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EMPLOYMENT OF SCIENTISTS AND ENGINEERS 1950-70

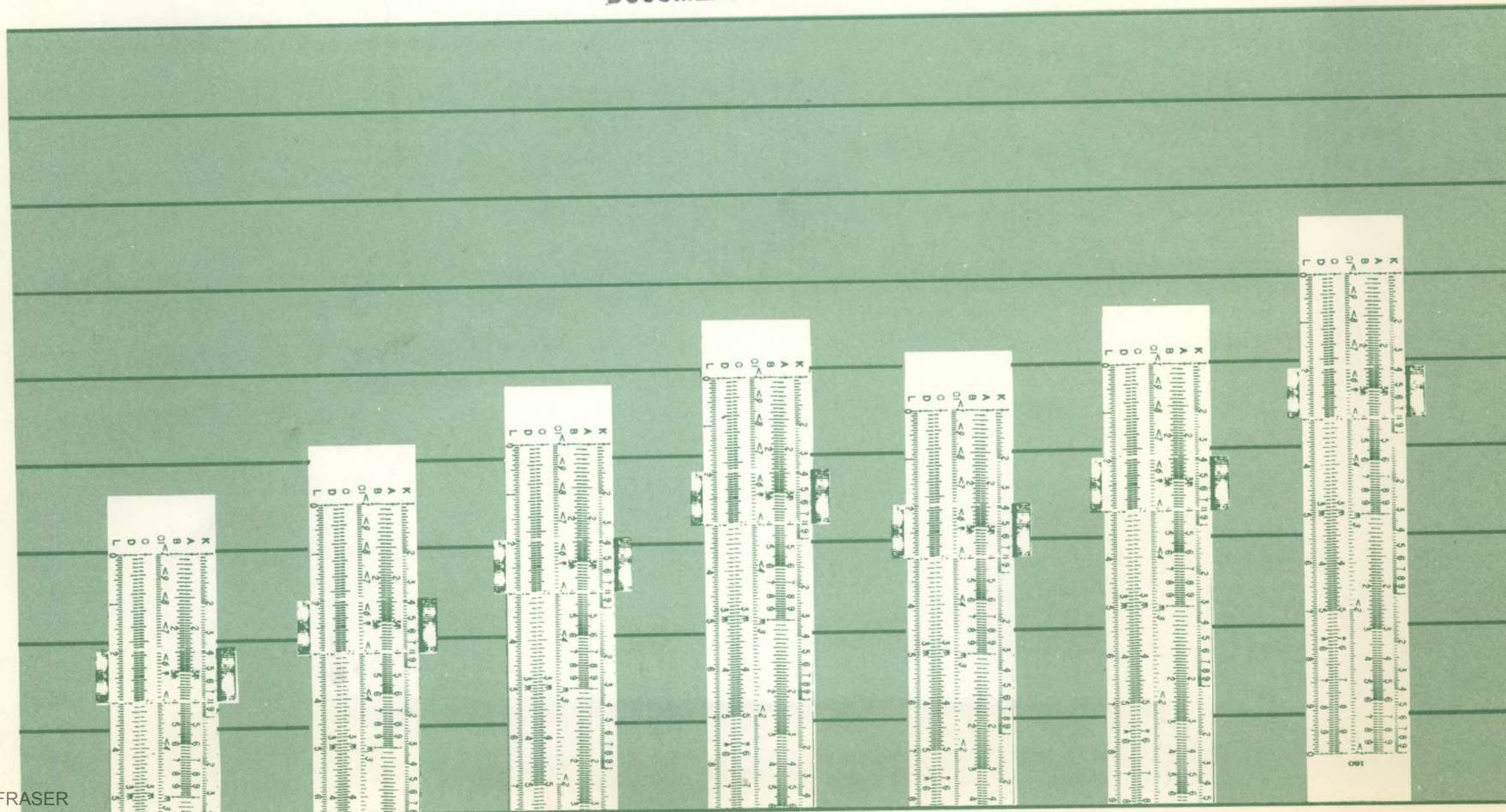
BULLETIN 1781

U.S. DEPARTMENT OF LABOR
Bureau of Labor Statistics
1973

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EMPLOYMENT OF SCIENTISTS AND ENGINEERS 1950-70

Bulletin 1781

U.S. DEPARTMENT OF LABOR
Peter J. Brennan, Secretary
BUREAU OF LABOR STATISTICS
Julius Shiskin, Commissioner
1973



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EMPLOYMENT OF
SCIENTISTS AND
ENGINEERS
1950-70

UNITED STATES
DEPARTMENT OF LABOR
BUREAU OF ECONOMIC ANALYSIS
WASHINGTON, D.C. 20501
1971

100-100000-1

Preface

Natural scientists and engineers contribute in countless ways to the welfare and technological progress of the Nation. They are essential to the functioning of an advanced industrial society and have an impact on society disproportionate to their numbers.

A consistent historical series on employment of scientists and engineers in various sectors of the economy is needed to assess the growth of manpower in scientific and technical areas and the factors underlying this growth. Although statistics on employment of scientists and engineers in various sectors have been collected by Federal Government agencies, the definitions, methods, survey coverage, and purposes for collecting the data have frequently differed, creating problems of comparability. Also, major gaps exist for specific years and for some important sectors of the economy. As a result of its concern for a consistent series of data on employment of scientists and engineers, the National Science Foundation has supported the Bureau of Labor Statistics in its effort to develop such a series.

This bulletin presents comprehensive data on the employment of scientists and engineers from 1950 to 1970 and includes estimates of each major scientific occupational group in all sectors of the economy. Estimates also are presented for scientists and engineers primarily engaged in research and development. Employment estimates shown in this report supersede those developed by the Bureau of Labor Statistics and published by the National Science Foundation in *Employment of Scientists and Engineers in the United States, 1950-66* (NSF 68-30).

This bulletin was prepared in the Division of Manpower and Occupational Outlook, Office of Manpower Structure and Trends. The detailed estimates were developed by Maurice Moylan, under the direction of Michael F. Crowley, who prepared the introductory text.

Within the National Science Foundation, Norman Seltzer, Study Director, Scientific Manpower Studies Group, provided general guidance and direction.

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Overall Trends

Employment of natural scientists¹ and engineers increased by more than 1 million over the 20-year span starting in 1950, from almost 557,000 to almost 1.6 million in 1970—an increase of 186 percent. Engineering employment was 1.1 million in 1970, up 690,000 or 169 percent, and scientific employment reached almost 500,000, up 348,000 or 234 percent.

Employment of scientists and engineers increased at an average annual rate of 5.4² percent between 1950 and 1970. However, growth, both absolutely and relatively, was not constant over the 1950-70 period. Growth was significantly faster in the first half of the period (7.1 percent a year) than in the second half (3.8 percent a year). Within the 1960's, employment growth was greater in the first half of the decade. Between 1960 and 1965, employment increased at an average annual rate of 4.4 percent while averaging an increase of only 3.1 percent between 1965 and 1970. Significant differences can be noted between engineers and scientists. For example, over half of the engineering employment growth took place between 1950 and 1960, while more than half of the growth in scientific employment took place between 1960 and 1970.

Growth in scientific and engineering employment over the decades of the 1950's and 1960's reflected many interwoven factors, including overall economic growth; increased research and development (R&D) expenditures; the space race, culminating in astronauts walking on the moon; and the development of complex new defense systems involving electronics, aircraft, and missiles. (See table 1 and chart 1.) Since many scientists teach in

¹ In this report, the term "scientists" refers only to natural scientists, including mathematicians. Excluded are social scientists and psychologists. (See appendix C.) For ease of presentation, "scientists" rather than "natural scientists" will be used throughout this report.

² In this report, "average annual rate," "annual growth", and similar terms are used to describe the estimated annual compound rate of change between the first and last year of the time period under discussion.

Table 1. Factors affecting science and engineering employment, 1950-70

(In billions of dollars)

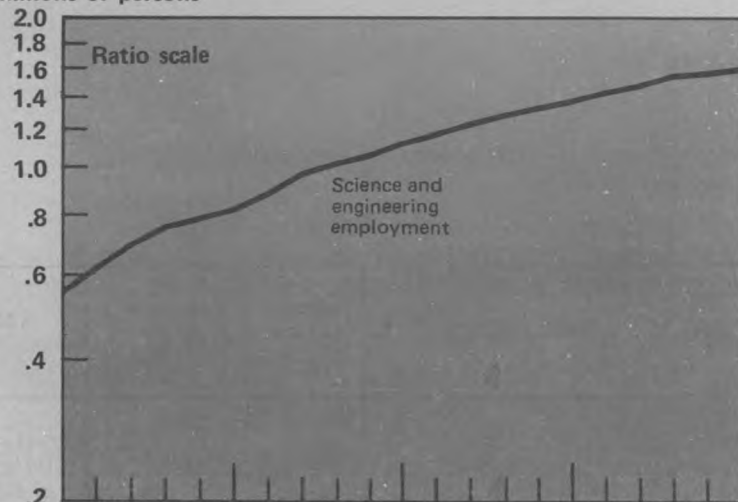
Year	Gross national product	National defense expenditures	R&D expenditures
1950	\$284.8	\$14.1	(¹)
1951	328.4	33.6	(¹)
1952	345.5	45.9	(¹)
1953	364.6	48.7	\$ 5.2
1954	364.8	41.2	5.7
1955	398.0	38.6	6.3
1956	419.2	40.3	8.5
1957	441.1	44.2	9.9
1958	447.3	45.9	10.9
1959	483.7	46.0	12.5
1960	503.7	44.9	13.7
1961	520.1	47.8	14.6
1962	560.3	51.6	15.7
1963	590.5	50.8	17.4
1964	632.4	50.0	19.2
1965	684.9	50.1	20.4
1966	749.9	60.7	22.3
1967	793.9	72.4	23.6
1968	864.2	78.3	25.2
1969	930.3	78.4	26.2
1970	976.4	75.1	26.3

¹ Not available.

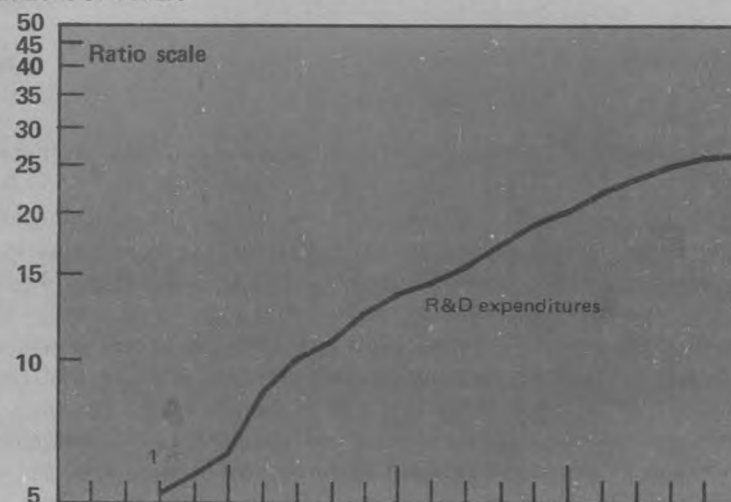
SOURCE: Council of Economic Advisers; National Science Foundation.

Chart 1. FACTORS AFFECTING SCIENCE AND ENGINEERING EMPLOYMENT, 1950-70

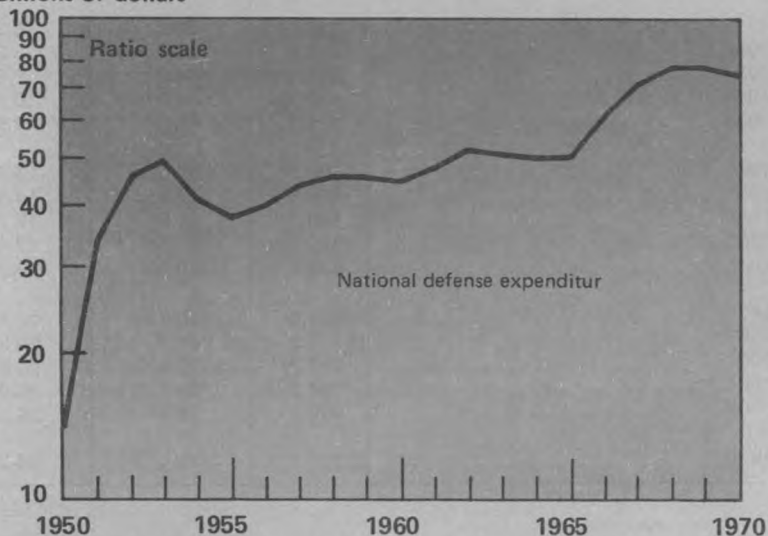
Millions of persons



Billions of dollars

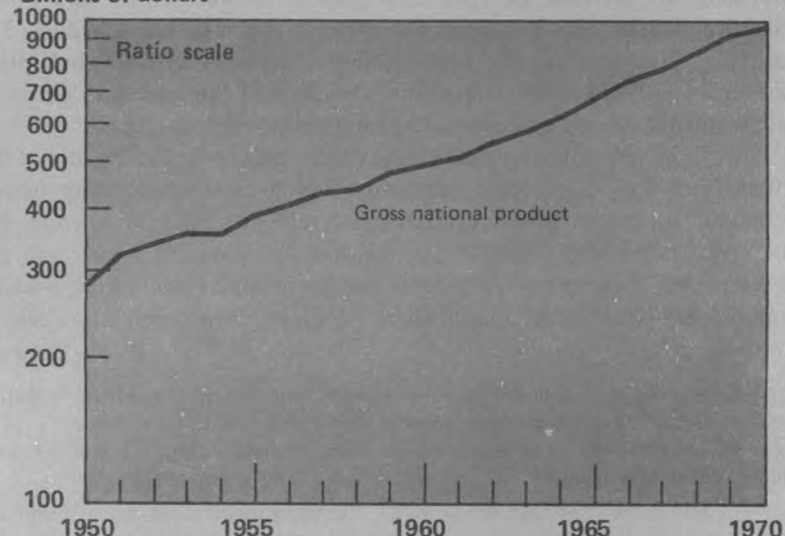


Billions of dollars



¹ Data not available before 1953

Billions of dollars



Sources: Bureau of Labor Statistics; National Science Foundation;
Council of Economic Advisers

colleges and universities, growth of college and university enrollments also was a factor. Many technological innovations, such as the widespread use of computers, also contributed to this growth, as did the expansion of industrial output associated with the Korean and Vietnam conflicts.

Employment of scientists and engineers increased more rapidly than did total employment in the economy, total white-collar employment, or total professional employment between 1950 and 1970. Thus, scientists and engineers increased from nearly 1 percent to about 2 percent of total employment. (See chart 2.) About 30 percent of the increase in science and engineering employment between 1950 and 1970 can be attributed to overall economic growth (as measured by the growth of total employment). The remainder can be attributed to the relatively greater utilization of scientists and engineers. Among the major factors contributing to the growth are increases in R&D activities, technological innovations, and expansion of government programs employing large numbers of scientists and engineers.

Increased expenditures for R&D contributed significantly to the growth of employment of scientists and engineers. Scientists and engineers engaged in R&D increased from 158,000 in 1950 to 535,000 in 1970, an increase of 377,000, representing an average annual growth of 6.3 percent. As a percent of all scientists and engineers, those in R&D increased from 28.4 in 1950 to a high of 37.6 in 1965, and declined to 33.6 in 1970. (See table 2.) Over the 1950-70 period, the increase in employment of scientists and engineers in R&D accounted for over 36 percent of total employment growth. In the 1950-60 period, R&D scientists and engineers represented about 42 percent of total growth, compared to about 30 percent over the 1960-70 period.

In rough terms, general economic growth and increased R&D expenditures accounted for about two-thirds of the increase in scientific and engineering employment over the 1950-70 period. In the first half of the period, increases in R&D were relatively more important than overall growth; in the second half, overall economic growth was relatively more important than the growth in R&D expenditures. The remaining growth reflects the greater utilization of scientists and engineers in the economy—presumably because of technological innovation; greater

Table 2. Estimated employment of scientists and engineers engaged in research and development, 1950-70

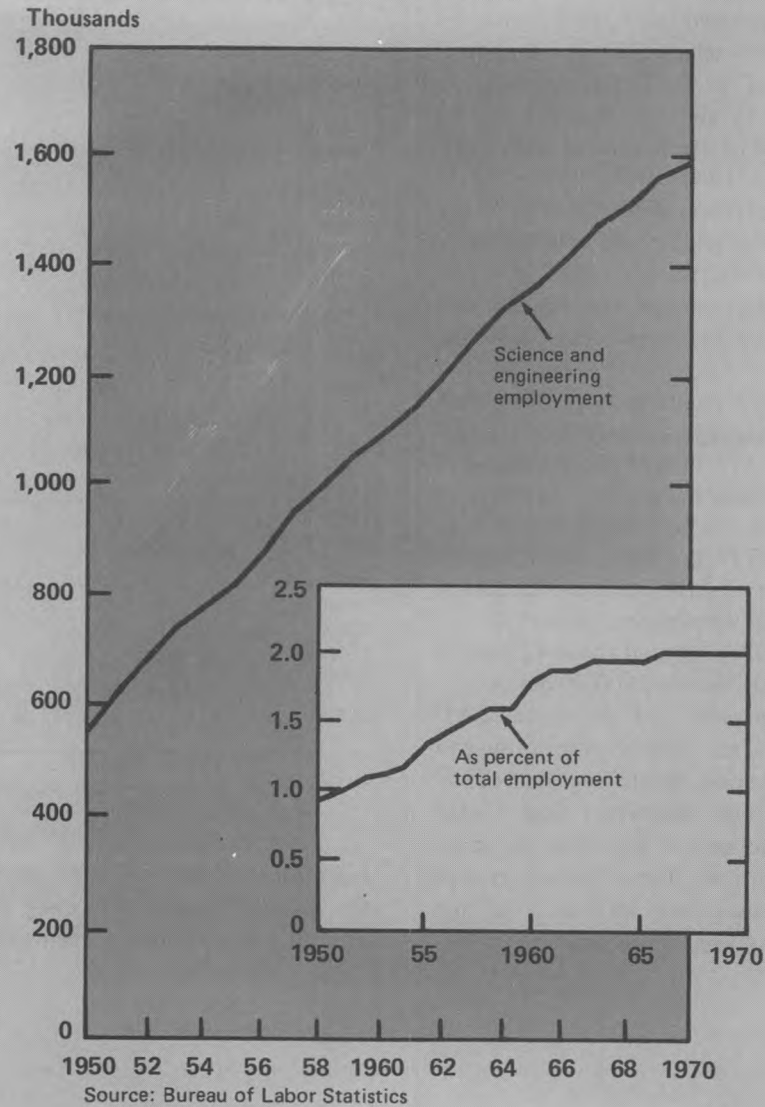
(Employment in thousands)

Year	All scientists and engineers	Engaged in R&D	
		Number	Percent
1950	556.7	157.9	28.4
1951	611.8	175.4	28.7
1952	685.9	204.9	29.9
1953	748.7	227.8	30.4
1954	783.7	243.5	31.1
1955	812.6	248.8	30.6
1956	873.7	271.0	31.0
1957	958.9	308.8	32.2
1958	1,001.2	329.7	32.9
1959	1,057.9	362.1	34.2
1960	1,104.0	386.1	35.0
1961	1,151.5	409.5	35.6
1962	1,210.3	441.9	36.5
1963	1,280.8	475.7	37.1
1964	1,327.0	497.9	37.5
1965	1,366.3	513.2	37.6
1966	1,417.5	526.3	37.1
1967	1,476.7	554.0	37.5
1968	1,525.0	552.8	36.2
1969	1,567.7	549.0	35.0
1970	1,594.7	535.4	33.6

SOURCE: Bureau of Labor Statistics.

technical sophistication of the production process, government expenditures for defense, space, and other programs requiring significant inputs of scientific and engineering talent; and other factors.

**Chart 2. SCIENCE AND ENGINEERING
EMPLOYMENT, 1950-70**



Employment By Sector

About 1.1 million (70 percent) of the almost 1.6 million scientists and engineers employed in the United States in 1970 worked in private industry. Federal, State, and local governments combined employed 239,000 (15 percent), colleges and universities 228,000 (14 percent), and nonprofit organizations 16,000 (1 percent).

The proportion of scientists and engineers in the private sector declined slightly between 1950 and 1970, and government's share of total science and engineering employment also dropped. In contrast, the proportions in colleges and universities and nonprofit organizations increased. (See chart 3.)

As with total scientific and engineering employment, most (70 percent) of those engaged in R&D were in private industry in 1970. About 14 percent worked in colleges and universities, nearly 14 percent in government—primarily in Federal agencies—and under 3 percent in nonprofit organizations. In general, the distribution of R&D funds followed similar patterns. (See table 3 and chart 4.)

Private industry

Manufacturing. Approximately 733,000 scientists and engineers, 46 percent of the Nation's total, were employed in manufacturing industries in 1970. In comparison, only 27.5 percent of all workers were employed in manufacturing industries in 1970.

Over the 1950-70 period, nearly one-half of the growth in total science and engineering employment took place in manufacturing. Growth in manufacturing, however, was not constant over the entire period. Over the 1950-70 period, employment increased at an average annual rate of 5.6 percent. Between 1950 and 1960, the rate was 8.4 percent a year; it was only 2.9 percent a year between 1960 and 1970. The most rapid growth occurred between 1950 and 1955—at an average annual rate of 10.3

percent—stimulated by a high demand for consumer durable goods and large Federal expenditures for military items due to the Korean conflict. Slow growth (2.2 percent a year) occurred over the 1965-70 period because of declines in the late 1960's when the Federal Government started to wind down the Vietnam conflict and reduce R&D funding.

As a proportion of total scientists and engineers, those in manufacturing rose from 44 percent in 1950 to a high of 50 percent in 1954. Between 1954 and 1967, the proportion of science and engineering employment in manufacturing never fell below 48 percent. After 1967 the proportion dropped, reaching 46 percent in 1970.

In addition to general economic growth, the increased employment of scientists and engineers in manufacturing reflects mainly the changing occupational composition of manufacturing industries in favor of highly trained workers, and a rapid increase in R&D performed in these industries. As a proportion of total manufacturing employment, scientists and engineers increased from 1.6 percent in 1950 to 3.3 percent in 1960, and to 3.8 percent in 1970. (See table 4.)

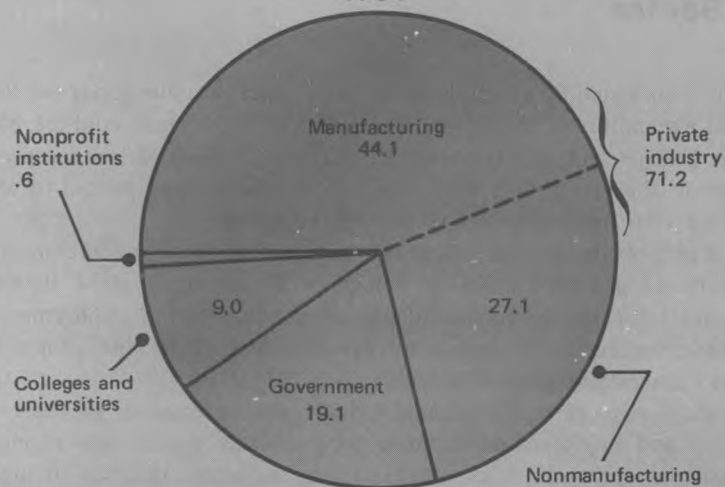
Over the 1950-70 period, employment of scientists and engineers engaged in R&D in manufacturing increased from 82,000 to 298,000, representing an average annual growth of 6.6 percent. Increases in R&D employment represented about 44 percent of the total growth of scientists and engineers in manufacturing. Between 1950 and 1960, R&D increases accounted for slightly over half of the growth; between 1960 and 1970 the comparable figure was only about one-third. As a proportion of total science and engineering employment in manufacturing, those in R&D increased steadily from 34 percent in 1950 to 46 percent in 1964. After 1964 the proportion started to decline, reaching 41 percent in 1970.

In 1970, five industries—electrical equipment, chemicals, machinery, aircraft, and ordnance—accounted for almost 70 percent of all scientists and engineers in manufacturing, up from 56 percent in 1950 and 67 percent in

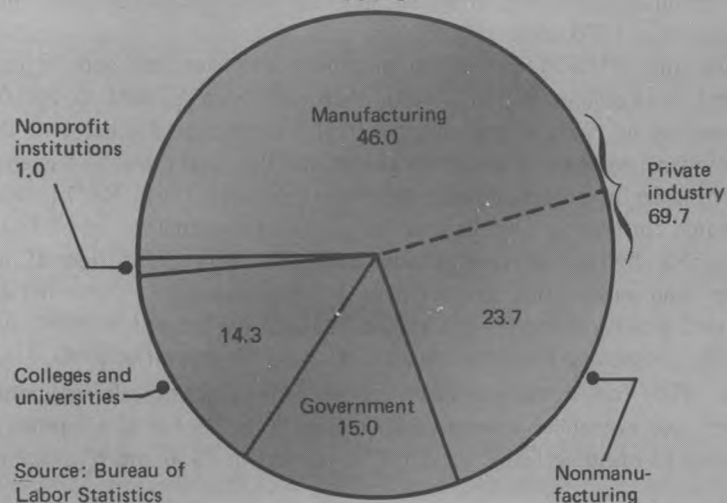
Chart 3. SCIENTISTS AND ENGINEERS BY SECTOR, 1950 AND 1970

PERCENT DISTRIBUTION

1950



1970



Source: Bureau of
Labor Statistics

1960. These same five industries accounted for about 75 percent of the total increase of scientists and engineers in manufacturing. Science and engineering employment increases in these industries resulted from the rapid increase in demand for the industries' products as well as large increases in R&D expenditures. In the chemicals industries, for example, output (as measured by industrial production indexes) increased by 388 percent, while employment of scientists and engineers increased by over 170 percent.

These five industries accounted for almost 78 percent of the scientists and engineers engaged in R&D in manufacturing in 1970, compared to 65 percent in 1950, and accounted for over 82 percent of the growth of R&D employment in manufacturing. Two industries—electrical equipment and aircraft—accounted for almost half of the total increase of R&D scientists and engineers in manufacturing.

Nonmanufacturing. Nonmanufacturing industries employed 378,000 scientists and engineers in 1970, 24 percent of the total, and 227,000 more than the number employed in 1950. While this 150 percent increase (an average increase of 4.7 percent a year) was less than that in manufacturing (199 percent), it was more evenly distributed over the entire period.

Between 1950 and 1960, employment of scientists and engineers in nonmanufacturing industries grew at a slower rate than in manufacturing—5.6 percent per year compared to 8.4 percent per year. However, between 1960 and 1970, employment in nonmanufacturing increased at an annual rate of 3.7 percent compared to 2.9 percent in manufacturing. Between 1965 and 1970, the rate of increase was almost twice that in manufacturing, 4.2 percent compared to 2.2 percent.

Employment of R&D scientists and engineers increased at a faster rate than did total science and engineering employment over the period (6.7 percent per year) and by 1970 almost 20 percent of the scientists and engineers in nonmanufacturing were engaged in R&D. This represents an increase from about 13 percent in 1950 and 17 percent in 1960.

Almost two-thirds of the scientists and engineers in nonmanufacturing in 1970 were in only three industries—engineering and architectural services, miscellaneous business services (primarily commercial R&D labs), and contract construction. These three industries accounted for two-thirds of R&D growth. One industry alone—miscellaneous business services—accounted for over two-thirds of the growth in R&D nonmanufacturing employment since 1950.

Table 3. Scientists and engineers in research and development and research and development expenditures, by sector, 1953-70

(Employment in thousands; expenditures in millions of dollars)

Year	Private industry		Federal Government		Colleges and universities		Nonprofit institutions	
	Employment	Expenditures	Employment	Expenditures	Employment	Expenditures	Employment	Expenditures
1953	160.0	\$3,630	33.1	\$1,010	28.6	\$ 455	3.9	\$112
1954	173.2	4,070	32.6	1,020	31.1	518	4.3	130
1955	180.4	4,640	27.6	905	33.8	589	4.7	145
1956	197.6	6,605	30.4	1,040	35.7	674	4.8	164
1957	227.8	7,731	34.0	1,220	38.8	771	5.6	190
1958	241.5	8,389	36.6	1,374	42.9	885	5.9	222
1959	264.2	9,618	42.1	1,640	46.0	1,020	6.7	262
1960	282.4	10,509	44.7	1,726	48.6	1,185	7.3	310
1961	296.8	10,908	48.0	1,874	52.4	1,379	8.5	391
1962	318.8	11,464	53.1	2,098	55.2	1,613	10.6	490
1963	343.2	12,630	56.4	2,279	59.3	1,889	12.6	573
1964	351.1	13,512	67.2	2,838	62.5	2,224	12.9	640
1965	359.9	14,185	71.2	3,093	64.5	2,451	13.3	710
1966	369.9	15,548	72.3	3,222	65.6	2,715	14.0	781
1967	384.2	16,415	74.5	3,395	77.1	3,002	14.4	830
1968	386.5	17,469	72.4	3,493	75.3	3,318	14.6	879
1969	387.8	18,321	69.4	3,498	73.1	3,430	14.6	930
1970	372.2	17,858	69.6	3,876	75.7	3,593	13.7	960

NOTE: Expenditures for Federally Funded Research and Development Centers administered by industry, colleges and universities, and nonprofit institutions are included in the totals for their respective sectors.

SOURCE: Employment, Bureau of Labor Statistics; expenditures, National Science Foundation.

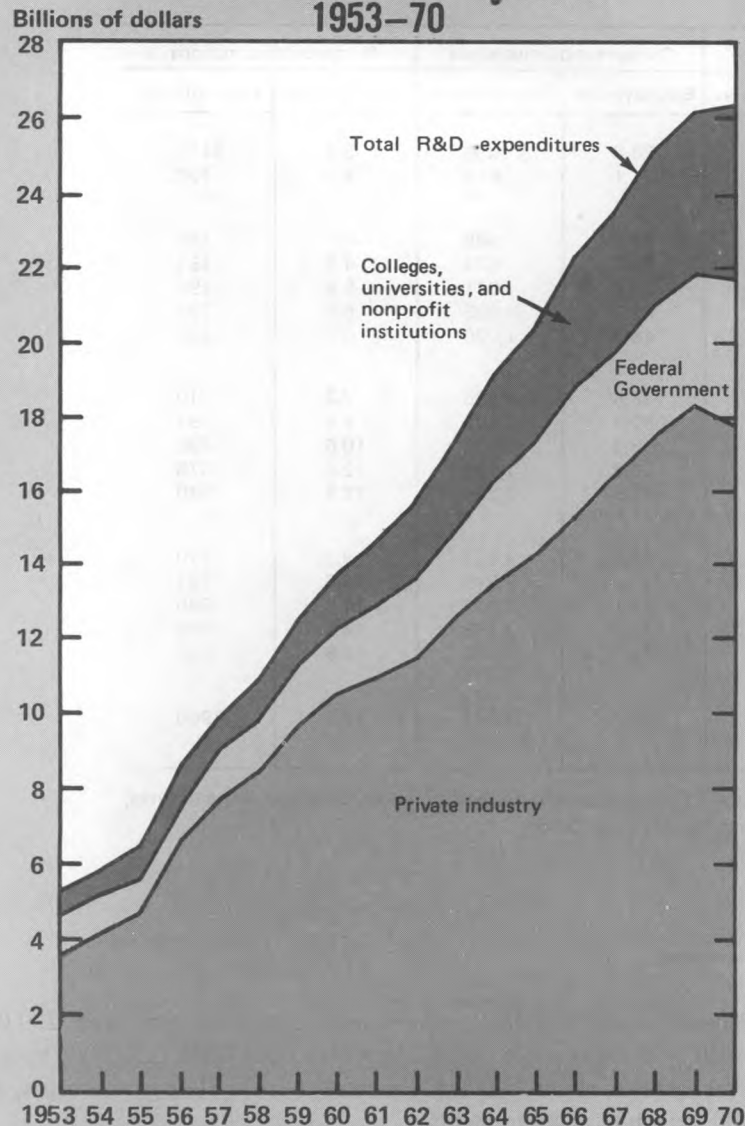
Scientists and engineers (mainly engineers) in contract construction increased primarily because of expansion in the nonresidential sectors of the industry, which include highways, schools, and sewage plants. Although growth in engineering and architectural services reflects demand by all user industries, these services have been particularly responsive to nonresidential construction activity. Increases in miscellaneous business services were due, for the most part, to the growth of independent R&D labs.

Government

Federal, State, and local governments combined employed 239,000 scientists and engineers in 1970. More than three-fifths (150,000) were in Federal agencies, about 54,000 (23 percent) were in State governments, and 34,000 were in local governments.

The number of scientists and engineers employed at all levels of

**Chart 4. RESEARCH AND DEVELOPMENT
EXPENDITURES, BY SECTOR,
1953-70**



Source: National Science Foundation

government increased at an average annual rate of 4.1 percent between 1950 and 1970—a slower rate of growth than the 5.4 percent recorded for the entire economy. In the government sector, growth was faster between 1950 and 1960 (4.7 percent per year) than between 1960 and 1970 (3.5 percent a year).

Federal Government. Between 1950 and 1970, federally employed scientists and engineers showed an average annual growth of 4.7 percent, increasing from 60,000 to 150,000. This growth rate was less than that shown for the entire economy, and scientists and engineers employed by the Federal Government fell from 10.7 percent to 9.5 percent of the total. As with the total of scientists and engineers, employment growth was faster in the first half of the period (average annual growth of 5.1 percent) than in the second half (4.4 percent a year). Growth was primarily related to expansion of defense and space programs. Over 45 percent of the increase in science and engineering employment was accounted for by increases in R&D activities. Employment of R&D scientists and engineers grew from about 27,000 in 1950 to almost 75,000 in 1967, and declined to 70,000 in 1970. Federal R&D scientists and engineers represented almost 95 percent of those in R&D in all sectors of government.

State Government. Employment of scientists and engineers in State governments (excluding those in education) rose from 26,400 in 1950 to 54,300 in 1970. This represented an average increase of 3.7 percent per year—slower than in the Federal Government. As a proportion of all scientists and engineers, those in State government fell from 4.7 percent in 1950 to 3.4 percent in 1970. Increased employment of scientists and engineers primarily reflected expanding programs for highways, public works, health, natural resources, and other programs associated with an increasing population. The increase in employment of scientists and engineers in State governments, however, was not as rapid as the total growth in personnel (other than in education). Between 1960 and 1970, for example, the proportion of employees in science and engineering jobs declined from almost 3.9 percent to 3.5 percent.

Local government. Scientists and engineers employed by local governments (excluding those in education) increased from 20,000 in 1950 to 34,000 in 1970. This rate of growth—2.6 percent a year—was slower than that in both Federal and State agencies. Growth was significantly faster between 1950 and 1960 (3.4 percent a year) than between 1960 and 1970 (1.8 percent a

year). As a percent of total local government employment (except in education), scientists and engineers declined from 1.3 in 1960 to 1.1 in 1970. Slower than average growth for those workers primarily reflected the

increasing concern of local governments with health, protective services, and other programs that do not employ significant numbers of engineers and scientists.

Table 4. Scientists and engineers as a percent of total employment, by sector, selected years, 1950-70

Sector	1950	1952	1954	1956	1958	1960	1962	1964	1966	1968	1970
All sectors	1.2	1.4	1.6	1.7	2.0	2.0	2.2	2.3	2.2	2.3	2.3
Private industry	1.0	1.2	1.4	1.5	1.7	1.8	1.9	1.9	1.9	1.9	1.9
Manufacturing	1.6	2.0	2.4	2.5	3.1	3.3	3.6	3.7	3.6	3.7	3.8
Ordnance	7.0	5.8	9.9	10.5	11.3	15.5	17.8	22.4	23.0	18.5	21.8
Food	.5	.6	.7	.7	.7	.8	.9	.8	.8	.8	.9
Textiles and apparel	.3	.3	.4	.4	.4	.5	.5	.5	.7	.6	.6
Lumber and furniture	.3	.3	.4	.4	.5	.5	.6	.6	.7	.8	.9
Paper	1.4	1.6	1.8	1.9	2.2	2.3	2.6	2.6	2.6	2.7	2.8
Chemicals	6.2	6.9	7.5	8.0	9.3	9.3	9.8	10.3	10.2	9.7	10.2
Petroleum refining	4.7	5.3	5.8	6.6	7.4	8.2	9.0	9.9	9.3	8.8	8.6
Rubber	2.0	2.2	2.4	2.3	2.6	2.6	2.5	2.6	2.6	2.6	2.6
Stone, clay and glass	1.0	1.1	1.3	1.4	1.6	1.7	1.8	1.7	1.7	1.8	1.9
Primary metals	1.2	1.5	1.7	1.7	2.2	2.3	2.6	2.2	2.1	2.2	2.3
Fabricated metals	1.6	1.8	1.9	2.0	2.2	2.2	2.3	2.3	2.2	2.1	2.2
Machinery	2.8	2.8	3.3	3.2	4.2	4.2	4.7	5.0	4.3	4.7	4.8
Electrical equipment	4.5	4.8	6.1	6.2	8.6	8.1	8.5	9.1	7.7	8.1	8.4
Motor vehicles	2.2	2.4	2.6	2.6	3.5	3.1	3.3	3.6	3.7	3.6	4.2
Aircraft	9.3	8.9	11.9	13.2	16.9	22.6	23.3	25.3	20.0	20.5	24.8
Other transportation equipment	1.1	.6	.7	.7	.9	1.0	.9	.9	.9	.9	1.0
Professional and scientific instruments	4.2	4.5	5.3	5.5	6.7	7.5	8.5	8.4	8.1	7.7	8.2
Miscellaneous manufacturing	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.1
Nonmanufacturing ¹	.6	.7	.8	.8	.9	.9	.9	1.0	1.0	.9	1.0
Government	1.8	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	1.9
Federal	3.1	3.4	3.6	3.9	4.2	4.3	4.7	5.4	5.2	5.3	5.6
State	2	2	2	3.7	3.6	3.9	4.1	3.9	3.7	3.5	3.5
Local	2	2	2	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.1

¹ Total wage and salary employment for nonmanufacturing excludes agriculture. However, scientists and engineers employed in agricultural services, forestry, and fisheries (about 700 in 1970) were included in the totals for scientists and engineers used to compute the percentages.

