washington, D.C., 1978.

Highest degree held. Highest degree held in 1978 refers to the highest academic degree awarded to the respondent in 1978

or earlier. Data on highest degree held were derived as follows: The level and the year of award of the highest degree received by the respondent between January 1972 and 1978 surveys (this degree will be referred to as degree "A") were compared with the level and year of award, determined from the 1976, 1974, and 1972 surveys, of the previously-designated highest degree held by the respondent (this is referred to as degree "B"). If degree A was at the same level or at a higher level than degree B, and if its date of award was later than that of degree B, degree A was designated as the highest degree held in 1978; otherwise, degree B was designated as the highest degree held in 1978.

The "other degree" category includes persons whose highest academic degree was one of the following: RN, LLB, MD, and academic degrees other than those shown in the tables.

Major field of study for highest degree held. The data on major field of study refer to the major subject associated with the highest degree held in 1978 determined by the method described above. For persons who received their highest degree held in 1978 after January 1972, the data are derived from question 3 of the 1978 questionnaire (see appendix C), or question 1, part b of the 1976 questionnaire or from question 2, part b5 of the 1974 questionnaire. For persons who received their highest degree in 1971 or earlier, the data on major subject are based on the 1972 survey.

Employment status. Employed persons are those who reported that they were employed, either full time or part time, on vacation, or otherwise temporarily absent from a job for health or personal reasons during the reference week (February 12-18, 1978). The unemployed are persons who marked the "unemployed and seeking work" category (box 3) of item 5a of the 1978 questionnaire (see appendix C), or who indicated in item 7 that they were on layoff from a job. All other persons were classified as "not in the labor force."

Unemployment in 1977. The data on unemployment in 1977 relate to the occurrence of unemployment during the entire calendar year rather than just during a reference week. Medians are based on the intervals shown in the tables.

Primary work activity in 1978. The data on primary work activity in 1978 were derived, in general, from answers to question 11b of the 1978 questionnaire. In certain instances of nonresponse to question 11b, however, the data were derived from an imputation procedure that used responses to question 11a.

Type of employer. The data on type of employer in 1978 are based entirely on responses to question 12 of the 1978 questionnaire.

Basic annual salary rate. The statistics on salary refer to the basic annual salary associated with the job held in February 1978. The figures relate to salary before deductions for income tax, Social Security, retirement, etc., but do not include bonuses, overtime pay, or earnings from secondary

jobs. For employees of educational institutions whose salary was for 9 or 10 months, the salary rate was adjusted to a 12-month basis. Median salaries were derived by an estimation process that distributed the subject population into \$1,000 intervals.

Job and occupational mobility in 1976 and 1978. The data on mobility between 1976 and 1978 were derived from answers on both the 1976 and 1978 questionnaires. Persons were classified as with a "job change between 1976 and 1978" if they were employed in both 1976 and 1978 and reported in the 1978 survey that their current job began in 1976 or later. Persons were classified as "same job in 1976 and 1978" if the beginning date of their most recent job was in 1975 or earlier, and as "not reported" if they did not report the beginning date of the most recent job. For persons with a job change, the detailed occupation of the 1978 job was compared with that of the 1976 job, and persons were

classified as with the same or a different occupation or as "occupation change not reported."

Job and occupational mobility in 1974 and 1978 and in 1972 and 1978. The data on mobility between 1974 and 1978 and between 1972 and 1978 were derived from answers on the 1974 and 1978 questionnaires and 1972 and 1978 questionnaires, respectively. The procedure was analogous to that described for the data on job and occupational mobility in 1976 and 1978.

Years of professional experience. Median years of professional experience are based on 1-year intervals.

Symbols. A dash (—) represents zero, and "X" means "not applicable." The symbol "Z" means less than 0.05 percent. The symbol "*" means based on fewer than 20 sample cases. For the characteristic "Unemployment in Calendar Year 1977," the symbol "27+" means that the median fell in the category "27 weeks or more."

Appendix B. Reliability of the Estimates and Standard Errors of Totals and Percentages

There are two types of possible errors associated with estimates based on data from a sample survey—sampling and nonsampling. The following is a description of the sampling and nonsampling errors associated with the 1978 Survey of Scientists and Engineers.

SAMPLING ERRORS

The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules and instructions were used, estimates from each of the different samples would differ from each other. The deviation of a sample estimate from the average of all possible samples is defined as the sampling error. The standard error of a survey estimate attempts to provide a measure of this variation among the estimates from the possible samples, and thus, is a measure of the precision with which an estimate from the sample approximates the average result of all possible samples.

As calculated for this survey, the standard error also partially measures the variation in the estimates due to response errors (nonsampling errors), but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and nonsampling errors not measured by the standard error.

The figures presented in tables B-1 and B-2 are approximations to the standard errors of the various estimates for this survey. A number of approximations and generalizations have been used so that the standard errors would be applicable to a wide variety of characteristics and still be prepared at a moderate cost. Thus, the standard errors in the following tables provide an indication of the order of magnitude, rather than precise measurements of the standard errors.

Standard errors on totals. Table B-1 presents the standard errors applicable to estimated totals for characteristics of engineers. Linear interpolation can be used to determine standard errors for estimated totals not specifically shown in table B-1. In addition, standard errors for estimated numbers not shown in these tables may also be computed directly from the following standard error formula:

$$\text{standard error of } x = \sqrt{ax^2 + bx}$$

The "a" and "b" parameters are:

Field	"a" parameter	"b" parameter
Engineers total	-.0000152	53.3

For example, there are an estimated 54,164 engineers, total, who were retired in 1978. The above table shows that a = -.0000152 and b = 53.3 for engineers, total. Thus, the estimated standard error of 54,164 is

$$\sqrt{(-.0000152)(54,164)^2 + (53.3)(54,164)} = 1,686$$

Standard errors on percentages. The reliability of an estimated percentage, computed by using sample data for both the numerator and the denominator, depends upon both the size of the percentage and the size of the total upon which the percentage is based. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentage, particularly if the percentages are 50 percent or more.

Table B-2 presents the standard errors of estimated percentages for engineers. Two-way linear interpolation can be used to determine standard errors for estimated percentages not specifically shown in table B-2. In addition, the standard errors for percentages not shown in these tables can also be computed directly from the following formula:¹

$$\text{standard error of the percentage } p \text{ on a base of } y = \sqrt{\frac{(p)(100-p)b}{y}}$$

For example, an estimated 1.5 percent of the 721,158 engineers worked part-time in 1978. The above table shows that b = 53.3 for engineers. Thus, the standard error for the 1.5 percent on a base of 721,158 is

$$\sqrt{\frac{(1.5)(100 - 1.5)(53.3)}{721,158}} = .10 \text{ percent}$$

Standard error intervals. The sample estimate and its estimated standard error enable one to construct interval estimates that include the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under identical conditions and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

¹The tables for the standard errors of percentages for most scientific and engineering fields (SEF's) were combined. The tables of standard errors given for such collapsed groups are always conservative, i.e., the table for the SEF with the largest standard errors was chosen to represent all the SEF's in the group. Because of this, the standard errors calculated directly from the formula may differ slightly from those found in the tables.