² Wage and salary data not available for State and local governments separately prior to 1955.

NOTE: Ratios based on employment of scientists and engineers, by sector, to total wage and salary employment by sector. For State and local governments, employment other than education, rather than total employment, was used to compute percentages. Comparable data for colleges are not available.

SOURCE: Bureau of Labor Statistics.

Colleges and universities

In 1970, 228,000 scientists and engineers were employed by colleges and universities, up from about 50,000 in 1950. Between 1950 and 1970, employment in this sector increased at an average annual rate of 7.9 percent, faster than in any other sector except in nonprofit institutions, where employment increased at the same rate. As a result, scientists and engineers in colleges and universities increased from 9 percent of all scientists and engineers in 1950 to 10 percent in 1960, and to over 14 percent in 1970. Over three-fifths of the growth of employment of scientists and engineers took place over the 1960-70 period. These increases reflected both greatly expanded enrollments and degrees in science and engineering—especially at the graduate levels—and substantial increases in the amount of R&D performed at these institutions. (See table 5 and chart 4.) In addition, employment grew because the estimates for scientists and engineers include graduate students working part time as scientists and engineers; these workers increased considerably over the 1950-70 period.

The number of scientists and engineers in colleges and universities and their associated Federally Funded Research and Development Centers who spent the greater proportion of their time in R&D activities increased from about 23,000 in 1950 to 75,000 in 1970, an average annual increase of 6.2 percent. The proportion of scientists and engineers in R&D declined from 46 percent in 1950 to 33 percent in 1970. The college and university sector was the only major sector of the economy in which growth of R&D employment was slower than growth of all other science and engineering employment.

Nonprofit institutions

Employment of scientists and engineers in nonprofit institutions increased from 3,600 in 1950 to 16,400 in 1970, an average increase of 7.9 percent per year. Employment in this sector reached a high of 17,500 in 1968, with subsequent declines attributable to reductions in Federal R&D funding. Over 80 percent of the scientists and engineers in this sector were engaged in R&D—by far the largest proportion among the sectors.

Table 5. Earned degrees in natural sciences and engineering, 1950-70

(In thousands)

Year	Natural sciences			Engineering		
	Total	Bachelor's degree	Advanced degrees	Total	Bachelor's degree	Advanced degrees
1950	100.1	87.4	15.4	57.4	52.2	5.0
1951	136.3	117.5	18.8	46.8	41.5	5.3
1952	114.1	96.3	17.8	35.2	30.5	4.7
1953	101.4	84.9	16.5	28.3	24.2	4.1
1954	97.7	81.5	16.2	27.1	22.3	4.8
1955	97.3	80.4	16.9	27.7	22.6	5.1
1956	103.0	86.1	16.9	31.6	26.3	5.3
1957	113.9	96.0	17.9	37.0	31.2	5.8
1958	124.1	104.6	19.5	41.6	35.2	6.4
1959	133.2	111.7	21.5	45.5	38.0	7.5
1960	137.6	114.7	22.9	45.6	37.7	7.9
1961	139.0	113.7	25.3	44.8	35.7	9.1
1962	143.5	115.6	27.9	44.7	34.6	10.1
1963	150.3	119.9	30.4	44.3	33.3	11.0
1964	162.8	128.7	34.1	47.5	35.0	12.5
1965	175.2	136.8	38.4	50.8	36.6	14.2
1966	181.2	138.5	42.7	51.6	35.6	16.0
1967	190.9	144.4	46.5	52.4	35.9	16.5
1968	226.3	155.9	70.4	55.5	37.4	18.1
1969	227.7	174.0	53.7	59.9	41.2	17.8
1970	240.1	184.1	56.0	63.8	44.5	19.3

SOURCE: Office of Education, U.S. Department of Health, Education, and Welfare.

Employment growth in this sector is largely attributable to federally funded R&D projects carried out by these institutions. Over two-thirds of all R&D carried out in this sector in 1970 was financed by the Federal Government.³

³ *National Pattern of R&D Resources, 1953-1972*, NSF 72-300 (National Science Foundation, 1971), table B-1.

Employment by Occupation

Engineers outnumbered scientists by more than 2 to 1 in 1970. Of the estimated 1.6 million scientists and engineers employed in 1970, about 1.1 million (69 percent) were engineers and almost 500,000 (31 percent) were scientists. (See table 6.)

The mix between engineers and scientists, however, varied widely by industry. In colleges and universities, for example, there were four scientists for every engineer in 1970. In manufacturing, there were four engineers for every scientist. However, scientists outnumbered engineers in the chemicals industry.

Over the 1950-70 period, employment of scientists increased by 234 percent, or at an average annual rate of 6.2 percent, while employment of engineers increased by 169 percent, or by 5.1 percent a year. (See chart 5.) The faster growth recorded for scientists reflected their greater concentration in R&D activities and faster than average growth in those industries and sectors that employ relatively more scientists than engineers; for example, colleges and universities.

Engineers

Engineering employment more than doubled between 1950 and 1970, from 408,000 to 1,098,000, representing an average annual growth of 5.1 percent. Growth was significantly faster between 1950 and 1960 (7.0 percent a year) than between 1960 and 1970 (3.3 percent a year). Employment growth slowed significantly between 1965 and 1970, averaging only 2.6 percent a year. However, the effects on engineering employment of the winding down of the Vietnam conflict and of cutbacks in R&D were not yet fully reflected in the 1970 estimates since the annual estimates refer to January or "early-in-year" employment. (See appendix B.)

Manufacturing industries employed about 53 percent of all engineers in 1970 (586,000), and employment of engineers in these industries increased

Table 6. Components of science and engineering employment, 1950-70

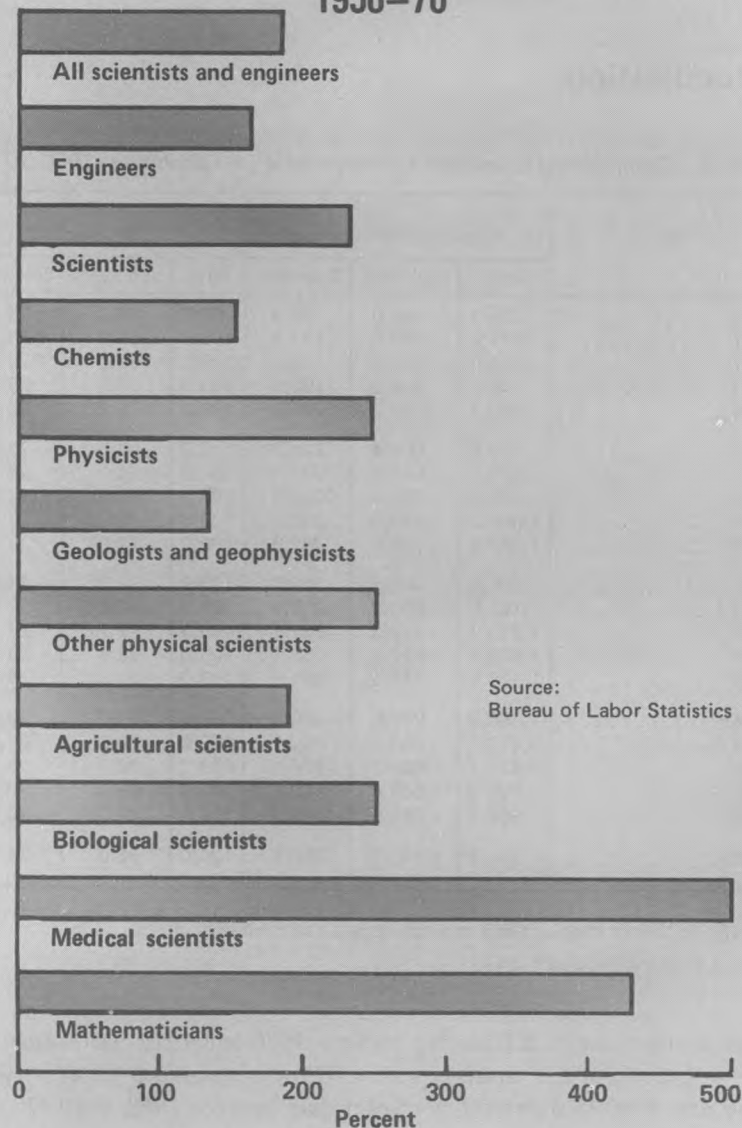
Year	Number (in thousands)			Percent		
	Total	Engineers	Scientists	Total	Engineers	Scientists
1950	556.7	408.0	148.7	100.0	73.3	26.7
1951	611.8	450.6	161.2	100.0	73.7	26.3
1952	685.9	507.5	178.4	100.0	74.0	26.0
1953	748.7	556.2	192.5	100.0	74.3	25.7
1954	783.7	581.2	202.6	100.0	74.2	25.8
1955	812.6	601.4	211.2	100.0	74.0	26.0
1956	873.7	646.4	227.3	100.0	74.0	26.0
1957	958.9	707.9	251.0	100.0	73.8	26.2
1958	1,001.2	730.3	270.9	100.0	72.9	27.1
1959	1,057.9	768.0	289.9	100.0	72.6	27.4
1960	1,104.0	801.1	302.9	100.0	72.6	27.4
1961	1,151.5	833.3	318.2	100.0	72.4	27.6
1962	1,210.3	873.2	337.1	100.0	72.1	27.9
1963	1,280.8	922.7	358.1	100.0	72.0	28.0
1964	1,327.0	945.5	381.5	100.0	71.3	28.7
1965	1,366.3	969.8	369.4	100.0	71.0	29.0
1966	1,417.5	999.6	417.9	100.0	70.5	29.5
1967	1,476.7	1,037.7	439.0	100.0	70.3	29.7
1968	1,525.0	1,062.4	462.6	100.0	69.7	30.3
1969	1,567.7	1,085.0	482.7	100.0	69.2	30.8
1970	1,594.7	1,098.2	496.5	100.0	68.9	31.1

NOTE: Detail may not add to totals because of rounding.

SOURCE: Bureau of Labor Statistics.

at an average rate of 5.7 percent between 1950 and 1970—faster than the rate of growth of the entire economy. Growth was much faster between 1950 and 1960 (8.6 percent per year) than between 1960 and 1970 (2.9

**Chart 5. GROWTH IN SCIENCE AND
ENGINEERING EMPLOYMENT, BY OCCUPATION,
1950-70**



percent a year). Between 1950 and 1960, increased employment of engineers in manufacturing accounted for about 63 percent of the total increase in engineering employment in the economy. However, between 1960 and 1970, manufacturing only accounted for about half of the total growth. The relatively slow growth in the latter part of the 1960's primarily reflected cutbacks associated with the Vietnam conflict and reduced space exploration activities. Between 1969 and 1970, for example, employment of engineers in industries heavily involved in these activities—ordnance, aircraft, and fabricated metals—declined by over 15,000.

Nonmanufacturing industries employed almost 312,000 engineers in 1970, or over 28 percent of the Nation's total. Between 1950 and 1970, employment of engineers in these industries increased at an average annual rate of 4.6 percent, a slower rate of growth than in manufacturing or in the economy as a whole. However, growth was more consistent than in manufacturing; over the 1950's engineering employment in nonmanufacturing showed an average annual increase of 5.7 percent, and over the 1960's 3.5 percent. Two industries—engineering and architectural service firms, and miscellaneous business services—employed slightly under half of the engineers in nonmanufacturing in 1970, and accounted for slightly over half of the growth in this sector. Within nonmanufacturing, only the railroad industry showed a consistent downward trend in engineering employment.

Employment of engineers in government increased by over 77,000 between 1950 and 1970, from 75,400 to 152,700. This represents a slower than average rate of growth (3.6 percent per year), and the proportion of engineers employed by government declined from 18.5 percent in 1950 to 13.9 percent in 1970. About two-thirds of the employment growth took place in the Federal Government.

Nonprofit organizations and college and universities showed above-average rates of growth. Employment of engineers in colleges and universities increased by more than 30,000, representing an average rate of growth of 6.8 percent a year. In nonprofit organizations, engineering employment climbed from 1,100 in 1950 to 5,700 in 1970, or by 8.6 percent a year.

Approximately 342,000 engineers—31 percent of all engineers—were engaged in R&D in 1970. In 1950, only 94,000 engineers—23 percent of the total—were in R&D. Thus, engineers engaged in R&D increased at a faster average annual rate (6.7 percent) than did total engineering employment (5.1 percent). Growth was about three times faster between 1950 and 1960 (average annual increase of 10.2 percent) than between 1960 and 1970

(average annual increase of 3.2 percent). Between 1965 and 1970, employment of R&D engineers showed an average increase of less than 1 percent per year. The number of engineers in R&D increased every year from 1950 to 1968. Between 1968 and 1970, however, employment dropped by over 17,000, primarily reflecting cutbacks in defense-related activities. (See chart 6.)

Scientists

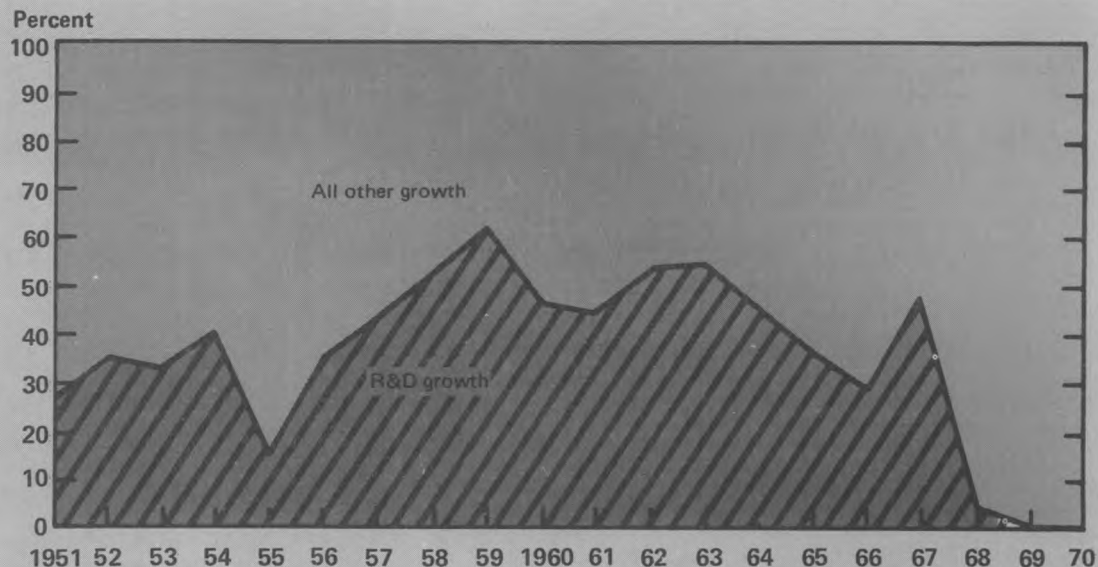
Scientists numbered 496,000 in 1970, an increase of 234 percent over 1950, representing an average annual increase of 6.3 percent. Over the 1950-60 period, employment grew on the average by 7.4 percent per year; over the 1960's employment grew by 5.1 percent per year. Rapid increases in college and university employment of scientists explain in large part why scientific employment increased at a faster rate than engineering employment. Excluding colleges and universities, scientific employment grew at an average annual rate of 5.3 percent over the 1950-70 period, only slightly faster than the 5.1 percent recorded for engineers.

Almost two-fifths of all scientists employed in 1970 were in colleges and universities. Employment of scientists in this sector increased from 39,100 in 1950 (29 percent of all scientists) to 186,500 in 1970, an average annual increase of 8.1 percent—substantially above the average for the entire economy. Over two-fifths of the total growth in scientific employment over 1950-70 period took place in colleges and universities.

Manufacturing industries accounted for about 27 percent of the increase in scientific employment, with the chemicals industry contributing over two-fifths of this growth. Large increases also occurred in the Federal Government and miscellaneous business services.

Employment of scientists primarily engaged in research and development peaked at 195,700 in 1967, up from 63,600 in 1950. In 1970, 194,000 scientists were engaged in R&D activities. Declines between 1967 and 1970 occurred in colleges and universities, manufacturing, the Federal Government, and nonprofit organizations. R&D employment in nonmanufacturing increased somewhat. Despite the rapid growth in numbers the proportion of scientists primarily engaged in R&D declined from 43 percent in 1950 to 39 percent in 1970. However, over the 1950-70 period, about 37

**Chart 6. CONTRIBUTION OF
R&D EMPLOYMENT TO
GROWTH OF ENGINEERING
EMPLOYMENT, 1951-70**



Note: Employment of engineers in R&D declined in 1969 and 1970. Thus, R&D employment made no contribution to total engineering employment growth in those years.

Source: Bureau of Labor Statistics

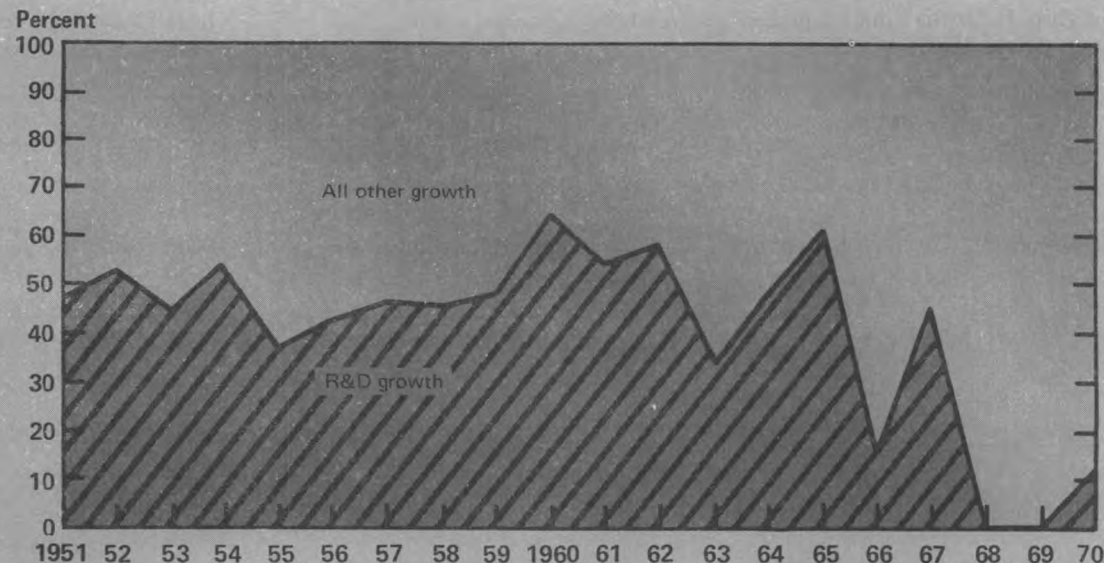
percent of the growth in employment of scientists can be attributed to increasing R&D activities, primarily resulting from increased Federal funds. The amount of growth attributable to R&D varied from year to year, however. (See chart 7.) About three-fifths of all scientists in R&D in 1970 were employed in only three areas—colleges and universities (29.8 percent), the chemicals industry (16.9 percent), and the Federal Government (12.8 percent). Other industries employing significant proportions of R&D scientists in 1970 were miscellaneous business services (8.7 percent), electrical equipment (4.2 percent), aircraft and parts (2.5 percent), and ordnance (2.1 percent).

Chemists constitute the largest natural science occupation, 133,000, or more than one-fourth of all scientists in 1970. (See tables 7 and 8.) Employment of chemists, however, grew more slowly (4.8 percent per year) than the average for all scientists combined. About 70 percent of all chemists were in the private sector of the economy, with almost half of these in the chemicals industry.

Geologists and geophysicists represent the smallest scientific occupation for which separate estimates were developed. This occupation also showed the slowest overall rate of growth over the 1950-70 period, increasing from 13,000 in 1950 to 30,600 in 1970, an average growth of 4.4 percent a year. Over 40 percent of all geologists and geophysicists were concentrated in the mining industry. Another 30 percent were in colleges and universities in 1970, where employment of these scientists increased at an average annual rate of 10.7 percent between 1950 and 1970.

Medical scientists showed the fastest growth of any scientific occupation—9.4 percent a year, increasing from almost 9,000 in 1950 to 53,000 in 1970. As a proportion of total scientists, medical scientists increased from 5.9 percent in 1950 to 10.7 percent in 1970. Colleges and universities accounted for nearly 80 percent of this growth and employed almost three-fourths of all medical scientists in 1970. Within manufacturing, only the chemicals industry employed significant numbers of these scientists (4,100). About 10 percent, or 5,500, were employed in government.

**Chart 7. CONTRIBUTION OF
R&D EMPLOYMENT TO GROWTH
OF SCIENCE EMPLOYMENT,
1951-70**



Note: Employment of scientists in R&D declined in 1968 and 1969. Thus, R&D employment made no contribution to total employment growth in those years.

Source: Bureau of Labor Statistics

Table 7. Estimated employment of scientists, by occupational group, 1950-70

(In thousands)

Year	All scientists	Physical scientists					Mathe- maticians	Life scientists			
		Total	Chemists	Physicists	Geologists and geo- physicists	Other		Total	Agricul- tural	Bio- logical	Medical
1950	148.7	89.1	51.9	14.0	13.0	10.2	13.8	45.6	16.9	19.9	8.8
1951	161.2	97.6	56.8	15.2	13.3	12.3	14.7	48.9	18.2	21.2	9.5
1952	178.4	108.6	62.9	16.7	13.8	15.2	16.1	53.7	20.4	23.0	10.3
1953	192.5	118.3	67.9	18.0	15.5	16.9	17.7	56.6	21.5	24.1	11.0
1954	202.6	124.2	71.6	19.1	16.1	17.4	19.5	58.9	21.7	25.5	11.7
1955	211.1	128.3	73.9	19.9	17.1	17.4	21.1	61.8	22.2	27.3	12.3
1956	227.3	137.0	79.2	21.4	17.9	18.5	23.1	67.3	23.7	29.9	13.7
1957	251.0	148.4	84.5	23.7	19.6	20.6	26.1	76.7	25.6	34.8	16.3
1958	270.9	157.4	90.6	26.1	20.1	20.6	28.5	84.9	27.3	39.0	18.6
1959	289.9	166.2	95.4	28.6	20.9	21.3	31.7	92.0	29.5	42.5	20.0
1960	302.9	172.0	99.7	29.8	20.4	22.1	34.2	96.7	30.4	44.3	21.5
1961	318.2	178.8	102.8	31.6	20.6	23.8	36.3	103.3	32.3	46.9	24.1
1962	337.1	186.0	106.8	33.9	21.1	24.2	39.8	111.5	35.3	49.0	27.2
1963	358.1	194.1	110.0	36.3	22.5	25.3	43.6	120.3	38.5	51.3	30.5
1964	381.5	203.7	115.0	39.0	23.4	26.3	47.2	130.5	41.5	54.4	34.6
1965	396.4	209.2	116.7	39.9	25.5	27.1	50.3	136.9	44.1	55.6	37.2
1966	417.9	217.1	119.6	42.1	26.2	29.1	53.9	147.0	46.9	56.9	43.2
1967	439.0	225.8	122.8	44.4	28.4	30.2	61.9	151.1	46.5	62.6	42.0
1968	462.6	236.1	127.3	46.2	29.0	33.6	67.1	159.4	47.2	65.8	46.4
1969	482.7	243.8	131.0	48.4	29.4	35.0	73.0	165.9	47.5	67.7	50.7
1970	496.5	248.8	132.9	49.1	30.6	36.2	74.3	173.4	49.3	71.1	53.0

NOTE: Detail may not add to totals because of rounding.

SOURCE: Bureau of Labor Statistics.

Employment of *mathematicians* grew much faster than the average for all scientists, increasing from almost 14,000 in 1950 to 74,300 in 1970—an average annual increase of 8.8 percent. Although mathematicians are employed in nearly every industry, about 40 percent of the growth took place in colleges and universities, which employed about 40 percent of these workers in 1970. Within manufacturing, significant numbers were in ordnance, chemicals, machinery (including computer manufacturing), electrical equipment, and aircraft and parts industries.

The number of employed *physicists* grew at an average annual rate of 6.5 percent between 1950 and 1970, from 14,000 to 49,100. Almost 44

percent of all physicists were in colleges and universities in 1970, and growth in this sector accounted for about 45 percent of total growth in this occupation. Significant increases also occurred in industries manufacturing ordnance, chemicals, electrical equipment, aircraft and parts, and instruments. Employment of physicists in nonmanufacturing increased almost 4 times over the 1950-70 period, primarily in miscellaneous business and engineering and architectural services.

Employment of *agricultural scientists* grew at a slower than average rate—5.5 percent per year. These occupations were heavily concentrated in government and colleges and universities. In 1970, the Federal Government

Table 8. Percent distribution of scientists, by occupational group, 1950-70

Year	All scientists	Physical scientists					Mathematicians	Life scientists			
		Total	Chemists	Physicists	Geologists and geo-physicists	Other		Total	Agricultural	Biological	Medical
1950	100.0	59.9	34.9	9.4	8.7	6.9	9.3	30.7	11.4	13.4	5.9
1951	100.0	60.5	35.2	9.4	8.3	7.6	9.1	30.3	11.3	13.2	5.9
1952	100.0	60.9	35.3	9.4	7.7	8.5	9.0	30.1	11.4	12.9	5.8
1953	100.0	61.5	35.3	9.4	8.1	8.8	9.2	29.4	11.2	12.5	5.7
1954	100.0	61.3	35.3	9.4	7.9	8.6	9.6	29.0	10.7	12.6	5.8
1955	100.0	60.8	35.0	9.4	8.1	8.2	10.0	29.3	10.5	12.9	5.8
1956	100.0	60.3	34.8	9.4	7.9	8.1	10.2	29.6	10.4	13.2	6.0
1957	100.0	59.1	33.7	9.4	7.8	8.2	10.4	30.5	10.2	13.9	6.5
1958	100.0	58.1	33.4	9.6	7.4	7.6	10.5	31.3	10.1	14.4	6.9
1959	100.0	57.3	32.9	9.9	7.2	7.3	10.9	31.7	10.2	14.7	6.9
1960	100.0	56.8	32.9	9.8	6.7	7.3	11.2	31.9	10.0	14.8	7.1
1961	100.0	56.2	32.3	9.9	6.5	7.5	11.4	32.5	10.2	14.7	7.6
1962	100.0	55.2	31.7	10.0	6.3	7.2	11.8	33.1	10.5	14.5	8.1
1963	100.0	54.2	30.7	10.1	6.3	7.1	12.2	33.6	10.8	14.3	8.5
1964	100.0	53.4	30.1	10.2	6.1	6.9	12.4	34.2	10.9	14.3	9.1
1965	100.0	52.8	29.4	10.1	6.4	6.8	12.7	34.5	11.1	14.0	9.4
1966	100.0	52.0	28.6	10.1	6.3	7.0	12.9	35.2	11.2	13.6	10.4
1967	100.0	51.4	28.0	10.1	6.5	6.9	14.1	34.4	10.6	14.3	9.6
1968	100.0	51.0	27.5	10.0	6.3	7.3	14.5	34.5	10.2	14.2	10.0
1969	100.0	50.5	27.1	10.0	6.1	7.3	15.1	34.4	9.8	14.0	10.5
1970	100.0	50.1	26.8	9.9	6.2	7.3	15.0	34.9	9.9	14.3	10.7

NOTE: Detail may not add to totals because of rounding.

SOURCE: Bureau of Labor Statistics.

employed over 31 percent of these workers, while almost 16 percent were employed in State and local governments. Over 40 percent were in colleges and universities. Governments and colleges and universities accounted for almost 90 percent of the growth over the 1950-70 period. The rate of growth, however, was significantly faster in colleges and universities than in government.

Biological scientists made up the largest of the life science occupations and the third largest group of scientists after chemists and mathematicians. Employment of biologists grew at a slightly faster rate than the average for

all scientists (6.6 percent per year), reaching 71,000 in 1970. Over 80 percent were employed in colleges and universities (55 percent) and government agencies (25 percent); these sectors accounted for about 80 percent of the growth over the period. Employment growth, however, was greater in colleges and universities than in government. Employment of biological scientists in the chemicals industry increased by more than 2-1/2 times between 1950 and 1970, when employment reached 6,700. In nonprofit organizations, employment of biological scientists increased by 400 percent, from 600 to 3,000, between 1950 and 1970.

Appendix A: Technical Tables

Appendix

Appendix A. Detailed Tables

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Table A-1. Estimated employment of scientists and engineers, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	556.7	611.8	685.9	748.7	783.7	812.6	873.7	958.9	1001.2	1057.9
PRIVATE INDUSTRY.....	396.3	439.4	500.1	557.5	590.0	610.1	656.3	719.6	743.5	778.3
MANUFACTURING.....	245.2	275.9	326.8	371.0	393.2	399.6	427.3	478.1	496.5	521.4
ORDNANCE.....	2.1	3.0	10.4	16.2	16.1	14.8	14.6	18.1	17.8	29.2
FOOD.....	9.7	10.6	11.2	11.6	12.1	12.4	12.8	13.1	13.6	14.2
TEXTILES AND APPAREL.....	3.1	3.4	3.5	3.6	3.6	3.8	3.8	3.9	3.9	4.0
LUMBER AND FURNITURE.....	2.2	2.5	2.6	2.7	2.7	2.7	2.9	3.1	3.1	3.2
PAPER.....	5.6	6.4	6.9	7.4	7.7	8.3	9.0	9.6	10.0	10.3
CHEMICALS.....	39.4	45.3	50.4	56.1	60.2	60.4	63.3	68.6	73.9	74.5
PETROLEUM REFINING.....	8.7	9.5	10.7	11.7	12.5	13.0	13.2	13.3	14.0	14.0
RUBBER.....	6.1	6.6	7.3	7.9	8.0	8.1	8.5	9.0	9.1	9.4
STONE, CLAY, AND GLASS.....	5.4	6.0	6.4	6.9	7.1	7.5	8.2	8.6	9.1	9.5
PRIMARY METALS.....	15.4	17.6	19.2	20.7	21.3	20.4	22.3	24.9	25.8	26.7
FABRICATED METALS.....	15.5	17.7	18.9	20.2	20.4	21.0	22.7	24.0	24.1	24.3
MACHINERY.....	33.6	38.0	43.0	45.5	47.4	47.5	49.9	55.9	56.5	59.1
ELECTRICAL EQUIPMENT.....	44.9	48.5	57.3	66.5	72.6	74.9	82.1	97.0	107.4	108.7
MOTOR VEHICLES.....	17.6	18.5	18.8	19.2	19.7	19.8	20.6	20.5	21.0	21.4
AIRCRAFT.....	17.6	22.4	37.7	50.0	55.7	58.8	65.3	77.7	74.6	78.0
OTHER TRANSPORTATION EQUIPMENT.....	2.8	2.8	3.2	3.7	3.6	3.3	3.7	4.3	4.7	4.7
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	10.5	12.0	14.0	15.7	17.0	17.3	18.6	20.5	21.8	24.0
MISCELLANEOUS MANUFACTURING.....	4.9	5.1	5.3	5.4	5.5	5.6	5.8	6.0	6.1	6.2
NONMANUFACTURING.....	151.1	163.5	173.3	186.5	196.8	210.5	229.0	241.5	247.0	256.9
PETROLEUM EXTRACTION.....	14.5	14.5	15.1	17.5	18.7	20.0	21.5	24.0	24.5	24.4
MINING.....	5.8	5.8	6.1	6.4	6.1	5.9	6.1	6.4	6.8	6.9
CONSTRUCTION.....	24.6	29.3	31.4	33.5	33.8	37.3	39.5	41.0	42.1	43.6
RAILROADS.....	5.3	5.4	5.4	5.4	5.3	5.3	5.3	5.2	5.1	5.0
OTHER TRANSPORTATION.....	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.6
TELECOMMUNICATIONS.....	6.3	6.6	7.2	7.7	8.0	8.2	8.6	8.9	8.9	9.1
RADIO AND TV.....	1.5	1.8	1.9	1.9	2.5	3.8	4.0	4.1	4.3	4.4
PUBLIC UTILITIES.....	10.7	11.8	11.8	13.5	15.1	16.8	17.3	19.0	20.3	20.8
MISCELLANEOUS BUSINESS SERVICES.....	23.1	24.4	25.8	27.1	28.5	29.8	32.3	34.6	37.3	41.9
MEDICAL AND DENTAL LABORATORIES.....	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.9	0.9	1.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	41.3	45.4	49.3	53.4	57.5	61.3	71.0	74.6	73.2	74.8
OTHER NONMANUFACTURING.....	14.0	14.3	15.0	15.6	16.6	17.3	18.4	18.6	19.3	20.4
GOVERNMENT.....	106.5	119.5	132.1	135.3	132.9	135.7	142.4	151.3	155.4	165.0
FEDERAL.....	59.7	70.7	82.2	84.9	79.7	81.5	85.4	90.1	91.7	97.7
STATE.....	26.4	27.8	29.5	29.4	31.5	31.5	33.4	35.3	36.7	39.3
LOCAL.....	20.4	21.0	20.4	21.0	21.7	22.7	23.6	25.9	27.0	28.0
COLLEGES AND UNIVERSITIES.....	50.3	49.2	49.4	51.2	55.8	61.2	69.4	81.5	95.3	106.7
NONPROFIT INSTITUTIONS.....	3.6	3.7	4.3	4.7	5.0	5.6	5.6	6.5	7.0	7.9

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
1104.0	1151.5	1210.3	1280.8	1327.0	1366.3	1417.5	1476.7	1525.0	1567.7	1594.7	..ALL SECTORS
812.0	842.2	878.3	925.2	946.6	968.0	1004.2	1044.2	1069.8	1100.2	1111.2	..PRIVATE INDUSTRY
550.1	577.1	603.0	638.1	643.7	658.3	681.5	714.5	729.6	734.4	733.2	MANUFACTURING
34.1	40.6	47.0	52.8	54.6	58.5	59.9	60.9	62.4	63.2	52.7	ORDNANCE
14.8	15.4	14.9	15.3	14.1	14.1	14.0	14.0	14.4	14.7	15.2	FOOD
4.2	4.0	4.1	4.3	5.1	5.8	6.3	5.6	5.8	5.8	5.9	TEXTILES AND APPAREL
3.3	3.4	3.4	3.4	3.5	3.7	4.0	4.3	4.8	5.0	5.0	LUMBER AND FURNITURE
10.9	11.8	12.6	12.6	12.8	13.0	13.3	14.0	14.6	14.7	15.0	PAPER
77.3	79.4	83.1	85.0	90.8	91.8	97.7	99.6	100.2	103.5	107.3	CHEMICALS
14.6	14.2	14.4	14.6	14.8	14.0	13.8	14.7	13.2	12.7	13.2	PETROLEUM REFINING
9.7	10.2	10.3	11.1	11.5	12.2	13.5	14.1	14.5	14.2	15.0	RUBBER
10.0	10.2	10.5	10.7	10.5	10.5	11.2	12.0	11.7	12.1	12.3	STONE, CLAY, AND GLASS
28.2	30.3	30.3	28.7	27.0	27.1	27.7	29.2	28.5	30.9	29.8	PRIMARY METALS
25.2	25.9	26.0	27.0	27.3	28.9	30.2	31.8	29.0	31.2	30.2	FABRICATED METALS
62.6	67.2	70.4	75.7	79.9	80.0	81.6	88.6	91.3	89.8	94.1	MACHINERY
118.9	128.5	133.8	146.1	141.0	142.2	146.2	152.5	160.4	158.8	161.8	ELECTRICAL EQUIPMENT
22.2	22.5	22.8	24.6	27.3	29.6	32.1	32.4	31.8	32.4	33.9	MOTOR VEHICLES
76.3	74.1	77.9	83.0	80.9	82.3	83.3	92.8	99.9	98.2	91.8	AIRCRAFT
4.9	4.8	4.8	5.0	4.9	5.2	5.5	5.9	5.8	5.4	6.1	OTHER TRANSPORTATION EQUIPMENT
26.6	28.5	30.4	31.5	31.2	32.8	34.8	35.8	35.4	35.7	37.5	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
6.3	6.1	6.3	6.7	6.5	6.5	6.4	6.3	5.9	6.2	6.4	MISCELLANEOUS MANUFACTURING
261.9	265.1	275.3	287.1	302.9	309.7	322.7	329.7	340.2	365.8	378.0	NONMANUFACTURING
23.3	23.3	22.9	23.8	23.8	24.2	23.9	24.6	25.0	25.8	24.7	PETROLEUM EXTRACTION
6.7	6.8	6.4	6.8	6.5	6.9	7.2	7.1	7.1	7.6	7.8	MINING
45.0	45.5	46.9	48.2	47.4	47.1	51.6	48.1	47.2	53.6	55.2	CONSTRUCTION
5.0	4.9	4.8	4.5	4.9	4.4	4.3	4.6	4.4	4.4	4.4	RAILROADS
4.7	5.0	5.0	4.8	5.0	5.4	5.4	5.3	5.4	5.6	5.8	OTHER TRANSPORTATION
9.2	9.4	9.7	9.8	10.5	11.8	12.1	12.9	15.0	15.7	16.1	TELECOMMUNICATIONS
4.4	4.5	4.5	4.5	4.7	5.1	5.1	5.3	5.6	5.8	6.0	RADIO AND TV
21.6	22.9	24.0	24.6	25.3	26.7	27.1	27.0	27.5	28.3	30.1	PUBLIC UTILITIES
44.3	45.7	47.7	53.1	56.0	55.1	57.0	61.1	65.9	74.5	76.1	MISCELLANEOUS BUSINESS SERVICES
1.0	1.0	1.1	1.1	1.2	1.3	1.4	1.5	1.5	1.4	1.5	MEDICAL AND DENTAL LABORATORIES
75.6	74.4	77.3	79.7	87.9	89.2	93.0	96.2	97.4	101.9	107.6	ENGINEERING AND ARCHITECTURAL SERVICES
21.0	21.7	25.0	26.2	29.7	32.5	34.7	36.0	38.2	41.1	42.7	OTHER NONMANUFACTURING
168.5	176.8	188.6	199.3	207.0	214.8	218.5	221.0	231.9	233.0	238.9	..GOVERNMENT
97.9	102.2	110.6	120.0	126.4	132.1	134.2	136.0	145.4	146.3	150.4	FEDERAL
42.0	44.8	47.4	47.9	48.5	49.7	50.4	51.2	52.8	53.2	54.3	STATE
28.6	29.8	30.6	31.4	32.1	33.0	33.7	33.8	33.7	33.5	34.2	LOCAL
114.8	122.5	130.9	141.6	158.2	167.8	178.1	194.3	205.8	217.1	228.2	..COLLEGES AND UNIVERSITIES
8.7	10.0	12.5	14.7	15.2	15.7	16.7	17.2	17.5	17.4	16.4	..NONPROFIT INSTITUTIONS

Table A-2. Percent distribution: Estimated employment of scientists and engineers, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	71.2	71.8	72.9	74.5	75.3	75.1	75.1	75.0	74.3	73.6
MANUFACTURING.....	44.0	45.1	47.6	49.6	50.2	49.2	48.9	49.9	49.6	49.3
ORDNANCE.....	0.4	0.5	1.5	2.2	2.1	1.8	1.7	1.9	1.8	2.8
FOOD.....	1.7	1.7	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.3
TEXTILES AND APPAREL.....	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
LUMBER AND FURNITURE.....	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
PAPER.....	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CHEMICALS.....	7.1	7.4	7.3	7.5	7.7	7.4	7.2	7.2	7.4	7.0
PETROLEUM REFINING.....	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.4	1.4	1.3
RUBBER.....	1.1	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9
STONE, CLAY, AND GLASS.....	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
PRIMARY METALS.....	2.8	2.9	2.8	2.8	2.7	2.5	2.6	2.6	2.6	2.5
FABRICATED METALS.....	2.8	2.9	2.8	2.7	2.6	2.6	2.6	2.5	2.4	2.3
MACHINERY.....	6.0	6.2	6.3	6.1	6.0	5.8	5.7	5.8	5.6	5.6
ELECTRICAL EQUIPMENT.....	8.1	7.9	8.4	8.9	9.3	9.2	9.4	10.1	10.7	10.3
MOTOR VEHICLES.....	3.2	3.0	2.7	2.6	2.5	2.4	2.4	2.1	2.1	2.0
AIRCRAFT.....	3.2	3.7	5.5	6.7	7.1	7.2	7.5	8.1	7.5	7.4
OTHER TRANSPORTATION EQUIPMENT.....	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.4
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	1.9	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.2	2.3
MISCELLANEOUS MANUFACTURING.....	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6
NONMANUFACTURING.....	27.1	26.7	25.3	24.9	25.1	25.9	26.2	25.2	24.7	24.3
PETROLEUM EXTRACTION.....	2.6	2.4	2.2	2.3	2.4	2.5	2.5	2.5	2.4	2.3
MINING.....	1.0	0.9	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.7
CONSTRUCTION.....	4.4	4.8	4.6	4.5	4.3	4.6	4.5	4.3	4.2	4.1
RAILROADS.....	1.0	0.9	0.8	0.7	0.7	0.7	0.6	0.5	0.5	0.5
OTHER TRANSPORTATION.....	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
TELECOMMUNICATIONS.....	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
RADIO AND TV.....	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.4	0.4	0.4
PUBLIC UTILITIES.....	1.9	1.9	1.7	1.8	1.9	2.1	2.0	2.0	2.0	2.0
MISCELLANEOUS BUSINESS SERVICES.....	4.1	4.0	3.8	3.6	3.6	3.7	3.7	3.6	3.7	4.0
MEDICAL AND DENTAL LABORATORIES.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ENGINEERING AND ARCHITECTURAL SERVICES.....	7.4	7.4	7.2	7.1	7.3	7.5	8.1	7.8	7.3	7.1
OTHER NONMANUFACTURING.....	2.5	2.3	2.2	2.1	2.1	2.1	2.1	1.9	1.9	1.9
GOVERNMENT.....	19.1	19.5	19.3	18.1	17.0	16.7	16.3	15.8	15.5	15.6
FEDERAL.....	10.7	11.6	12.0	11.3	10.2	10.0	9.8	9.4	9.2	9.2
STATE.....	4.7	4.5	4.3	3.9	4.0	3.9	3.8	3.7	3.7	3.7
LOCAL.....	3.7	3.4	3.0	2.8	2.8	2.8	2.7	2.7	2.7	2.6
COLLEGES AND UNIVERSITIES.....	9.0	8.0	7.2	6.8	7.1	7.5	7.9	8.5	9.5	10.1
NONPROFIT INSTITUTIONS.....	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.7	0.7

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
73.6	73.1	72.6	72.2	71.3	70.8	70.8	70.7	70.2	70.2	69.7	..PRIVATE INDUSTRY
49.8	50.1	49.8	49.8	48.5	48.2	48.1	48.4	47.8	46.8	46.0	MANUFACTURING
3.1	3.5	3.9	4.1	4.1	4.3	4.2	4.1	4.1	4.0	3.3	ORDNANCE
1.3	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.9	0.9	1.0	FOOD
0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	TEXTILES AND APPAREL
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	LUMBER AND FURNITURE
1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.0	0.9	0.9	PAPER
7.0	6.9	6.9	6.6	6.8	6.7	6.9	6.7	6.6	6.6	6.7	CHEMICALS
1.3	1.2	1.2	1.1	1.1	1.0	1.0	1.0	0.9	0.8	0.8	PETROLEUM REFINING
0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	0.9	0.9	RUBBER
0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	STONE, CLAY, AND GLASS
2.6	2.6	2.5	2.2	2.0	2.0	2.0	2.0	1.9	2.0	1.9	PRIMARY METALS
2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	1.9	2.0	1.9	FABRICATED METALS
5.7	5.8	5.8	5.9	6.0	5.9	5.8	6.0	6.0	5.7	5.9	MACHINERY
10.8	11.2	11.1	11.4	10.6	10.4	10.3	10.3	10.5	10.1	10.1	ELECTRICAL EQUIPMENT
2.0	2.0	1.9	1.9	2.1	2.2	2.3	2.2	2.1	2.1	2.1	MOTOR VEHICLES
6.9	6.4	6.4	6.5	6.1	6.0	5.9	6.3	6.6	6.3	5.8	AIRCRAFT
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	OTHER TRANSPORTATION EQUIPMENT
2.4	2.5	2.5	2.5	2.4	2.4	2.5	2.4	2.3	2.3	2.4	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	MISCELLANEOUS MANUFACTURING
23.7	23.0	22.7	22.4	22.8	22.7	22.8	22.3	22.3	23.3	23.7	NONMANUFACTURING
2.1	2.0	1.9	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.5	PETROLEUM EXTRACTION
0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	MINING
4.1	4.0	3.9	3.8	3.6	3.4	3.6	3.3	3.1	3.4	3.5	CONSTRUCTION
0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	RAILROADS
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	OTHER TRANSPORTATION
0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	TELECOMMUNICATIONS
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	RADIO AND TV
2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.8	1.8	1.8	1.9	PUBLIC UTILITIES
4.0	4.0	3.9	4.1	4.2	4.0	4.0	4.1	4.3	4.8	4.8	MISCELLANEOUS BUSINESS SERVICES
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	MEDICAL AND DENTAL LABORATORIES
6.8	6.5	6.4	6.2	6.6	6.5	6.6	6.5	6.4	6.5	6.7	ENGINEERING AND ARCHITECTURAL SERVICES
1.9	1.9	2.1	2.0	2.2	2.4	2.4	2.4	2.5	2.6	2.7	OTHER NONMANUFACTURING
15.3	15.4	15.6	15.6	15.6	15.7	15.4	15.0	15.2	14.9	15.0	..GOVERNMENT
8.9	8.9	9.1	9.4	9.5	9.7	9.5	9.2	9.5	9.3	9.4	FEDERAL
3.8	3.9	3.9	3.7	3.7	3.6	3.6	3.5	3.5	3.4	3.4	STATE
2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.3	2.2	2.1	2.1	LOCAL
10.4	10.6	10.8	11.1	11.9	12.3	12.6	13.2	13.5	13.8	14.3	..COLLEGES AND UNIVERSITIES
0.8	0.9	1.0	1.1	1.1	1.1	1.2	1.2	1.1	1.1	1.0	..NONPROFIT INSTITUTIONS

Table A-3. Estimated employment of scientists and engineers engaged in research and development, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	157.9	175.4	204.9	227.8	243.5	248.8	271.0	308.8	329.7	362.1
PRIVATE INDUSTRY.....	102.6	115.7	138.7	160.0	173.2	180.4	197.6	227.8	241.5	264.2
MANUFACTURING.....	82.4	93.9	115.1	134.3	145.4	150.6	164.4	190.9	203.0	222.0
ORDNANCE.....	0.6	0.8	2.9	4.7	4.8	4.7	4.8	7.6	8.1	16.2
FOOD.....	2.5	2.8	2.9	3.1	3.2	3.3	3.4	3.6	3.7	3.9
TEXTILES AND APPAREL.....	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0
LUMBER AND FURNITURE.....	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4
PAPER.....	2.2	2.4	2.6	2.7	2.8	3.0	3.3	3.4	3.6	3.8
CHEMICALS.....	13.1	15.4	17.3	19.5	21.2	21.9	23.5	26.1	29.4	30.4
PETROLEUM REFINING.....	1.8	2.0	2.3	2.5	2.7	2.9	2.9	2.9	3.1	3.1
RUBBER.....	2.4	2.6	2.8	3.0	3.0	3.0	3.1	3.3	3.3	3.3
STONE, CLAY, AND GLASS.....	1.0	1.2	1.4	1.5	1.6	1.7	2.0	2.2	2.3	2.5
PRIMARY METALS.....	2.0	2.3	2.6	2.8	2.9	2.9	3.4	4.0	4.3	4.6
FABRICATED METALS.....	3.6	4.1	4.4	4.8	4.9	5.1	5.6	6.0	6.1	6.2
MACHINERY.....	11.4	12.9	14.8	15.7	16.5	16.7	17.6	19.8	20.2	21.2
ELECTRICAL EQUIPMENT.....	19.3	20.9	24.9	29.1	32.1	33.3	36.8	43.8	51.2	55.4
MOTOR VEHICLES.....	5.0	5.4	5.4	5.5	5.7	5.7	5.9	5.8	6.1	6.2
AIRCRAFT.....	9.3	12.0	20.6	28.1	32.0	34.2	39.0	48.2	46.5	49.1
OTHER TRANSPORTATION EQUIPMENT.....	0.8	0.9	1.0	1.1	1.1	1.0	1.1	1.3	1.4	1.4
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	4.9	5.6	6.5	7.3	7.9	8.1	8.7	9.6	10.2	11.2
MISCELLANEOUS MANUFACTURING.....	1.6	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.1	2.1
NONMANUFACTURING.....	20.2	21.8	23.6	25.7	27.8	29.8	33.2	36.9	38.5	42.2
PETROLEUM EXTRACTION.....	2.1	2.1	2.2	2.5	2.6	2.8	2.9	3.2	3.2	3.2
MINING.....	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6
CONSTRUCTION.....	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5
RAILROADS.....	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
OTHER TRANSPORTATION.....	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4
TELECOMMUNICATIONS.....	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.6
MISCELLANEOUS BUSINESS SERVICES.....	11.6	12.5	13.4	14.4	15.4	16.4	18.1	19.9	21.7	24.7
MEDICAL AND DENTAL LABORATORIES.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ENGINEERING AND ARCHITECTURAL SERVICES.....	3.8	4.4	5.1	5.7	6.4	6.9	8.3	9.5	9.2	9.8
OTHER NONMANUFACTURING.....	1.0	1.1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
GOVERNMENT.....	29.3	32.9	36.2	35.3	34.9	29.9	32.9	36.6	39.4	45.2
FEDERAL.....	27.4	30.9	34.1	33.1	32.6	27.6	30.4	34.0	36.6	42.1
STATE.....	1.3	1.4	1.5	1.5	1.6	1.6	1.7	1.8	1.9	2.2
LOCAL.....	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.9	0.9
COLLEGES AND UNIVERSITIES.....	22.9	23.6	26.3	28.6	31.1	33.8	35.7	38.8	42.9	46.0
NONPROFIT INSTITUTIONS.....	3.1	3.2	3.7	3.9	4.3	4.7	4.8	5.6	5.9	6.7

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
386.1	409.5	441.9	475.7	497.9	513.2	526.3	554.0	552.8	549.0	535.4	..ALL SECTORS
282.4	296.8	318.8	343.2	351.1	359.9	369.9	384.2	386.5	387.8	372.2	..PRIVATE INDUSTRY
237.9	250.7	270.1	290.3	296.8	300.5	306.9	317.6	317.7	316.5	298.4	MANUFACTURING
19.2	23.2	27.2	31.0	33.2	35.3	37.4	36.9	34.0	34.3	26.2	ORDNANCE
4.1	4.2	4.1	4.1	4.5	4.3	4.0	4.0	4.2	4.3	4.5	FOOD
1.1	1.0	1.1	1.5	1.4	1.7	1.9	1.8	1.7	1.9	2.1	TEXTILES AND APPAREL
0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.7	1.0	LUMBER AND FURNITURE
4.0	4.2	4.3	4.2	4.4	4.7	5.0	4.8	4.7	4.9	5.1	PAPER
32.4	34.0	36.9	39.1	40.7	41.9	43.0	43.9	43.0	43.6	44.9	CHEMICALS
3.3	3.2	3.5	3.7	3.8	3.7	3.6	3.5	3.4	3.3	3.5	PETROLEUM REFINING
3.4	3.4	3.4	3.5	3.6	4.0	4.2	4.2	4.4	4.4	4.5	RUBBER
2.8	2.9	3.1	3.2	3.3	3.2	3.1	3.3	3.5	3.6	3.5	STONE, CLAY, AND GLASS
4.9	5.5	5.1	4.7	5.2	4.5	3.8	4.0	3.9	4.2	4.5	PRIMARY METALS
6.5	6.7	6.8	7.1	7.1	7.3	7.4	8.7	8.5	9.1	9.4	FABRICATED METALS
22.6	24.4	26.4	29.0	31.0	31.7	32.3	33.4	34.3	33.2	31.6	MACHINERY
62.1	66.5	73.8	82.4	79.4	78.1	80.2	82.3	81.9	80.8	78.7	ELECTRICAL EQUIPMENT
6.4	6.4	6.6	6.9	7.7	8.5	9.3	9.7	9.9	10.1	9.9	MOTOR VEHICLES
48.5	47.4	50.3	53.8	52.8	52.9	53.0	57.8	60.3	59.3	50.5	AIRCRAFT
1.5	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.8	2.0	2.0	OTHER TRANSPORTATION EQUIPMENT
12.5	14.0	13.6	12.5	14.9	14.9	14.8	15.2	15.6	15.2	14.9	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
2.2	2.1	2.2	1.9	2.0	1.8	1.9	2.0	2.0	1.6	1.6	MISCELLANEOUS MANUFACTURING
44.5	46.1	48.7	52.9	54.3	59.4	63.0	66.6	68.8	71.3	73.8	NONMANUFACTURING
3.0	2.9	3.0	3.2	3.3	3.6	3.6	3.9	4.2	4.4	4.5	PETROLEUM EXTRACTION
0.6	0.6	0.6	0.6	0.5	0.7	0.9	1.1	0.7	0.8	0.9	MINING
0.6	0.5	0.6	0.7	0.8	0.8	1.0	1.2	1.4	1.7	1.8	CONSTRUCTION
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	RAILROADS
0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.7	0.6	0.7	0.6	OTHER TRANSPORTATION
0.3	0.3	0.3	0.4	0.3	0.5	0.6	0.6	0.7	0.9	1.1	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	RADIO AND TV
0.6	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.4	1.5	1.6	PUBLIC UTILITIES
26.6	27.9	29.8	34.2	34.5	38.9	42.3	43.7	45.2	46.7	47.9	MISCELLANEOUS BUSINESS SERVICES
0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.3	0.4	0.4	MEDICAL AND DENTAL LABORATORIES
10.2	10.4	10.6	10.2	10.8	10.4	9.6	10.7	10.9	10.4	10.8	ENGINEERING AND ARCHITECTURAL SERVICES
1.9	2.0	2.3	2.0	2.2	2.5	3.0	3.0	3.0	3.4	3.6	OTHER NONMANUFACTURING
48.1	51.8	57.3	60.6	71.4	75.5	76.8	78.3	76.4	73.5	73.8	..GOVERNMENT
44.7	48.0	53.1	56.4	67.2	71.2	72.3	74.5	72.4	69.4	69.6	FEDERAL
2.5	2.8	3.1	3.1	3.1	3.2	3.3	2.6	2.7	2.8	2.9	STATE
0.9	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.3	1.3	1.3	LOCAL
48.6	52.4	55.2	59.3	62.5	64.5	65.6	77.1	75.3	73.1	75.7	..COLLEGES AND UNIVERSITIES
7.3	8.5	10.6	12.6	12.9	13.3	14.0	14.4	14.6	14.6	13.7	..NONPROFIT INSTITUTIONS

Table A-4. Percent distribution: Estimated employment of scientists and engineers in research and development, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	65.0	66.0	67.7	70.2	71.1	72.5	72.9	73.8	73.2	73.0
MANUFACTURING.....	52.2	53.5	56.2	59.0	59.7	60.5	60.7	61.8	61.6	61.3
ORDNANCE.....	0.4	0.5	1.4	2.1	2.0	1.9	1.8	2.5	2.5	4.5
FOOD.....	1.6	1.6	1.4	1.4	1.3	1.3	1.3	1.2	1.1	1.1
TEXTILES AND APPAREL.....	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
LUMBER AND FURNITURE.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PAPER.....	1.4	1.4	1.3	1.2	1.1	1.2	1.2	1.1	1.1	1.0
CHEMICALS.....	8.3	8.8	8.4	8.6	8.7	8.8	8.7	8.5	8.9	8.4
PETROLEUM REFINING.....	1.1	1.1	1.1	1.1	1.1	1.2	1.1	0.9	0.9	0.9
RUBBER.....	1.5	1.5	1.4	1.3	1.2	1.2	1.1	1.1	1.0	0.9
STONE, CLAY, AND GLASS.....	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
PRIMARY METALS.....	1.3	1.3	1.3	1.2	1.2	1.2	1.3	1.3	1.3	1.3
FABRICATED METALS.....	2.3	2.3	2.1	2.1	2.0	2.0	2.1	1.9	1.9	1.7
MACHINERY.....	7.2	7.4	7.2	6.9	6.8	6.7	6.5	6.4	6.1	5.9
ELECTRICAL EQUIPMENT.....	12.2	11.9	12.2	12.8	13.2	13.4	13.6	14.2	15.5	15.3
MOTOR VEHICLES.....	3.2	3.1	2.6	2.4	2.3	2.3	2.2	1.9	1.9	1.7
AIRCRAFT.....	5.9	6.8	10.1	12.3	13.1	13.7	14.4	15.6	14.1	13.6
OTHER TRANSPORTATION EQUIPMENT.....	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	3.1	3.2	3.2	3.2	3.2	3.3	3.2	3.1	3.1	3.1
MISCELLANEOUS MANUFACTURING.....	1.0	0.9	0.8	0.8	0.7	0.8	0.7	0.6	0.6	0.6
NONMANUFACTURING.....	12.8	12.4	11.5	11.3	11.4	12.0	12.3	11.9	11.7	11.7
PETROLEUM EXTRACTION.....	1.3	1.2	1.1	1.1	1.1	1.1	1.1	1.0	1.0	0.9
MINING.....	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
CONSTRUCTION.....	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1
RAILROADS.....	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
OTHER TRANSPORTATION.....	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1
TELECOMMUNICATIONS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MISCELLANEOUS BUSINESS SERVICES.....	7.3	7.1	6.5	6.3	6.3	6.6	6.7	6.4	6.6	6.8
MEDICAL AND DENTAL LABORATORIES.....	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	2.4	2.5	2.5	2.5	2.6	2.8	3.1	3.1	2.8	2.7
OTHER NONMANUFACTURING.....	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5
GOVERNMENT.....	18.6	18.8	17.7	15.5	14.3	12.0	12.1	11.9	12.0	12.5
FEDERAL.....	17.4	17.6	16.6	14.5	13.4	11.1	11.2	11.0	11.1	11.6
STATE.....	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
LOCAL.....	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
COLLEGES AND UNIVERSITIES.....	14.5	13.5	12.8	12.6	12.8	13.6	13.2	12.6	13.0	12.7
NONPROFIT INSTITUTIONS.....	2.0	1.8	1.8	1.7	1.8	1.9	1.8	1.8	1.8	1.9

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
73.1	72.5	72.1	72.1	70.5	70.1	70.3	69.4	69.9	70.6	69.5	..PRIVATE INDUSTRY
61.6	61.2	61.1	61.0	59.6	58.6	58.3	57.3	57.5	57.7	55.7	MANUFACTURING
5.0	5.7	6.2	6.5	6.7	6.9	7.1	6.7	6.2	6.2	4.9	ORDNANCE
1.1	1.0	0.9	0.9	0.9	0.8	0.8	0.7	0.8	0.8	0.8	FOOD
0.3	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	TEXTILES AND APPAREL
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	LUMBER AND FURNITURE
1.0	1.0	1.0	0.9	0.9	0.9	1.0	0.9	0.9	0.9	1.0	PAPER
8.4	8.3	8.4	8.2	8.2	8.2	8.2	7.9	7.8	7.9	8.4	CHEMICALS
0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.7	PETROLEUM REFINING
0.9	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	RUBBER
0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.7	STONE, CLAY, AND GLASS
1.3	1.3	1.2	1.0	1.0	0.9	0.7	0.7	0.7	0.8	0.8	PRIMARY METALS
1.7	1.6	1.5	1.5	1.4	1.4	1.4	1.6	1.5	1.7	1.8	FABRICATED METALS
5.9	6.0	6.0	6.1	6.2	6.2	6.1	6.0	6.2	6.0	5.9	MACHINERY
16.1	16.2	16.7	17.3	15.9	15.2	15.2	14.9	14.8	14.7	14.7	ELECTRICAL EQUIPMENT
1.7	1.6	1.5	1.5	1.5	1.7	1.8	1.8	1.8	1.8	1.8	MOTOR VEHICLES
12.6	11.6	11.4	11.3	10.6	10.3	10.1	10.4	10.9	10.8	9.4	AIRCRAFT
0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	OTHER TRANSPORTATION EQUIPMENT
3.2	3.4	3.1	2.6	3.0	2.9	2.8	2.7	2.8	2.8	2.8	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	MISCELLANEOUS MANUFACTURING
11.5	11.3	11.0	11.1	10.9	11.6	12.0	12.0	12.4	13.0	13.8	NONMANUFACTURING
0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	PETROLEUM EXTRACTION
0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	MINING
0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	CONSTRUCTION
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	RAILROADS
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	OTHER TRANSPORTATION
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	PUBLIC UTILITIES
6.9	6.8	6.7	7.2	6.9	7.6	8.0	7.9	8.2	8.5	8.9	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	MEDICAL AND DENTAL LABORATORIES
2.6	2.5	2.4	2.1	2.2	2.0	1.8	1.9	2.0	1.9	2.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.5	0.5	0.5	0.4	0.4	0.5	0.6	0.5	0.5	0.6	0.7	OTHER NONMANUFACTURING
12.5	12.6	13.0	12.7	14.3	14.7	14.6	14.1	13.8	13.4	13.8	..GOVERNMENT
11.6	11.7	12.0	11.9	13.5	13.9	13.7	13.4	13.1	12.6	13.0	FEDERAL
0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	STATE
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	LOCAL
12.6	12.8	12.5	12.5	12.6	12.6	12.5	13.9	13.6	13.3	14.1	..COLLEGES AND UNIVERSITIES
1.9	2.1	2.4	2.6	2.6	2.6	2.7	2.6	2.6	2.7	2.6	..NONPROFIT INSTITUTIONS

Table A-5. Percent of scientists and engineers engaged in research and development, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	28.4	28.7	29.9	30.4	31.1	30.6	31.0	32.2	32.9	34.2
PRIVATE INDUSTRY.....	25.9	26.3	27.7	28.7	29.4	29.6	30.1	31.7	32.5	33.9
MANUFACTURING.....	33.6	34.0	35.2	36.2	37.0	37.7	38.5	39.9	40.9	42.6
ORDNANCE.....	28.6	26.7	27.9	29.0	29.8	31.8	32.9	42.0	45.5	55.5
FOOD.....	25.8	26.4	25.9	26.7	26.4	26.6	26.6	27.5	27.2	27.5
TEXTILES AND APPAREL.....	22.6	23.5	22.9	25.0	25.0	23.7	26.3	25.6	25.6	25.0
LUMBER AND FURNITURE.....	9.1	8.0	7.7	7.4	11.1	11.1	10.3	9.7	12.9	12.5
PAPER.....	39.3	37.5	37.7	36.5	36.4	36.1	36.7	35.4	36.0	36.9
CHEMICALS.....	33.2	34.0	34.3	34.8	35.2	36.3	37.1	38.0	39.8	40.8
PETROLEUM REFINING.....	20.7	21.1	21.5	21.4	21.6	22.3	22.0	21.8	22.1	22.1
RUBBER.....	39.3	39.4	38.4	38.0	37.5	37.0	36.5	36.7	36.3	35.1
STONE, CLAY, AND GLASS.....	18.5	20.0	21.9	21.7	22.5	22.7	24.4	25.6	25.3	26.3
PRIMARY METALS.....	13.0	13.1	13.5	13.5	13.6	14.2	15.2	16.1	16.7	17.2
FABRICATED METALS.....	23.2	23.2	23.3	3.8	24.0	24.3	24.7	25.0	25.3	25.5
MACHINERY.....	33.9	33.9	34.4	34.5	34.8	35.2	35.3	35.4	35.8	35.9
ELECTRICAL EQUIPMENT.....	43.0	43.1	43.5	43.8	44.2	44.5	44.8	45.2	47.7	51.0
MOTOR VEHICLES.....	28.4	29.2	28.7	28.6	28.9	28.8	28.6	28.3	29.0	29.0
AIRCRAFT.....	52.8	53.6	54.6	56.2	57.5	58.2	59.7	62.0	62.3	62.9
OTHER TRANSPORTATION EQUIPMENT.....	28.6	32.1	31.3	29.7	30.6	30.3	29.7	30.2	29.8	29.8
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	46.7	46.7	46.4	46.5	46.5	46.8	46.8	46.8	46.8	46.7
MISCELLANEOUS MANUFACTURING.....	32.7	31.4	32.1	33.3	32.7	33.9	34.5	33.3	34.4	33.9
NONMANUFACTURING.....	13.4	13.3	13.6	13.8	14.1	14.2	14.5	15.3	15.6	16.4
PETROLEUM EXTRACTION.....	14.5	14.5	14.6	14.3	13.9	14.0	13.5	13.3	13.1	13.1
MINING.....	8.6	8.6	8.2	7.8	8.2	8.5	8.2	9.4	8.8	8.7
CONSTRUCTION.....	0.8	0.7	1.0	0.9	0.9	1.1	1.0	1.2	1.2	1.1
RAILROADS.....	1.9	1.9	1.9	1.9	1.9	3.8	3.8	3.8	3.9	4.0
OTHER TRANSPORTATION.....	8.6	8.3	8.1	7.9	10.3	10.0	9.8	9.5	9.3	8.7
TELECOMMUNICATIONS.....	3.2	3.0	2.8	2.6	2.5	2.4	3.5	3.4	3.4	3.3
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	2.8	2.5	2.5	3.0	3.3	3.0	2.9	3.2	3.0	2.9
MISCELLANEOUS BUSINESS SERVICES.....	50.2	51.2	51.9	53.1	54.0	55.0	56.0	57.5	58.2	58.9
MEDICAL AND DENTAL LABORATORIES.....	20.0	16.7	16.7	14.3	12.5	12.5	11.1	11.1	11.1	10.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	9.2	9.7	10.3	10.7	11.1	11.3	11.7	12.7	12.6	13.1
OTHER NONMANUFACTURING.....	7.1	7.7	7.3	7.7	7.8	8.1	8.2	8.6	8.8	8.8
GOVERNMENT.....	27.5	27.5	27.4	26.1	26.3	22.0	23.1	24.2	25.4	27.4
FEDERAL.....	45.9	43.7	41.5	39.0	40.9	33.9	35.6	37.7	39.9	43.1
STATE.....	4.9	5.0	5.1	5.1	5.1	5.1	5.1	5.1	5.2	5.6
LOCAL.....	2.9	2.9	2.9	3.3	3.2	3.1	3.4	3.1	3.3	3.2
COLLEGES AND UNIVERSITIES.....	45.5	48.0	53.2	55.9	55.7	55.2	51.4	47.6	45.0	43.1
NONPROFIT INSTITUTIONS.....	86.1	86.5	86.0	83.0	86.0	83.9	85.7	86.2	84.3	84.8

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
35.0	35.6	36.5	37.1	37.5	37.6	37.1	37.5	36.2	35.0	33.6	..ALL SECTORS
34.8	35.2	36.3	37.1	37.1	37.2	36.8	36.8	36.1	35.2	33.5	..PRIVATE INDUSTRY
43.2	43.4	44.8	45.5	46.1	45.6	45.0	44.5	43.5	43.1	40.7	MANUFACTURING
56.3	57.1	57.9	58.7	60.8	60.3	62.4	60.6	54.5	54.3	49.7	ORDNANCE
27.7	27.3	27.5	26.8	31.9	30.5	28.6	28.6	29.2	29.3	29.6	FOOD
26.2	25.0	26.8	34.9	27.5	29.3	30.2	32.1	29.3	32.8	35.6	TEXTILES AND APPAREL
12.1	11.8	11.8	11.8	11.4	13.5	12.5	11.6	12.5	14.0	20.0	LUMBER AND FURNITURE
36.7	35.6	34.1	33.3	34.4	36.2	37.6	34.3	32.2	33.3	34.0	PAPER
41.9	42.8	44.4	46.0	44.8	45.6	44.0	44.1	42.9	42.1	41.8	CHEMICALS
22.6	22.5	24.3	25.3	25.7	26.4	26.1	23.8	25.8	26.0	26.5	PETROLEUM REFINING
35.1	33.3	33.0	31.5	31.3	32.8	31.1	29.8	30.3	31.0	30.0	RUBBER
28.0	28.4	29.5	29.9	31.4	30.5	27.7	27.5	29.9	29.8	28.5	STONE, CLAY, AND GLASS
17.4	18.2	16.8	16.4	19.3	16.6	13.7	13.7	13.7	13.6	15.1	PRIMARY METALS
25.8	25.9	26.2	26.3	26.0	25.3	24.5	27.4	29.3	29.2	31.1	FABRICATED METALS
36.1	36.3	37.5	38.3	38.8	39.6	39.6	37.7	37.6	37.0	33.6	MACHINERY
52.2	51.8	55.2	56.4	56.3	54.9	54.9	54.0	51.1	50.9	48.6	ELECTRICAL EQUIPMENT
28.8	28.4	28.9	28.0	28.2	28.7	29.0	29.9	31.1	31.2	29.2	MOTOR VEHICLES
63.6	64.0	64.6	64.8	65.3	64.3	63.6	62.3	60.4	60.4	55.0	AIRCRAFT
30.6	25.0	27.1	26.0	28.6	28.8	27.3	27.1	31.0	37.0	32.8	OTHER TRANSPORTATION EQUIPMENT
47.0	49.1	44.7	39.7	47.8	45.4	42.5	42.5	44.1	42.6	39.7	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
34.9	34.4	34.9	28.4	30.8	27.7	29.7	31.7	33.9	25.8	25.0	MISCELLANEOUS MANUFACTURING
17.0	17.4	17.7	18.4	17.9	19.2	19.5	20.2	20.2	19.5	19.5	NONMANUFACTURING
12.9	12.4	13.1	13.4	13.9	14.9	15.1	15.9	16.8	17.1	18.2	PETROLEUM EXTRACTION
9.0	8.8	9.4	8.8	7.7	10.1	12.5	15.5	9.9	10.5	11.5	MINING
1.3	1.1	1.3	1.5	1.7	1.7	1.9	2.5	3.0	3.2	3.3	CONSTRUCTION
4.0	4.1	4.2	4.4	4.1	4.5	4.7	4.3	4.5	4.5	9.1	RAILROADS
8.5	8.0	8.0	8.3	12.0	11.1	11.1	13.2	11.1	12.5	10.3	OTHER TRANSPORTATION
3.3	3.2	3.1	4.1	2.9	4.2	5.0	4.7	4.7	5.7	6.8	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	2.1	2.0	2.0	1.9	3.6	3.4	3.3	RADIO AND TV
2.8	3.5	3.3	3.7	3.6	3.4	3.3	3.7	5.1	5.3	5.3	PUBLIC UTILITIES
60.0	61.1	62.5	64.4	61.6	70.6	74.2	71.5	68.6	62.7	62.9	MISCELLANEOUS BUSINESS SERVICES
10.0	10.0	9.1	9.1	8.3	15.4	14.3	26.7	20.0	28.6	26.7	MEDICAL AND DENTAL LABORATORIES
13.5	14.0	13.7	12.8	12.3	11.7	10.3	11.1	11.2	10.2	10.0	ENGINEERING AND ARCHITECTURAL SERVICES
9.0	9.2	9.2	7.6	7.4	7.7	8.6	8.3	7.9	8.3	8.4	OTHER NONMANUFACTURING
28.5	29.3	30.4	30.4	34.5	35.1	35.1	35.4	32.9	31.5	30.9	..GOVERNMENT
45.7	47.0	48.0	47.0	53.2	53.9	53.9	54.8	49.8	47.4	46.3	FEDERAL
6.0	6.3	6.5	6.5	6.4	6.4	6.5	5.1	5.1	5.3	5.3	STATE
3.1	3.4	3.6	3.5	3.4	3.3	3.6	3.6	3.9	3.9	3.8	LOCAL
42.3	42.8	42.2	41.9	39.5	38.4	36.8	39.7	36.6	33.7	33.2	..COLLEGES AND UNIVERSITIES
83.9	85.0	84.8	85.7	84.9	84.7	83.8	83.7	83.4	83.9	83.5	..NONPROFIT INSTITUTIONS