Table B-1. Standard Errors of Totals

(68 chances out of 100)

Size of estimate	Engineers
100.....	70
200.....	100
500.....	160
700.....	190
1,000.....	230
2,500.....	370
5,000.....	520
10,000.....	730
25,000.....	1,150
50,000.....	1,620
75,000.....	1,980
100,000.....	2,280
150,000.....	2,770
200,000.....	3,170
250,000.....	3,520
300,000.....	3,830
400,000.....	4,350
500,000.....	4,780
600,000.....	5,150
700,000.....	5,470
800,000.....	5,470

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample one can say with specified confidence that the average result of all possible samples is included within the constructed interval.

Standard errors may also be used to perform hypothesis testing, a procedure for distinguishing between population parameters using sample estimates. The most common types of hypotheses appearing in this report are: 1) The population parameters are identical, versus 2) they are different. An example of this would be comparing the mean annual income of men versus the mean annual income of women. Tests may be performed at various levels of significance, where a level of significance is the probability of concluding that the parameters are different when, in fact, they are identical.

All statements of comparison in the text have passed a hypothesis test at the 0.10 level of significance or better, and most have passed a hypothesis test at the 0.05 level of significance or better. This means that, for most differences cited in the text, the estimated difference between parameters is greater than twice the standard error of the difference. For the other difference mentioned, the estimated difference

Table B-2. Standard Errors of Percentages for Engineers

(68 chances out of 100)

Base of percentage	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
100.....	7.5	10.6	16.5	22.7	27.1	32.8	37.9
200.....	5.3	7.5	11.7	16.1	19.1	23.2	26.8
500.....	3.4	4.7	7.4	10.2	12.1	14.7	16.9
700.....	2.9	4.0	6.2	8.6	10.2	12.4	14.3
1,000.....	2.4	3.4	5.2	7.2	8.6	10.4	12.0
2,500.....	1.5	2.1	3.3	4.5	5.4	6.6	7.6
5,000.....	1.1	1.5	2.3	3.2	3.8	4.6	5.4
10,000.....	0.8	1.1	1.7	2.3	2.7	3.3	3.8
25,000.....	0.5	0.7	1.0	1.4	1.7	2.1	2.4
50,000.....	0.3	0.5	0.7	1.0	1.2	1.5	1.7
75,000.....	0.3	0.4	0.6	0.8	1.0	1.2	1.4
100,000.....	0.2	0.3	0.5	0.7	0.9	1.0	1.2
150,000.....	0.2	0.3	0.4	0.6	0.7	0.8	1.0
200,000.....	0.2	0.2	0.4	0.5	0.6	0.7	0.8
250,000.....	0.2	0.2	0.3	0.5	0.5	0.7	0.8
300,000.....	0.14	0.2	0.3	0.4	0.5	0.6	0.7
400,000.....	0.12	0.2	0.3	0.4	0.4	0.5	0.6
500,000.....	0.11	0.2	0.2	0.3	0.4	0.5	0.5
600,000.....	0.10	0.14	0.2	0.3	0.3	0.4	0.5
700,000.....	0.09	0.13	0.2	0.3	0.3	0.4	0.5
800,000.....	0.08	0.12	0.2	0.3	0.3	0.4	0.4

between parameters is between 1.6 and 2.0 times the standard error of the difference. When this is the case, the statement of comparison will be qualified in some way; e.g., by use of the phrase "some evidence."

For example, of the 721,158 engineers, in 1978, 22.8 percent have the master's degree as the highest degree held in 1978. The standard error of this percent as computed from table B-2 is 0.4 percentage points. Based on these data, we may conclude that the percentage of engineers with the master's degree as the highest degree held in 1978 lies between 22.0 percent and 23.6 percent with 95 percent confidence, i.e., within 2 standard errors.

Standard errors of differences between estimates. The figures in these tables are not directly applicable to standard errors of differences between two sample estimates. The standard error of the estimated difference between two figures may be approximated by the square root of the sum of the squares of the standard error of each estimate. This approximation will yield an exact result when the two characteristics are uncorrelated. If the two characteristics are positively (negatively) correlated, the approximation will overestimate (underestimate) the standard error of the difference. For a difference between two sample estimates, one of which represents a subclass of the other, the table can be used with the difference considered as the sample estimate.

For example, of the 721,158 engineers in 1978, 67.6 percent have the bachelor's as the highest degree held in 1978. The standard error of this percent as computed from table B-2 is 0.4 percentage points. The standard error of the difference between the percentage of those with bachelor's degrees and the percentage of those with master's degree (i.e. $67.6 - 22.8 = 44.8$ percent) is then approximately

$$\sqrt{(0.4)^2 + (0.4)^2} = 0.6 \text{ percentage points}$$

Based on these data, we may conclude with 95 percent confidence that the average estimate of the difference of the percentages derived from all possible sample lies within the interval 43.6 percentage points to 46.0 percentage points.

Standard errors of medians. The figures in these tables are not directly applicable to standard errors of estimated medians. The sampling variability of an estimated median depends upon the size of the base as well as on the distribution from which the median is determined. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on all possible samples lies with the interval. The following procedure may be used to estimate confidence limits of a median based on sample data:

1. Determine the standard error of a 50-percent characteristic from the appropriate standard error table (table B-2) using the appropriate base.
2. Add this standard error to 50 percent to obtain an upper boundary percentage and subtract this standard error from 50 percent to obtain a lower boundary percentage.

3. Using the cumulative distribution from which the median is derived, read off the numbers corresponding to the boundary percentages. The interval between these two numbers (i.e., the confidence limits) will be the 68-percent confidence interval. A 95-percent confidence interval may be determined by finding the values corresponding to 50 percent plus or minus twice the standard error in step 1.

For example, the data for 1978 indicate that the estimate of the median age for engineers is 47.0 years. The distribution of engineers by age is shown in the table below:

Age (years)	Percentage	Cumulative distribution
Under 30	0.9	0.9
30 to 34	10.9	11.8
35 to 39	16.0	27.8
40 to 44	15.9	43.7
45 to 49	15.4	59.1
50 to 54	15.6	74.7
55 to 59	11.6	86.3
60 to 64	6.8	93.1
65 to 69	4.1	97.2
70 and over	2.8	100.0

From standard error table B-2, the standard error of a 50-percent characteristic with a base of 721,158 is 0.5 percentage points. From the table of cumulative age distribution, the percentage point that corresponds to 45 years is 43.7 percent and to 50 years is 59.1 percent. The lower confidence limit corresponding to 49.5 percent (50 percent minus 0.5 percent) is found by linear interpolation between 45 years and 50 years to be 46.9 years, i.e.,

$$45 + (50 - 45) \frac{49.5 - 43.7}{59.1 - 43.7} = 46.9$$

Similarly, the upper confidence limit corresponding to 50.5 percent (50 percent plus 0.5 percent) is found to be 47.1 years:

$$45 + (50 - 45) \left(\frac{50.5 - 43.7}{59.1 - 43.7} \right) = 47.2$$

Consequently the 68-percent confidence interval, as shown by the data, is from 46.9 years to 47.2 years. Likewise, we could conclude that the 95-percent confidence interval is from 46.7 years (the distribution point corresponding to 49.0 percent) to 47.4 years (corresponding to 51.0 percent).

NONSAMPLING ERRORS

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases; definitional difficulties; differences in the interpretation of questions; inability or unwillingness of the respondents to provide correct information; mistakes in recording or coding the data; and other errors of collection, response, processing, coverage, and estimation for missing data. As the above list indicates,

nonsampling errors are not unique to sample surveys, since they can, and do, occur in complete censuses as well.