Table A-6. Estimated employment of engineers, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	408.0	450.6	507.5	556.2	581.2	601.4	646.4	707.9	730.3	768.0
PRIVATE INDUSTRY.....	320.3	355.5	405.9	453.3	479.0	496.2	535.4	588.1	605.4	634.1
MANUFACTURING.....	193.4	216.7	258.8	295.2	312.6	317.2	340.1	382.3	395.8	416.9
ORDNANCE.....	1.9	2.8	9.6	14.8	14.7	13.5	13.3	16.4	16.2	26.3
FOOD.....	5.0	5.5	5.8	6.0	6.4	6.5	6.8	6.9	7.2	7.6
TEXTILES AND APPAREL.....	2.2	2.4	2.5	2.6	2.6	2.7	2.7	2.8	2.8	2.8
LUMBER AND FURNITURE.....	2.0	2.3	2.4	2.5	2.5	2.5	2.7	2.7	2.7	2.8
PAPER.....	3.9	4.4	4.8	5.2	5.4	5.8	6.3	6.7	7.0	7.2
CHEMICALS.....	19.7	21.7	22.9	25.6	26.8	26.6	27.5	29.6	31.8	31.4
PETROLEUM REFINING.....	6.1	6.7	7.6	8.2	8.8	9.1	9.3	9.4	9.9	9.9
RUBBER.....	4.3	4.7	5.2	5.7	5.8	5.9	6.2	6.6	6.7	7.0
STONE, CLAY, AND GLASS.....	4.2	4.7	5.1	5.3	5.5	5.9	6.4	6.8	7.1	7.5
PRIMARY METALS.....	11.2	12.6	13.7	14.8	15.1	14.4	15.8	17.6	18.1	18.6
FABRICATED METALS.....	14.2	16.3	17.4	18.6	18.8	19.3	20.8	22.1	22.2	22.4
MACHINERY.....	31.3	35.3	40.0	42.3	44.2	44.2	46.4	51.9	52.5	54.9
ELECTRICAL EQUIPMENT.....	40.5	43.7	51.8	60.3	66.1	68.1	75.0	88.8	98.5	99.9
MOTOR VEHICLES.....	15.7	16.6	16.9	17.3	17.7	17.8	18.5	18.3	18.9	19.0
AIRCRAFT.....	16.0	20.3	34.2	45.2	50.2	52.8	58.6	69.5	66.4	69.8
OTHER TRANSPORTATION EQUIPMENT.....	2.7	2.7	3.1	3.5	3.4	3.1	3.5	4.1	4.5	4.5
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	8.7	10.1	11.7	13.1	14.3	14.6	15.7	17.4	18.5	20.4
MISCELLANEOUS MANUFACTURING.....	3.8	3.9	4.1	4.2	4.3	4.4	4.6	4.7	4.8	4.9
NONMANUFACTURING.....	126.9	138.8	147.1	158.1	166.4	179.0	195.3	205.8	209.6	217.2
PETROLEUM EXTRACTION.....	6.0	6.1	6.5	7.7	8.4	9.1	10.3	11.9	12.4	12.3
MINING.....	4.5	4.6	4.7	4.9	4.7	4.5	4.6	4.8	5.1	5.1
CONSTRUCTION.....	24.4	29.1	31.2	33.3	33.6	37.1	39.3	40.8	41.9	43.3
RAILROADS.....	5.1	5.2	5.2	5.2	5.1	5.1	5.1	5.0	4.9	4.8
OTHER TRANSPORTATION.....	3.4	3.5	3.6	3.7	3.7	3.8	3.9	4.0	4.1	4.4
TELECOMMUNICATIONS.....	6.2	6.5	7.1	7.6	7.9	8.1	8.5	8.8	8.8	9.0
RADIO AND TV.....	1.5	1.8	1.9	1.9	2.5	3.8	4.0	4.1	4.3	4.4
PUBLIC UTILITIES.....	10.2	11.3	11.3	12.8	14.4	16.1	16.6	18.2	19.4	19.9
MISCELLANEOUS BUSINESS SERVICES.....	16.2	17.2	17.9	18.9	19.7	20.6	22.2	23.9	25.4	28.5
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	40.5	44.4	48.2	52.2	56.0	59.8	69.1	72.5	71.1	72.7
OTHER NONMANUFACTURING.....	8.9	9.1	9.5	9.9	10.4	11.0	11.7	11.8	12.2	12.8
GOVERNMENT.....	75.4	83.1	89.9	90.7	88.9	90.5	94.6	100.5	103.5	110.0
FEDERAL.....	38.8	45.1	51.3	51.8	48.0	48.8	50.9	53.6	54.7	58.5
STATE.....	18.9	19.9	21.1	21.0	22.5	22.5	23.9	25.2	26.2	28.2
LOCAL.....	17.7	18.1	17.5	17.9	18.4	19.2	19.8	21.7	22.6	23.3
COLLEGES AND UNIVERSITIES.....	11.2	10.9	10.5	10.9	11.8	13.0	14.7	17.3	19.3	21.6
NONPROFIT INSTITUTIONS.....	1.1	1.1	1.2	1.3	1.5	1.7	1.7	2.0	2.1	2.3

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
801.1	833.3	873.2	922.7	945.5	969.8	999.6	1037.7	1062.4	1085.0	1098.2	..ALL SECTORS
662.6	686.9	716.1	756.5	771.6	789.1	816.1	850.8	869.3	890.7	898.1	..PRIVATE INDUSTRY
440.8	462.4	483.5	514.8	518.1	531.2	548.4	578.0	587.7	588.6	586.6	MANUFACTURING
30.4	36.2	41.1	46.2	47.4	50.6	51.5	51.9	53.7	54.2	45.4	ORDNANCE
7.9	8.2	7.8	7.9	6.8	6.8	7.0	7.0	7.1	7.4	7.7	FOOD
2.9	2.7	2.8	3.0	3.4	3.5	3.7	3.8	3.8	3.7	3.9	TEXTILES AND APPAREL
2.9	3.0	3.0	3.0	3.1	3.3	3.6	3.9	4.2	4.4	4.4	LUMBER AND FURNITURE
7.6	8.3	8.8	8.8	8.6	9.0	9.1	9.4	9.3	9.2	9.5	PAPER
32.0	32.2	33.2	34.6	39.4	38.6	40.6	42.5	42.4	44.2	46.4	CHEMICALS
10.3	10.0	10.1	10.3	10.5	10.1	9.9	10.7	9.2	8.8	9.2	PETROLEUM REFINING
7.3	7.6	7.6	8.0	8.5	9.2	10.1	10.7	10.9	10.6	11.2	RUBBER
8.0	8.1	8.4	8.5	8.3	8.4	8.9	9.6	9.4	9.7	9.8	STONE, CLAY, AND GLASS
19.6	20.5	21.1	20.3	19.4	20.0	20.5	21.4	19.7	21.6	20.9	PRIMARY METALS
23.2	23.9	23.9	24.7	24.8	26.2	27.9	29.2	26.6	28.7	27.6	FABRICATED METALS
58.1	62.3	65.2	69.9	73.3	73.5	75.1	81.5	83.5	81.1	85.1	MACHINERY
109.7	118.6	123.6	134.8	130.5	132.2	135.6	142.0	148.9	146.7	149.0	ELECTRICAL EQUIPMENT
19.8	20.1	20.4	21.8	24.1	26.6	29.1	29.3	28.5	29.1	30.5	MOTOR VEHICLES
68.7	67.1	71.1	76.1	73.9	75.5	76.2	84.5	90.6	89.3	83.8	AIRCRAFT
4.7	4.6	4.6	4.8	4.7	4.9	5.2	5.7	5.6	5.3	5.9	OTHER TRANSPORTATION EQUIPMENT
22.7	24.3	25.9	26.9	26.6	27.9	29.6	30.1	29.8	30.0	31.5	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
5.0	4.7	4.9	5.2	4.8	4.9	4.8	4.8	4.5	4.6	4.8	MISCELLANEOUS MANUFACTURING
221.8	224.5	232.6	241.7	253.5	257.9	267.7	272.8	281.6	302.1	311.5	NONMANUFACTURING
12.1	12.5	12.1	13.2	13.0	12.2	11.7	12.0	12.1	12.5	11.7	PETROLEUM EXTRACTION
4.9	4.9	4.5	4.8	4.6	5.2	5.5	5.3	5.6	6.2	6.1	MINING
44.7	45.3	46.6	47.9	47.1	46.7	51.1	47.7	46.8	53.2	54.7	CONSTRUCTION
4.8	4.7	4.6	4.3	4.6	4.1	4.0	4.2	4.0	3.9	3.9	RAILROADS
4.5	4.9	4.9	4.7	4.9	5.3	5.3	5.2	5.2	5.4	5.6	OTHER TRANSPORTATION
9.1	9.3	9.6	9.7	10.4	11.7	12.0	12.5	14.6	15.3	15.8	TELECOMMUNICATIONS
4.4	4.5	4.5	4.5	4.7	5.1	5.1	5.3	5.6	5.8	6.0	RADIO AND TV
20.7	21.9	23.2	23.6	24.1	25.5	26.0	25.9	26.4	27.0	28.7	PUBLIC UTILITIES
29.9	30.5	31.3	34.8	36.2	34.7	35.4	39.5	43.7	49.0	48.7	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
73.5	72.3	75.0	77.4	84.7	87.1	90.1	92.9	93.9	98.2	103.8	ENGINEERING AND ARCHITECTURAL SERVICES
13.2	13.7	16.3	16.8	19.2	20.3	21.5	22.3	23.7	25.6	26.5	OTHER NONMANUFACTURING
112.5	118.4	126.6	133.0	137.4	141.9	142.8	142.9	148.2	148.6	152.7	..GOVERNMENT
58.6	61.8	67.5	73.0	76.4	79.7	80.1	81.1	86.2	87.0	90.4	FEDERAL
30.1	32.1	34.0	34.2	34.5	34.9	34.7	34.2	34.9	34.8	35.0	STATE
23.8	24.5	25.1	25.8	26.5	27.3	28.0	27.6	27.1	26.8	27.3	LOCAL
23.3	24.8	26.5	28.4	31.5	33.4	35.1	38.3	39.1	39.9	41.7	..COLLEGES AND UNIVERSITIES
2.7	3.2	4.0	4.8	5.0	5.4	5.6	5.7	5.8	5.8	5.7	..NONPROFIT INSTITUTIONS

Table A-7. Percent distribution: Estimated employment of engineers, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	78.5	78.9	80.0	81.5	82.4	82.5	82.8	83.1	82.9	82.6
MANUFACTURING.....	47.4	48.1	51.0	53.1	53.8	52.7	52.6	54.0	54.2	54.3
ORDNANCE.....	0.5	0.6	1.9	2.7	2.5	2.2	2.1	2.3	2.2	3.4
FOOD.....	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0
TEXTILES AND APPAREL.....	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
LUMBER AND FURNITURE.....	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
PAPER.....	1.0	1.0	0.9	0.9	0.9	1.0	1.0	0.9	1.0	0.9
CHEMICALS.....	4.8	4.8	4.5	4.6	4.6	4.4	4.3	4.2	4.4	4.1
PETROLEUM REFINING.....	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.3	1.4	1.3
RUBBER.....	1.1	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
STONE, CLAY, AND GLASS.....	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0
PRIMARY METALS.....	2.7	2.8	2.7	2.7	2.6	2.4	2.4	2.5	2.5	2.4
FABRICATED METALS.....	3.5	3.6	3.4	3.3	3.2	3.2	3.2	3.1	3.0	2.9
MACHINERY.....	7.7	7.8	7.9	7.6	7.6	7.3	7.2	7.3	7.2	7.1
ELECTRICAL EQUIPMENT.....	9.9	9.7	10.2	10.8	11.4	11.3	11.6	12.5	13.5	13.0
MOTOR VEHICLES.....	3.8	3.7	3.3	3.1	3.0	3.0	2.9	2.6	2.6	2.5
AIRCRAFT.....	3.9	4.5	6.7	8.1	8.6	8.8	9.1	9.8	9.1	9.1
OTHER TRANSPORTATION EQUIPMENT.....	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.6
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	2.1	2.2	2.3	2.4	2.5	2.4	2.4	2.5	2.5	2.7
MISCELLANEOUS MANUFACTURING.....	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.6
NONMANUFACTURING.....	31.1	30.8	29.0	28.4	28.6	29.8	30.2	29.1	28.7	28.3
PETROLEUM EXTRACTION.....	1.5	1.4	1.3	1.4	1.4	1.5	1.6	1.7	1.7	1.6
MINING.....	1.1	1.0	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.7
CONSTRUCTION.....	6.0	6.5	6.1	6.0	5.8	6.2	6.1	5.8	5.7	5.6
RAILROADS.....	1.2	1.2	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6
OTHER TRANSPORTATION.....	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
TELECOMMUNICATIONS.....	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.2
RADIO AND TV.....	0.4	0.4	0.4	0.3	0.4	0.6	0.6	0.6	0.6	0.6
PUBLIC UTILITIES.....	2.5	2.5	2.2	2.3	2.5	2.7	2.6	2.6	2.7	2.6
MISCELLANEOUS BUSINESS SERVICES.....	4.0	3.8	3.5	3.4	3.4	3.4	3.4	3.4	3.5	3.7
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	9.9	9.9	9.5	9.4	9.6	9.9	10.7	10.2	9.7	9.5
OTHER NONMANUFACTURING.....	2.2	2.0	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7
GOVERNMENT.....	18.5	18.4	17.7	16.3	15.3	15.0	14.6	14.2	14.2	14.3
FEDERAL.....	9.5	10.0	10.1	9.3	8.3	8.1	7.9	7.6	7.5	7.6
STATE.....	4.6	4.4	4.2	3.8	3.9	3.7	3.7	3.6	3.6	3.7
LOCAL.....	4.3	4.0	3.4	3.2	3.2	3.2	3.1	3.1	3.1	3.0
COLLEGES AND UNIVERSITIES.....	2.7	2.4	2.1	2.0	2.0	2.2	2.3	2.4	2.6	2.8
NONPROFIT INSTITUTIONS.....	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
82.7	82.4	82.0	82.0	81.6	81.4	81.6	82.0	81.8	82.1	81.8	..PRIVATE INDUSTRY
55.0	55.5	55.4	55.8	54.8	54.8	54.9	55.7	55.3	54.2	53.4	MANUFACTURING
3.8	4.3	4.7	5.0	5.0	5.2	5.2	5.0	5.1	5.0	4.1	ORDNANCE
1.0	1.0	0.9	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	FOOD
0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4	TEXTILES AND APPAREL
0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	LUMBER AND FURNITURE
0.9	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.9	PAPER
4.0	3.9	3.8	3.7	4.2	4.0	4.1	4.1	4.0	4.1	4.2	CHEMICALS
1.3	1.2	1.2	1.1	1.1	1.0	1.0	1.0	0.9	0.8	0.8	PETROLEUM REFINING
0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	RUBBER
1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	STONE, CLAY, AND GLASS
2.4	2.5	2.4	2.2	2.1	2.1	2.1	2.1	1.9	2.0	1.9	PRIMARY METALS
2.9	2.9	2.7	2.7	2.6	2.7	2.8	2.8	2.5	2.6	2.5	FABRICATED METALS
7.3	7.5	7.5	7.6	7.8	7.6	7.5	7.9	7.9	7.5	7.7	MACHINERY
13.7	14.2	14.2	14.6	13.8	13.6	13.6	13.7	14.0	13.5	13.6	ELECTRICAL EQUIPMENT
2.5	2.4	2.3	2.4	2.5	2.7	2.9	2.8	2.7	2.7	2.8	MOTOR VEHICLES
8.6	8.1	8.1	8.2	7.8	7.8	7.6	8.1	8.5	8.2	7.6	AIRCRAFT
0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	OTHER TRANSPORTATION EQUIPMENT
2.8	2.9	3.0	2.9	2.8	2.9	3.0	2.9	2.8	2.8	2.9	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	MISCELLANEOUS MANUFACTURING
27.7	26.9	26.6	26.2	26.8	26.6	26.8	26.3	26.5	27.8	28.4	NONMANUFACTURING
1.5	1.5	1.4	1.4	1.4	1.3	1.2	1.2	1.1	1.2	1.1	PETROLEUM EXTRACTION
0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.6	0.6	MINING
5.6	5.4	5.3	5.2	5.0	4.8	5.1	4.6	4.4	4.9	5.0	CONSTRUCTION
0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	RAILROADS
0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	OTHER TRANSPORTATION
1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.4	1.4	1.4	TELECOMMUNICATIONS
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	RADIO AND TV
2.6	2.6	2.7	2.6	2.5	2.6	2.6	2.5	2.5	2.5	2.6	PUBLIC UTILITIES
3.7	3.7	3.6	3.8	3.8	3.6	3.5	3.8	4.1	4.5	4.4	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
9.2	8.7	8.6	8.4	9.0	9.0	9.0	9.0	8.8	9.1	9.5	ENGINEERING AND ARCHITECTURAL SERVICES
1.6	1.6	1.9	1.8	2.0	2.1	2.2	2.1	2.2	2.4	2.4	OTHER NONMANUFACTURING
14.0	14.2	14.5	14.4	14.5	14.6	14.3	13.8	13.9	13.7	13.9	..GOVERNMENT
7.3	7.4	7.7	7.9	8.1	8.2	8.0	7.8	8.1	8.0	8.2	FEDERAL
3.8	3.9	3.9	3.7	3.6	3.6	3.5	3.3	3.3	3.2	3.2	STATE
3.0	2.9	2.9	2.8	2.8	2.8	2.8	2.7	2.6	2.5	2.5	LOCAL
2.9	3.0	3.0	3.1	3.3	3.4	3.5	3.7	3.7	3.7	3.8	..COLLEGES AND UNIVERSITIES
0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	..NONPROFIT INSTITUTIONS

Table A-8. Estimated employment of engineers engaged in research and development, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	94.0	105.7	126.2	142.8	152.8	156.0	171.1	197.9	209.6	232.8
PRIVATE INDUSTRY.....	69.8	79.2	97.2	113.8	123.5	129.2	142.0	165.5	175.0	193.8
MANUFACTURING.....	56.4	64.5	81.1	96.2	104.4	108.5	118.8	139.8	148.3	164.4
ORDNANCE.....	0.5	0.7	2.4	3.8	3.9	3.9	4.0	6.3	6.7	13.7
FOOD.....	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.9	0.9	1.0
TEXTILES AND APPAREL.....	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4
LUMBER AND FURNITURE.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
PAPER.....	1.0	1.1	1.2	1.3	1.3	1.4	1.6	1.6	1.7	1.8
CHEMICALS.....	3.2	3.8	4.3	4.9	5.4	5.4	5.6	6.0	6.8	7.1
PETROLEUM REFINING.....	0.8	0.9	1.1	1.2	1.3	1.3	1.3	1.3	1.4	1.4
RUBBER.....	1.3	1.4	1.5	1.7	1.7	1.7	1.8	1.9	1.9	1.9
STONE, CLAY, AND GLASS.....	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.3
PRIMARY METALS.....	0.9	1.0	1.1	1.2	1.2	1.2	1.4	1.7	1.9	2.3
FABRICATED METALS.....	3.0	3.5	3.7	4.1	4.1	4.3	4.7	5.1	5.2	5.2
MACHINERY.....	9.6	10.9	12.5	13.3	14.0	14.3	15.3	17.4	18.0	19.1
ELECTRICAL EQUIPMENT.....	16.0	17.5	21.0	24.7	27.4	28.5	31.5	37.6	44.1	47.9
MOTOR VEHICLES.....	4.4	4.8	4.8	4.9	5.1	5.1	5.2	5.1	5.4	5.5
AIRCRAFT.....	8.1	10.5	18.0	24.7	28.1	30.1	34.4	42.6	41.2	43.5
OTHER TRANSPORTATION EQUIPMENT.....	0.8	0.9	1.0	1.0	1.0	0.9	1.0	1.2	1.3	1.3
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	4.0	4.6	5.4	6.0	6.5	6.7	7.2	8.0	8.5	9.3
MISCELLANEOUS MANUFACTURING.....	1.1	1.1	1.1	1.2	1.2	1.3	1.3	1.3	1.4	1.4
NONMANUFACTURING.....	13.4	14.7	16.1	17.6	19.1	20.7	23.2	25.7	26.7	29.4
PETROLEUM EXTRACTION.....	0.5	0.5	0.5	0.6	0.7	0.7	0.8	0.9	0.9	1.0
MINING.....	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
CONSTRUCTION.....	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5
RAILROADS.....	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
OTHER TRANSPORTATION.....	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
TELECOMMUNICATIONS.....	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.6
MISCELLANEOUS BUSINESS SERVICES.....	7.9	8.6	9.1	9.8	10.4	11.1	12.2	13.3	14.5	16.5
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	3.4	3.9	4.6	5.1	5.7	6.0	7.3	8.3	8.0	8.5
OTHER NONMANUFACTURING.....	0.7	0.8	0.8	0.9	1.0	1.1	1.1	1.2	1.3	1.4
GOVERNMENT.....	18.1	20.3	22.4	21.8	21.5	18.2	20.1	22.5	24.1	27.8
FEDERAL.....	17.7	19.9	22.0	21.4	21.1	17.8	19.6	22.0	23.6	27.2
STATE.....	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
LOCAL.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
COLLEGES AND UNIVERSITIES.....	5.1	5.2	5.5	6.0	6.5	7.1	7.5	8.1	8.6	9.2
NONPROFIT INSTITUTIONS.....	1.0	1.0	1.1	1.2	1.2	1.5	1.5	1.8	1.9	2.0

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
248.5	263.0	284.4	311.0	321.6	330.5	339.4	358.2	359.2	356.8	341.6	..ALL SECTORS
206.7	217.9	234.5	257.7	260.6	266.4	274.2	285.2	288.3	288.7	273.0	..PRIVATE INDUSTRY
175.9	186.0	200.5	221.3	223.7	226.6	231.7	241.2	242.6	241.7	224.2	MANUFACTURING
16.0	19.4	22.8	26.1	27.5	29.4	31.2	30.6	28.9	29.2	22.1	ORDNANCE
1.0	1.0	1.0	0.8	0.9	0.9	0.8	0.8	0.9	0.9	1.0	FOOD
0.4	0.4	0.5	0.8	0.6	0.6	0.6	0.8	0.8	0.9	0.9	TEXTILES AND APPAREL
0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	LUMBER AND FURNITURE
1.8	1.8	1.8	2.0	2.1	2.7	2.7	2.5	2.4	2.6	2.6	PAPER
7.6	8.0	9.4	10.6	11.6	11.5	11.4	11.5	11.2	11.7	12.1	CHEMICALS
1.5	1.4	1.5	1.6	1.6	1.6	1.4	1.3	1.2	1.2	1.6	PETROLEUM REFINING
2.0	2.0	2.1	2.1	2.3	2.5	2.7	2.7	2.8	2.8	2.9	RUBBER
1.4	1.5	1.6	1.6	1.7	1.6	1.5	1.6	1.8	1.8	1.7	STONE, CLAY, AND GLASS
2.4	2.8	2.6	2.5	2.8	2.6	2.4	2.5	2.2	2.9	3.1	PRIMARY METALS
5.5	5.7	5.8	6.0	5.7	6.1	6.4	7.4	7.1	7.7	8.0	FABRICATED METALS
20.2	21.7	23.1	25.9	26.8	27.5	28.2	29.3	30.3	28.9	27.6	MACHINERY
53.7	57.8	64.5	73.6	70.8	70.1	72.2	74.3	73.3	72.3	70.5	ELECTRICAL EQUIPMENT
5.7	5.7	5.8	6.1	6.8	7.5	8.2	8.5	8.7	9.1	8.9	MOTOR VEHICLES
43.1	42.2	44.4	48.6	47.5	47.1	47.4	52.0	54.7	53.8	45.6	AIRCRAFT
1.4	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.9	1.9	OTHER TRANSPORTATION EQUIPMENT
10.4	11.7	10.7	10.1	12.0	11.8	11.6	12.2	12.8	12.5	12.2	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
1.5	1.4	1.3	1.3	1.3	1.2	1.1	1.2	1.3	1.0	0.9	MISCELLANEOUS MANUFACTURING
30.8	31.9	34.0	36.4	36.9	39.8	42.5	43.9	45.7	47.0	48.8	NONMANUFACTURING
0.9	0.9	1.0	1.1	1.1	1.2	1.2	1.3	1.6	1.7	1.8	PETROLEUM EXTRACTION
0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.5	0.3	0.4	0.4	MINING
0.6	0.5	0.6	0.7	0.8	0.8	1.0	1.2	1.3	1.5	1.6	CONSTRUCTION
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	RAILROADS
0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.2	OTHER TRANSPORTATION
0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.3	0.4	0.5	0.8	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	RADIO AND TV
0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.8	1.2	1.3	1.3	PUBLIC UTILITIES
17.6	18.5	20.2	22.5	22.5	24.5	27.8	28.4	29.3	30.2	31.0	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
8.8	8.9	8.9	8.8	9.0	8.5	8.1	8.7	9.0	8.5	8.8	ENGINEERING AND ARCHITECTURAL SERVICES
1.4	1.5	1.7	1.4	1.5	1.8	2.1	2.0	1.8	2.2	2.3	OTHER NONMANUFACTURING
29.6	31.8	35.4	37.4	44.4	46.9	47.5	48.8	47.4	45.5	45.6	..GOVERNMENT
28.9	31.0	34.3	36.4	43.4	46.0	46.6	48.0	46.6	44.7	44.8	FEDERAL
0.5	0.6	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5	STATE
0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	LOCAL
9.8	10.5	11.0	11.7	12.3	12.6	12.7	19.0	18.2	17.3	17.9	..COLLEGES AND UNIVERSITIES
2.4	2.8	3.5	4.2	4.3	4.6	5.0	5.2	5.3	5.3	5.1	..NONPROFIT INSTITUTIONS

Table A-9. Percent distribution: Estimated employment of engineers engaged in research and development, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	74.3	74.9	77.0	79.7	80.8	82.8	83.0	83.6	83.5	83.2
MANUFACTURING.....	60.0	61.0	64.3	67.4	68.3	69.6	69.4	70.6	70.8	70.6
ORDNANCE.....	0.5	0.7	1.9	2.7	2.6	2.5	2.3	3.2	3.2	5.9
FOOD.....	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4
TEXTILES AND APPAREL.....	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.2	0.2
LUMBER AND FURNITURE.....	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PAPER.....	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8
CHEMICALS.....	3.4	3.6	3.4	3.4	3.5	3.5	3.3	3.0	3.2	3.0
PETROLEUM REFINING.....	0.9	0.9	0.9	0.8	0.9	0.8	0.8	0.7	0.7	0.6
RUBBER.....	1.4	1.3	1.2	1.2	1.1	1.1	1.1	1.0	0.9	0.8
STONE, CLAY, AND GLASS.....	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6
PRIMARY METALS.....	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.9	0.9	1.0
FABRICATED METALS.....	3.2	3.3	2.9	2.9	2.7	2.8	2.7	2.6	2.5	2.2
MACHINERY.....	10.2	10.3	9.9	9.3	9.2	9.2	8.9	8.8	8.6	8.2
ELECTRICAL EQUIPMENT.....	17.0	16.6	16.6	17.3	17.9	18.3	18.4	19.0	21.0	20.6
MOTOR VEHICLES.....	4.7	4.5	3.8	3.4	3.3	3.3	3.0	2.6	2.6	2.4
AIRCRAFT.....	8.6	9.9	14.3	17.3	18.4	19.3	20.1	21.5	19.7	18.7
OTHER TRANSPORTATION EQUIPMENT.....	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	4.3	4.4	4.3	4.2	4.3	4.3	4.2	4.0	4.1	4.0
MISCELLANEOUS MANUFACTURING.....	1.2	1.0	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.6
NONMANUFACTURING.....	14.3	13.9	12.8	12.3	12.5	13.3	13.6	13.0	12.7	12.6
PETROLEUM EXTRACTION.....	0.5	0.5	0.4	0.4	0.5	0.4	0.5	0.5	0.4	0.4
MINING.....	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1
CONSTRUCTION.....	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2
RAILROADS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
OTHER TRANSPORTATION.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TELECOMMUNICATIONS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
MISCELLANEOUS BUSINESS SERVICES.....	8.4	8.1	7.2	6.9	6.8	7.1	7.1	6.7	6.9	7.1
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	3.6	3.7	3.6	3.6	3.7	3.8	4.3	4.2	3.8	3.7
OTHER NONMANUFACTURING.....	0.7	0.8	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.6
GOVERNMENT.....	19.3	19.2	17.7	15.3	14.1	11.7	11.7	11.4	11.5	11.9
FEDERAL.....	18.8	18.8	17.4	15.0	13.8	11.4	11.5	11.1	11.3	11.7
STATE.....	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.2
LOCAL.....	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
COLLEGES AND UNIVERSITIES.....	5.4	4.9	4.4	4.2	4.3	4.6	4.4	4.1	4.1	4.0
NONPROFIT INSTITUTIONS.....	1.1	0.9	0.9	0.8	0.8	1.0	0.9	0.9	0.9	0.9

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
83.2	82.9	82.5	82.9	81.0	80.6	80.8	79.6	80.3	80.9	79.9	..PRIVATE INDUSTRY
70.8	70.7	70.5	71.2	69.6	68.6	68.3	67.3	67.5	67.7	65.6	MANUFACTURING
6.4	7.4	8.0	8.4	8.6	8.9	9.2	8.5	8.0	8.2	6.5	ORDNANCE
0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	FOOD
0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	TEXTILES AND APPAREL
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	LUMBER AND FURNITURE
0.7	0.7	0.6	0.6	0.7	0.8	0.8	0.7	0.7	0.7	0.8	PAPER
3.1	3.0	3.3	3.4	3.6	3.5	3.4	3.2	3.1	3.3	3.5	CHEMICALS
0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.5	PETROLEUM REFINING
0.8	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	RUBBER
0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	STONE, CLAY, AND GLASS
1.0	1.1	0.9	0.8	0.9	0.8	0.7	0.7	0.6	0.8	0.9	PRIMARY METALS
2.2	2.2	2.0	1.9	1.8	1.8	1.9	2.1	2.0	2.2	2.3	FABRICATED METALS
8.1	8.3	8.1	8.3	8.3	8.3	8.3	8.2	8.4	8.1	8.1	MACHINERY
21.6	22.0	22.7	23.7	22.0	21.2	21.3	20.7	20.4	20.3	20.6	ELECTRICAL EQUIPMENT
2.3	2.2	2.0	2.0	2.1	2.3	2.4	2.4	2.4	2.6	2.6	MOTOR VEHICLES
17.3	16.0	15.6	15.6	14.8	14.3	14.0	14.5	15.2	15.1	13.3	AIRCRAFT
0.6	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.6	OTHER TRANSPORTATION EQUIPMENT
4.2	4.4	3.8	3.2	3.7	3.6	3.4	3.4	3.6	3.5	3.6	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.3	MISCELLANEOUS MANUFACTURING
12.4	12.1	12.0	11.7	11.5	12.0	12.5	12.3	12.7	13.2	14.3	NONMANUFACTURING
0.4	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.5	PETROLEUM EXTRACTION
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	MINING
0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5	CONSTRUCTION
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	RAILROADS
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	OTHER TRANSPORTATION
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	RADIO AND TV
0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.4	0.4	PUBLIC UTILITIES
7.1	7.0	7.1	7.2	7.0	7.4	8.2	7.9	8.2	8.5	9.1	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
3.5	3.4	3.1	2.8	2.8	2.6	2.4	2.4	2.5	2.4	2.6	ENGINEERING AND ARCHITECTURAL SERVICES
0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.7	OTHER NONMANUFACTURING
11.9	12.1	12.4	12.0	13.8	14.2	14.0	13.6	13.2	12.8	13.3	..GOVERNMENT
11.6	11.8	12.1	11.7	13.5	13.9	13.7	13.4	13.0	12.5	13.1	FEDERAL
0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	STATE
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	LOCAL
3.9	4.0	3.9	3.8	3.8	3.8	3.7	5.3	5.1	4.8	5.2	..COLLEGES AND UNIVERSITIES
1.0	1.1	1.2	1.4	1.3	1.4	1.5	1.5	1.5	1.5	1.5	..NONPROFIT INSTITUTIONS

Table A-10. Percent of engineers engaged in research and development, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	23.0	23.5	24.9	25.7	26.3	25.9	26.5	28.0	28.7	30.3
PRIVATE INDUSTRY.....	21.8	22.3	23.9	25.1	25.8	26.0	26.5	28.1	28.9	30.6
MANUFACTURING.....	29.2	29.8	31.3	32.6	33.4	34.2	34.9	36.6	37.5	39.4
ORDNANCE.....	26.3	25.0	25.0	25.7	26.5	28.9	30.1	38.4	41.4	52.1
FOOD.....	12.0	10.9	12.1	11.7	10.9	12.3	11.8	13.0	12.5	13.2
TEXTILES AND APPAREL.....	18.2	16.7	16.0	19.2	19.2	18.5	18.5	17.9	14.3	14.3
LUMBER AND FURNITURE.....	10.0	8.7	8.3	8.0	8.0	8.0	7.4	7.4	11.1	10.7
PAPER.....	25.6	25.0	25.0	25.0	24.1	24.1	25.4	23.9	24.3	25.0
CHEMICALS.....	16.2	17.5	18.8	19.1	20.1	20.3	20.4	20.3	21.4	22.6
PETROLEUM REFINING.....	13.1	13.4	14.5	14.6	14.8	14.3	14.0	13.8	14.1	14.1
RUBBER.....	30.2	29.8	29.8	29.8	29.3	28.8	29.0	28.8	28.4	27.1
STONE, CLAY, AND GLASS.....	11.9	12.8	13.7	15.1	14.5	15.3	15.6	16.2	16.9	17.3
PRIMARY METALS.....	8.0	7.9	8.0	8.1	7.9	8.3	8.9	9.7	10.5	12.4
FABRICATED METALS.....	21.1	21.5	21.3	22.0	21.8	22.3	22.6	23.1	23.4	23.2
MACHINERY.....	30.7	30.9	31.3	31.4	31.7	32.4	33.0	33.5	34.3	34.8
ELECTRICAL EQUIPMENT.....	39.5	40.0	40.5	41.0	41.5	41.9	42.0	42.3	44.8	47.9
MOTOR VEHICLES.....	28.0	28.4	28.3	28.8	28.7	28.7	28.1	27.9	28.6	28.9
AIRCRAFT.....	50.6	51.7	52.6	54.6	56.0	57.0	58.7	61.3	62.0	62.3
OTHER TRANSPORTATION EQUIPMENT.....	29.6	33.3	32.3	28.6	29.4	29.0	28.6	29.3	28.9	28.9
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	46.0	45.5	46.2	45.8	45.5	45.9	45.9	46.0	45.9	45.6
MISCELLANEOUS MANUFACTURING.....	28.9	28.2	26.8	28.6	27.9	29.5	28.3	27.7	29.2	28.6
NONMANUFACTURING.....	10.6	10.6	10.9	11.1	11.5	11.6	11.9	12.5	12.7	13.5
PETROLEUM EXTRACTION.....	8.3	8.2	7.7	7.8	8.3	7.7	7.8	7.6	7.3	8.1
MINING.....	2.2	2.2	4.3	4.1	4.3	6.7	6.5	6.3	5.9	5.9
CONSTRUCTION.....	0.8	0.7	1.0	0.9	0.9	1.1	1.0	1.2	1.2	1.2
RAILROADS.....	2.0	1.9	1.9	1.9	2.0	3.9	3.9	4.0	4.1	4.2
OTHER TRANSPORTATION.....	2.9	2.9	2.8	2.7	2.7	5.3	5.1	5.0	4.9	4.5
TELECOMMUNICATIONS.....	1.6	1.5	1.4	1.3	1.3	2.5	2.4	2.3	2.3	2.2
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	2.9	2.7	2.7	3.1	3.5	3.1	3.0	3.3	3.1	3.0
MISCELLANEOUS BUSINESS SERVICES.....	48.8	50.0	50.8	51.9	52.8	53.9	55.0	55.6	57.1	57.9
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	8.4	8.8	9.5	9.8	10.2	10.0	10.6	11.4	11.3	11.7
OTHER NONMANUFACTURING.....	7.9	8.8	8.4	9.1	9.6	10.0	9.4	10.2	10.7	10.9
GOVERNMENT.....	24.0	24.4	24.9	24.0	24.2	20.1	21.2	22.4	23.3	25.3
FEDERAL.....	45.6	44.1	42.9	41.3	44.0	36.5	38.5	41.0	43.1	46.5
STATE.....	1.1	1.0	0.9	1.0	0.9	0.9	1.3	1.2	1.1	1.4
LOCAL.....	1.1	1.1	1.1	1.1	1.1	1.0	1.0	0.9	0.9	0.9
COLLEGES AND UNIVERSITIES.....	45.5	47.7	52.4	55.0	55.1	54.6	51.0	46.8	44.6	42.6
NONPROFIT INSTITUTIONS.....	90.9	90.9	91.7	92.3	80.0	88.2	88.2	90.0	90.5	87.0