The primary source of nonsampling error in the 1978 National Sample survey is probably the high nonresponse rate. An adjustment in the estimation procedure for the 23 percent noninterview rate in the 1972 survey and the additional 19 percent nonresponse rate in 1978 was made, but there still remains some unknown bias in the estimates due to differences in the characteristics of those who were interviewed in 1978 and those who were not.

It should also be pointed out that estimates for this survey do not represent those who have entered the labor force in scientific and engineering fields since 1970. In particular, this survey does not include the large numbers of graduates produced since 1970. This causes significant biases for such items as the relative distributions of sex, age, and race and the unemployment figures if the results are assumed to be indicative of the current scientific and engineering fields including new entrants since 1970.

Appendix C. Questionnaire and Reference Lists

O.M.B. No. 99-577003; Approval Expires December 31, 1978

<p>FORM PMS-26D 9-26-77</p>	<p>U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS</p>	<p>NOTICE - Your report to the Census Bureau is confidential. It may be seen only by sworn Census employees and may be used only for statistical purposes.</p>
<p>1978 NATIONAL SURVEY OF NATURAL AND SOCIAL SCIENTISTS AND ENGINEERS</p>		<p><i>Please read</i> instructions carefully before answering questions.</p> <p>Answer as accurately as you can by printing your reply clearly or by entering an "X" in the box next to the appropriate reply.</p> <p>When the instructions for a question direct you to enter a code and description from a list, please refer to the reference list attached to this questionnaire.</p>
		<p>PLEASE COMPLETE AND RETURN TO Bureau of the Census 1201 East Tenth Street Jeffersonville, Indiana 47132</p>
<p>A. Do you currently live in the State (or foreign country) printed in the above mailing label?</p> <p>1 <input type="checkbox"/> Yes, same State (or foreign country)</p> <p>2 <input type="checkbox"/> No, different State (or foreign country) - Please enter your current State (or foreign country) of residence _____ 3 <input type="text"/> <input type="text"/></p>		
<p style="text-align: center;">FROM THE DIRECTOR BUREAU OF THE CENSUS</p> <p>This is the final questionnaire for the series of surveys known as the National Sample of Scientists and Engineers. The National Science Foundation, the project sponsor, and the Bureau of the Census wish to thank you for your invaluable contribution to this program. Each of the biennial surveys has given policymakers and planners an increasingly clearer view of the dynamics of the educational system and the job market for one of the Nation's central resources—highly trained persons. The goal of this final survey is to complete the picture for the decade of the 1970's.</p> <p>Thus, we are asking you to provide one final report on your employment and related topics. The questionnaire is much shorter than previous ones. Please note that the sample includes many kinds of highly trained persons in addition to scientists and engineers. For the survey to be successful and yield truly representative information, it is important that each person fill out and return the questionnaire.</p> <p>Please complete the questions which follow on pages 2 through 4 and return your questionnaire in the enclosed preaddressed envelope. For some questions you are instructed to enter a code and description from Reference List A, B, or C. These lists are attached to the questionnaire.</p> <p>This information is being collected under the authority of the National Science Foundation Act of 1950, as amended. The information you provide is confidential and may be seen only by sworn employees of the Bureau of the Census. The information cannot be used for anything but statistical purposes and cannot be given to any other Government agency, private concern, or individual. The data will be released only in the form of statistical summaries from which it will be impossible to identify information about any particular person. Your response is entirely voluntary, and your failure to provide some or all of the requested information will in no way adversely affect you.</p> <p>Thank you for your cooperation.</p> <p>Sincerely,</p> <p style="text-align: center;"> MANUEL D. PLOTKIN</p> <p>Enclosure</p>		

PART I - EDUCATION AND TRAINING																	
<p>1. Since January 1972 have you attended any college, university, or other post high school institution?</p>	<p>1 <input type="checkbox"/> Yes - Continue with question 2a 2 <input type="checkbox"/> No - Skip to question 4</p>																
<p>2a. What is the highest degree you have RECEIVED since January 1972?</p> <p><i>Mark only one box</i></p>	<p>1 <input type="checkbox"/> Associate 2 <input type="checkbox"/> Registered Nurse (R.N.) 3 <input type="checkbox"/> Bachelor's 4 <input type="checkbox"/> Master's 5 <input type="checkbox"/> First Professional Non-Medical (J.D., LL.B., Th.B.) 6 <input type="checkbox"/> First Professional Medical (D.D.M., D.D.S., D.O., D.V.M., M.D.) 7 <input type="checkbox"/> Doctorate 8 <input type="checkbox"/> Other - Specify _____ 9 <input type="checkbox"/> None - Skip to question 4</p>																
<p>b. When was this degree awarded?</p> <p><i>If you received more than one degree at the same level (e.g., two master's degrees), enter the year of award of the most recent one.</i></p>	<p>19 _____</p>																
<p>3. What was the major field of study of the degree you described in question 2?</p> <p><i>Enter code and description from Reference List A.</i></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Code</th> <th>Description from Reference List A</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">[] [] []</td> <td>_____</td> </tr> <tr> <td> </td> <td>_____</td> </tr> </tbody> </table>	Code	Description from Reference List A	[] [] []	_____		_____										
Code	Description from Reference List A																
[] [] []	_____																

<p>4. Aside from formal education, which of the following types of training did you receive in 1976 or 1977?</p> <p><i>Mark the appropriate year for each type of training you have received.</i></p> <p>(1) On-the-job training</p> <p>(2) Military training applicable to civilian occupations</p> <p>(3) Extension or correspondence courses</p> <p>(4) Courses at employer's training facility</p> <p>(5) Courses at adult education center</p> <p>(6) Other training</p> <p>(7) None</p>	<table style="width: 100%;"> <thead> <tr> <th style="width: 50%; text-align: center;">a. 1976</th> <th style="width: 50%; text-align: center;">b. 1977</th> </tr> </thead> <tbody> <tr><td>1 <input type="checkbox"/></td><td>1 <input type="checkbox"/></td></tr> <tr><td>2 <input type="checkbox"/></td><td>2 <input type="checkbox"/></td></tr> <tr><td>3 <input type="checkbox"/></td><td>3 <input type="checkbox"/></td></tr> <tr><td>4 <input type="checkbox"/></td><td>4 <input type="checkbox"/></td></tr> <tr><td>5 <input type="checkbox"/></td><td>5 <input type="checkbox"/></td></tr> <tr><td>6 <input type="checkbox"/></td><td>6 <input type="checkbox"/></td></tr> <tr><td>7 <input type="checkbox"/></td><td>7 <input type="checkbox"/></td></tr> </tbody> </table>	a. 1976	b. 1977	1 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	7 <input type="checkbox"/>
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PART II - EMPLOYMENT STATUS																	
<p>5a. What was your employment status during the week of February 12-18, 1978?</p>	<p>1 <input type="checkbox"/> Employed full time (including self-employed full time) - Skip to 6a 2 <input type="checkbox"/> Employed part time (including self-employed part time) - Answer 5b 3 <input type="checkbox"/> Unemployed and seeking work - Go to Part III 4 <input type="checkbox"/> Not employed and not seeking work - Skip to 7</p>																
<p>b. If you worked part time, were you seeking full-time work?</p>	<p>1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No</p>																
<p>6a. Were you working in a position related to science or engineering during the week of February 12-18, 1978?</p>	<p>1 <input type="checkbox"/> Yes - Go to Part III 2 <input type="checkbox"/> No - Answer 6b</p>																
<p>b. What was the most important reason for taking this position?</p> <p><i>Mark only one box</i></p>	<p>1 <input type="checkbox"/> Preferred nonscience or nonengineering position 2 <input type="checkbox"/> Promoted out of science or engineering position 3 <input type="checkbox"/> Pay was better in nonscience or nonengineering position 4 <input type="checkbox"/> Locational preference 5 <input type="checkbox"/> Science or engineering position not available 6 <input type="checkbox"/> Other - Specify _____</p> <p style="text-align: right;"><i>(Go to Part III)</i></p>																
<p>7. If you were not employed and not seeking work during the week of February 12-18, 1978, what was your most important reason for not seeking work?</p> <p><i>Mark only one box</i></p>	<p>1 <input type="checkbox"/> On vacation or otherwise temporarily absent from a job for health or personal reasons 2 <input type="checkbox"/> On layoff from a job 3 <input type="checkbox"/> Retired 4 <input type="checkbox"/> Student 5 <input type="checkbox"/> Tending to family responsibilities 6 <input type="checkbox"/> Could not find work or believed no jobs available in my particular field 7 <input type="checkbox"/> Other - Specify _____</p> <p style="text-align: right;"><i>(Go to Part III)</i></p>																