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
30.3	31.0	31.6	32.6	33.7	34.0	34.1	34.0	34.5	33.8	32.9	..ALL SECTORS
30.6	31.2	31.7	32.7	34.1	33.8	33.8	33.6	33.5	33.2	32.4	..PRIVATE INDUSTRY
39.4	39.9	40.2	41.5	43.0	43.2	42.7	42.3	41.7	41.3	41.1	MANUFACTURING
52.1	52.6	53.6	55.5	56.5	58.0	58.1	60.6	59.0	53.8	53.9	ORDNANCE
13.2	12.7	12.2	12.8	10.1	13.2	13.2	11.4	11.4	12.7	12.2	FOOD
14.3	13.8	14.8	17.9	26.7	17.6	17.1	16.2	21.1	21.1	24.3	TEXTILES AND APPAREL
10.7	10.3	10.0	10.0	10.0	9.7	12.1	11.1	10.3	11.9	11.4	LUMBER AND FURNITURE
25.0	23.7	21.7	20.5	22.7	24.4	30.0	29.7	26.6	25.8	28.3	PAPER
22.6	23.8	24.8	28.3	30.6	29.4	29.8	28.1	27.1	26.4	26.5	CHEMICALS
14.1	14.6	14.0	14.9	15.5	15.2	15.8	14.1	12.1	13.0	13.6	PETROLEUM REFINING
27.1	27.4	26.3	27.6	26.3	27.1	27.2	26.7	25.2	25.7	26.4	RUBBER
17.3	17.5	18.5	19.0	18.8	20.5	19.0	16.9	16.7	19.1	18.6	STONE, CLAY, AND GLASS
12.4	12.2	13.7	12.3	12.3	14.4	13.0	11.7	11.7	11.2	13.4	PRIMARY METALS
23.2	23.7	23.8	24.3	24.3	23.0	23.3	22.9	25.3	26.7	26.8	FABRICATED METALS
34.8	34.8	34.8	35.4	37.1	36.6	37.4	37.5	36.0	36.3	35.6	MACHINERY
47.9	49.0	48.7	52.2	54.6	54.3	53.0	53.2	52.3	49.2	49.3	ELECTRICAL EQUIPMENT
28.9	28.8	28.4	28.4	28.0	28.2	28.2	28.2	29.0	30.5	31.3	MOTOR VEHICLES
62.3	62.7	62.9	62.4	63.9	64.3	62.4	62.2	61.5	60.4	60.2	AIRCRAFT
28.9	29.8	26.1	28.3	27.1	29.8	30.6	28.8	28.1	30.4	35.8	OTHER TRANSPORTATION EQUIPMENT
45.6	45.8	48.1	41.3	37.5	45.1	42.3	39.2	40.5	43.0	41.7	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
28.6	30.0	29.8	26.5	25.0	27.1	24.5	22.9	25.0	28.9	21.7	MISCELLANEOUS MANUFACTURING
13.5	13.9	14.2	14.6	15.1	14.6	15.4	15.9	16.1	16.2	15.6	NONMANUFACTURING
8.1	7.4	7.2	8.3	8.3	8.5	9.8	10.3	10.8	13.2	13.6	PETROLEUM EXTRACTION
5.9	6.1	6.1	6.7	8.3	6.5	5.8	7.3	9.4	5.4	6.5	MINING
1.2	1.3	1.1	1.3	1.5	1.7	1.7	2.0	2.5	2.8	2.8	CONSTRUCTION
4.2	4.2	4.3	4.3	4.7	4.3	4.9	5.0	4.8	5.0	5.1	RAILROADS
4.5	4.4	4.1	4.1	4.3	6.1	5.7	5.7	7.7	7.7	5.6	OTHER TRANSPORTATION
2.2	2.2	2.2	2.1	3.1	2.9	3.4	4.2	2.4	2.7	3.3	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	2.1	2.0	2.0	1.9	3.6	3.4	RADIO AND TV
3.0	2.9	3.2	3.0	3.4	3.3	3.1	3.1	3.1	4.5	4.8	PUBLIC UTILITIES
57.9	58.9	60.7	64.5	64.7	62.2	70.6	78.5	71.9	67.0	61.6	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
11.7	12.0	12.3	11.9	11.4	10.6	9.8	9.0	9.4	9.6	8.7	ENGINEERING AND ARCHITECTURAL SERVICES
10.9	10.6	10.9	10.4	8.3	7.8	8.9	9.8	9.0	7.6	8.6	OTHER NONMANUFACTURING
25.3	26.3	26.9	28.0	28.1	32.3	33.1	33.3	34.1	32.0	30.6	..GOVERNMENT
46.5	49.3	50.2	50.8	49.9	56.8	57.7	58.2	59.2	54.1	51.4	FEDERAL
1.4	1.7	1.9	2.4	2.0	2.0	1.7	1.7	1.5	1.4	1.4	STATE
0.9	0.8	0.8	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	LOCAL
42.6	42.1	42.3	41.5	41.2	39.0	37.7	36.2	49.6	46.5	43.4	..COLLEGES AND UNIVERSITIES
87.0	88.9	87.5	87.5	87.5	86.0	85.2	89.3	91.2	91.4	91.4	..NONPROFIT INSTITUTIONS

Table A-11. Estimated employment of scientists, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	148.7	161.2	178.4	192.5	202.6	211.2	227.3	251.0	270.9	289.9
PRIVATE INDUSTRY.....	76.0	83.9	94.2	104.2	111.0	113.9	120.9	131.5	138.1	144.2
MANUFACTURING.....	51.8	59.2	68.0	75.8	80.6	82.4	87.2	95.8	100.7	104.5
ORDNANCE.....	0.2	0.2	0.8	1.4	1.4	1.3	1.3	1.7	1.6	2.9
FOOD.....	4.7	5.1	5.4	5.6	5.7	5.9	6.0	6.2	6.4	6.6
TEXTILES AND APPAREL.....	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2
LUMBER AND FURNITURE.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4
PAPER.....	1.7	2.0	2.1	2.2	2.3	2.5	2.7	2.9	3.0	3.1
CHEMICALS.....	19.7	23.6	27.5	30.5	33.4	33.8	35.8	39.0	42.1	43.1
PETROLEUM REFINING.....	2.6	2.8	3.1	3.5	3.7	3.9	3.9	3.9	4.1	4.1
RUBBER.....	1.8	1.9	2.1	2.2	2.2	2.2	2.3	2.4	2.4	2.4
STONE, CLAY, AND GLASS.....	1.2	1.3	1.3	1.6	1.6	1.6	1.8	1.8	2.0	2.0
PRIMARY METALS.....	4.4	5.0	5.5	5.9	6.2	6.0	6.5	7.3	7.7	8.1
FABRICATED METALS.....	1.2	1.4	1.5	1.6	1.6	1.7	1.9	1.9	1.9	1.9
MACHINERY.....	2.3	2.7	3.0	3.2	3.2	3.3	3.5	4.0	4.0	4.2
ELECTRICAL EQUIPMENT.....	4.4	4.8	5.5	6.2	6.5	6.8	7.1	8.2	8.9	8.8
MOTOR VEHICLES.....	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.2	2.1	2.4
AIRCRAFT.....	1.6	2.1	3.5	4.8	5.5	6.0	6.7	8.2	8.2	8.2
OTHER TRANSPORTATION EQUIPMENT.....	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	1.8	1.9	2.3	2.6	2.7	2.7	2.9	3.1	3.3	3.6
MISCELLANEOUS MANUFACTURING.....	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3
NONMANUFACTURING.....	24.2	24.7	26.2	28.4	30.4	31.5	33.7	35.7	37.4	39.7
PETROLEUM EXTRACTION.....	8.5	8.4	8.6	9.8	10.3	10.9	11.2	12.1	12.1	12.1
MINING.....	1.3	1.2	1.4	1.5	1.4	1.4	1.5	1.6	1.7	1.8
CONSTRUCTION.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
RAILROADS.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
OTHER TRANSPORTATION.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
TELECOMMUNICATIONS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.5	0.5	0.5	0.7	0.7	0.7	0.7	0.8	0.9	0.9
MISCELLANEOUS BUSINESS SERVICES.....	6.9	7.2	7.9	8.2	8.8	9.2	10.1	10.7	11.9	13.4
MEDICAL AND DENTAL LABORATORIES.....	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.9	0.9	1.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.8	1.0	1.1	1.2	1.5	1.5	1.9	2.1	2.1	2.1
OTHER NONMANUFACTURING.....	5.1	5.2	5.5	5.7	6.2	6.3	6.7	6.8	7.1	7.6
GOVERNMENT.....	31.1	36.4	42.2	44.6	44.0	45.2	47.8	50.8	51.9	55.0
FEDERAL.....	20.9	25.6	30.9	33.1	31.7	32.7	34.5	36.5	37.0	39.2
STATE.....	7.5	7.9	8.4	8.4	9.0	9.0	9.5	10.1	10.5	11.1
LOCAL.....	2.7	2.9	2.9	3.1	3.3	3.5	3.8	4.2	4.4	4.7
COLLEGES AND UNIVERSITIES.....	39.1	38.3	38.9	40.3	44.0	48.2	54.7	64.2	76.0	85.1
NONPROFIT INSTITUTIONS.....	2.5	2.6	3.1	3.4	3.5	3.9	3.9	4.5	4.9	5.6

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
302.9	318.2	337.1	358.1	381.5	396.4	417.9	439.0	462.6	482.7	496.5	..ALL SECTORS
149.4	155.3	162.2	168.7	175.0	178.9	188.1	193.4	200.5	209.5	213.1	..PRIVATE INDUSTRY
109.3	114.7	119.5	123.3	125.6	127.1	133.1	136.5	141.9	145.8	146.6	MANUFACTURING
3.7	4.4	5.9	6.6	7.2	7.9	8.4	9.0	8.7	9.0	7.3	ORDNANCE
6.9	7.2	7.1	7.4	7.3	7.3	7.0	7.0	7.3	7.3	7.5	FOOD
1.3	1.3	1.3	1.3	1.7	2.3	2.6	1.8	2.0	2.1	2.0	TEXTILES AND APPAREL
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	LUMBER AND FURNITURE
3.3	3.5	3.8	3.8	4.2	4.0	4.2	4.6	5.3	5.5	5.5	PAPER
45.3	47.2	49.9	50.4	51.4	53.2	57.1	57.1	57.8	59.3	60.9	CHEMICALS
4.3	4.2	4.3	4.3	4.3	3.9	3.9	4.0	4.0	3.9	4.0	PETROLEUM REFINING
2.4	2.6	2.7	3.1	3.0	3.0	3.4	3.4	3.6	3.6	3.8	RUBBER
2.0	2.1	2.1	2.2	2.2	2.1	2.3	2.4	2.3	2.4	2.5	STONE, CLAY, AND GLASS
8.6	9.8	9.2	8.4	7.6	7.1	7.2	7.8	8.8	9.3	8.9	PRIMARY METALS
2.0	2.0	2.1	2.3	2.5	2.7	2.3	2.6	2.4	2.5	2.6	FABRICATED METALS
4.5	4.9	5.2	5.8	6.6	6.6	6.5	7.1	7.8	8.7	9.0	MACHINERY
9.2	9.9	10.2	11.3	10.5	10.0	10.6	10.5	11.5	12.1	12.8	ELECTRICAL EQUIPMENT
2.4	2.4	2.4	2.8	3.2	3.0	3.0	3.1	3.3	3.3	3.4	MOTOR VEHICLES
7.6	7.0	6.8	6.9	7.0	6.8	7.1	8.3	9.3	8.9	8.0	AIRCRAFT
0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.1	0.2	OTHER TRANSPORTATION EQUIPMENT
3.9	4.2	4.5	4.6	4.6	4.9	5.2	5.7	5.6	5.7	6.0	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
1.3	1.4	1.4	1.5	1.7	1.6	1.6	1.5	1.4	1.6	1.6	MISCELLANEOUS MANUFACTURING
40.1	40.6	42.7	45.4	49.4	51.8	55.0	56.9	58.6	63.6	66.5	NONMANUFACTURING
11.2	10.8	10.8	10.6	10.8	12.0	12.2	12.6	12.9	13.3	13.0	PETROLEUM EXTRACTION
1.8	1.9	1.9	2.0	1.9	1.7	1.7	1.8	1.5	1.4	1.7	MINING
0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	CONSTRUCTION
0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	RAILROADS
0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.4	0.3	OTHER TRANSPORTATION
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.4	0.4	0.3	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.9	1.0	0.8	1.0	1.2	1.2	1.1	1.1	1.1	1.3	1.4	PUBLIC UTILITIES
14.4	15.2	16.4	18.3	19.8	20.4	21.6	21.6	22.2	25.5	27.4	MISCELLANEOUS BUSINESS SERVICES
1.0	1.0	1.1	1.1	1.2	1.3	1.4	1.5	1.5	1.4	1.5	MEDICAL AND DENTAL LABORATORIES
2.1	2.1	2.3	2.3	3.2	2.1	2.9	3.3	3.5	3.7	3.8	ENGINEERING AND ARCHITECTURAL SERVICES
7.8	8.0	8.7	9.4	10.5	12.2	13.2	13.7	14.5	15.5	16.2	OTHER NONMANUFACTURING
56.0	58.4	62.0	66.3	69.6	72.9	75.7	78.1	83.7	84.4	86.2	..GOVERNMENT
39.3	40.4	43.1	47.0	50.0	52.4	54.1	54.9	59.2	59.3	60.0	FEDERAL
11.9	12.7	13.4	13.7	14.0	14.8	15.7	17.0	17.9	18.4	19.3	STATE
4.8	5.3	5.5	5.6	5.6	5.7	5.9	6.2	6.6	6.7	6.9	LOCAL
91.5	97.7	104.4	113.2	126.7	134.4	143.0	156.0	166.7	177.2	186.5	..COLLEGES AND UNIVERSITIES
6.0	6.8	8.5	9.9	10.2	10.3	11.1	11.5	11.7	11.6	10.7	..NONPROFIT INSTITUTIONS

Table A-12. Percent distribution: Estimated employment of scientists, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	51.1	52.0	52.8	54.1	54.8	53.9	53.2	52.4	51.0	49.7
MANUFACTURING.....	34.8	36.7	38.1	39.4	39.8	39.0	38.4	38.2	37.2	36.0
ORDNANCE.....	0.1	0.1	0.4	0.7	0.7	0.6	0.6	0.7	0.6	1.0
FOOD.....	3.2	3.2	3.0	2.9	2.8	2.8	2.6	2.5	2.4	2.3
TEXTILES AND APPAREL.....	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4
LUMBER AND FURNITURE.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
PAPER.....	1.1	1.2	1.2	1.1	1.1	1.2	1.2	1.2	1.1	1.1
CHEMICALS.....	13.2	14.6	15.4	15.8	16.5	16.0	15.8	15.5	15.5	14.9
PETROLEUM REFINING.....	1.7	1.7	1.7	1.8	1.8	1.8	1.7	1.6	1.5	1.4
RUBBER.....	1.2	1.2	1.2	1.1	1.1	1.0	1.0	1.0	0.9	0.8
STONE, CLAY, AND GLASS.....	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.7	0.7	0.7
PRIMARY METALS.....	3.0	3.1	3.1	3.1	3.1	2.8	2.9	2.9	2.8	2.8
FABRICATED METALS.....	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7
MACHINERY.....	1.5	1.7	1.7	1.7	1.6	1.6	1.5	1.6	1.5	1.4
ELECTRICAL EQUIPMENT.....	3.0	3.0	3.1	3.2	3.2	3.2	3.1	3.3	3.3	3.0
MOTOR VEHICLES.....	1.3	1.2	1.1	1.0	1.0	0.9	0.9	0.9	0.8	0.8
AIRCRAFT.....	1.1	1.3	2.0	2.5	2.7	2.8	2.9	3.3	3.0	2.8
OTHER TRANSPORTATION EQUIPMENT.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	1.2	1.2	1.3	1.4	1.3	1.3	1.3	1.2	1.2	1.2
MISCELLANEOUS MANUFACTURING.....	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4
NONMANUFACTURING.....	16.3	15.3	14.7	14.8	15.0	14.9	14.8	14.2	13.8	13.7
PETROLEUM EXTRACTION.....	5.7	5.2	4.8	5.1	5.1	5.2	4.9	4.8	4.5	4.2
MINING.....	0.9	0.7	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6
CONSTRUCTION.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RAILROADS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
OTHER TRANSPORTATION.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TELECOMMUNICATIONS.....	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
MISCELLANEOUS BUSINESS SERVICES.....	4.6	4.5	4.4	4.3	4.3	4.4	4.4	4.3	4.4	4.6
MEDICAL AND DENTAL LABORATORIES.....	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.7
OTHER NONMANUFACTURING.....	3.4	3.2	3.1	3.0	3.1	3.0	2.9	2.7	2.6	2.6
GOVERNMENT.....	20.9	22.6	23.7	23.2	21.7	21.4	21.0	20.2	19.2	19.0
FEDERAL.....	14.1	15.9	17.3	17.2	15.6	15.5	15.2	14.5	13.7	13.5
STATE.....	5.0	4.9	4.7	4.4	4.4	4.3	4.2	4.0	3.9	3.8
LOCAL.....	1.8	1.8	1.6	1.6	1.6	1.7	1.7	1.7	1.6	1.6
COLLEGES AND UNIVERSITIES.....	26.3	23.8	21.8	20.9	21.7	22.8	24.1	25.6	28.1	29.4
NONPROFIT INSTITUTIONS.....	1.7	1.6	1.7	1.8	1.7	1.8	1.7	1.8	1.8	1.9

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
49.3	48.8	48.1	47.1	45.9	45.1	45.0	44.1	43.3	43.4	42.9	..PRIVATE INDUSTRY
36.1	36.0	35.4	34.4	32.9	32.1	31.8	31.1	30.7	30.2	29.5	MANUFACTURING
1.2	1.4	1.8	1.8	1.9	2.0	2.0	2.1	1.9	1.9	1.5	ORDNANCE
2.3	2.3	2.1	2.1	1.9	1.8	1.7	1.6	1.6	1.5	1.5	FOOD
0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.4	0.4	0.4	0.4	TEXTILES AND APPAREL
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	LUMBER AND FURNITURE
1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	PAPER
15.0	14.8	14.8	14.1	13.5	13.4	13.7	13.0	12.5	12.3	12.3	CHEMICALS
1.4	1.3	1.3	1.2	1.1	1.0	0.9	0.9	0.9	0.8	0.8	PETROLEUM REFINING
0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.8	RUBBER
0.7	0.7	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.5	STONE, CLAY, AND GLASS
2.8	3.1	2.7	2.3	2.0	1.8	1.7	1.8	1.9	1.9	1.8	PRIMARY METALS
0.7	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.5	0.5	0.5	FABRICATED METALS
1.5	1.5	1.5	1.6	1.7	1.7	1.6	1.6	1.7	1.8	1.8	MACHINERY
3.0	3.1	3.0	3.2	2.8	2.5	2.5	2.4	2.5	2.5	2.6	ELECTRICAL EQUIPMENT
0.8	0.8	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	MOTOR VEHICLES
2.5	2.2	2.0	1.9	1.8	1.7	1.7	1.9	2.0	1.8	1.6	AIRCRAFT
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.3	1.2	1.2	1.2	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	MISCELLANEOUS MANUFACTURING
13.2	12.8	12.7	12.7	12.9	13.1	13.2	13.0	12.7	13.2	13.4	NONMANUFACTURING
3.7	3.4	3.2	3.0	2.8	3.0	2.9	2.9	2.8	2.8	2.6	PETROLEUM EXTRACTION
0.6	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	MINING
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	CONSTRUCTION
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	RAILROADS
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	PUBLIC UTILITIES
4.8	4.8	4.9	5.1	5.2	5.1	5.2	4.9	4.8	5.3	5.5	MISCELLANEOUS BUSINESS SERVICES
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	MEDICAL AND DENTAL LABORATORIES
0.7	0.7	0.7	0.6	0.8	0.5	0.7	0.8	0.8	0.8	0.8	ENGINEERING AND ARCHITECTURAL SERVICES
2.6	2.5	2.6	2.6	2.8	3.1	3.2	3.1	3.1	3.2	3.3	OTHER NONMANUFACTURING
18.5	18.4	18.4	18.5	18.2	18.4	18.1	17.8	18.1	17.5	17.4	..GOVERNMENT
13.0	12.7	12.8	13.1	13.1	13.2	12.9	12.5	12.8	12.3	12.1	FEDERAL
3.9	4.0	4.0	3.8	3.7	3.7	3.8	3.9	3.9	3.8	3.9	STATE
1.6	1.7	1.6	1.6	1.5	1.4	1.4	1.4	1.4	1.4	1.4	LOCAL
30.2	30.7	31.0	31.6	33.2	33.9	34.2	35.5	36.0	36.7	37.6	..COLLEGES AND UNIVERSITIES
2.0	2.1	2.5	2.8	2.7	2.6	2.7	2.6	2.5	2.4	2.2	..NONPROFIT INSTITUTIONS

Table A-13. Estimated employment of scientists engaged in research and development, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	63.6	69.6	78.7	85.0	90.5	92.9	99.9	110.9	120.1	129.3
PRIVATE INDUSTRY.....	32.5	36.4	41.5	46.2	49.6	51.3	55.6	62.3	66.5	70.4
MANUFACTURING.....	25.9	29.4	34.0	38.1	41.0	42.1	45.6	51.1	54.7	57.6
ORDNANCE.....	0.1	0.1	0.5	0.9	0.9	0.8	0.8	1.3	1.4	2.5
FOOD.....	1.9	2.2	2.2	2.4	2.5	2.5	2.6	2.7	2.8	2.9
TEXTILES AND APPAREL.....	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
PAPER.....	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.8	1.9	2.0
CHEMICALS.....	9.9	11.6	13.0	14.6	15.8	16.5	17.9	20.1	22.6	23.3
PETROLEUM REFINING.....	0.9	1.1	1.2	1.3	1.5	1.6	1.6	1.6	1.7	1.7
RUBBER.....	1.1	1.2	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4
STONE, CLAY, AND GLASS.....	0.5	0.6	0.7	0.7	0.8	0.8	1.0	1.1	1.1	1.2
PRIMARY METALS.....	1.1	1.3	1.5	1.6	1.6	1.7	2.0	2.3	2.4	2.3
FABRICATED METALS.....	0.6	0.6	0.7	0.7	0.8	0.8	0.9	0.9	0.9	1.0
MACHINERY.....	1.8	2.0	2.3	2.4	2.5	2.4	2.3	2.4	2.2	2.1
ELECTRICAL EQUIPMENT.....	3.3	3.4	3.9	4.4	4.7	4.8	5.3	6.2	7.1	7.5
MOTOR VEHICLES.....	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
AIRCRAFT.....	1.2	1.5	2.6	3.4	3.9	4.1	4.6	5.6	5.3	5.6
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.9	1.0	1.1	1.3	1.4	1.4	1.5	1.6	1.7	1.9
MISCELLANEOUS MANUFACTURING.....	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
NONMANUFACTURING.....	6.6	7.0	7.5	8.1	8.6	9.2	10.0	11.2	11.8	12.3
PETROLEUM EXTRACTION.....	1.6	1.6	1.7	1.9	1.9	2.1	2.1	2.3	2.3	2.2
MINING.....	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
TELECOMMUNICATIONS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	3.6	3.9	4.3	4.6	5.0	5.3	5.9	6.6	7.2	8.2
MEDICAL AND DENTAL LABORATORIES.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.4	0.5	0.5	0.6	0.7	0.9	1.0	1.2	1.2	1.3
OTHER NONMANUFACTURING.....	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
GOVERNMENT.....	11.2	12.6	13.8	13.5	13.4	11.7	12.8	14.1	15.3	17.4
FEDERAL.....	9.7	11.0	12.1	11.7	11.5	9.8	10.8	12.0	13.0	14.9
STATE.....	1.1	1.2	1.3	1.3	1.4	1.4	1.4	1.5	1.6	1.8
LOCAL.....	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.7
COLLEGES AND UNIVERSITIES.....	17.8	18.4	20.8	22.6	24.5	26.7	28.2	30.7	34.3	36.8
NONPROFIT INSTITUTIONS.....	2.1	2.2	2.6	2.7	3.0	3.2	3.3	3.8	4.0	4.7

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
137.9	146.4	157.4	164.6	176.1	182.8	186.4	195.7	193.7	192.2	193.8	..ALL SECTORS
75.7	78.8	84.2	85.4	90.3	93.9	95.7	99.0	98.3	99.1	99.2	..PRIVATE INDUSTRY
62.0	64.6	69.5	68.9	72.9	74.3	75.2	76.4	75.1	74.8	74.3	MANUFACTURING
3.2	3.8	4.4	4.9	5.7	5.9	6.2	6.3	5.1	5.1	4.1	ORDNANCE
3.1	3.2	3.1	3.2	3.6	3.5	3.2	3.2	3.3	3.4	3.5	FOOD
0.7	0.6	0.6	0.7	0.8	1.1	1.3	1.0	0.9	1.0	1.2	TEXTILES AND APPAREL
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	LUMBER AND FURNITURE
2.2	2.4	2.5	2.2	2.1	2.0	2.3	2.3	2.3	2.3	2.5	PAPER
24.8	26.0	27.5	28.5	29.1	30.4	31.6	32.4	31.8	31.9	32.8	CHEMICALS
1.8	1.7	2.0	2.1	2.2	2.3	2.2	2.2	2.2	2.1	1.9	PETROLEUM REFINING
1.4	1.4	1.3	1.4	1.3	1.5	1.5	1.5	1.6	1.6	1.7	RUBBER
1.4	1.4	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.8	1.8	STONE, CLAY, AND GLASS
2.5	2.7	2.5	2.2	2.4	1.9	1.4	1.5	1.7	1.3	1.4	PRIMARY METALS
1.0	1.0	1.0	1.1	1.4	1.2	1.0	1.3	1.4	1.4	1.4	FABRICATED METALS
2.4	2.7	3.3	3.1	4.2	4.2	4.1	4.1	4.0	4.3	4.0	MACHINERY
8.4	8.7	9.2	8.8	8.6	8.1	8.0	8.0	8.6	8.5	8.2	ELECTRICAL EQUIPMENT
0.7	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.2	1.0	1.0	MOTOR VEHICLES
5.4	5.2	5.9	5.2	5.3	5.8	5.6	5.8	5.6	5.5	4.9	AIRCRAFT
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	OTHER TRANSPORTATION EQUIPMENT
2.1	2.3	2.9	2.4	2.9	3.1	3.2	3.0	2.8	2.7	2.7	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.7	0.7	0.9	0.6	0.7	0.6	0.8	0.8	0.7	0.6	0.7	MISCELLANEOUS MANUFACTURING
13.7	14.2	14.7	16.5	17.4	19.6	20.5	22.6	23.2	24.3	24.9	NONMANUFACTURING
2.1	2.0	2.0	2.1	2.2	2.4	2.4	2.6	2.6	2.7	2.7	PETROLEUM EXTRACTION
0.3	0.3	0.3	0.2	0.2	0.4	0.5	0.6	0.4	0.4	0.5	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.4	0.3	OTHER TRANSPORTATION
0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.3	0.4	0.4	0.3	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	PUBLIC UTILITIES
9.0	9.4	9.6	11.7	12.0	13.5	14.5	15.3	15.9	16.5	16.9	MISCELLANEOUS BUSINESS SERVICES
0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.3	0.4	0.4	MEDICAL AND DENTAL LABORATORIES
1.4	1.5	1.7	1.4	1.8	1.9	1.5	1.9	1.9	1.9	2.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.5	0.5	0.6	0.6	0.7	0.7	0.9	1.0	1.2	1.2	1.3	OTHER NONMANUFACTURING
18.5	20.0	21.9	23.4	27.0	28.3	28.8	29.4	29.0	28.0	28.2	..GOVERNMENT
15.8	17.0	18.8	20.2	23.8	25.2	25.7	26.5	25.8	24.7	24.8	FEDERAL
2.0	2.2	2.3	2.4	2.4	2.3	2.2	2.1	2.2	2.3	2.4	STATE
0.7	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.0	1.0	LOCAL
38.8	41.9	44.2	47.6	50.2	51.9	52.9	58.1	57.1	55.8	57.8	..COLLEGES AND UNIVERSITIES
4.9	5.7	7.1	8.2	8.6	8.7	9.0	9.2	9.3	9.3	8.6	..NONPROFIT INSTITUTIONS

Table A-14. Percent distribution: Estimated employment of scientists engaged in research and development, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	51.1	52.3	52.7	54.4	54.8	55.2	55.7	56.2	55.4	54.4
MANUFACTURING.....	40.7	42.2	43.2	44.8	45.3	45.3	45.6	46.1	45.5	44.5
ORDNANCE.....	0.2	0.1	0.6	1.1	1.0	0.9	0.8	1.2	1.2	1.9
FOOD.....	3.0	3.2	2.8	2.8	2.8	2.7	2.6	2.4	2.3	2.2
TEXTILES AND APPAREL.....	0.5	0.6	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
PAPER.....	1.9	1.9	1.8	1.6	1.7	1.7	1.7	1.6	1.6	1.5
CHEMICALS.....	15.6	16.7	16.5	17.2	17.5	17.8	17.9	18.1	18.8	18.0
PETROLEUM REFINING.....	1.4	1.6	1.5	1.5	1.7	1.7	1.6	1.4	1.4	1.3
RUBBER.....	1.7	1.7	1.7	1.5	1.4	1.4	1.3	1.3	1.2	1.1
STONE, CLAY, AND GLASS.....	0.8	0.9	0.9	0.8	0.9	0.9	1.0	1.0	0.9	0.9
PRIMARY METALS.....	1.7	1.9	1.9	1.9	1.8	1.8	2.0	2.1	2.0	1.8
FABRICATED METALS.....	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.8	0.7	0.8
MACHINERY.....	2.8	2.9	2.9	2.8	2.8	2.6	2.3	2.2	1.8	1.6
ELECTRICAL EQUIPMENT.....	5.2	4.9	5.0	5.2	5.2	5.2	5.3	5.6	5.9	5.8
MOTOR VEHICLES.....	0.9	0.9	0.8	0.7	0.7	0.6	0.7	0.6	0.6	0.5
AIRCRAFT.....	1.9	2.2	3.3	4.0	4.3	4.4	4.6	5.0	4.4	4.3
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.4	1.4	1.5
MISCELLANEOUS MANUFACTURING.....	0.8	0.7	0.8	0.7	0.7	0.6	0.7	0.6	0.6	0.5
NONMANUFACTURING.....	10.4	10.1	9.5	9.5	9.5	9.9	10.0	10.1	9.8	9.9
PETROLEUM EXTRACTION.....	2.5	2.3	2.2	2.2	2.1	2.3	2.1	2.1	1.9	1.7
MINING.....	0.5	0.4	0.4	0.4	0.3	0.2	0.2	0.3	0.2	0.2
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
TELECOMMUNICATIONS.....	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	5.7	5.6	5.5	5.4	5.5	5.7	5.9	6.0	6.0	6.3
MEDICAL AND DENTAL LABORATORIES.....	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.6	0.7	0.6	0.7	0.8	1.0	1.0	1.1	1.0	1.0
OTHER NONMANUFACTURING.....	0.5	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3
GOVERNMENT.....	17.6	18.1	17.5	15.9	14.8	12.6	12.8	12.7	12.7	13.5
FEDERAL.....	15.3	15.8	15.4	13.8	12.7	10.5	10.8	10.8	10.8	11.5
STATE.....	1.7	1.7	1.7	1.5	1.5	1.5	1.4	1.4	1.3	1.4
LOCAL.....	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.5	0.6	0.5
COLLEGES AND UNIVERSITIES.....	28.0	26.4	26.4	26.6	27.1	28.7	28.2	27.7	28.6	28.5
NONPROFIT INSTITUTIONS.....	3.3	3.2	3.3	3.2	3.3	3.4	3.3	3.4	3.3	3.6

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
54.9	53.8	53.5	51.9	51.3	51.4	51.3	50.6	50.7	51.6	51.2	..PRIVATE INDUSTRY
45.0	44.1	44.2	41.9	41.4	40.6	40.3	39.0	38.8	38.9	38.3	MANUFACTURING
2.3	2.6	2.8	3.0	3.2	3.2	3.3	3.2	2.6	2.7	2.1	ORDNANCE
2.2	2.2	2.0	1.9	2.0	1.9	1.7	1.6	1.7	1.8	1.8	FOOD
0.5	0.4	0.4	0.4	0.5	0.6	0.7	0.5	0.5	0.5	0.6	TEXTILES AND APPAREL
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	LUMBER AND FURNITURE
1.6	1.6	1.6	1.3	1.2	1.1	1.2	1.2	1.2	1.2	1.3	PAPER
18.0	17.8	17.5	17.3	16.5	16.6	17.0	16.6	16.4	16.6	16.9	CHEMICALS
1.3	1.2	1.3	1.3	1.2	1.3	1.2	1.1	1.1	1.1	1.0	PETROLEUM REFINING
1.0	1.0	0.8	0.9	0.7	0.8	0.8	0.8	0.8	0.8	0.9	RUBBER
1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	STONE, CLAY, AND GLASS
1.8	1.8	1.6	1.3	1.4	1.0	0.8	0.8	0.9	0.7	0.7	PRIMARY METALS
0.7	0.7	0.6	0.7	0.8	0.7	0.5	0.7	0.7	0.7	0.7	FABRICATED METALS
1.7	1.8	2.1	1.9	2.4	2.3	2.2	2.1	2.1	2.2	2.1	MACHINERY
6.1	5.9	5.8	5.3	4.9	4.4	4.3	4.1	4.4	4.4	4.2	ELECTRICAL EQUIPMENT
0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	MOTOR VEHICLES
3.9	3.6	3.7	3.2	3.0	3.2	3.0	3.0	2.9	2.9	2.5	AIRCRAFT
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	OTHER TRANSPORTATION EQUIPMENT
1.5	1.6	1.8	1.5	1.6	1.7	1.7	1.5	1.4	1.4	1.4	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.5	0.5	0.6	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.4	MISCELLANEOUS MANUFACTURING
9.9	9.7	9.3	10.0	9.9	10.7	11.0	11.5	12.0	12.6	12.8	NONMANUFACTURING
1.5	1.4	1.3	1.3	1.2	1.3	1.3	1.3	1.3	1.4	1.4	PETROLEUM EXTRACTION
0.2	0.2	0.2	0.1	0.1	0.2	0.3	0.3	0.2	0.2	0.3	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	OTHER TRANSPORTATION
0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.2	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	PUBLIC UTILITIES
6.5	6.4	6.1	7.1	6.8	7.4	7.8	7.8	8.2	8.6	8.7	MISCELLANEOUS BUSINESS SERVICES
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	MEDICAL AND DENTAL LABORATORIES
1.0	1.0	1.1	0.9	1.0	1.0	0.8	1.0	1.0	1.0	1.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7	OTHER NONMANUFACTURING
13.4	13.7	13.9	14.2	15.3	15.5	15.5	15.0	15.0	14.6	14.6	..GOVERNMENT
11.5	11.6	11.9	12.3	13.5	13.8	13.8	13.5	13.3	12.9	12.8	FEDERAL
1.5	1.5	1.5	1.5	1.4	1.3	1.2	1.1	1.1	1.2	1.2	STATE
0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	LOCAL
28.1	28.6	28.1	28.9	28.5	28.4	28.4	29.7	29.5	29.0	29.8	..COLLEGES AND UNIVERSITIES
3.6	3.9	4.5	5.0	4.9	4.8	4.8	4.7	4.9	4.8	4.4	..NONPROFIT INSTITUTIONS

Table A-15. Percent of scientists engaged in research and development, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	42.8	43.2	44.1	44.2	44.7	44.0	44.0	44.2	44.3	44.6
PRIVATE INDUSTRY.....	42.8	43.4	44.1	44.3	44.7	45.0	46.0	47.4	48.2	48.8
MANUFACTURING.....	50.0	49.7	50.0	50.3	50.9	51.1	52.3	53.3	54.3	55.1
ORDNANCE.....	50.0	50.0	62.5	64.3	64.3	61.5	61.5	76.5	87.5	86.2
FOOD.....	40.4	43.1	40.7	42.9	43.9	42.4	43.3	43.5	43.8	43.9
TEXTILES AND APPAREL.....	33.3	40.0	40.0	40.0	40.0	36.4	45.5	45.5	54.5	50.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	50.0	50.0	50.0	25.0	25.0	25.0
PAPER.....	70.6	65.0	66.7	63.6	65.2	64.0	63.0	62.1	63.3	64.5
CHEMICALS.....	50.3	49.2	47.3	47.9	47.3	48.8	50.0	51.5	53.7	54.1
PETROLEUM REFINING.....	34.6	39.3	38.7	37.1	40.5	41.0	41.0	41.0	41.5	41.5
RUBBER.....	61.1	63.2	61.9	59.1	59.1	59.1	56.5	58.3	58.3	58.3
STONE, CLAY, AND GLASS.....	41.7	46.2	53.8	43.7	50.0	50.0	55.6	61.1	55.0	60.0
PRIMARY METALS.....	25.0	26.0	27.3	27.1	25.8	28.3	30.8	31.5	31.2	28.4
FABRICATED METALS.....	50.0	42.9	46.7	43.7	50.0	47.1	47.4	47.4	47.4	52.6
MACHINERY.....	78.3	74.1	76.7	75.0	78.1	72.7	65.7	60.0	55.0	50.0
ELECTRICAL EQUIPMENT.....	75.0	70.8	70.9	71.0	72.3	70.6	74.6	75.6	79.8	85.2
MOTOR VEHICLES.....	31.6	31.6	31.6	31.6	30.0	30.0	33.3	31.8	33.3	29.2
AIRCRAFT.....	75.0	71.4	74.3	70.8	70.9	68.3	68.7	68.3	64.6	68.3
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	50.0	52.6	47.8	50.0	51.9	51.9	51.7	51.6	51.5	52.8
MISCELLANEOUS MANUFACTURING.....	45.5	41.7	50.0	50.0	50.0	50.0	58.3	53.8	53.8	53.8
NONMANUFACTURING.....	27.3	28.3	28.6	28.5	28.3	29.2	29.7	31.4	31.6	32.2
PETROLEUM EXTRACTION.....	18.8	19.0	19.8	19.4	18.4	19.3	18.8	19.0	19.0	18.2
MINING.....	23.1	25.0	21.4	20.0	21.4	14.3	13.3	18.7	17.6	16.7
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TELECOMMUNICATIONS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	52.2	54.2	54.4	56.1	56.8	57.6	58.4	61.7	60.5	61.2
MEDICAL AND DENTAL LABORATORIES.....	20.0	16.7	16.7	14.3	12.5	12.5	11.1	11.1	11.1	10.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	50.0	50.0	45.5	50.0	46.7	60.0	52.6	57.1	57.1	61.9
OTHER NONMANUFACTURING.....	5.9	5.8	5.5	5.3	4.8	4.8	6.0	5.9	5.6	5.3
GOVERNMENT.....	36.0	34.6	32.7	30.3	30.5	25.9	26.8	27.8	29.5	31.6
FEDERAL.....	46.4	43.0	39.2	35.3	36.3	30.0	31.3	32.9	35.1	38.0
STATE.....	14.7	15.2	15.5	15.5	15.6	15.6	14.7	14.9	15.2	16.2
LOCAL.....	14.8	13.8	13.8	16.1	15.2	14.3	15.8	14.3	15.9	14.9
COLLEGES AND UNIVERSITIES.....	45.5	48.0	53.5	56.1	55.7	55.4	51.6	47.8	45.1	43.2
NONPROFIT INSTITUTIONS.....	84.0	84.6	83.9	79.4	85.7	82.1	84.6	84.4	81.6	83.9