PART III - JOB ACTIVITIES																																	
INSTRUCTIONS																																	
<p>a. Complete questions 8-15 for the job held during the week of February 12-18, 1978, or, if you did not hold a job during that week, complete these questions for your most recent job prior to that week.</p> <p>b. If you held more than one job, please report only the job at which you worked the greatest number of hours.</p>																																	
<p>8. Where did you work? <i>Write in city and State or foreign country of company, business, agency, or other employer.</i></p>	<p style="text-align: center;">Job held during the week of February 12-18, 1978, or most recent prior job.</p> <p>City _____</p> <p><input type="checkbox"/> <input type="checkbox"/> State or foreign country _____</p>																																
<p>9. What kind of business was this? <i>Enter code and description from Reference List B.</i></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">Code</td> <td>Description from Reference List B</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/> <input type="checkbox"/></td> <td>_____</td> </tr> </table>	Code	Description from Reference List B	<input type="checkbox"/> <input type="checkbox"/>	_____																												
Code	Description from Reference List B																																
<input type="checkbox"/> <input type="checkbox"/>	_____																																
<p>10. What was your occupation? <i>Enter code and description from Reference List C.</i></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">Code</td> <td>Description from Reference List C</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/> <input type="checkbox"/></td> <td>_____</td> </tr> </table>	Code	Description from Reference List C	<input type="checkbox"/> <input type="checkbox"/>	_____																												
Code	Description from Reference List C																																
<input type="checkbox"/> <input type="checkbox"/>	_____																																
<p>11a. What percent of working time did you devote to each of the following activities? Entries should sum to 100%.</p> <p>PLEASE NOTE Basic research is study directed toward gaining scientific knowledge primarily for its own sake. Applied research is study directed toward gaining scientific knowledge in an effort to meet a recognized need. Development is direction of the knowledge gained from research toward production of useful materials, devices, systems, and methods.</p>	<table style="width: 100%;"> <tr><td>01 _____ %</td><td>Management or administration of research and development</td></tr> <tr><td>02 _____ %</td><td>Management or administration of other than research and development</td></tr> <tr><td>03 _____ %</td><td>Teaching and training - preparing and teaching courses, guiding and counseling students or trainees</td></tr> <tr><td>04 _____ %</td><td>Basic research</td></tr> <tr><td>05 _____ %</td><td>Applied research</td></tr> <tr><td>06 _____ %</td><td>Development - product, process, and technical development</td></tr> <tr><td>07 _____ %</td><td>Report and technical writing, editing, information retrieval</td></tr> <tr><td>08 _____ %</td><td>Clinical diagnosis</td></tr> <tr><td>09 _____ %</td><td>Design of equipment, processes, models</td></tr> <tr><td>10 _____ %</td><td>Quality control, testing, evaluation, or inspection</td></tr> <tr><td>11 _____ %</td><td>Operations - production, maintenance, construction, installation</td></tr> <tr><td>12 _____ %</td><td>Distribution - sales, traffic, purchasing, customer and public relations</td></tr> <tr><td>13 _____ %</td><td>Statistical work - survey work, forecasting, statistical analysis</td></tr> <tr><td>14 _____ %</td><td>Consulting</td></tr> <tr><td>15 _____ %</td><td>Computer applications</td></tr> <tr><td>16 _____ %</td><td>Other activities - Specify _____</td></tr> </table> <p style="text-align: center;">TOTAL=100%</p>	01 _____ %	Management or administration of research and development	02 _____ %	Management or administration of other than research and development	03 _____ %	Teaching and training - preparing and teaching courses, guiding and counseling students or trainees	04 _____ %	Basic research	05 _____ %	Applied research	06 _____ %	Development - product, process, and technical development	07 _____ %	Report and technical writing, editing, information retrieval	08 _____ %	Clinical diagnosis	09 _____ %	Design of equipment, processes, models	10 _____ %	Quality control, testing, evaluation, or inspection	11 _____ %	Operations - production, maintenance, construction, installation	12 _____ %	Distribution - sales, traffic, purchasing, customer and public relations	13 _____ %	Statistical work - survey work, forecasting, statistical analysis	14 _____ %	Consulting	15 _____ %	Computer applications	16 _____ %	Other activities - Specify _____
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16 _____ %	Other activities - Specify _____																																
<p>b. Among all these activities, which was your primary and which was your major secondary work activity? <i>Fill in the appropriate code numbers (01-16) from question 11a.</i></p>	<p>Code (01-16 from Question 11a).</p> <p><input type="checkbox"/> <input type="checkbox"/> Primary work activity</p> <p><input type="checkbox"/> <input type="checkbox"/> Secondary work activity</p>																																
<p>12. Which category best describes the type of organization of your principal employment or postdoctoral appointment? <i>Mark only one box</i></p>	<p>01 <input type="checkbox"/> Business or industry, including self-employed</p> <p>02 <input type="checkbox"/> Junior college, 2-year college, technical institute</p> <p>03 <input type="checkbox"/> Medical school</p> <p>04 <input type="checkbox"/> 4-year college or university, other than medical school</p> <p>05 <input type="checkbox"/> Elementary or secondary school system</p> <p>06 <input type="checkbox"/> Hospital or clinic</p> <p>07 <input type="checkbox"/> Non-profit organization, other than hospital, clinic, or educational institution</p> <p>08 <input type="checkbox"/> U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA</p> <p>09 <input type="checkbox"/> U.S. Government, civilian employee</p> <p>10 <input type="checkbox"/> State government</p> <p>11 <input type="checkbox"/> Local or other government - Specify <input type="checkbox"/> _____</p> <p>12 <input type="checkbox"/> International agency</p> <p>13 <input type="checkbox"/> Other - Specify <input type="checkbox"/> _____</p>																																

PART III – JOB ACTIVITIES – Continued							
<p>13. What was the basic salary associated with this position? (If not working during February 12–18, report ending salary of most recent prior job.)</p> <p>If you were on a postdoctoral appointment, include stipend plus allowances. (Basic salary refers to salary before deductions for income tax, social security, retirement, etc. but does not include bonuses, overtime, summer teaching, or other payment for secondary jobs.)</p>	<p style="text-align: center;">Job held during week of February 12–18, 1978, or most recent prior job</p> <p>a. \$ _____ .00</p> <p>b. <input type="checkbox"/> Per year <input type="checkbox"/> Per month <input type="checkbox"/> Per week</p> <p>c. If academically employed, mark whether salary is for – <input type="checkbox"/> 9–10 months <input type="checkbox"/> 11–12 months</p>						
<p>14. Between what dates did you hold this position? <i>Enter month and year</i> Consider a change in positions to have occurred if there were significant changes in your duties, level of responsibility, or occupation, even if you continued to work for the same employer.</p>	<p>a. Beginning month and year: _____</p> <p>b. Ending month and year: _____ OR <input type="checkbox"/> Present</p>						
<p>15a. Was ANY of your work supported or sponsored by U.S. Government funds?</p>	<p><input type="checkbox"/> Yes – Continue with 15b <input type="checkbox"/> No <input type="checkbox"/> Don't know } <i>Skip to 16a</i></p>						
<p>b. Which of the following agencies or departments were supporting the work? <i>Mark as many as apply</i></p>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <p>01 <input type="checkbox"/> AID (Agency for International Development)</p> <p>02 <input type="checkbox"/> Department of Agriculture</p> <p>03 <input type="checkbox"/> Department of Commerce</p> <p>04 <input type="checkbox"/> Department of Defense</p> <p>05 <input type="checkbox"/> Department of Energy</p> <p>Department of Health, Education, and Welfare</p> <p>06 <input type="checkbox"/> Alcohol and Drug Abuse Mental Health Administration</p> <p>07 <input type="checkbox"/> NIH (National Institutes of Health)</p> <p>08 <input type="checkbox"/> Office of Education</p> <p>09 <input type="checkbox"/> Other HEW – <i>Specify</i> _____</p> </td> <td style="width: 50%; border: none; vertical-align: top;"> <p>11 <input type="checkbox"/> Department of the Interior</p> <p>12 <input type="checkbox"/> Department of Justice</p> <p>13 <input type="checkbox"/> Department of Labor</p> <p>14 <input type="checkbox"/> Department of Transportation</p> <p>15 <input type="checkbox"/> EPA (Environmental Protection Agency)</p> <p>16 <input type="checkbox"/> NASA (National Aeronautics and Space Administration)</p> <p>17 <input type="checkbox"/> NSF (National Science Foundation)</p> <p>18 <input type="checkbox"/> Nuclear Regulatory Commission</p> <p>19 <input type="checkbox"/> Other agency or department – <i>Specify</i> _____</p> </td> </tr> <tr> <td style="border: none; vertical-align: top;"> <p>10 <input type="checkbox"/> Department of Housing and Urban Development</p> </td> <td style="border: none; vertical-align: top;"> <p>20 <input type="checkbox"/> Don't know source agency or department</p> </td> </tr> </table>	<p>01 <input type="checkbox"/> AID (Agency for International Development)</p> <p>02 <input type="checkbox"/> Department of Agriculture</p> <p>03 <input type="checkbox"/> Department of Commerce</p> <p>04 <input type="checkbox"/> Department of Defense</p> <p>05 <input type="checkbox"/> Department of Energy</p> <p>Department of Health, Education, and Welfare</p> <p>06 <input type="checkbox"/> Alcohol and Drug Abuse Mental Health Administration</p> <p>07 <input type="checkbox"/> NIH (National Institutes of Health)</p> <p>08 <input type="checkbox"/> Office of Education</p> <p>09 <input type="checkbox"/> Other HEW – <i>Specify</i> _____</p>	<p>11 <input type="checkbox"/> Department of the Interior</p> <p>12 <input type="checkbox"/> Department of Justice</p> <p>13 <input type="checkbox"/> Department of Labor</p> <p>14 <input type="checkbox"/> Department of Transportation</p> <p>15 <input type="checkbox"/> EPA (Environmental Protection Agency)</p> <p>16 <input type="checkbox"/> NASA (National Aeronautics and Space Administration)</p> <p>17 <input type="checkbox"/> NSF (National Science Foundation)</p> <p>18 <input type="checkbox"/> Nuclear Regulatory Commission</p> <p>19 <input type="checkbox"/> Other agency or department – <i>Specify</i> _____</p>	<p>10 <input type="checkbox"/> Department of Housing and Urban Development</p>	<p>20 <input type="checkbox"/> Don't know source agency or department</p>		
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<p>10 <input type="checkbox"/> Department of Housing and Urban Development</p>	<p>20 <input type="checkbox"/> Don't know source agency or department</p>						
PART IV – OTHER INFORMATION							
<p>16a. At anytime during calendar year 1977 were you without a job AND actively seeking employment?</p>	<p><input type="checkbox"/> Yes – Continue with 16b <input type="checkbox"/> No – Skip to question 17</p>						
<p>b. For how many weeks were you seeking employment?</p>	<p>1 <input type="checkbox"/> 1 to 4 weeks 2 <input type="checkbox"/> 5 to 10 weeks 3 <input type="checkbox"/> 11 to 14 weeks 4 <input type="checkbox"/> 15 to 26 weeks 5 <input type="checkbox"/> 27 weeks or more</p>						
<p>17. How many years of professional experience, including teaching, have you had? <i>Enter number of years</i></p>	<p>_____ Years</p>						
<p>18. Based on your total education and experience, what do you regard yourself as professionally? <i>Enter code and description from Reference List C.</i></p>	<table style="width: 100%; border: none;"> <tr> <th style="width: 10%; text-align: center;">Code</th> <th style="text-align: left;">Description from Reference List C</th> </tr> <tr> <td style="border: 1px solid black; width: 10%; text-align: center;"> </td> <td style="border: 1px solid black;"> </td> </tr> <tr> <td style="border: 1px solid black; text-align: center;"> </td> <td style="border: 1px solid black;"> </td> </tr> </table>	Code	Description from Reference List C				
Code	Description from Reference List C						
<p>19. Listed at the right are selected topics of critical national interest. If you devote a significant proportion of your professional time to any of these problem areas, please mark the box for the one on which you spend the MOST time. <i>Mark only one box</i></p>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <p>01 <input type="checkbox"/> Health</p> <p>02 <input type="checkbox"/> Environment protection, pollution control</p> <p>Education:</p> <p>03 <input type="checkbox"/> Teaching</p> <p>04 <input type="checkbox"/> Other</p> <p>05 <input type="checkbox"/> Space</p> <p>06 <input type="checkbox"/> National defense</p> <p>07 <input type="checkbox"/> Crime prevention and control</p> </td> <td style="width: 50%; border: none; vertical-align: top;"> <p>08 <input type="checkbox"/> Food production and technology</p> <p>09 <input type="checkbox"/> Energy and fuel</p> <p>10 <input type="checkbox"/> Other mineral resources</p> <p>11 <input type="checkbox"/> Community development and services</p> <p>12 <input type="checkbox"/> Housing (planning, design, construction)</p> <p>13 <input type="checkbox"/> Other – <i>Specify</i> _____</p> <p>14 <input type="checkbox"/> Does not apply</p> </td> </tr> </table>	<p>01 <input type="checkbox"/> Health</p> <p>02 <input type="checkbox"/> Environment protection, pollution control</p> <p>Education:</p> <p>03 <input type="checkbox"/> Teaching</p> <p>04 <input type="checkbox"/> Other</p> <p>05 <input type="checkbox"/> Space</p> <p>06 <input type="checkbox"/> National defense</p> <p>07 <input type="checkbox"/> Crime prevention and control</p>	<p>08 <input type="checkbox"/> Food production and technology</p> <p>09 <input type="checkbox"/> Energy and fuel</p> <p>10 <input type="checkbox"/> Other mineral resources</p> <p>11 <input type="checkbox"/> Community development and services</p> <p>12 <input type="checkbox"/> Housing (planning, design, construction)</p> <p>13 <input type="checkbox"/> Other – <i>Specify</i> _____</p> <p>14 <input type="checkbox"/> Does not apply</p>				
<p>01 <input type="checkbox"/> Health</p> <p>02 <input type="checkbox"/> Environment protection, pollution control</p> <p>Education:</p> <p>03 <input type="checkbox"/> Teaching</p> <p>04 <input type="checkbox"/> Other</p> <p>05 <input type="checkbox"/> Space</p> <p>06 <input type="checkbox"/> National defense</p> <p>07 <input type="checkbox"/> Crime prevention and control</p>	<p>08 <input type="checkbox"/> Food production and technology</p> <p>09 <input type="checkbox"/> Energy and fuel</p> <p>10 <input type="checkbox"/> Other mineral resources</p> <p>11 <input type="checkbox"/> Community development and services</p> <p>12 <input type="checkbox"/> Housing (planning, design, construction)</p> <p>13 <input type="checkbox"/> Other – <i>Specify</i> _____</p> <p>14 <input type="checkbox"/> Does not apply</p>						
<p>20a. Are you physically handicapped?</p>	<p><input type="checkbox"/> Yes – Continue with 20b <input type="checkbox"/> No – Skip to question 21</p>						
<p>b. What is the nature of your handicap(s)? <i>Mark as many as apply</i></p>	<p>1 <input type="checkbox"/> Visual 2 <input type="checkbox"/> Auditory 3 <input type="checkbox"/> Orthopedic 4 <input type="checkbox"/> Other – <i>Specify</i> _____</p>						
<p>21. Is your ethnic heritage Hispanic? (Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture)</p>	<p>1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No</p>						
<p>22. In the event that it is necessary to contact you to clarify some of the information you provided, may we contact you by telephone?</p>	<table style="width: 100%; border: none;"> <tr> <td style="width: 60%; border: none; vertical-align: top;"> <p><input type="checkbox"/> Yes – <i>Enter number(s) on which you can be reached</i> →</p> <p><input type="checkbox"/> No</p> </td> <td style="width: 40%; border: none;"> <table style="width: 100%; border: none;"> <tr> <td style="border: 1px solid black; width: 50%;">Area code</td> <td style="border: 1px solid black;">Telephone number</td> </tr> <tr> <td style="border: 1px solid black;">Area code</td> <td style="border: 1px solid black;">Telephone number</td> </tr> </table> </td> </tr> </table>	<p><input type="checkbox"/> Yes – <i>Enter number(s) on which you can be reached</i> →</p> <p><input type="checkbox"/> No</p>	<table style="width: 100%; border: none;"> <tr> <td style="border: 1px solid black; width: 50%;">Area code</td> <td style="border: 1px solid black;">Telephone number</td> </tr> <tr> <td style="border: 1px solid black;">Area code</td> <td style="border: 1px solid black;">Telephone number</td> </tr> </table>	Area code	Telephone number	Area code	Telephone number
<p><input type="checkbox"/> Yes – <i>Enter number(s) on which you can be reached</i> →</p> <p><input type="checkbox"/> No</p>	<table style="width: 100%; border: none;"> <tr> <td style="border: 1px solid black; width: 50%;">Area code</td> <td style="border: 1px solid black;">Telephone number</td> </tr> <tr> <td style="border: 1px solid black;">Area code</td> <td style="border: 1px solid black;">Telephone number</td> </tr> </table>	Area code	Telephone number	Area code	Telephone number		
Area code	Telephone number						
Area code	Telephone number						
<p>23. Please print your name here</p>	<p>Date prepared</p>						