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
44.6	45.5	46.0	46.7	46.0	46.2	46.1	44.6	44.6	41.9	39.8	..ALL SECTORS
48.8	50.7	50.7	51.9	50.6	51.6	52.5	50.9	51.2	49.0	47.3	..PRIVATE INDUSTRY
55.1	56.7	56.3	58.2	55.9	58.0	58.5	56.5	56.0	52.9	51.3	MANUFACTURING
86.2	86.5	86.4	74.6	74.2	79.2	74.7	73.8	70.0	58.6	56.7	ORDNANCE
43.9	44.9	44.4	43.7	43.2	49.3	47.9	45.7	45.7	45.2	46.6	FOOD
50.0	53.8	46.2	46.2	53.8	47.1	47.8	50.0	55.6	45.0	47.6	TEXTILES AND APPAREL
25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	16.7	33.3	LUMBER AND FURNITURE
64.5	66.7	68.6	65.8	57.9	50.0	50.0	54.8	50.0	43.4	41.8	PAPER
54.1	54.7	55.1	55.1	56.5	56.6	57.1	55.3	56.7	55.0	53.8	CHEMICALS
41.5	41.9	40.5	46.5	48.8	51.2	59.0	56.4	55.0	55.0	53.8	PETROLEUM REFINING
58.3	58.3	53.8	48.1	45.2	43.3	50.0	44.1	44.1	44.4	44.4	RUBBER
60.0	70.0	66.7	71.4	72.7	72.7	76.2	69.6	70.8	73.9	75.0	STONE, CLAY, AND GLASS
28.4	29.1	27.6	27.2	26.2	31.6	26.8	19.4	19.2	19.3	14.0	PRIMARY METALS
52.6	50.0	50.0	47.6	47.8	56.0	44.4	43.5	50.0	58.3	56.0	FABRICATED METALS
50.0	53.3	55.1	63.5	53.4	63.6	63.6	63.1	57.7	51.3	49.4	MACHINERY
85.2	91.3	87.9	90.2	77.9	81.9	81.0	75.5	76.2	74.8	70.2	ELECTRICAL EQUIPMENT
29.2	29.2	29.2	33.3	28.6	28.1	33.3	36.7	38.7	36.4	30.3	MOTOR VEHICLES
68.3	71.1	74.3	86.8	75.4	75.7	85.3	78.9	69.9	60.2	61.8	AIRCRAFT
50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	100.0	OTHER TRANSPORTATION EQUIPMENT
52.8	53.8	54.8	64.4	52.2	63.0	63.3	61.5	52.6	50.0	47.4	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
53.8	53.8	50.0	64.3	40.0	41.2	37.5	50.0	53.3	50.0	37.5	MISCELLANEOUS MANUFACTURING
32.2	34.2	35.0	34.4	36.3	35.2	37.8	37.3	39.7	39.6	38.2	NONMANUFACTURING
18.2	18.8	18.5	18.5	19.8	20.4	20.0	19.7	20.6	20.2	20.3	PETROLEUM EXTRACTION
16.7	16.7	15.8	15.8	10.0	10.5	23.5	29.4	33.3	26.7	28.6	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	50.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
100.0	100.0	66.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	OTHER TRANSPORTATION
100.0	100.0	100.0	100.0	100.0	0.0	100.0	100.0	75.0	100.0	100.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.0	10.0	12.5	10.0	8.3	8.3	9.1	18.2	18.2	15.4	PUBLIC UTILITIES
61.2	62.5	61.8	58.5	63.9	60.6	66.2	67.1	70.8	71.6	64.7	MISCELLANEOUS BUSINESS SERVICES
10.0	10.0	10.0	9.1	9.1	8.3	15.4	14.3	26.7	20.0	28.6	MEDICAL AND DENTAL LABORATORIES
61.9	66.7	71.4	73.9	60.9	56.3	90.5	51.7	57.6	54.3	51.4	ENGINEERING AND ARCHITECTURAL SERVICES
5.3	6.4	6.3	6.9	6.4	6.7	5.7	6.8	7.3	8.3	7.7	OTHER NONMANUFACTURING
31.6	33.0	34.2	35.3	35.3	38.8	38.8	38.0	37.6	34.6	33.2	..GOVERNMENT
38.0	40.2	42.1	43.6	43.0	47.6	48.1	47.5	48.3	43.6	41.7	FEDERAL
16.2	16.8	17.3	17.2	17.5	17.1	15.5	14.0	12.4	12.3	12.5	STATE
14.9	14.6	15.1	14.5	14.3	14.3	14.0	15.3	14.5	15.2	14.9	LOCAL
43.2	42.4	42.9	42.3	42.0	39.6	38.6	37.0	37.2	34.3	31.5	..COLLEGES AND UNIVERSITIES
83.9	81.7	83.8	83.5	82.8	84.3	84.5	81.1	80.0	79.5	80.2	..NONPROFIT INSTITUTIONS

Table A-16. Estimated employment of chemists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	51.9	56.8	62.9	67.9	71.6	73.9	79.2	84.5	90.6	95.4
PRIVATE INDUSTRY.....	36.6	40.9	46.4	50.5	53.9	55.1	58.3	62.6	66.3	68.7
MANUFACTURING.....	31.1	35.3	40.4	44.2	47.2	48.2	50.7	54.6	57.7	59.4
ORDNANCE.....	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.5
FOOD.....	2.9	3.2	3.3	3.5	3.6	3.6	3.7	3.9	4.1	4.2
TEXTILES AND APPAREL.....	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2
LUMBER AND FURNITURE.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
PAPER.....	1.5	1.7	1.8	1.9	2.0	2.1	2.3	2.5	2.5	2.6
CHEMICALS.....	13.4	15.8	18.8	21.0	23.3	23.7	25.1	27.0	29.2	30.1
PETROLEUM REFINING.....	2.3	2.5	2.8	3.1	3.3	3.5	3.5	3.5	3.7	3.7
RUBBER.....	1.6	1.7	1.9	2.0	2.0	2.0	2.1	2.2	2.2	2.2
STONE, CLAY, AND GLASS.....	0.9	1.0	1.0	1.2	1.2	1.2	1.3	1.3	1.5	1.5
PRIMARY METALS.....	2.0	2.2	2.4	2.5	2.5	2.3	2.4	2.6	2.6	2.6
FABRICATED METALS.....	0.5	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8	0.8
MACHINERY.....	0.7	0.8	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.1
ELECTRICAL EQUIPMENT.....	1.3	1.4	1.6	1.8	1.9	2.0	2.0	2.3	2.5	2.5
MOTOR VEHICLES.....	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6
AIRCRAFT.....	0.4	0.5	0.9	1.2	1.3	1.5	1.7	2.1	2.1	2.1
OTHER TRANSPORTATION EQUIPMENT.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	1.0	1.1	1.4	1.5	1.6	1.6	1.7	1.9	2.0	2.2
MISCELLANEOUS MANUFACTURING.....	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2
NONMANUFACTURING.....	5.5	5.6	6.0	6.3	6.7	6.9	7.6	8.0	8.6	9.3
PETROLEUM EXTRACTION.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MINING.....	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.5
CONSTRUCTION.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RAILROADS.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
MISCELLANEOUS BUSINESS SERVICES.....	2.8	2.9	3.2	3.3	3.4	3.6	4.0	4.1	4.6	5.3
MEDICAL AND DENTAL LABORATORIES.....	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4
OTHER NONMANUFACTURING.....	1.4	1.5	1.5	1.6	1.7	1.7	1.9	1.9	2.0	2.1
GOVERNMENT.....	4.4	5.2	6.1	6.5	6.4	6.5	7.0	7.3	7.4	7.9
FEDERAL.....	3.2	3.9	4.7	5.0	4.8	4.9	5.2	5.3	5.4	5.7
STATE.....	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.2
LOCAL.....	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.9	0.9	1.0
COLLEGES AND UNIVERSITIES.....	10.2	9.9	9.5	9.8	10.1	11.1	12.6	13.2	15.4	17.3
NONPROFIT INSTITUTIONS.....	0.7	0.8	0.9	1.1	1.2	1.2	1.3	1.4	1.5	1.5

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
99.7	102.8	106.8	110.0	115.0	116.7	119.6	122.8	127.3	131.0	132.9	..ALL SECTORS
72.1	74.7	77.7	79.7	83.4	84.5	87.3	86.7	89.5	92.0	93.5	..PRIVATE INDUSTRY
62.3	64.4	66.6	68.1	70.0	69.5	73.7	73.3	75.1	76.5	77.6	MANUFACTURING
0.7	0.8	0.9	1.1	1.2	1.5	1.6	1.6	1.5	1.5	1.2	ORDNANCE
4.4	4.6	4.5	4.6	4.5	4.5	4.4	4.1	4.4	4.3	4.5	FOOD
1.3	1.3	1.3	1.3	1.7	1.9	2.1	1.5	1.7	1.8	1.7	TEXTILES AND APPAREL
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	LUMBER AND FURNITURE
2.8	3.0	3.0	3.0	3.1	2.9	2.8	2.9	3.1	3.3	3.6	PAPER
32.0	33.1	35.3	35.3	36.3	37.8	40.3	40.5	40.9	41.6	42.8	CHEMICALS
3.9	3.8	3.8	3.8	3.9	3.4	3.3	3.3	3.2	3.3	3.2	PETROLEUM REFINING
2.2	2.4	2.4	2.8	2.7	2.8	3.0	2.9	3.1	2.8	3.0	RUBBER
1.5	1.6	1.6	1.6	1.6	1.5	1.6	1.4	1.3	1.4	1.5	STONE, CLAY, AND GLASS
2.7	2.9	2.7	2.5	2.3	2.2	2.2	2.3	2.6	2.9	2.4	PRIMARY METALS
0.8	0.8	0.8	0.9	1.1	1.1	0.8	0.9	0.9	1.0	0.9	FABRICATED METALS
1.2	1.3	1.2	1.4	1.7	1.7	1.7	1.8	1.8	2.0	2.0	MACHINERY
2.5	2.6	2.8	3.2	2.9	2.5	2.6	2.5	2.6	2.8	3.0	ELECTRICAL EQUIPMENT
0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.9	0.9	1.0	1.1	MOTOR VEHICLES
1.8	1.6	1.5	1.4	1.4	1.4	1.5	1.8	2.1	2.0	1.8	AIRCRAFT
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
2.4	2.4	2.6	2.7	3.0	3.2	3.4	3.5	3.4	3.2	3.3	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
1.2	1.3	1.3	1.4	1.5	1.4	1.3	1.2	1.3	1.5	1.5	MISCELLANEOUS MANUFACTURING
9.8	10.3	11.1	11.6	13.4	13.6	13.6	13.5	14.4	15.5	15.9	NONMANUFACTURING
0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.4	0.3	0.5	0.5	PETROLEUM EXTRACTION
0.6	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.4	0.5	MINING
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	CONSTRUCTION
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	RAILROADS
0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.4	0.5	0.4	0.5	PUBLIC UTILITIES
5.6	5.8	6.3	6.5	7.3	7.3	7.0	6.9	7.5	8.5	8.6	MISCELLANEOUS BUSINESS SERVICES
0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	MEDICAL AND DENTAL LABORATORIES
0.4	0.4	0.4	0.4	0.6	0.3	0.4	0.5	0.5	0.6	0.7	ENGINEERING AND ARCHITECTURAL SERVICES
2.2	2.3	2.6	2.9	3.4	3.9	4.1	4.3	4.5	4.6	4.5	OTHER NONMANUFACTURING
7.9	8.1	8.9	9.7	10.3	10.9	11.3	11.5	12.1	12.1	12.4	..GOVERNMENT
5.7	5.7	6.4	7.1	7.7	8.2	8.4	8.4	8.8	8.8	8.9	FEDERAL
1.2	1.3	1.4	1.4	1.4	1.5	1.6	1.7	1.8	1.8	1.9	STATE
1.0	1.1	1.1	1.2	1.2	1.2	1.3	1.4	1.5	1.5	1.6	LOCAL
18.1	18.4	18.6	19.0	19.7	19.7	19.3	22.8	23.9	25.1	25.3	..COLLEGES AND UNIVERSITIES
1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.8	1.8	1.8	1.7	..NONPROFIT INSTITUTIONS

Table A-17. Percent distribution: Estimated employment of chemists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	70.5	72.0	73.8	74.4	75.3	74.6	73.6	74.1	73.2	72.0
MANUFACTURING.....	59.9	62.1	64.2	65.1	65.9	65.2	64.0	64.6	63.7	62.3
ORDNANCE.....	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.5
FOOD.....	5.6	5.6	5.2	5.2	5.0	4.9	4.7	4.6	4.5	4.4
TEXTILES AND APPAREL.....	1.7	1.8	1.6	1.5	1.4	1.5	1.4	1.3	1.2	1.3
LUMBER AND FURNITURE.....	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2
PAPER.....	2.9	3.0	2.9	2.8	2.8	2.8	2.9	3.0	2.8	2.7
CHEMICALS.....	25.8	27.8	29.9	30.9	32.5	32.1	31.7	32.0	32.2	31.6
PETROLEUM REFINING.....	4.4	4.4	4.5	4.6	4.6	4.7	4.4	4.1	4.1	3.9
RUBBER.....	3.1	3.0	3.0	2.9	2.8	2.7	2.7	2.6	2.4	2.3
STONE, CLAY, AND GLASS.....	1.7	1.8	1.6	1.8	1.7	1.6	1.6	1.5	1.7	1.6
PRIMARY METALS.....	3.9	3.9	3.8	3.7	3.5	3.1	3.0	3.1	2.9	2.7
FABRICATED METALS.....	1.0	1.1	1.0	0.9	0.8	0.9	1.0	0.9	0.9	0.8
MACHINERY.....	1.3	1.4	1.4	1.3	1.3	1.2	1.3	1.3	1.2	1.2
ELECTRICAL EQUIPMENT.....	2.5	2.5	2.5	2.7	2.7	2.7	2.5	2.7	2.8	2.6
MOTOR VEHICLES.....	1.0	0.9	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6
AIRCRAFT.....	0.8	0.9	1.4	1.8	1.8	2.0	2.1	2.5	2.3	2.2
OTHER TRANSPORTATION EQUIPMENT.....	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	1.9	1.9	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.3
MISCELLANEOUS MANUFACTURING.....	1.9	1.9	1.7	1.6	1.5	1.5	1.4	1.4	1.3	1.3
NONMANUFACTURING.....	10.6	9.9	9.5	9.3	9.4	9.3	9.6	9.5	9.5	9.7
PETROLEUM EXTRACTION.....	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MINING.....	0.8	0.5	0.6	0.6	0.6	0.5	0.6	0.7	0.7	0.5
CONSTRUCTION.....	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RAILROADS.....	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3
MISCELLANEOUS BUSINESS SERVICES.....	5.4	5.1	5.1	4.9	4.7	4.9	5.1	4.9	5.1	5.6
MEDICAL AND DENTAL LABORATORIES.....	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.4
OTHER NONMANUFACTURING.....	2.7	2.6	2.4	2.4	2.4	2.3	2.4	2.2	2.2	2.2
GOVERNMENT.....	8.5	9.2	9.7	9.6	8.9	8.8	8.8	8.6	8.2	8.3
FEDERAL.....	6.2	6.9	7.5	7.4	6.7	6.6	6.6	6.3	6.0	6.0
STATE.....	1.5	1.4	1.4	1.3	1.3	1.2	1.3	1.3	1.2	1.3
LOCAL.....	0.8	0.9	0.8	0.9	1.0	0.9	1.0	1.1	1.0	1.0
COLLEGES AND UNIVERSITIES.....	19.7	17.4	15.1	14.4	14.1	15.0	15.9	15.6	17.0	18.1
NONPROFIT INSTITUTIONS.....	1.3	1.4	1.4	1.6	1.7	1.6	1.6	1.7	1.7	1.6

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
72.3	72.7	72.8	72.5	72.5	72.4	73.0	70.6	70.3	70.2	70.4	..PRIVATE INDUSTRY
62.5	62.6	62.4	61.9	60.9	59.6	61.6	59.7	59.0	58.4	58.4	MANUFACTURING
0.7	0.8	0.8	1.0	1.0	1.3	1.3	1.3	1.2	1.1	0.9	ORDNANCE
4.4	4.5	4.2	4.2	3.9	3.9	3.7	3.3	3.5	3.3	3.4	FOOD
1.3	1.3	1.2	1.2	1.5	1.6	1.8	1.2	1.3	1.4	1.3	TEXTILES AND APPAREL
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	LUMBER AND FURNITURE
2.8	2.9	2.8	2.7	2.7	2.5	2.3	2.4	2.4	2.5	2.7	PAPER
32.1	32.2	33.1	32.1	31.6	32.4	33.7	33.0	32.1	31.8	32.2	CHEMICALS
3.9	3.7	3.6	3.5	3.4	2.9	2.8	2.7	2.5	2.5	2.4	PETROLEUM REFINING
2.2	2.3	2.2	2.5	2.3	2.4	2.5	2.4	2.4	2.1	2.3	RUBBER
1.5	1.6	1.5	1.5	1.4	1.3	1.3	1.1	1.0	1.1	1.1	STONE, CLAY, AND GLASS
2.7	2.8	2.5	2.3	2.0	1.9	1.8	1.9	2.0	2.2	1.8	PRIMARY METALS
0.8	0.8	0.7	0.8	1.0	0.9	0.7	0.7	0.7	0.8	0.7	FABRICATED METALS
1.2	1.3	1.1	1.3	1.5	1.5	1.4	1.5	1.4	1.5	1.5	MACHINERY
2.5	2.5	2.6	2.9	2.5	2.1	2.2	2.0	2.0	2.1	2.3	ELECTRICAL EQUIPMENT
0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	MOTOR VEHICLES
1.8	1.6	1.4	1.3	1.2	1.2	1.3	1.5	1.5	1.5	1.4	AIRCRAFT
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
2.4	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.7	2.4	2.5	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
1.2	1.3	1.2	1.3	1.3	1.2	1.1	1.0	1.0	1.1	1.1	MISCELLANEOUS MANUFACTURING
9.8	10.0	10.4	10.5	11.7	11.7	11.4	11.0	11.3	11.8	12.0	NONMANUFACTURING
0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.2	0.4	0.4	PETROLEUM EXTRACTION
0.6	0.8	0.7	0.7	0.6	0.6	0.6	0.4	0.4	0.3	0.4	MINING
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	CONSTRUCTION
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	RAILROADS
0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.4	PUBLIC UTILITIES
5.6	5.6	5.9	5.9	6.3	6.3	5.9	5.6	5.9	6.5	6.5	MISCELLANEOUS BUSINESS SERVICES
0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	MEDICAL AND DENTAL LABORATORIES
0.4	0.4	0.4	0.4	0.5	0.3	0.3	0.4	0.4	0.5	0.5	ENGINEERING AND ARCHITECTURAL SERVICES
2.2	2.2	2.4	2.6	3.0	3.3	3.4	3.5	3.5	3.5	3.4	OTHER NONMANUFACTURING
7.9	7.9	8.3	8.8	9.0	9.3	9.4	9.4	9.5	9.2	9.3	..GOVERNMENT
5.7	5.5	6.0	6.5	6.7	7.0	7.0	6.8	6.9	6.7	6.7	FEDERAL
1.2	1.3	1.3	1.3	1.2	1.3	1.3	1.4	1.4	1.4	1.4	STATE
1.0	1.1	1.0	1.1	1.0	1.0	1.1	1.1	1.2	1.1	1.2	LOCAL
18.2	17.9	17.4	17.3	17.1	16.9	16.1	18.6	18.8	19.2	19.0	..COLLEGES AND UNIVERSITIES
1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.5	1.4	1.4	1.3	..NONPROFIT INSTITUTIONS

Table A-18. Estimated employment of physicists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	14.0	15.2	16.7	18.0	19.1	19.9	21.4	23.7	26.1	28.6
PRIVATE INDUSTRY.....	5.8	6.7	7.7	8.8	9.6	9.8	10.4	11.7	12.2	13.1
MANUFACTURING.....	4.2	4.9	5.8	6.9	7.4	7.5	7.9	9.0	9.3	10.0
ORDNANCE.....	0.1	0.1	0.3	0.6	0.6	0.5	0.5	0.6	0.6	1.1
FOOD.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	0.5	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0	1.1
PETROLEUM REFINING.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RUBBER.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
STONE, CLAY, AND GLASS.....	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3
PRIMARY METALS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
FABRICATED METALS.....	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MACHINERY.....	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.8
ELECTRICAL EQUIPMENT.....	1.4	1.6	1.8	2.0	2.1	2.2	2.2	2.6	2.8	2.8
MOTOR VEHICLES.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
AIRCRAFT.....	0.5	0.7	1.0	1.3	1.6	1.7	1.9	2.3	2.2	2.2
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.5	0.5	0.6	0.7	0.7	0.7	0.8	0.8	0.9	0.9
MISCELLANEOUS MANUFACTURING.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NONMANUFACTURING.....	1.6	1.8	1.9	1.9	2.2	2.3	2.5	2.7	2.9	3.1
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	1.3	1.4	1.5	1.5	1.7	1.7	1.8	2.0	2.2	2.4
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5
OTHER NONMANUFACTURING.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
GOVERNMENT.....	2.3	2.7	3.1	3.1	2.9	2.8	2.8	2.8	3.2	3.5
FEDERAL.....	2.3	2.7	3.1	3.1	2.9	2.8	2.8	2.8	3.2	3.5
STATE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOCAL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COLLEGES AND UNIVERSITIES.....	5.6	5.5	5.5	5.7	6.2	6.8	7.7	8.6	10.1	11.3
NONPROFIT INSTITUTIONS.....	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
29.8	31.6	33.9	36.3	39.0	39.9	42.1	44.4	46.2	48.4	49.1	..ALL SECTORS
13.2	13.7	14.7	15.5	16.4	16.1	17.1	17.4	17.9	19.3	19.8	..PRIVATE INDUSTRY
9.9	10.2	10.7	11.2	11.6	11.0	11.7	11.8	12.4	13.3	13.5	MANUFACTURING
1.3	1.4	2.2	2.2	2.2	2.4	2.4	2.5	2.5	2.5	2.2	ORDNANCE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LUMBER AND FURNITURE
0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	PAPER
1.1	1.1	1.3	1.5	1.6	1.8	2.0	2.1	2.0	2.2	2.3	CHEMICALS
0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.2	PETROLEUM REFINING
0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	RUBBER
0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.3	STONE, CLAY, AND GLASS
0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.2	0.2	PRIMARY METALS
0.2	0.2	0.3	0.3	0.4	0.3	0.2	0.3	0.2	0.3	0.3	FABRICATED METALS
0.8	0.9	0.9	0.9	0.9	0.8	0.7	0.6	0.8	1.0	1.1	MACHINERY
2.9	3.0	2.9	3.2	2.9	2.7	3.0	2.9	3.1	3.4	3.5	ELECTRICAL EQUIPMENT
0.2	0.2	0.2	0.2	0.5	0.4	0.4	0.3	0.4	0.4	0.4	MOTOR VEHICLES
1.7	1.4	1.2	1.1	1.2	1.1	1.2	1.4	1.5	1.6	1.5	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
1.0	1.1	1.0	1.1	1.1	0.9	1.0	1.0	1.1	1.1	1.3	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
3.3	3.5	4.0	4.3	4.8	5.1	5.4	5.6	5.5	6.0	6.3	NONMANUFACTURING
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	PETROLEUM EXTRACTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PUBLIC UTILITIES
2.6	2.8	3.1	3.4	3.7	4.3	4.5	4.6	4.4	4.5	4.8	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
0.5	0.5	0.6	0.6	0.8	0.5	0.6	0.7	0.8	0.9	1.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	OTHER NONMANUFACTURING
3.7	4.2	4.6	5.0	5.3	5.6	5.9	6.0	6.5	6.5	6.5	..GOVERNMENT
3.7	4.2	4.6	5.0	5.3	5.6	5.9	6.0	6.5	6.5	6.5	FEDERAL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	STATE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LOCAL
12.2	12.9	13.6	14.6	16.1	16.9	17.7	19.5	20.3	21.1	21.4	..COLLEGES AND UNIVERSITIES
0.7	0.8	1.0	1.2	1.2	1.3	1.4	1.5	1.5	1.5	1.4	..NONPROFIT INSTITUTIONS

Table A-19. Percent distribution: Estimated employment of physicists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	41.4	44.1	46.1	48.9	50.3	49.2	48.6	49.4	46.7	45.8
MANUFACTURING.....	30.0	32.2	34.7	38.3	38.7	37.7	36.9	38.0	35.6	35.0
ORDNANCE.....	0.7	0.7	1.8	3.3	3.1	2.5	2.3	2.5	2.3	3.8
FOOD.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	3.6	3.9	4.2	3.9	4.2	4.0	3.7	3.8	3.8	3.8
PETROLEUM REFINING.....	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.3
RUBBER.....	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.3
STONE, CLAY, AND GLASS.....	0.7	0.7	0.6	1.1	1.0	1.0	1.4	1.3	1.1	1.0
PRIMARY METALS.....	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.3
FABRICATED METALS.....	0.7	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7
MACHINERY.....	2.9	3.3	3.0	3.3	3.1	3.0	2.8	3.0	2.7	2.8
ELECTRICAL EQUIPMENT.....	10.0	10.5	10.8	11.1	11.0	11.1	10.3	11.0	10.7	9.8
MOTOR VEHICLES.....	1.4	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7
AIRCRAFT.....	3.6	4.6	5.0	7.2	8.4	8.5	8.9	9.7	8.4	7.7
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	3.6	3.3	3.6	3.9	3.7	3.5	3.7	3.4	3.4	3.1
MISCELLANEOUS MANUFACTURING.....	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.3
NONMANUFACTURING.....	11.4	11.8	11.4	10.6	11.5	11.6	11.7	11.4	11.1	10.8
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.4	0.4	0.3
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	9.3	9.2	9.0	8.3	8.9	8.5	8.4	8.4	8.4	8.4
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	1.4	2.0	1.8	1.7	2.1	2.0	2.3	2.1	1.9	1.7
OTHER NONMANUFACTURING.....	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.3
GOVERNMENT.....	16.4	17.8	18.6	17.2	15.2	14.1	13.1	11.8	12.3	12.2
FEDERAL.....	16.4	17.8	18.6	17.2	15.2	14.1	13.1	11.8	12.3	12.2
STATE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOCAL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COLLEGES AND UNIVERSITIES.....	40.0	36.2	32.9	31.7	32.5	34.2	36.0	36.3	38.7	39.5
NONPROFIT INSTITUTIONS.....	2.1	2.0	2.4	2.2	2.1	2.5	2.3	2.5	2.3	2.4

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
44.3	43.4	43.4	42.7	42.1	40.4	40.6	39.2	38.7	39.9	40.3	..PRIVATE INDUSTRY
33.2	32.3	31.6	30.9	29.7	27.6	27.8	26.6	26.8	27.5	27.5	MANUFACTURING
4.4	4.4	6.5	6.1	5.6	6.0	5.7	5.6	5.4	5.2	4.5	ORDNANCE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LUMBER AND FURNITURE
0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.2	0.2	0.2	0.2	PAPER
3.7	3.5	3.8	4.1	4.1	4.5	4.8	4.7	4.3	4.5	4.7	CHEMICALS
0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.2	0.4	0.2	0.4	PETROLEUM REFINING
0.3	0.3	0.3	0.3	0.3	0.0	0.2	0.2	0.2	0.2	0.2	RUBBER
1.0	0.9	0.9	0.8	0.8	0.5	0.7	0.5	0.4	0.6	0.6	STONE, CLAY, AND GLASS
0.3	0.9	0.3	0.3	0.3	0.0	0.0	0.2	0.4	0.4	0.4	PRIMARY METALS
0.7	0.6	0.9	0.8	1.0	0.8	0.5	0.7	0.4	0.6	0.6	FABRICATED METALS
2.7	2.8	2.7	2.5	2.3	2.0	1.7	1.4	1.7	2.1	2.2	MACHINERY
9.7	9.5	8.6	8.8	7.4	6.8	7.1	6.5	6.7	7.0	7.1	ELECTRICAL EQUIPMENT
0.7	0.6	0.6	0.6	1.3	1.0	1.0	0.7	0.9	0.8	0.8	MOTOR VEHICLES
5.7	4.4	3.5	3.0	3.1	2.8	2.9	3.2	3.2	3.3	3.1	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
3.4	3.5	2.9	3.0	2.8	2.3	2.4	2.3	2.4	2.3	2.6	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
11.1	11.1	11.8	11.8	12.3	12.8	12.8	12.6	11.9	12.4	12.8	NONMANUFACTURING
0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.4	0.2	PETROLEUM EXTRACTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PUBLIC UTILITIES
8.7	8.9	9.1	9.4	9.5	10.8	10.7	10.4	9.5	9.3	9.8	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
1.7	1.6	1.8	1.7	2.1	1.3	1.4	1.6	1.7	1.9	2.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.3	0.3	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.8	0.8	OTHER NONMANUFACTURING
12.4	13.3	13.6	13.8	13.6	14.0	14.0	13.5	14.1	13.4	13.2	..GOVERNMENT
12.4	13.3	13.6	13.8	13.6	14.0	14.0	13.5	14.1	13.4	13.2	FEDERAL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	STATE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LOCAL
40.9	40.8	40.1	40.2	41.3	42.4	42.0	43.9	43.9	43.6	43.6	..COLLEGES AND UNIVERSITIES
2.3	2.5	2.9	3.3	3.1	3.3	3.3	3.4	3.2	3.1	2.9	..NONPROFIT INSTITUTIONS

Table A-20. Estimated employment of geologists and geophysicists, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	13.0	13.3	13.8	15.5	16.1	17.1	17.9	19.6	20.1	20.9
PRIVATE INDUSTRY.....	10.2	10.2	10.6	12.0	12.5	12.9	13.4	14.5	14.7	14.9
MANUFACTURING.....	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8
ORDNANCE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
PETROLEUM REFINING.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PRIMARY METALS.....	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
FABRICATED METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MACHINERY.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRICAL EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR VEHICLES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIRCRAFT.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	9.6	9.5	9.9	11.3	11.8	12.2	12.6	13.7	13.9	14.1
PETROLEUM EXTRACTION.....	8.3	8.2	8.4	9.6	10.1	10.6	10.9	11.8	11.8	11.8
MINING.....	0.6	0.6	0.7	0.8	0.7	0.6	0.6	0.6	0.7	0.8
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3
MISCELLANEOUS BUSINESS SERVICES.....	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.6
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.4	0.5
OTHER NONMANUFACTURING.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
GOVERNMENT.....	1.5	1.8	1.9	2.1	2.1	2.3	2.3	2.4	2.3	2.6
FEDERAL.....	1.0	1.3	1.4	1.6	1.5	1.7	1.7	1.8	1.7	2.0
STATE.....	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6
LOCAL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COLLEGES AND UNIVERSITIES.....	1.2	1.2	1.2	1.3	1.4	1.8	2.1	2.5	2.9	3.2
NONPROFIT INSTITUTIONS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
20.4	20.6	21.1	22.5	23.4	25.5	26.2	28.4	29.0	29.4	30.6	..ALL SECTORS
14.0	13.5	13.4	13.8	13.8	15.1	15.5	16.3	16.3	16.4	16.8	..PRIVATE INDUSTRY
0.8	0.8	1.0	1.0	0.8	0.6	0.6	1.0	0.9	1.0	1.0	MANUFACTURING
0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.2	0.1	ORDNANCE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LUMBER AND FURNITURE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PAPER
0.3	0.3	0.3	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.2	CHEMICALS
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	PETROLEUM REFINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RUBBER
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	STONE, CLAY, AND GLASS
0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	PRIMARY METALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FABRICATED METALS
0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	MACHINERY
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	ELECTRICAL EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MOTOR VEHICLES
0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
13.2	12.7	12.4	12.8	13.0	14.5	14.9	15.3	15.4	15.4	15.8	NONMANUFACTURING
10.9	10.4	10.4	10.3	10.3	11.3	11.5	11.7	12.1	12.0	12.0	PETROLEUM EXTRACTION
0.7	0.8	0.6	0.6	0.8	0.5	0.5	0.7	0.6	0.8	0.9	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.3	0.3	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	PUBLIC UTILITIES
0.7	0.7	0.7	1.0	1.1	1.8	1.8	1.8	1.7	1.6	1.9	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
0.5	0.5	0.5	0.5	0.4	0.5	0.6	0.6	0.6	0.5	0.6	ENGINEERING AND ARCHITECTURAL SERVICES
0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.0	OTHER NONMANUFACTURING
2.7	3.0	3.1	3.6	3.8	4.1	4.1	4.1	4.2	4.1	4.2	..GOVERNMENT
2.0	2.0	2.0	2.4	2.6	2.8	2.8	2.8	2.8	2.7	2.6	FEDERAL
0.7	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.3	STATE
0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	LOCAL
3.5	3.8	4.2	4.6	5.3	5.8	6.1	7.5	8.0	8.4	9.2	..COLLEGES AND UNIVERSITIES
0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	..NONPROFIT INSTITUTIONS

Table A-21. Percent distribution: Estimated employment of geologists and geophysicists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	78.5	76.7	76.8	77.4	77.6	75.4	74.9	74.0	73.1	71.3
MANUFACTURING.....	4.6	5.3	5.1	4.5	4.3	4.1	4.5	4.1	4.0	3.8
ORDNANCE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	1.5	1.5	1.4	1.3	1.2	1.2	1.7	1.5	1.5	1.4
PETROLEUM REFINING.....	0.8	0.8	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	0.8	0.8	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5
PRIMARY METALS.....	0.8	1.5	1.4	1.3	1.2	1.2	1.1	1.0	1.0	1.0
FABRICATED METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MACHINERY.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRICAL EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR VEHICLES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIRCRAFT.....	0.8	0.8	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	73.8	71.4	71.7	72.9	73.3	71.3	70.4	69.9	69.2	67.5
PETROLEUM EXTRACTION.....	63.8	61.7	60.9	61.9	62.7	62.0	60.9	60.2	58.7	56.5
MINING.....	4.6	4.5	5.1	5.2	4.3	3.5	3.4	3.1	3.5	3.8
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.8	0.8	0.7	1.3	1.2	1.2	1.1	1.0	1.5	1.4
MISCELLANEOUS BUSINESS SERVICES.....	2.3	2.3	2.2	1.9	2.5	2.3	2.2	2.6	3.0	2.9
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	1.5	1.5	2.2	1.9	1.9	1.8	2.2	2.6	2.0	2.4
OTHER NONMANUFACTURING.....	0.8	0.8	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5
GOVERNMENT.....	11.5	13.5	13.8	13.5	13.0	13.5	12.8	12.2	11.4	12.4
FEDERAL.....	7.7	9.8	10.1	10.3	9.3	9.9	9.5	9.2	8.5	9.6
STATE.....	3.8	3.8	3.6	3.2	3.7	3.5	3.4	3.1	3.0	2.9
LOCAL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COLLEGES AND UNIVERSITIES.....	9.2	9.0	8.7	8.4	8.7	10.5	11.7	12.8	14.4	15.3
NONPROFIT INSTITUTIONS.....	0.8	0.8	0.7	0.6	0.6	0.6	0.6	1.0	1.0	1.0