REFERENCE LIST B – KINDS OF BUSINESSES

This list is to be used in answering question 9 about the kind of business or industry for which you worked. Please scan the entire list, choose the appropriate answer for the question and enter the code and description from this list. If none of the categories listed below adequately describes the kind of business for which you worked, use the "Other" category (code 731).

Code	Description	Code	Description
Manufacturing		Other Kinds of Business	
701	Aircraft, aircraft engines, aircraft parts	720	Agriculture, forestry, and fisheries
702	Chemicals and allied products	721	Business, personal, and professional services
703	Electrical machinery, equipment and supplies for the generation, storage, transformation, transmission, and utilization of electrical energy	722	Construction
704	Electronic apparatus, radio, television and communication equipment and parts	723	Engineering or architectural services
705	Electronic computers, accounting, calculating and office machinery and equipment	724	Finance, insurance, or real estate
706	Fabricated metal products (except ordnance, machinery and transportation equipment)	725	Mining and petroleum extraction
707	Machinery (except electrical) including engines and turbines, farming and construction machinery, mining, metalworking and other manufacturing and service industry machines	726	Private, nonprofit organizations other than educational institutions and hospitals
708	Motor vehicles and motor vehicle equipment including trucks, buses, automobiles, railroad engines and cars	727	Professional and technical societies
709	Ordnance, including manufacture of arms, ammunition, tanks, and complete guided missiles, space vehicles and equipment	728	Research institutions
710	Petroleum refining and related industries	729	Retail and wholesale trade
711	Primary metal industries, including smelting, refining, rolling, drawing, alloying, and manufacture of castings, forgings and other basic metal products	730	Transportation, communication, or other public utilities
712	Professional and scientific equipment and supplies	731	Other (Describe briefly under the applicable item on the questionnaire.)
713	Other manufacturing including printing and publishing		
Educational Institutions		Public Administration (Include only uniquely governmental activities, such as the U.S. Postal Service, U.S. Air Force, State court, Department of Motor Vehicles, city building inspection, or city public welfare. For example, if you work for the U.S. Postal Service use code 733. Federal public administration; on the other hand, if you work at a Veterans' Administration Hospital, use code 718. Hospital or clinic; if you work at a State university, use code 714. College or university; if you work for a county road building agency, use code 722. Construction; if you work in a Defense Department research laboratory, use code 728. Research institution.)	
714	College or university (offering at least a bachelor's degree)	732	Uniformed military service
715	Junior college or technical institute	733	Federal public administration
716	Medical school	734	State public administration
717	Other educational institutions	735	Local public administration (city, county, etc.)
Health Services		737	Regional government
718	Hospital or clinic	736	Other government
719	Other medical and health services		

REFERENCE LIST C – OCCUPATIONS

This list is to be used in answering questions 10 and 18 about your occupational classification. Please scan the entire list, choose the appropriate entry and enter the code and description from this list. If you cannot find exactly the right entry, please choose the one that comes nearest to it. If none of the entries is at all appropriate, use the "Other" category (code 475) and enter a brief description in the space provided on the questionnaire.