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
68.6	65.5	63.5	61.3	59.0	59.2	59.2	57.4	56.2	55.8	54.9	..PRIVATE INDUSTRY
3.9	3.9	4.7	4.4	3.4	2.4	2.3	3.5	3.1	3.4	3.3	MANUFACTURING
0.0	0.0	0.0	0.0	0.4	0.4	0.8	0.7	0.3	0.7	0.3	ORDNANCE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LUMBER AND FURNITURE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PAPER
1.5	1.5	1.4	1.8	0.9	0.4	0.4	0.4	0.3	0.7	0.7	CHEMICALS
0.5	0.5	0.5	0.4	0.4	0.4	0.4	1.1	1.0	1.0	1.0	PETROLEUM REFINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RUBBER
0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.7	0.7	0.7	0.7	STONE, CLAY, AND GLASS
1.0	0.5	0.9	0.9	0.4	0.4	0.4	0.4	0.3	0.0	0.0	PRIMARY METALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FABRICATED METALS
0.0	0.5	0.9	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	MACHINERY
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.3	ELECTRICAL EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MOTOR VEHICLES
0.5	0.5	0.5	0.4	0.4	0.4	0.0	0.0	0.0	0.3	0.3	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
64.7	61.7	58.8	56.9	55.6	56.9	56.9	53.9	53.1	52.4	51.6	NONMANUFACTURING
53.4	50.5	49.3	45.8	44.0	44.3	43.9	41.2	41.7	40.8	39.2	PETROLEUM EXTRACTION
3.4	3.9	2.8	2.7	3.4	2.0	1.9	2.5	2.1	2.7	2.9	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
1.5	1.5	0.5	1.3	1.3	1.2	1.1	1.1	1.0	1.0	1.0	PUBLIC UTILITIES
3.4	3.4	3.3	4.4	4.7	7.1	6.9	6.3	5.9	5.4	6.2	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
2.5	2.4	2.4	2.2	1.7	2.0	2.3	2.1	2.1	1.7	2.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.5	0.0	0.5	0.4	0.4	0.4	0.8	0.7	0.3	0.3	0.0	OTHER NONMANUFACTURING
13.2	14.6	14.7	16.0	16.2	16.1	15.6	14.4	14.5	13.9	13.7	..GOVERNMENT
9.8	9.7	9.5	10.7	11.1	11.0	10.7	9.9	9.7	9.2	8.5	FEDERAL
3.4	3.9	4.3	4.4	4.3	4.3	4.2	3.9	4.1	4.1	4.2	STATE
0.0	1.0	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.7	LOCAL
17.2	18.4	19.9	20.4	22.6	22.7	23.3	25.4	27.6	28.6	30.1	..COLLEGES AND UNIVERSITIES
1.0	1.5	1.9	2.2	2.1	2.0	1.9	1.8	1.7	1.7	1.3	..NONPROFIT INSTITUTIONS

Table A-22. Estimated employment of other physical scientists, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	10.2	12.3	15.2	16.9	17.4	17.4	18.5	20.6	20.6	21.3
PRIVATE INDUSTRY.....	6.4	7.1	8.4	9.6	10.3	10.4	11.3	12.7	12.9	13.6
MANUFACTURING.....	5.7	6.4	7.5	8.5	9.1	9.1	9.9	11.3	11.5	12.1
ORDNANCE.....	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.3
FOOD.....	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7
PETROLEUM REFINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PRIMARY METALS.....	1.9	2.2	2.5	2.8	3.1	3.1	3.5	4.1	4.5	4.9
FABRICATED METALS.....	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
MACHINERY.....	0.6	0.7	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.0
ELECTRICAL EQUIPMENT.....	0.7	0.8	1.0	1.1	1.2	1.2	1.3	1.4	1.5	1.4
MOTOR VEHICLES.....	0.9	0.9	0.9	0.9	1.0	1.0	1.1	1.2	1.1	1.2
AIRCRAFT.....	0.3	0.4	0.7	1.1	1.2	1.2	1.3	1.6	1.6	1.6
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	0.7	0.7	0.9	1.1	1.2	1.3	1.4	1.4	1.4	1.5
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINING.....	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.6
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2
OTHER NONMANUFACTURING.....	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
GOVERNMENT.....	3.5	4.9	6.5	6.9	6.6	6.5	6.7	7.3	7.0	6.9
FEDERAL.....	3.3	4.6	6.2	6.6	6.3	6.2	6.4	7.0	6.6	6.5
STATE.....	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
LOCAL.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
COLLEGES AND UNIVERSITIES.....	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.5
NONPROFIT INSTITUTIONS.....	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
22.1	23.8	24.2	25.3	26.3	27.1	29.1	30.2	33.6	35.0	36.2	..ALL SECTORS
14.4	15.9	15.9	15.9	15.7	15.8	16.8	17.7	19.0	19.9	20.2	..PRIVATE INDUSTRY
12.8	14.3	14.3	14.1	13.8	13.9	14.7	15.4	16.4	16.8	16.8	MANUFACTURING
0.4	0.8	0.6	0.6	0.8	0.5	0.6	0.6	0.5	0.5	0.4	ORDNANCE
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.2	FOOD
0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	LUMBER AND FURNITURE
0.0	0.0	0.1	0.1	0.1	0.3	0.4	0.5	0.7	0.6	0.5	PAPER
0.8	0.9	1.2	1.3	1.3	1.4	1.5	1.5	1.4	1.7	1.7	CHEMICALS
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	PETROLEUM REFINING
0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.4	0.4	RUBBER
0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.4	0.3	0.3	STONE, CLAY, AND GLASS
5.3	6.2	5.9	5.3	4.9	4.5	4.6	4.9	5.4	5.7	5.9	PRIMARY METALS
0.5	0.5	0.3	0.5	0.4	0.8	0.8	0.8	0.8	0.8	1.0	FABRICATED METALS
1.0	1.0	1.0	1.1	1.2	1.2	1.2	1.3	1.6	1.9	1.9	MACHINERY
1.4	1.5	1.5	1.7	1.7	1.5	1.5	1.4	1.6	1.5	1.7	ELECTRICAL EQUIPMENT
1.2	1.2	1.2	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	MOTOR VEHICLES
1.6	1.5	1.5	1.5	1.4	1.2	1.4	1.5	1.7	1.4	1.1	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	OTHER TRANSPORTATION EQUIPMENT
0.2	0.3	0.4	0.2	0.1	0.4	0.4	0.5	0.4	0.4	0.3	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
1.6	1.6	1.6	1.8	1.9	1.9	2.1	2.3	2.6	3.1	3.4	NONMANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	PETROLEUM EXTRACTION
0.5	0.3	0.4	0.5	0.3	0.3	0.3	0.4	0.3	0.2	0.3	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	PUBLIC UTILITIES
0.6	0.7	0.7	0.8	0.8	1.0	1.0	1.1	1.3	1.7	2.1	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
0.2	0.2	0.2	0.2	0.5	0.2	0.3	0.3	0.4	0.4	0.3	ENGINEERING AND ARCHITECTURAL SERVICES
0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.5	0.5	0.5	OTHER NONMANUFACTURING
6.7	6.8	7.0	7.5	8.0	8.2	8.6	9.3	11.0	11.1	11.7	..GOVERNMENT
6.3	6.4	6.6	7.2	7.8	8.0	8.4	8.8	10.5	10.6	11.1	FEDERAL
0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.4	0.4	0.4	0.5	STATE
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	LOCAL
0.7	0.8	0.9	1.4	2.1	2.6	3.1	2.6	3.0	3.5	3.9	..COLLEGES AND UNIVERSITIES
0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.4	..NONPROFIT INSTITUTIONS

Table A-23. Percent distribution: Estimated employment of other physical scientists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	62.7	57.7	55.3	56.8	59.2	59.8	61.1	61.7	62.6	63.8
MANUFACTURING.....	55.9	52.0	49.3	50.3	52.3	52.3	53.5	54.9	55.8	56.8
ORDNANCE.....	0.0	0.0	0.0	0.6	0.6	0.6	0.5	1.0	0.5	1.4
FOOD.....	2.9	2.4	2.6	2.4	2.3	2.3	2.2	1.9	1.5	1.4
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	3.9	4.1	3.9	3.6	3.4	3.4	3.2	3.4	3.4	3.3
PETROLEUM REFINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	1.0	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5
PRIMARY METALS.....	18.6	17.9	16.4	16.6	17.8	17.8	18.9	19.9	21.8	23.0
FABRICATED METALS.....	2.9	2.4	2.0	2.4	2.3	2.3	2.2	1.9	1.9	1.9
MACHINERY.....	5.9	5.7	5.3	4.7	4.6	4.6	4.9	4.9	4.9	4.7
ELECTRICAL EQUIPMENT.....	6.9	6.5	6.6	6.5	6.9	6.9	7.0	6.8	7.3	6.6
MOTOR VEHICLES.....	8.8	7.3	5.9	5.3	5.7	5.7	5.9	5.8	5.3	5.6
AIRCRAFT.....	2.9	3.3	4.6	6.5	6.9	6.9	7.0	7.8	7.8	7.5
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	2.0	1.6	1.3	1.2	1.1	1.1	1.1	1.0	1.0	0.9
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	6.9	5.7	5.9	6.5	6.9	7.5	7.6	6.8	6.8	7.0
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINING.....	2.9	2.4	2.0	1.8	1.7	2.3	2.2	1.9	1.9	2.3
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	1.0	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	2.0	1.6	2.0	2.4	2.9	2.9	2.7	2.4	2.4	2.8
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.0	0.0	0.0	0.6	0.6	0.6	1.1	1.0	1.0	0.9
OTHER NONMANUFACTURING.....	1.0	0.8	1.3	1.2	1.1	1.1	1.1	1.0	1.0	0.9
GOVERNMENT.....	34.3	39.8	42.8	40.8	37.9	37.4	36.2	35.4	34.0	32.4
FEDERAL.....	32.4	37.4	40.8	39.1	36.2	35.6	34.6	34.0	32.0	30.5
STATE.....	1.0	1.6	1.3	1.2	1.1	1.1	1.1	1.0	1.5	1.4
LOCAL.....	1.0	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5
COLLEGES AND UNIVERSITIES.....	2.0	1.6	1.3	1.2	1.7	1.7	1.6	1.9	2.4	2.3
NONPROFIT INSTITUTIONS.....	1.0	0.8	0.7	1.2	1.1	1.1	1.1	1.0	1.0	1.4

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
65.2	66.8	65.7	62.8	59.7	58.3	57.7	58.6	56.5	56.9	55.8	..PRIVATE INDUSTRY
57.9	60.1	59.1	55.7	52.5	51.3	50.5	51.0	48.8	48.0	46.4	MANUFACTURING
1.8	3.4	2.5	2.4	3.0	1.8	2.1	2.0	1.5	1.4	1.1	ORDNANCE
1.4	1.3	1.2	1.2	1.1	1.1	1.0	1.3	0.9	0.9	0.6	FOOD
0.0	0.0	0.4	0.0	0.0	0.4	0.3	0.3	0.3	0.3	0.3	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	LUMBER AND FURNITURE
0.0	0.0	0.4	0.4	0.4	1.1	1.4	1.7	2.1	1.7	1.4	PAPER
3.6	3.8	5.0	5.1	4.9	5.2	5.2	5.0	4.2	4.9	4.7	CHEMICALS
0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.3	0.3	0.0	0.3	PETROLEUM REFINING
0.0	0.0	0.4	0.4	0.4	0.7	1.0	1.0	0.9	1.1	1.1	RUBBER
0.5	0.4	0.4	0.4	0.4	0.7	0.7	1.3	1.2	0.9	0.8	STONE, CLAY, AND GLASS
24.0	26.1	24.4	20.9	18.6	16.6	15.8	16.2	16.1	16.3	16.3	PRIMARY METALS
2.3	2.1	1.2	2.0	1.5	3.0	2.7	2.6	2.4	2.3	2.8	FABRICATED METALS
4.5	4.2	4.1	4.3	4.6	4.4	4.1	4.3	4.8	5.4	5.2	MACHINERY
6.3	6.3	6.2	6.7	6.5	5.5	5.2	4.6	4.8	4.3	4.7	ELECTRICAL EQUIPMENT
5.4	5.0	5.0	5.1	4.9	4.4	4.1	3.6	3.3	3.1	2.8	MOTOR VEHICLES
7.2	6.3	6.2	5.9	5.3	4.4	4.8	5.0	5.1	4.0	3.0	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	OTHER TRANSPORTATION EQUIPMENT
0.9	1.3	1.7	0.8	0.4	1.5	1.4	1.7	1.2	1.1	0.8	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
7.2	6.7	6.6	7.1	7.2	7.0	7.2	7.6	7.7	8.9	9.4	NONMANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.3	0.3	0.6	0.3	PETROLEUM EXTRACTION
2.3	1.3	1.7	2.0	1.1	1.1	1.0	1.3	0.9	0.6	0.8	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.3	PUBLIC UTILITIES
2.7	2.9	2.9	3.2	3.0	3.7	3.4	3.6	3.9	4.9	5.8	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
0.9	0.8	0.8	0.8	1.9	0.7	1.0	1.0	1.2	1.1	0.8	ENGINEERING AND ARCHITECTURAL SERVICES
0.9	1.3	1.2	1.2	1.1	1.1	1.4	1.0	1.5	1.4	1.4	OTHER NONMANUFACTURING
30.3	28.6	28.9	29.6	30.4	30.3	29.6	30.8	32.7	31.7	32.3	..GOVERNMENT
28.5	26.9	27.3	28.5	29.7	29.5	28.9	29.1	31.2	30.3	30.7	FEDERAL
1.4	1.3	1.2	0.8	0.4	0.4	0.3	1.3	1.2	1.1	1.4	STATE
0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	LOCAL
3.2	3.4	3.7	5.5	8.0	9.6	10.7	8.6	8.9	10.0	10.8	..COLLEGES AND UNIVERSITIES
1.4	1.3	1.7	2.0	1.9	1.8	2.1	2.0	1.8	1.4	1.1	..NONPROFIT INSTITUTIONS

Table A-24. Estimated employment of mathematicians, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	13.8	14.7	16.1	17.7	19.5	21.1	23.1	26.1	28.5	31.7
PRIVATE INDUSTRY.....	8.4	9.0	10.2	11.7	12.6	13.3	14.3	15.6	16.2	17.7
MANUFACTURING.....	3.5	3.9	4.8	6.0	6.3	6.7	7.2	8.3	8.5	9.2
ORDNANCE.....	0.1	0.1	0.3	0.5	0.5	0.5	0.5	0.6	0.6	1.0
FOOD.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
CHEMICALS.....	0.3	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.7
PETROLEUM REFINING.....	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
RUBBER.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
STONE, CLAY, AND GLASS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRIMARY METALS.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
FABRICATED METALS.....	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
MACHINERY.....	0.6	0.7	0.8	0.9	0.9	1.0	1.0	1.2	1.2	1.3
ELECTRICAL EQUIPMENT.....	0.9	1.0	1.1	1.3	1.3	1.4	1.6	1.9	2.1	2.1
MOTOR VEHICLES.....	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
AIRCRAFT.....	0.3	0.4	0.8	1.1	1.3	1.5	1.7	2.1	2.1	2.1
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	4.9	5.1	5.4	5.7	6.3	6.6	7.1	7.3	7.7	8.5
PETROLEUM EXTRACTION.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MISCELLANEOUS BUSINESS SERVICES.....	1.7	1.8	2.0	2.1	2.2	2.4	2.6	2.8	3.0	3.5
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5
OTHER NONMANUFACTURING.....	2.6	2.6	2.7	2.8	3.2	3.3	3.5	3.5	3.7	3.9
GOVERNMENT.....	1.1	1.5	1.6	1.6	1.5	1.9	2.2	2.4	2.3	2.5
FEDERAL.....	0.9	1.3	1.4	1.4	1.3	1.7	2.0	2.2	2.1	2.2
STATE.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
LOCAL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
COLLEGES AND UNIVERSITIES.....	4.1	4.0	4.0	4.1	5.1	5.6	6.3	7.8	9.6	10.8
NONPROFIT INSTITUTIONS.....	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.7

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
34.2	36.3	39.8	43.6	47.2	50.3	53.9	61.9	67.1	73.0	74.3	..ALL SECTORS
18.9	19.8	22.2	23.9	25.5	27.1	29.4	33.2	34.9	37.9	38.7	..PRIVATE INDUSTRY
10.1	10.8	12.4	13.5	13.7	15.3	16.2	19.0	20.2	21.3	20.7	MANUFACTURING
1.2	1.3	2.0	2.1	2.3	2.9	3.1	3.6	3.6	3.9	3.0	ORDNANCE
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.3	FOOD
0.0	0.1	0.0	0.0	0.0	0.3	0.4	0.2	0.2	0.2	0.2	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	LUMBER AND FURNITURE
0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.5	PAPER
0.7	0.7	0.8	0.9	0.9	1.2	1.3	1.4	1.5	1.7	1.9	CHEMICALS
0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	PETROLEUM REFINING
0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.3	RUBBER
0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	STONE, CLAY, AND GLASS
0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.5	0.5	0.4	PRIMARY METALS
0.5	0.5	0.7	0.6	0.5	0.5	0.5	0.6	0.5	0.4	0.4	FABRICATED METALS
1.5	1.6	1.8	2.2	2.5	2.7	2.7	3.2	3.4	3.6	3.8	MACHINERY
2.4	2.8	3.0	3.2	3.0	3.1	3.3	3.4	3.9	4.2	4.3	ELECTRICAL EQUIPMENT
0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.8	0.9	0.8	0.9	MOTOR VEHICLES
2.3	2.3	2.4	2.6	2.7	2.8	2.8	3.4	3.8	3.6	3.3	AIRCRAFT
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	OTHER TRANSPORTATION EQUIPMENT
0.3	0.3	0.4	0.4	0.2	0.2	0.2	0.5	0.4	0.6	0.7	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.1	MISCELLANEOUS MANUFACTURING
8.8	9.0	9.8	10.4	11.8	11.8	13.2	14.2	14.7	16.6	18.0	NONMANUFACTURING
0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.3	PETROLEUM EXTRACTION
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	MINING
0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	CONSTRUCTION
0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	OTHER TRANSPORTATION
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.4	0.4	0.3	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.2	0.2	0.3	0.3	0.4	0.2	0.2	0.2	0.2	0.3	0.4	PUBLIC UTILITIES
3.7	3.8	4.1	4.5	5.0	4.1	4.8	4.7	4.5	5.5	6.1	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
0.5	0.5	0.6	0.6	0.8	0.5	0.8	1.1	1.2	1.3	1.2	ENGINEERING AND ARCHITECTURAL SERVICES
4.0	4.1	4.3	4.6	5.1	6.1	6.5	6.8	7.3	8.0	8.9	OTHER NONMANUFACTURING
2.6	2.8	2.7	3.3	3.7	4.2	4.6	4.6	5.2	5.3	4.7	..GOVERNMENT
2.2	2.4	2.3	2.9	3.3	3.8	4.1	4.2	4.8	4.9	4.3	FEDERAL
0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	STATE
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	LOCAL
12.0	12.8	13.5	14.5	15.9	16.8	17.5	21.6	24.4	27.2	28.5	..COLLEGES AND UNIVERSITIES
0.7	0.9	1.4	1.9	2.1	2.2	2.4	2.5	2.6	2.6	2.4	..NONPROFIT INSTITUTIONS

Table A-25. Percent distribution: Estimated employment of mathematicians, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	60.9	61.2	63.4	66.1	64.6	63.0	61.9	59.8	56.8	55.8
MANUFACTURING.....	25.4	26.5	29.8	33.9	32.3	31.8	31.2	31.8	29.8	29.0
ORDNANCE.....	0.7	0.7	1.9	2.8	2.6	2.4	2.2	2.3	2.1	3.2
FOOD.....	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3
CHEMICALS.....	2.2	2.7	2.5	2.8	3.1	2.8	2.6	2.7	2.5	2.2
PETROLEUM REFINING.....	0.7	0.7	0.6	1.1	1.0	0.9	0.9	0.8	0.7	0.6
RUBBER.....	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3
STONE, CLAY, AND GLASS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRIMARY METALS.....	1.4	1.4	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.6
FABRICATED METALS.....	2.2	2.0	2.5	2.3	2.1	1.9	2.2	1.9	1.8	1.6
MACHINERY.....	4.3	4.8	5.0	5.1	4.6	4.7	4.3	4.6	4.2	4.1
ELECTRICAL EQUIPMENT.....	6.5	6.8	6.8	7.3	6.7	6.6	6.9	7.3	7.4	6.6
MOTOR VEHICLES.....	2.2	2.0	1.9	1.7	1.5	1.4	1.3	1.1	1.1	1.3
AIRCRAFT.....	2.2	2.7	5.0	6.2	6.7	7.1	7.4	8.0	7.4	6.6
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.6	0.5	0.5	0.4	0.4	0.4	0.3
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.7	0.7	0.6	1.1	1.0	0.9	0.9	0.8	0.7	0.9
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	35.5	34.7	33.5	32.2	32.3	31.3	30.7	28.0	27.0	26.8
PETROLEUM EXTRACTION.....	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.6
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.7	0.7	0.6	1.1	1.0	0.9	0.9	0.8	0.7	0.6
MISCELLANEOUS BUSINESS SERVICES.....	12.3	12.2	12.4	11.9	11.3	11.4	11.3	10.7	10.5	11.0
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	1.4	2.0	1.9	1.7	2.1	1.9	2.2	1.9	1.8	1.6
OTHER NONMANUFACTURING.....	18.8	17.7	16.8	15.8	16.4	15.6	15.2	13.4	13.0	12.3
GOVERNMENT.....	8.0	10.2	9.9	9.0	7.7	9.0	9.5	9.2	8.1	7.9
FEDERAL.....	6.5	8.8	8.7	7.9	6.7	8.1	8.7	8.4	7.4	6.9
STATE.....	1.4	1.4	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.6
LOCAL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
COLLEGES AND UNIVERSITIES.....	29.7	27.2	24.8	23.2	26.2	26.5	27.3	29.9	33.7	34.1
NONPROFIT INSTITUTIONS.....	1.4	1.4	1.9	1.7	1.5	1.4	1.3	1.1	1.4	2.2

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
55.3	54.5	55.8	54.8	54.0	53.9	54.5	53.6	52.0	51.9	52.1	..PRIVATE INDUSTRY
29.5	29.8	31.2	31.0	29.0	30.4	30.1	30.7	30.1	29.2	27.9	MANUFACTURING
3.5	3.6	5.0	4.8	4.9	5.8	5.8	5.8	5.4	5.3	4.0	ORDNANCE
0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.5	0.4	0.5	0.4	FOOD
0.0	0.3	0.0	0.0	0.0	0.6	0.7	0.3	0.3	0.3	0.3	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	LUMBER AND FURNITURE
0.3	0.3	0.5	0.5	0.4	0.4	0.6	0.6	0.6	0.5	0.7	PAPER
2.0	1.9	2.0	2.1	1.9	2.4	2.4	2.3	2.2	2.3	2.6	CHEMICALS
0.6	0.6	0.5	0.5	0.4	0.2	0.4	0.3	0.3	0.3	0.3	PETROLEUM REFINING
0.3	0.3	0.3	0.2	0.2	0.0	0.0	0.2	0.1	0.4	0.4	RUBBER
0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.3	0.3	0.3	0.3	STONE, CLAY, AND GLASS
0.6	0.6	0.5	0.5	0.4	0.6	0.6	0.5	0.7	0.7	0.5	PRIMARY METALS
1.5	1.4	1.8	1.4	1.1	1.0	0.9	1.0	0.7	0.5	0.5	FABRICATED METALS
4.4	4.4	4.5	5.0	5.3	5.4	5.0	5.2	5.1	4.9	5.1	MACHINERY
7.0	7.7	7.5	7.3	6.4	6.2	6.1	5.5	5.8	5.8	5.8	ELECTRICAL EQUIPMENT
1.2	1.1	1.0	1.1	1.3	1.2	1.1	1.3	1.3	1.1	1.2	MOTOR VEHICLES
6.7	6.3	6.0	6.0	5.7	5.6	5.2	5.5	5.7	4.9	4.4	AIRCRAFT
0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	OTHER TRANSPORTATION EQUIPMENT
0.9	0.8	1.0	0.9	0.4	0.4	0.4	0.8	0.6	0.8	0.9	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.3	0.1	0.1	0.1	MISCELLANEOUS MANUFACTURING
25.7	24.8	24.6	23.9	25.0	23.5	24.5	22.9	21.9	22.7	24.2	NONMANUFACTURING
0.3	0.6	0.5	0.2	0.2	0.4	0.4	0.5	0.4	0.5	0.4	PETROLEUM EXTRACTION
0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.0	0.0	MINING
0.6	0.3	0.5	0.5	0.4	0.6	0.6	0.5	0.4	0.4	0.5	CONSTRUCTION
0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.3	0.3	0.3	0.3	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.3	0.3	0.3	OTHER TRANSPORTATION
0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.6	0.6	0.5	0.4	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.6	0.6	0.8	0.7	0.8	0.4	0.4	0.3	0.3	0.4	0.5	PUBLIC UTILITIES
10.8	10.5	10.3	10.3	10.6	8.2	8.9	7.6	6.7	7.5	8.2	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
1.5	1.4	1.5	1.4	1.7	1.0	1.5	1.8	1.8	1.8	1.6	ENGINEERING AND ARCHITECTURAL SERVICES
11.7	11.3	10.8	10.6	10.8	12.1	12.1	11.0	10.9	11.0	12.0	OTHER NONMANUFACTURING
7.6	7.7	6.8	7.6	7.8	8.3	8.5	7.4	7.7	7.3	6.3	..GOVERNMENT
6.4	6.6	5.8	6.7	7.0	7.6	7.6	6.8	7.2	6.7	5.8	FEDERAL
0.9	0.8	0.8	0.7	0.6	0.6	0.7	0.5	0.4	0.4	0.4	STATE
0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	LOCAL
35.1	35.3	33.9	33.3	33.7	33.4	32.5	34.9	36.4	37.3	38.4	..COLLEGES AND UNIVERSITIES
2.0	2.5	3.5	4.4	4.4	4.4	4.5	4.0	3.9	3.6	3.2	..NONPROFIT INSTITUTIONS

Table A-26. Estimated employment of agricultural scientists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	16.9	18.2	20.4	21.5	21.7	22.2	23.7	25.6	27.3	29.5
PRIVATE INDUSTRY.....	2.4	2.7	2.9	3.0	3.1	3.3	3.5	3.8	4.0	4.2
MANUFACTURING.....	1.7	2.0	2.1	2.2	2.3	2.5	2.6	2.9	3.1	3.2
ORDNANCE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD.....	1.0	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.5
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
PAPER.....	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4
CHEMICALS.....	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.9	1.0	1.0
PETROLEUM REFINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRIMARY METALS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
FABRICATED METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MACHINERY.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRICAL EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR VEHICLES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIRCRAFT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MISCELLANEOUS BUSINESS SERVICES.....	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER NONMANUFACTURING.....	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6
GOVERNMENT.....	10.8	11.9	13.9	14.8	14.5	14.8	15.5	16.4	17.0	18.2
FEDERAL.....	7.7	8.7	10.5	11.4	10.9	11.1	11.6	12.3	12.6	13.6
STATE.....	2.3	2.4	2.6	2.6	2.8	2.8	2.9	3.1	3.3	3.5
LOCAL.....	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.1	1.1
COLLEGES AND UNIVERSITIES.....	3.6	3.5	3.5	3.6	4.0	4.0	4.6	5.3	6.2	7.0
NONPROFIT INSTITUTIONS.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
30.4	32.3	35.3	38.5	41.5	44.1	46.9	46.5	47.2	47.5	49.3	..ALL SECTORS
4.4	4.5	4.7	5.3	5.3	5.5	5.4	5.6	5.7	6.0	6.0	..PRIVATE INDUSTRY
3.3	3.3	3.4	3.7	3.8	3.6	3.5	3.6	3.8	3.9	3.9	MANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ORDNANCE
1.6	1.6	1.6	1.8	1.7	1.7	1.5	1.5	1.5	1.4	1.5	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	LUMBER AND FURNITURE
0.4	0.4	0.5	0.5	0.7	0.5	0.6	0.7	0.9	1.0	0.8	PAPER
1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.1	1.2	CHEMICALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM REFINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RUBBER
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	STONE, CLAY, AND GLASS
0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	PRIMARY METALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FABRICATED METALS
0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	MACHINERY
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ELECTRICAL EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MOTOR VEHICLES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
1.1	1.2	1.3	1.6	1.5	1.9	1.9	2.0	1.9	2.1	2.1	NONMANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM EXTRACTION
0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	PUBLIC UTILITIES
0.4	0.5	0.5	0.7	0.6	0.8	0.8	0.8	0.8	1.0	1.1	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.6	0.6	0.6	0.7	0.7	0.8	0.9	1.0	1.0	0.9	0.9	OTHER NONMANUFACTURING
18.4	18.8	20.0	20.6	20.9	21.1	21.5	22.4	22.9	22.9	23.3	..GOVERNMENT
13.5	13.7	14.6	15.2	15.4	15.5	15.6	15.5	15.6	15.4	15.5	FEDERAL
3.7	3.9	4.1	4.1	4.2	4.3	4.5	5.4	5.7	5.9	6.1	STATE
1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.5	1.6	1.6	1.7	LOCAL
7.5	8.9	10.5	12.5	15.2	17.4	19.9	18.4	18.5	18.5	19.9	..COLLEGES AND UNIVERSITIES
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	..NONPROFIT INSTITUTIONS

Table A-27. Percent distribution: Estimated employment of agricultural scientists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	14.2	14.8	14.2	14.0	14.3	14.9	14.8	14.8	14.7	14.2
MANUFACTURING.....	10.1	11.0	10.3	10.2	10.6	11.3	11.0	11.3	11.4	10.8
ORDNANCE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD.....	5.9	6.0	5.9	5.6	5.5	5.9	5.5	5.5	5.1	5.1
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.8	0.7	0.7
PAPER.....	0.6	1.1	1.0	0.9	0.9	1.4	1.3	1.2	1.5	1.4
CHEMICALS.....	2.4	2.7	2.5	2.8	3.2	3.2	3.4	3.5	3.7	3.4
PETROLEUM REFINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRIMARY METALS.....	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.3
FABRICATED METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MACHINERY.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRICAL EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR VEHICLES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIRCRAFT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	4.1	3.8	3.9	3.7	3.7	3.6	3.8	3.5	3.3	3.4
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.3
MISCELLANEOUS BUSINESS SERVICES.....	1.2	1.1	1.0	0.9	0.9	0.9	1.3	1.2	1.1	1.0
MEDICAL AND DENTAL LABORATORIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER NONMANUFACTURING.....	2.4	2.2	2.5	2.3	2.3	2.3	2.1	2.0	1.8	2.0
GOVERNMENT.....	63.9	65.4	68.1	68.8	66.8	66.7	65.4	64.1	62.3	61.7
FEDERAL.....	45.6	47.8	51.5	53.0	50.2	50.0	48.9	48.0	46.2	46.1
STATE.....	13.6	13.2	12.7	12.1	12.9	12.6	12.2	12.1	12.1	11.9
LOCAL.....	4.7	4.4	3.9	3.7	3.7	4.1	4.2	3.9	4.0	3.7
COLLEGES AND UNIVERSITIES.....	21.3	19.2	17.2	16.7	18.4	18.0	19.4	20.7	22.7	23.7
NONPROFIT INSTITUTIONS.....	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.3

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
14.5	13.9	13.3	13.8	12.8	12.5	11.5	12.0	12.1	12.6	12.2	..PRIVATE INDUSTRY
10.9	10.2	9.6	9.6	9.2	8.2	7.5	7.7	8.1	8.2	7.9	MANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ORDNANCE
5.3	5.0	4.5	4.7	4.1	3.9	3.2	3.2	3.2	2.9	3.0	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.6	0.6	0.6	LUMBER AND FURNITURE
1.3	1.2	1.4	1.3	1.7	1.1	1.3	1.5	1.9	2.1	1.6	PAPER
3.3	3.1	2.8	2.9	2.7	2.5	2.3	2.2	2.1	2.3	2.4	CHEMICALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM REFINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RUBBER
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	STONE, CLAY, AND GLASS
0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	PRIMARY METALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FABRICATED METALS
0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	MACHINERY
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ELECTRICAL EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MOTOR VEHICLES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
3.6	3.7	3.7	4.2	3.6	4.3	4.1	4.3	4.0	4.4	4.3	NONMANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM EXTRACTION
0.0	0.0	0.3	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.3	0.3	0.3	0.3	0.2	0.5	0.2	0.2	0.2	0.4	0.2	PUBLIC UTILITIES
1.3	1.5	1.4	1.8	1.4	1.8	1.7	1.7	1.7	2.1	2.2	MISCELLANEOUS BUSINESS SERVICES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MEDICAL AND DENTAL LABORATORIES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ENGINEERING AND ARCHITECTURAL SERVICES
2.0	1.9	1.7	1.8	1.7	1.8	1.9	2.2	2.1	1.9	1.8	OTHER NONMANUFACTURING
60.5	58.2	56.7	53.5	50.4	47.8	45.8	48.2	48.5	48.2	47.3	..GOVERNMENT
44.4	42.4	41.4	39.5	37.1	35.1	33.3	33.3	33.1	32.4	31.4	FEDERAL
12.2	12.1	11.6	10.6	10.1	9.8	9.6	11.6	12.1	12.4	12.4	STATE
3.9	3.7	3.7	3.4	3.1	2.9	3.0	3.2	3.4	3.4	3.4	LOCAL
24.7	27.6	29.7	32.5	36.6	39.5	42.4	39.6	39.2	38.9	40.4	..COLLEGES AND UNIVERSITIES
0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	..NONPROFIT INSTITUTIONS

Table A-28. Estimated employment of biological scientists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	19.9	21.2	23.0	24.1	25.5	27.3	29.9	34.8	39.0	42.5
PRIVATE INDUSTRY.....	3.6	4.3	4.8	5.1	5.3	5.4	5.7	6.3	6.9	7.1
MANUFACTURING.....	2.9	3.5	4.0	4.3	4.4	4.5	4.8	5.4	5.9	5.9
ORDNANCE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD.....	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	2.5	3.1	3.6	3.9	4.0	4.0	4.3	4.9	5.4	5.4
PETROLEUM REFINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRIMARY METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FABRICATED METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MACHINERY.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRICAL EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR VEHICLES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIRCRAFT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.2
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
MEDICAL AND DENTAL LABORATORIES.....	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER NONMANUFACTURING.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
GOVERNMENT.....	5.6	6.3	7.0	7.2	7.5	7.9	8.5	9.2	9.6	10.3
FEDERAL.....	2.1	2.5	3.1	3.3	3.3	3.6	3.9	4.2	4.5	4.8
STATE.....	2.5	2.7	2.8	2.8	3.0	3.0	3.2	3.4	3.4	3.7
LOCAL.....	1.0	1.1	1.1	1.1	1.2	1.3	1.4	1.6	1.7	1.8
COLLEGES AND UNIVERSITIES.....	10.1	9.9	10.4	10.9	11.8	13.0	14.7	18.1	21.2	23.7
NONPROFIT INSTITUTIONS.....	0.6	0.7	0.8	0.9	0.9	1.0	1.0	1.2	1.3	1.4

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
44.8	46.9	49.0	51.3	54.4	55.6	56.9	62.6	65.8	67.7	71.1	..ALL SECTORS
7.5	8.2	8.6	9.0	9.4	9.4	9.9	9.5	10.3	10.8	11.0	..PRIVATE INDUSTRY
6.2	6.9	7.2	7.4	7.6	7.6	7.8	7.5	8.1	8.2	8.4	MANUFACTURING
0.1	0.1	0.2	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	ORDNANCE
0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.9	1.0	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LUMBER AND FURNITURE
0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	PAPER
5.5	6.0	6.0	6.0	6.1	6.1	6.3	6.0	6.4	6.5	6.7	CHEMICALS
0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM REFINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RUBBER
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	STONE, CLAY, AND GLASS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PRIMARY METALS
0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	FABRICATED METALS
0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	MACHINERY
0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	ELECTRICAL EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MOTOR VEHICLES
0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
1.3	1.3	1.4	1.6	1.8	1.8	2.1	2.0	2.2	2.6	2.6	NONMANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM EXTRACTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PUBLIC UTILITIES
0.4	0.4	0.4	0.6	0.6	0.4	0.4	0.4	0.7	1.2	1.2	MISCELLANEOUS BUSINESS SERVICES
0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	0.9	0.9	MEDICAL AND DENTAL LABORATORIES
0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.3	0.3	0.3	0.3	0.4	0.5	0.6	0.6	0.6	0.5	0.5	OTHER NONMANUFACTURING
10.6	11.1	11.7	12.3	13.0	13.8	14.4	14.9	16.2	16.7	17.9	..GOVERNMENT
4.8	4.9	5.2	5.6	6.0	6.4	6.7	7.0	7.9	8.1	9.0	FEDERAL
4.0	4.3	4.5	4.7	5.0	5.3	5.6	5.7	6.0	6.2	6.5	STATE
1.8	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.4	2.4	LOCAL
25.1	25.8	26.4	27.3	29.2	29.6	29.6	35.1	36.1	37.0	39.2	..COLLEGES AND UNIVERSITIES
1.6	1.8	2.3	2.7	2.8	2.8	3.0	3.1	3.2	3.2	3.0	..NONPROFIT INSTITUTIONS