Code	Description	Code	Description
Engineers , including college professors and instructors		Health Occupations , including persons who are primarily practitioners. Persons engaged primarily in medical research, teaching, and similar activities use code 432. Medical scientist.	
401	Engineer, aeronautical and astronautical	438	Physician or surgeon
402	Engineer, agricultural	439	Technician, dental
403	Engineer, chemical	440	Technician, medical
404	Engineer, civil and architectural	441	Other health occupation (Describe briefly under the applicable item on the questionnaire.)
405	Engineer, electrical and electronic		
406	Engineer, industrial	Technicians and Technologists , except medical	
407	Engineer, mechanical	442	Designer, electronic parts and machine tools
408	Engineer, metallurgical and materials	443	Designer, industrial
409	Engineer, mining, petroleum, and geological	444	Designer, other
410	Engineer, nuclear	445	Draftsman
411	Engineer, environmental and sanitary	446	Surveyor
412	Engineer, operations research systems	447	Technician, biological and agricultural
413	Engineer, other fields (Describe briefly under the applicable item on the questionnaire.)	448	Technician, electrical and electronic
Computer Specialist , including college professors and instructors		449	Technician, construction, highways, and architectural
414	Computer programmer	450	Technician, mechanical
415	Computer systems analyst	451	Technician, other engineering
416	Computer scientist	452	Technician, physical science
417	Other computer specialist (Describe briefly under the applicable item on the questionnaire.)	453	Technician, other fields (Describe briefly under the applicable item on the questionnaire.)
Mathematicians and Statisticians , including college professors and instructors		Teachers	
418	Actuary	454	Teacher, elementary school
419	Mathematician	455	Teacher, secondary school
420	Statistician	456	Teacher, college and university, excluding engineering and science (Engineering and science teachers see codes 401-437 above.)
421	Operations research analyst	Administrators, Managers, and Officials , excluding farm	
Physical Scientists , including college professors and instructors		476	Urban and regional planner
422	Chemist	477	College president or dean
423	Earth scientists including geologists, geophysicists, etc.	458	Administrator or manager, scientific and technical research and development
424	Physicist, astronomer	459	Administrator or manager, production and operations
425	Atmospheric scientist, meteorologist	460	Administrator, manager, or official, all other, excluding self-employed
426	Oceanographer	461	Self-employed proprietor
427	Other physical scientist (Describe)	All Other Occupations	
Biological Scientists , including college professors and instructors		462	Accountant
428	Agricultural scientists, including foresters and conservationists	463	Attorney or judge
429	Biological scientist	464	Sales worker
430	Brochemist	465	Clerical worker (such as bookkeeper, secretary, etc.)
431	Biophysicist	466	Clergy
432	Medical scientist, excluding persons who are primarily medical practitioners, see Health Occupations	467	Craft worker (such as baker, carpenter, electrician, mechanic, repair worker)
433	Other biological scientist (Describe)	468	Farmer (owner, manager, tenant, or farm laborer)
Social Scientists , including college professors and instructors		469	Fire fighter or police
434	Economist	470	Laborer, except farm
435	Psychologist	471	Librarian
436	Sociologist or anthropologist	472	Merchant or shopkeeper, self-employed
437	Other social scientist (Describe briefly under the applicable item on the questionnaire.)	473	Operative (such as assembler, factory worker, miner, welder, truck driver, etc.)
		474	Postal worker
		475	Other occupations, not specified above (Describe briefly under the applicable item on the questionnaire.)

Appendix D. Source of Data

Characteristic	Table number	Item number on 1978 questionnaire
Age in 1978*.....	1	(From the 1970 census response)
Sex.....	1	(From the 1972 survey response, if available; otherwise from the 1970 census response)
Race*.....	1	(From the 1970 census response)
Residence in 1978.....	1	A, page 1
Professional identification.....	1	Part IV, 18
Hispanic heritage.....	1	Part IV, 21
Occupation in 1978.....	1	Part III, 10
Highest degree held*.....	2	2a; otherwise from 1976, 1974, or 1972 survey response
Major field of study for highest degree held*.....	2	3; otherwise from 1976, 1974, or 1972 survey response
Type of supplementary training: 1977.....	2	Part I, 4b
Job and occupational mobility: 1976, 1978*.....	3	1976 survey response and Part III, 10, 14
Job and occupational mobility: 1974, 1978*.....	3	1974 survey response and Part III, 10, 14
Job and occupational mobility: 1972, 1978*.....	3	1972 survey response and Part III, 10, 14
Years of professional experience*.....	3	Part IV, 17
Type of employer.....	4	Part III, 12
Federal support.....	4	Part III, 15a, 15b
Unemployment status: 1977.....	4	Part IV, 16a, 16b
Employment status: February 1978*.....	4	Part II, 5a, 5b, 7
Full-time employment in science or engineering: February 1978.....	4	Part II, 6a, 6b
National interest topics.....	4	Part IV, 19
Industry in 1978.....	4	Part III, 9
Primary work activity*.....	4	Part III, 11b
Annual salary rate: 1978.....	5	Part III, 13

*For more information, see appropriate subject in appendix A.

Appendix E. Response Rates

Table E-1 presents response rates of various components of the sample for the 1978 National Survey of Natural and Social Scientists and Engineers. The characteristics presented here are based on the 1970 census or on the 1978, 1976, 1974, or 1972 surveys. Since the percentages in table E-1 are based on a complete count of the sample cases, no reference to the standard error tables is necessary.

Table E-2 presents distributions of respondents and nonrespondents by the set of characteristics shown in table E-1.

Table E-1 is the counterpart of table E-1 of appendix E of the first report in this series *Selected Characteristics of Persons in Physical Science: 1978*. Table E-1 of that report, however, contained data for 362 respondents whose data were not represented in the tables and text of the report. Table E-1 of this report for engineers excludes data for these 362 respondents.

Table E-1. National Sample, by Field of Science or Engineering in 1976, 1974, and 1972, Age in 1978, and Sex, by Response in the 1978 Survey (Unweighted)

Sex, age in 1978 and field of science or engineering 1976	Response in 1978			
	Total		Respondents	Nonrespondents
	Number	Percent		
Total.....	50,093	100.0	81.4	18.6
SEX				
Male.....	46,877	100.0	81.6	18.4
Female.....	3,216	100.0	78.5	21.5
AGE IN 1978				
Under 30 years.....	287	100.0	76.0	24.0
30 to 34 years.....	6,264	100.0	75.7	24.3
35 to 39 years.....	9,226	100.0	78.1	21.9
40 to 44 years.....	8,075	100.0	81.3	18.7
45 to 49 years.....	7,644	100.0	83.1	16.9
50 to 54 years.....	6,994	100.0	84.9	15.1
55 to 59 years.....	5,183	100.0	85.8	14.2
60 to 64 years.....	3,193	100.0	85.5	14.5
65 to 69 years.....	1,930	100.0	82.2	17.8
70 years and over.....	1,297	100.0	76.2	23.8
FIELD OF SCIENCE OR ENGINEERING IN 1976				
Respondents in 1976.....	42,644	100.0	91.8	8.2
Total in scope in 1976.....	37,602	100.0	92.0	8.0
Computer specialists.....	2,064	100.0	90.8	9.2
Engineers.....	19,922	100.0	91.4	8.6
Mathematical specialists.....	1,486	100.0	92.6	7.4
Life scientists.....	3,800	100.0	93.9	6.1
Physical scientists.....	4,695	100.0	93.4	6.6
Environmental scientists.....	1,749	100.0	92.3	7.7
Psychologists.....	1,936	100.0	92.1	7.9
Social scientists.....	1,950	100.0	92.4	7.6
Total out-of-scope in 1976.....	5,042	100.0	89.8	10.2
Nonrespondents in 1976.....	7,449	100.0	21.9	78.1
FIELD OF SCIENCE OR ENGINEERING IN 1974				
Respondents in 1974.....	44,158	100.0	88.9	11.1
Total in scope in 1974.....	39,473	100.0	89.2	10.8
Computer specialists.....	2,291	100.0	87.4	12.6
Engineers.....	20,814	100.0	88.6	11.4
Mathematical specialists.....	1,612	100.0	89.3	10.7
Life scientists.....	4,026	100.0	91.0	9.0
Physical scientists.....	4,824	100.0	91.3	8.7
Environmental scientists.....	1,867	100.0	88.6	11.4
Psychologists.....	1,989	100.0	89.0	11.0
Social scientists.....	2,050	100.0	89.2	10.8
Total out-of-scope in 1974.....	4,685	100.0	86.2	13.8
Nonrespondents in 1974.....	5,935	100.0	25.6	74.4
FIELD OF SCIENCE OR ENGINEERING IN 1972				
Respondents in 1972.....	50,093	100.0	81.4	18.6
Total in scope in 1972.....	50,093	100.0	81.4	18.6
Computer specialists.....	3,391	100.0	76.7	23.3
Engineers.....	25,797	100.0	81.1	18.9
Mathematical specialists.....	2,185	100.0	81.9	18.1
Life scientists.....	4,891	100.0	84.1	15.9
Physical scientists.....	6,248	100.0	84.0	16.0
Environmental scientists.....	2,095	100.0	82.2	17.8
Psychologists.....	2,488	100.0	79.9	20.1
Social scientists.....	2,998	100.0	79.4	20.6

Table E-2. Respondents and Nonrespondents in the 1978 National Survey, by Field of Science or Engineering in 1976, 1974, and 1972, by Age in 1978, and Sex (Unweighted)

Sex, age in 1978, and field of science or engineering in 1976, 1974, 1972	Responded in 1978		Did not respond in 1978	
	Number	Percent	Number	Percent
Total.....	40,771	100.0	9,322	100.0
SEX				
Male.....	38,245	93.8	8,632	92.6
Female.....	2,526	6.2	690	7.4
AGE IN 1978				
Under 30 years.....	218	0.5	69	0.7
30 to 34 years.....	4,739	11.6	1,525	16.4
35 to 39 years.....	7,208	17.7	2,018	21.6
40 to 44 years.....	6,565	16.1	1,510	16.2
45 to 49 years.....	6,354	15.6	1,290	13.8
50 to 54 years.....	5,939	14.6	1,055	11.3
55 to 59 years.....	4,445	10.9	738	7.9
60 to 64 years.....	2,729	6.7	464	5.0
65 to 69 years.....	1,586	3.9	344	3.7
70 years and over.....	988	2.4	309	3.3
Median age.....	45	(X)	43	(X)
FIELD OF SCIENCE OR ENGINEERING IN 1976				
Responded in 1976.....	39,137	96.0	3,507	37.6
In scope in 1976.....	34,609	84.9	2,993	32.1
Computer specialists.....	1,875	4.6	189	2.0
Engineers.....	18,206	44.7	1,716	18.4
Mathematical specialists.....	1,376	3.4	110	1.2
Mathematicians.....	992	2.4	89	1.0
Statisticians.....	384	0.9	21	0.2
Life scientists.....	3,568	8.8	232	2.5
Agricultural scientists.....	1,446	3.5	94	1.0
Biologists.....	1,720	4.2	112	1.2
Medical scientists.....	402	1.0	26	0.3
Physical scientists.....	4,384	10.8	311	3.3
Chemists.....	2,692	6.6	171	1.8
Physicists and astronomers.....	1,443	3.5	124	1.3
Other physical scientists.....	249	0.6	16	0.2
Environmental scientists.....	1,615	4.0	134	1.4
Earth scientists.....	1,357	3.3	114	1.2
Atmospheric scientists.....	187	0.5	13	0.1
Oceanographers.....	71	0.2	7	0.1
Psychologists.....	1,784	4.4	152	1.6
Social scientists.....	1,801	4.4	149	1.6
Economists.....	750	1.8	70	0.8
Sociologists and anthropologists.....	484	1.2	38	0.4
Other social scientists.....	567	1.4	41	0.4
Out of scope.....	4,528	11.1	514	5.5
Did not respond in 1976.....	1,634	4.0	5,815	62.4

Table E-2. Respondents and Nonrespondents in the 1978 National Survey, by Field of Science or Engineering in 1976, 1974, and 1972, by Age in 1978, and Sex (Unweighted)—Continued

Sex, age in 1978, and field in science or engineering in 1976, 1974, 1972	Responded in 1978		Did not respond in 1978	
	Number	Percent	Number	Percent
FIELD OF SCIENCE OR ENGINEERING IN 1974				
Responded in 1974.....	39,252	96.3	4,906	52.6
In scope in 1974.....	35,212	86.4	4,261	45.7
Computer specialists.....	2,003	4.9	288	3.1
Engineers.....	18,450	45.3	2,364	25.4
Mathematical specialists.....	1,440	3.5	172	1.8
Mathematicians.....	1,041	2.6	131	1.4
Statisticians.....	399	1.0	41	0.4
Life scientists.....	3,663	9.0	363	3.9
Agricultural scientists.....	1,491	3.7	159	1.7
Biologists.....	1,755	4.3	160	1.7
Medical scientists.....	417	1.0	44	0.5
Physical scientists.....	4,402	10.8	422	4.5
Chemists.....	2,713	6.7	251	2.7
Physicists and astronomers.....	1,409	3.5	145	1.6
Other physical scientists.....	280	0.7	26	0.3
Environmental scientists.....	1,655	4.1	212	2.3
Earth scientists.....	1,399	3.4	176	1.9
Atmospheric scientists.....	186	0.5	22	0.2
Oceanographers.....	70	0.2	14	0.2
Psychologists.....	1,771	4.3	218	2.3
Social scientists.....	1,828	4.5	222	2.4
Economists.....	787	1.9	109	1.2
Sociologists and anthropologists.....	490	1.2	54	0.6
Other social scientists.....	551	1.4	59	0.6
Out of scope.....	4,040	9.9	645	6.9
Did not respond in 1974.....	1,519	3.7	4,416	47.4
Responded in 1972.....	40,771	100.0	9,322	100.0
In scope in 1972.....	40,771	100.0	9,322	100.0
Computer specialists.....	2,600	6.4	791	8.5
Engineers.....	20,927	51.3	4,870	52.2
Mathematical specialists.....	1,790	4.4	395	4.2
Mathematicians.....	1,315	3.2	289	3.1
Statisticians.....	475	1.2	106	1.1
Life scientists.....	4,113	10.1	778	8.3
Agricultural scientists.....	1,720	4.2	305	3.3
Biologists.....	1,798	4.4	341	3.7
Medical scientists.....	595	1.5	132	1.4
Physical scientists.....	5,249	12.9	999	10.7
Chemists.....	3,061	7.5	583	6.3
Physicists and astronomers.....	1,791	4.4	337	3.6
Other physical scientists.....	397	1.0	79	0.8
Environmental scientists.....	1,723	4.2	372	4.0
Earth scientists.....	1,553	3.8	345	3.7
Atmospheric scientists.....	132	0.3	18	0.2
Oceanographers.....	38	0.1	9	0.1
Psychologists.....	1,988	4.9	500	5.4
Social scientists.....	2,381	5.8	617	6.6
Economists.....	954	2.3	262	2.8
Sociologists and anthropologists.....	554	1.4	142	1.5
Other social scientists.....	873	2.1	213	2.3
Out of scope in 1972.....	-	-	-	-
Did not respond in 1972.....	-	-	-	-

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