Table A-29. Percent distribution: Estimated employment of biological scientists, by sector, 1950-70
(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	18.1	20.3	20.9	21.2	20.8	19.8	19.1	18.1	17.7	16.7
MANUFACTURING.....	14.6	16.5	17.4	17.8	17.3	16.5	16.1	15.5	15.1	13.9
ORDNANCE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD.....	2.0	1.9	1.7	1.7	1.6	1.8	1.7	1.4	1.3	1.2
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	12.6	14.6	15.7	16.2	15.7	14.7	14.4	14.1	13.8	12.7
PETROLEUM REFINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRIMARY METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FABRICATED METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MACHINERY.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRICAL EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR VEHICLES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIRCRAFT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	3.5	3.8	3.5	3.3	3.5	3.3	3.0	2.6	2.6	2.8
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.8	0.7
MEDICAL AND DENTAL LABORATORIES.....	1.5	1.9	1.7	1.7	2.0	1.8	1.7	1.4	1.3	1.4
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER NONMANUFACTURING.....	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.5	0.7
GOVERNMENT.....	28.1	29.7	30.4	29.9	29.4	28.9	28.4	26.4	24.6	24.2
FEDERAL.....	10.6	11.8	13.5	13.7	12.9	13.2	13.0	12.1	11.5	11.3
STATE.....	12.6	12.7	12.2	11.6	11.8	11.0	10.7	9.8	8.7	8.7
LOCAL.....	5.0	5.2	4.8	4.6	4.7	4.8	4.7	4.6	4.4	4.2
COLLEGES AND UNIVERSITIES.....	50.8	46.7	45.2	45.2	46.3	47.6	49.2	52.0	54.4	55.8
NONPROFIT INSTITUTIONS.....	3.0	3.3	3.5	3.7	3.5	3.7	3.3	3.4	3.3	3.3

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
16.7	17.5	17.6	17.5	17.3	16.9	17.4	15.2	15.7	16.0	15.5	..PRIVATE INDUSTRY
13.8	14.7	14.7	14.4	14.0	13.7	13.7	12.0	12.3	12.1	11.8	MANUFACTURING
0.2	0.2	0.4	0.8	0.7	0.5	0.5	0.5	0.5	0.3	0.3	ORDNANCE
1.1	1.3	1.2	1.2	1.3	1.3	1.2	1.1	1.2	1.3	1.4	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LUMBER AND FURNITURE
0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	PAPER
12.3	12.8	12.2	11.7	11.2	11.0	11.1	9.6	9.7	9.6	9.4	CHEMICALS
0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM REFINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RUBBER
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	STONE, CLAY, AND GLASS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PRIMARY METALS
0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	FABRICATED METALS
0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	MACHINERY
0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.3	0.3	0.3	0.3	ELECTRICAL EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MOTOR VEHICLES
0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
2.9	2.8	2.9	3.1	3.3	3.2	3.7	3.2	3.3	3.8	3.7	NONMANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM EXTRACTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PUBLIC UTILITIES
0.9	0.9	0.8	1.2	1.1	0.7	0.7	0.6	1.1	1.8	1.7	MISCELLANEOUS BUSINESS SERVICES
1.3	1.3	1.4	1.4	1.3	1.4	1.6	1.4	1.4	1.3	1.3	MEDICAL AND DENTAL LABORATORIES
0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.2	0.0	0.0	0.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.7	0.6	0.6	0.6	0.7	0.9	1.1	1.0	0.9	0.7	0.7	OTHER NONMANUFACTURING
23.7	23.7	23.9	24.0	23.9	24.8	25.3	23.8	24.6	24.7	25.2	..GOVERNMENT
10.7	10.4	10.6	10.9	11.0	11.5	11.8	11.2	12.0	12.0	12.7	FEDERAL
8.9	9.2	9.2	9.2	9.2	9.5	9.8	9.1	9.1	9.2	9.1	STATE
4.0	4.1	4.1	3.9	3.7	3.8	3.7	3.5	3.5	3.5	3.4	LOCAL
56.0	55.0	53.9	53.2	53.7	53.2	52.0	56.1	54.9	54.7	55.1	..COLLEGES AND UNIVERSITIES
3.6	3.8	4.7	5.3	5.1	5.0	5.3	5.0	4.9	4.7	4.2	..NONPROFIT INSTITUTIONS

Table A-30. Estimated employment of medical scientists, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	8.8	9.5	10.3	11.0	11.7	12.3	13.7	16.3	18.6	20.0
PRIVATE INDUSTRY.....	2.5	3.0	3.2	3.5	3.7	3.7	4.0	4.4	4.8	4.8
MANUFACTURING.....	2.0	2.5	2.7	3.0	3.2	3.2	3.3	3.6	3.9	3.9
ORDNANCE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	2.0	2.5	2.7	3.0	3.2	3.2	3.3	3.6	3.8	3.8
PETROLEUM REFINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRIMARY METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FABRICATED METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MACHINERY.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRICAL EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR VEHICLES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIRCRAFT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.8	0.9	0.9
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4
MEDICAL AND DENTAL LABORATORIES.....	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER NONMANUFACTURING.....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
GOVERNMENT.....	1.9	2.1	2.1	2.4	2.5	2.5	2.8	3.0	3.1	3.2
FEDERAL.....	0.4	0.6	0.5	0.7	0.7	0.7	0.9	0.9	0.9	0.9
STATE.....	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.5	1.6	1.7
LOCAL.....	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6
COLLEGES AND UNIVERSITIES.....	4.1	4.1	4.6	4.7	5.1	5.6	6.4	8.3	10.1	11.3
NONPROFIT INSTITUTIONS.....	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
21.5	24.1	27.2	30.5	34.6	37.2	43.2	42.0	46.4	50.7	53.0	..ALL SECTORS
4.9	5.2	5.2	5.6	5.5	5.3	6.7	6.8	6.9	7.2	7.1	..PRIVATE INDUSTRY
4.0	4.2	4.1	4.3	4.3	4.1	4.9	4.9	5.0	4.9	4.7	MANUFACTURING
0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	ORDNANCE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LUMBER AND FURNITURE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PAPER
3.9	4.1	4.0	3.9	3.9	3.7	4.5	4.5	4.5	4.3	4.1	CHEMICALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM REFINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RUBBER
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	STONE, CLAY, AND GLASS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PRIMARY METALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FABRICATED METALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MACHINERY
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ELECTRICAL EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MOTOR VEHICLES
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
0.9	1.0	1.1	1.3	1.2	1.2	1.8	1.9	1.9	2.3	2.4	NONMANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM EXTRACTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PUBLIC UTILITIES
0.4	0.5	0.6	0.8	0.7	0.7	1.3	1.3	1.3	1.5	1.6	MISCELLANEOUS BUSINESS SERVICES
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	MEDICAL AND DENTAL LABORATORIES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ENGINEERING AND ARCHITECTURAL SERVICES
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	OTHER NONMANUFACTURING
3.4	3.6	4.0	4.3	4.6	5.0	5.3	5.3	5.6	5.7	5.5	..GOVERNMENT
1.1	1.1	1.4	1.6	1.9	2.1	2.2	2.2	2.3	2.3	2.0	FEDERAL
1.7	1.8	1.9	2.0	2.0	2.2	2.4	2.4	2.5	2.6	2.7	STATE
0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	LOCAL
12.4	14.3	16.7	19.3	23.2	25.6	29.8	28.5	32.5	36.4	39.1	..COLLEGES AND UNIVERSITIES
0.8	1.0	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.3	..NONPROFIT INSTITUTIONS

Table A-31. Percent distribution: Estimated employment of medical scientists, by sector, 1950-70

(In thousands)

SECTOR	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
ALL SECTORS.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIVATE INDUSTRY.....	28.4	31.6	31.1	31.8	31.6	30.1	29.2	27.0	25.8	24.0
MANUFACTURING.....	22.7	26.3	26.2	27.3	27.4	26.0	24.1	22.1	21.0	19.5
ORDNANCE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOOD.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TEXTILES AND APPAREL.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUMBER AND FURNITURE.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAPER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHEMICALS.....	22.7	26.3	26.2	27.3	27.4	26.0	24.1	22.1	20.4	19.0
PETROLEUM REFINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RUBBER.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STONE, CLAY, AND GLASS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRIMARY METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FABRICATED METALS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MACHINERY.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELECTRICAL EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MOTOR VEHICLES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AIRCRAFT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
OTHER TRANSPORTATION EQUIPMENT.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PROFESSIONAL AND SCIENTIFIC INSTRUMENTS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS MANUFACTURING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NONMANUFACTURING.....	5.7	5.3	4.9	4.5	4.3	4.1	5.1	4.9	4.8	4.5
PETROLEUM EXTRACTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MINING.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAILROADS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TRANSPORTATION.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TELECOMMUNICATIONS.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RADIO AND TV.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUBLIC UTILITIES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MISCELLANEOUS BUSINESS SERVICES.....	2.3	2.1	1.9	1.8	1.7	1.6	2.2	1.8	2.2	2.0
MEDICAL AND DENTAL LABORATORIES.....	1.1	1.1	1.0	0.9	0.9	0.8	1.5	1.2	1.1	1.0
ENGINEERING AND ARCHITECTURAL SERVICES.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER NONMANUFACTURING.....	2.3	2.1	1.9	1.8	1.7	1.6	1.5	1.8	1.6	1.5
GOVERNMENT.....	21.6	22.1	20.4	21.8	21.4	20.3	20.4	18.4	16.7	16.0
FEDERAL.....	4.5	6.3	4.9	6.4	6.0	5.7	6.6	5.5	4.8	4.5
STATE.....	12.5	11.6	11.7	10.9	11.1	10.6	10.2	9.2	8.6	8.5
LOCAL.....	4.5	4.2	3.9	4.5	4.3	4.1	3.6	3.7	3.2	3.0
COLLEGES AND UNIVERSITIES.....	46.6	43.2	44.7	42.7	43.6	45.5	46.7	50.9	54.3	56.5
NONPROFIT INSTITUTIONS.....	3.4	3.2	3.9	3.6	3.4	4.1	3.6	3.7	3.2	3.5

NOTE: DETAIL MAY NOT ADD TO TOTALS DUE TO ROUNDING. 0.0 IS LESS THAN 50.

1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	SECTOR
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..ALL SECTORS
22.8	21.6	19.1	18.4	15.9	14.2	15.5	16.2	14.9	14.2	13.4	..PRIVATE INDUSTRY
18.6	17.4	15.1	14.1	12.4	11.0	11.3	11.7	10.8	9.7	8.9	MANUFACTURING
0.0	0.0	0.0	0.7	0.6	0.5	0.5	0.5	0.4	0.4	0.4	ORDNANCE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FOOD
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TEXTILES AND APPAREL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	LUMBER AND FURNITURE
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PAPER
18.1	17.0	14.7	12.8	11.3	9.9	10.4	10.7	9.7	8.5	7.7	CHEMICALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM REFINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RUBBER
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	STONE, CLAY, AND GLASS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PRIMARY METALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	FABRICATED METALS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MACHINERY
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ELECTRICAL EQUIPMENT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MOTOR VEHICLES
0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	AIRCRAFT
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION EQUIPMENT
0.0	0.0	0.0	0.3	0.3	0.3	0.2	0.2	0.4	0.6	0.6	PROFESSIONAL AND SCIENTIFIC INSTRUMENTS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MISCELLANEOUS MANUFACTURING
4.2	4.1	4.0	4.3	3.5	3.2	4.2	4.5	4.1	4.5	4.5	NONMANUFACTURING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PETROLEUM EXTRACTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	MINING
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	CONSTRUCTION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RAILROADS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OTHER TRANSPORTATION
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	TELECOMMUNICATIONS
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	RADIO AND TV
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	PUBLIC UTILITIES
1.9	2.1	2.2	2.6	2.0	1.9	3.0	3.1	2.8	3.0	3.0	MISCELLANEOUS BUSINESS SERVICES
0.9	0.8	0.7	0.7	0.6	0.5	0.5	0.7	0.6	0.6	0.6	MEDICAL AND DENTAL LABORATORIES
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ENGINEERING AND ARCHITECTURAL SERVICES
1.4	1.2	1.1	1.0	0.9	0.8	0.7	0.7	0.6	1.0	0.9	OTHER NONMANUFACTURING
15.8	14.9	14.7	14.1	13.3	13.4	12.3	12.6	12.1	11.2	10.4	..GOVERNMENT
5.1	4.6	5.1	5.2	5.5	5.6	5.1	5.2	5.0	4.5	3.8	FEDERAL
7.9	7.5	7.0	6.6	5.8	5.9	5.6	5.7	5.4	5.1	5.1	STATE
2.8	2.9	2.6	2.3	2.0	1.9	1.6	1.7	1.7	1.6	1.5	LOCAL
57.7	59.3	61.4	63.3	67.1	68.8	69.0	67.9	70.0	71.8	73.8	..COLLEGES AND UNIVERSITIES
3.7	4.1	4.8	4.3	3.8	3.5	3.2	3.3	3.0	2.8	2.5	..NONPROFIT INSTITUTIONS

Appendix B. Guidelines and Methods

Over the past two decades, statistics on science and engineering employment have been collected by many organizations for a variety of purposes. Differences in occupational definitions, industry coverage, survey techniques, and a variety of other factors, however, have created problems of comparability. In addition, data on employment of scientists and engineers are not available for some economic sectors for a number of years.

The main purpose of this study was to resolve problems created by the gaps and inconsistencies in employment data for scientists and engineers in order to develop a comprehensive and consistent historical employment series applicable to them. To accomplish this it was necessary, first of all, to establish guidelines for the occupations to be included in the study; to resolve definitional problems, such as who should be counted as being engaged in R&D work; to establish the reference period applicable to each year's employment estimates (i.e., annual average, "early-in-year," midyear, etc.). This appendix identifies these guidelines. It also presents the basic sources of data on science and engineering employment and discusses the methods used to develop the estimates.

Coverage

Scientists and engineers in this report include those who "work as" natural scientists or engineers. This concept, therefore, includes persons without college degrees in science and engineering who are working in engineering and science jobs. It does not include individuals with college degrees in science and engineering who are not working in these fields. Also excluded are social scientists, psychologists, and high school teachers of science subjects, as well as medical scientists who spend the greatest portion of their time providing care to patients. Estimates were developed for total employment and for employment in research and development.

Definitions

The basic definitions used in this time series are those used in the periodic surveys of scientific and technical personnel in private industry and in State and local governments that have been conducted by the Bureau of Labor Statistics. These surveys cover about four-fifths of all scientists and engineers. Following are the major definitions used in these surveys:

1. Scientists and engineers are workers who perform at a level requiring education or training equivalent to that acquired through completion of a 4-year college course with a major in a natural scientific or engineering field. (See appendix C for additional definitions of the individual science and engineering occupations.)
2. R&D scientists and engineers are defined as those who spend the greater portion of their time in basic and applied research in the natural sciences (including medical science) and engineering, and in design and development of prototypes and processes.
3. The overall employment data include all workers employed as scientists and engineers whether full or part time.
4. Industry classifications used are those of the *Standard Industrial Classification Manual*, 1967.

Period covered

This employment series covers the 1950-70 period. Preliminary efforts to develop comparable employment estimates for earlier years were abandoned

because the decennial censuses are almost the only sources of earlier data. Thus, these estimates could not be augmented or modified by other studies as were the data for the later period.

The annual estimates refer to January or "early-in-year" employment, reflecting the same time period as the surveys of scientific and technical personnel in private industry. Relatively few adjustments were necessary for survey data on science and engineering employment in State governments, universities and colleges, and nonprofit organizations, as most data collected were "early-in-year". Adjustments were necessary for survey data on Federal Government and local governments, as October was generally the date of the surveys in these sectors.

Sources of data

Historically, surveys of science and engineering employment have been made separately for six major sectors of the economy—private industry, Federal Government, State governments, local governments, colleges and universities, and nonprofit organizations.¹ In private industry, surveys of scientific and technical personnel were conducted by the Bureau of Labor Statistics for the years 1952, 1954, and annually 1959 through 1964 and 1966 through 1970. Data on State government employment, also collected by the BLS, are available only for the years 1959, 1962, 1964, and 1967. Non-recurring BLS surveys in this field include a survey of science and engineering employment in local governments for the year 1963 and a pilot survey covering such employment in six States in 1960. Surveys of science and engineering employment in universities and colleges were conducted by the National Science Foundation (NSF) in 1954, 1958, 1961, and biennially from 1965 through 1971. Scientists and engineers employed by nonprofit organizations were surveyed by the BLS in 1958 and the NSF in 1965, 1967, and 1970. An NSF survey in 1960 of such employment was limited in scope. (For a detailed listing of these surveys see appendix D.)

To augment the data from the various surveys of scientific and engineering employment, other sources of information were used. These included BLS establishment data on total wage and salary worker

¹ This nonprofit sector includes philanthropic foundations, voluntary health agencies, independent nonprofit institutes, certain Federally Funded Research and Development Centers, professional and technical societies, and science museums, zoological and botanical gardens, and arboretums.

employment and production worker employment; information from the Decennial Census of Population; Current Population Surveys; information on R&D expenditures from the NSF and the Department of Defense; information from the NSF's National Register of Scientific and Technical Personnel on scientists, by field, type of employer, and function; and data on full-time-equivalent R&D employment of scientists and engineers in private industry from NSF reports.

This bulletin also reflects information obtained directly from the BLS programs of occupational outlook and manpower research, which yield valuable industry and occupational data. It is this framework of studies, reports, and analyses which provided the basis for making the many judgments needed to develop the time series covering science and engineering employment.

General methods

Total estimates of science and engineering employment were derived by aggregating the separate estimates made for each of the six sectors of the economy for which data were available. Within private industry, estimates were derived separately for 31 industry groups.

In developing the six sector estimates, data from each employment survey conducted during the 1950-70 period were analyzed. Survey data for the various years were analyzed extensively for inconsistencies resulting from changes in survey coverage and definitions. In private industry, for example, it was necessary to account for changes from company to establishment reporting between 1960 and 1961; for State governments, adjustments were made for the different occupational definitions used in the 1961, 1964, and 1967 surveys.

Trends in employment for each sector based on the survey data were reviewed and analyzed for consistency. For example, in each of the manufacturing industries, science and engineering employment as reported in the Surveys of Scientific and Technical Personnel in Industry (STP) was analyzed in relation to the trends of employment indicators, such as total employment, nonproduction worker employment, output, and R&D expenditures. When needed, adjustments were made to resolve inconsistencies. In a few industries the more current levels of employment estimates were thought to be more accurate and reliable. In these instances adjustments were made to the earlier data. Thus, for each industry, the data

for years in which a survey was conducted are not necessarily identical to previously published survey data.²

Statistical relationships between the key industry indicators and science and engineering employment for each survey year served as the means of developing initial employment estimates for nonsurvey years. For example, for each industry within the private industry sector, ratios of science and engineering employment to total employment were developed each survey year. A trend of these ratios was then developed for the entire 1950-70 period. The resulting ratios were applied to estimates of total industry employment in corresponding years to derive "initial" estimates of science and engineering employment. An analysis was then made to see whether the "initial" estimates of science and engineering employment were consistent with other indicators, such as nonproduction worker employment and R&D expenditures.

In using the employment estimates developed in this report, perhaps the most important point to keep in mind is that a considerable amount of judgment was used in making the estimates. Additional study could possibly result in further refinement and greater reliability of the employment estimates.

Further, the degree of confidence in the estimates varies from sector to sector and from year to year within the same sector. In general, the estimates of all sectors are weaker in the earlier years because of the infrequency of the surveys, the more experimental nature of the earlier surveys, and the smaller amount of related information upon which judgments could be based. The estimates of Federal Government employment, followed by private industry, are felt to be the most reliable, as much more direct and related information was available on science and engineering employment in these sectors. Since these two sectors represent about 80 percent of all science and engineering employment in the United States, the estimates of total employment of scientists and engineers are believed to be good.

² For private industry, published data also differ because adjustments are made to include those not covered by the STP surveys – the self-employed and those in firms below the cutoff size.

The weakest estimates are for scientists and engineers in the local government and nonprofit organizations sectors, in which comprehensive surveys of science and engineering employment have been conducted very infrequently. The later-year estimates for nonprofit organizations are more reliable, however.

Occupational distribution. Employment in each science and engineering occupation was developed on the basis of occupational distributions in individual industries as shown by various surveys. Inconsistencies in the distributions were resolved on the basis of an analysis of the trends that most logically fit the data. Final ratios for each year were applied to the estimates of total science and engineering employment in the industry for the corresponding year to derive employment estimates for individual occupations.

Research and development. The methods for deriving employment estimates for scientists and engineers engaged in research and development were similar to those for total science and engineering employment. First, estimates were made for the years for which survey information was available. After several tests were conducted for consistency between the R&D employment and related industry indicators, particularly data on R&D expenditures, ratios were developed relating R&D employment of scientists and engineers to total science and engineering employment. The ratios were then applied to science and engineering employment in corresponding years to derive R&D employment estimates. Another method used to develop estimates of R&D science and engineering employment was to develop a trend of R&D expenditures per scientist or engineer engaged in research and development based on survey-year data and then to apply the annual estimates of such expenditures to total R&D expenditures in that sector. Similar techniques were used to develop estimates for scientists and engineers separately. (See discussion on colleges and universities later in this appendix.)

Methods for economic sectors

Private industry

Employment information on scientists and engineers in private industry was obtained from surveys of employment of Scientific and Technical Personnel in Industry (STP Surveys) for the years 1954, 1957, annually 1959 through 1964, and 1966 through 1970. These studies furnished the basic data on which estimates were developed for 31 two- and three-digit industries as defined by the Standard Industrial Classification system. The 1966 through 1969 surveys are believed to be the most reliable as they had a much larger sample and the statistical techniques are assumed to be better. The data reported in these surveys were used, therefore, as benchmarks for the entire series. The basic problem encountered in developing the series was to devise measures of estimating employment for years for which no survey was conducted and of minimizing the effects of changing survey concepts from year to year.

Survey-year estimates. Employment of scientists and engineers in each industry as reported in the separate surveys was first tabulated and analyzed for consistency with total industry employment, R&D expenditures, and other indicators of industry employment activity. A key measure of consistency was the employment data reported in each survey for the previous year. For example, the 1961 survey collected data for both 1961 and 1960. Previous-year data were particularly helpful in bridging years between which significant changes in survey concepts occurred, or between years for which the levels of employment reported in the surveys were not consistent. For example, the 1960 survey reported 71,400 scientists and engineers employed in the machinery industry. The 1961 survey reported 65,400 but also indicated that employment increased 7.2 percent from 1960. A back-year estimate based on the 1961 survey indicated 60,900 as the 1960 employment. The back-year estimate was generally used as the "initial" survey-year estimate, which was in turn checked out for consistency with available information.

The most important change to affect comparability of industry survey data was the conversion from company to establishment reporting between 1960 and 1961. In the 1960 and earlier surveys, company reporting

restricted identification of industry employment to the industrial classification in which the largest proportion of company personnel were employed. The change to establishment reporting in 1961 provided more specific identification of the industry of employment. This was particularly true in large, multiestablishment companies engaged in widely diverse activities.³ Beginning in 1961, establishments in these large companies were classified separately.

In addition to the adjustments for changes in survey methods and techniques, other adjustments were necessary to assure coverage of all scientists and engineers in the economy. The major adjustment was the inclusion of self-employed scientists and engineers, who are excluded from coverage in the STP surveys. The benchmark estimate of these workers was based upon data in the 1960 census, and trends were established from unpublished data in the Current Population Survey. The large majority of these workers were engineers classified in the engineering and architectural services industry.

Adjustments also were made to account for a small number of scientists and engineers who were estimated to be employed in firms of smaller size than the minimum employment size of firms in the STP surveys. Most of these "cutoffs" were in the construction industry. In total, adjustments for cutoffs were made in 6 of the 31 industry groups for which separate estimates were developed in this study. The tabulation on the following page shows which cutoff adjustments were made for 1966-70.

Exclusion of industry segments in early surveys also produced problems of comparability in survey data. For example, in 1957 surveys the minimum employment size of firms providing miscellaneous business services was 100 employees; in 1959, 50. The change in employment size for cutoffs in construction firms from 10 in the 1964 survey to 4 in the 1966 survey also had a pronounced effect on reported employment.

Many sources of industry information were used in appraising the consistency of year-to-year variations in survey-year employment as shown by the initial estimates, especially information from reports of industry activity and employment prepared by government agencies. Industry

³ For illustration of the effect of company versus establishment reporting, see National Science Foundation, *Scientists, Engineers, and Technicians in the 1960's: Requirements and Supply*, NSF 63-34. (Washington, D.C., U.S. Government Printing Office, 1964), appendix table G-1.

<i>Industry</i>	<i>Number of employees in smallest size of firm sampled</i>
Textile mill products and apparel:	
Textile mill products ⁴	50
Apparel ⁴	100
Lumber and furniture	50
Contract construction	4
Miscellaneous manufacturing:	
Tobacco manufacturers ⁴	50
Printing, publishing, and allied industries ⁴	100
Miscellaneous manufacturing industries ⁴	10
Mining, except petroleum	10
Other transportation services:	
Local passenger transportation ⁴	100
Trucking ⁴	10
Water transportation ⁴	10
Air transportation ⁴	100
Pipeline transportation ⁴	50

occupational data, such as those periodically reported by regulatory agencies, and information collected during the course of research for the Bureau's occupational outlook program, also were used to develop the employment estimates.

In analyzing survey-year science and engineering employment by industry, extensive analysis was made of the relationship of STP survey data to BLS data on employment of wage and salary workers. In each industry, ratios of science and engineering employment to total employment and to nonproduction worker employment were developed by relating science and engineering employment as reported in the STP surveys to wage and salary worker employment and to nonproduction worker employment statistics based on payroll data. Consistency of trends in these

⁴ A separate series was not developed for this industry.

⁵ The revised 1961 and 1962 survey data are published in BLS Bulletin 1609, along with the reports on the 1963, 1964, and 1966 surveys.

latter ratios was considered to be of the highest importance, and many of the judgment estimates resulted from elimination of computed ratios that were inconsistent.

Improvements in STP survey techniques since 1962 have significantly reduced the inconsistency of survey data. Few "judgment" changes were made to the reported data in the 1963 and 1964 surveys and almost none to the 1966 through 1970 survey data. The 1962 and 1961 survey data that were revised based on new survey estimating procedures also were consistent with other data and only minor adjustments were made.⁵ Thus, data in the published 1962 and 1961 surveys were not used extensively. They were used primarily to adjust year-to-year changes. For example, information in the 1961 survey on 1961 and 1960 employment was used primarily to develop the percent increase in employment between 1960 and 1961. By relating this change to the 1961 revised survey data, the initial 1960 estimate was developed.

Nonsurvey year estimates. The initial estimates of science and engineering employment for non-STP-survey years relied heavily on the use of ratios of science and engineering employment to total industry employment that were developed based upon trends in these ratios in the survey years. The initial employment estimates obtained by applying estimated ratios to appropriate BLS wage and salary worker employment were analyzed in relation to other industry indicators such as production levels, product mix, capital expenditures, technology, and R&D expenditures. This analysis provided a basis for necessary adjustments to the initial estimates.

Occupational estimates. In developing occupational estimates, employment in each occupation by industry was computed as a percent of the industry's total science and engineering employment as was reported in each survey. Changes in the proportions from year to year were examined for consistency and reasonableness. Extreme variations were examined for possible industry and occupational classification differences. For example, survey data for the iron and steel industry showed that employment of metallurgists (included in "other physical scientists") and engineers moved radically in opposite directions from year to year. Investigation indicated that the differences shown in these occupations from survey to survey resulted from classification problems rather than from actual employment changes.

Adjusted survey-year proportions in each occupation were used to develop trends from which initial estimates were made for nonsurvey years. For all years, the percent that each occupation made up of total science and engineering employment in each industry was applied to estimates of total science and engineering employment. The resulting employment levels were checked for consistency with any available data, such as 1950, 1960, and 1970 Census of Population information or the special industry studies.

R&D estimates. To develop estimates of scientists and engineers engaged in research and development, the proportions that R&D scientists and engineers made up of all scientists and engineers were derived by industry for each STP survey. These data were considered in conjunction with other data, such as R&D expenditures by industry and statistics on full-time equivalent employment of scientists and engineers collected by the Bureau of the Census for the National Science Foundation. After adjustments in the survey-year ratios were made for irregularities, trends were developed for the entire 1950-70 period, which provided proportions of total science and engineering employment in research and development for the nonsurvey years. The R&D employment series was developed by applying these ratios to estimates of total science and engineering employment.

Separate estimates for scientists and engineers were available for 1963, 1964, and 1966 through 1970. These data served as benchmarks and were used to develop estimates for years prior to 1963. When separate estimates for scientists and engineers were available prior to 1963, ratios of engineers in R&D to total R&D scientists and engineers were developed by industry. This same procedure was followed for scientists. These ratios were analyzed in relation to those available from 1964-70, and in most instances were comparable to the latter data even though the reported numbers were out of line with more current estimates.

Ratios for intervening years were interpolated. For industries where data did not exist prior to 1963, regression analysis was used to establish the relevant ratios. After a complete set of ratios had been established for 1950 through 1970 for both scientists and engineers, these ratios were applied to the estimates of total scientists and engineers in R&D prior to 1963 to obtain separate estimates of engineers in R&D and scientists in R&D.

As a final check, ratios were developed for engineers in R&D to total engineers prior to 1963 and analyzed in relation to ratios where actual data

existed. This same procedure was followed for scientists. Both sets of estimates were compared to more recent ratios and analyzed in relation to R&D funds, by industry, where data were available.

STP survey data for individual science occupations employed in research and development were found to be so inconsistent, especially in the earlier years, that occupational series were not developed.

Federal Government

Employment estimates developed for the Federal Government sector were based primarily on Civil Service Commission surveys of Federal Government employment for the years 1951, 1954, annually 1957 through 1962, 1964, and 1966 through 1970. The basic problem encountered was the lack of comparability of occupational titles used in the time series with the many job titles in the CSC code. To develop comparable occupational categories, Federal Government occupational titles were analyzed in detail by evaluating written descriptions and by discussing problem occupations with CSC officials and in some cases with supervisors of workers in the occupations in question. The following tabulation shows the CSC occupational codes and titles (as of October 1969) that were included in the occupational employment estimates in this report.

<i>Occupational classification for employment series</i>	<i>Civil Service Commission code and occupational title</i>	
Engineers	GS-801	General engineering
	GS-803	Safety engineering
	GS-804	Fire prevention engineering
	GS-806	Materials engineering
	GS-808	Architecture ⁶
	GS-810	Civil engineering ⁷
	GS-819	Sanitary engineering
	GS-830	Mechanical engineering ^{7,8}
	GS-840	Nuclear engineering
	GS-850	Electrical engineering

⁶ Series established in August 1962: replaced former G-1040, Architecture.

⁷ Includes positions formerly in Valuation engineering, GS-897, coded GS-800 after June 1965.

⁸ Includes positions formerly in Marine engineering, GS-870, abolished August 1968.

**Occupational classification
for employment series**

**Civil Service Commission code and
occupational title**

Engineers (Continued)

GS-855 Electronic engineering
GS-861 Aerospace engineering
GS-871 Naval architecture
GS-880 Mining engineering
GS-881 Petroleum engineering^{7,9}
GS-890 Agricultural engineering
GS-892 Ceramic engineering
GS-893 Chemical engineering
GS-894 Welding engineering
GS-896 Industrial engineering
GS-1301 General physical science¹⁰

Data for the following engineering series were used prior to their discontinuance. Personnel in these series were reclassified into other engineering series. For example, structural engineers were classified as civil engineers in December 1964.

GS-805 Maintenance engineering. Series discontinued, December 1964.
GS-811 Construction engineering. Series discontinued, December 1964.
GS-812 Structural engineering. Series discontinued, December 1964.
GS-813 Hydraulic engineering. Series discontinued, December 1964.
GS-820 Highway engineering. Series discontinued, December 1964.
GS-824 Bridge engineering. Series discontinued, December 1964.
GS-831 Automotive engineering, Series number changed to GS-832 January, 1958.
GS-832 Automotive engineering. Series discontinued, February 1965.
GS-834 Internal combustion power plant engineering. Series discontinued, August 1961.
GS-862 Airways engineering. Series discontinued, December 1964.
GS-870 Marine engineering. Series discontinued, August 1968.
GS-897 Valuation engineering. Series discontinued, June 1965.

Mathematicians

GS-1520 Mathematics
GS-1529 Mathematical statistician¹¹

Chemists

GS-1301 General physical science¹⁰
GS-1320 Chemistry

**Occupational classification
for employment series**

**Civil Service Commission code and
occupational title**

**Geologists and
geophysicists**

GS-1301 General physical science¹⁰
GS-1313 Geophysics
GS-1350 Geology
GS-1371 Geodesy

Physicists

GS-1301 General physical science¹⁰
GS-1306 Health physics
GS-1310 Physics

**Other physical
scientists**

GS-015 Operations research
GS-1301 General physical science¹⁰
GS-1315 Hydrology
GS-1321 Metallurgy
GS-1330 Astronomy and space science¹²
GS-1340 Meteorology
GS-1360 Oceanography¹³
GS-1370 Cartography
GS-1373 Cadastral survey
GS-1380 Forest products technology
GS-1382 Food technology
GS-1384 Textile technology

Data for GS-1390, Technology, were used prior to the discontinuance of the series in June 1966. Personnel were reclassified into the physical sciences series.

**Agricultural
scientists**

GS-434 Plant pathology
GS-437 Horticulture
GS-452 Park naturalist
GS-454 Range conservation

⁹ Series title changes from Petroleum production and natural-gas engineering in June 1966.

¹⁰ This series was distributed into engineering and physical science occupational groups based upon the proportion that each occupation was of combined engineering and physical science employment before the addition. The majority of these workers are employed at NASA.

¹¹ Series established in February 1961; personnel formerly classified in GS-1530, Statistician.

¹² Series title changed from Astronomy in August 1961.

¹³ Series title changed from Nautical science in August 1963.

**Occupational classification
for employment series**

**Civil Service Commission code and
occupational title**

**Agricultural
scientists (Continued)**

GS-457 Soil conservation
GS-460 Forestry
GS-470 Soil science
GS-471 Agronomy
GS-487 Husbandry
GS-701 Veterinary medical science¹⁴

Data for GS-450, General agriculture administration, and GS-451, General agriculture, were used prior to the discontinuance of the series in April 1967. An adjustment was made to data reported for GS-451 prior to August 1959, at which time the U.S. Civil Service Commission created GS-475, Farm management loan, from a portion of GS-451. After 1964, the title was changed to Farm management.

Biological scientists

GS-401 Biology
GS-403 Microbiology
GS-405 Pharmacology
GS-410 Zoology
GS-411 Systematic zoology
GS-412 Parasitology
GS-413 Physiology
GS-414 Entomology
GS-415 Nematology
GS-430 Botany
GS-435 Plant physiology
GS-436 Plant quarantine and pest control
GS-440 Genetics
GS-480 General fish and wildlife administration
GS-482 Fishery biology
GS-485 Wildlife refuge management
GS-486 Wildlife biology

Data for the following series were used prior to their discontinuance. Personnel in these series were reclassified into other biological sciences.

GS-420 Bacteriology. Series discontinued, December 1962.
GS-431 Mycology. Series discontinued, December 1962.
GS-433 Plant taxonomy. Series discontinued, April 1966.
GS-484 Animal control biology. Series discontinued, February 1966.
GS-494 Microanalysis. Series discontinued, December 1962.

**Occupational classification
for employment series**

**Civil Service Commission code and
occupational title**

Medical scientists¹⁴

GS-602 Medical officer
GS-630 Dietitian
GS-660 Pharmacist
GS-662 Optometrist
GS-680 Dental officer
GS-685 Public health program specialist¹⁵
GS-690 Industrial hygiene
GS-695 Food and drug officer

Most CSC surveys were conducted as of October 31. Therefore, adjustments were made, based on the relationship of science and engineering employment to total Federal employment, to make the data conform to the January dateline of the other sectors. Once satisfactory estimates were derived for the survey years, estimates for the nonsurvey years were obtained by applying rates of change to the survey year estimates based on changes in total Federal Government employment.

Estimates of employment of scientists and engineers engaged in research and development were based upon CSC survey data and trends in R&D expenditures per R&D scientist or engineer. Survey data were available for the years 1958 through 1962, 1967, and 1969.

State Government

Estimates of employment of scientists and engineers in State governments were based primarily on information in the BLS surveys of scientists and engineers employed in this sector in 1959, 1962, 1964, and 1967.¹⁶ After the data from these surveys were adjusted for comparability

¹⁴ Only those persons engaged in R&D activities were counted.

¹⁵ Series title changed from Public health administration in October 1963.

¹⁶ National Science Foundation, *Employment of Scientific and Technical Personnel in State Government Agencies. Report on a 1959 Survey*, NSF 61-17, (1961); U.S. Department of Labor, Bureau of Labor Statistics, *Employment of Scientific and Technical Personnel in State Government Agencies, 1962*, Bulletin No. 1412, (1964); *Review of Occupational Employment Statistics: Employment of Scientific, Professional, and Technical Personnel in State Governments, January 1964*, Bulletin No. 1557, (1967); *Scientific and Professional Employment by State Governments*, reprint 2675 from the *Monthly Labor Review*, August 1969.

of occupational classifications, total science and engineering employment and employment by occupation were estimated for the intervening years through an analysis of the relation of science and engineering employment to total State government employment (less State educational employment)¹⁷ as reported by the BLS. Other data used to analyze engineering employment were expenditures for highway programs and total highway department employment, as about 80 percent of the scientists and engineers in State governments were employed in highway departments.

For estimates of employment of engineers in State governments for 1950 through 1956 use also was made of two Bureau of Public Roads inventories of State highway engineering manpower, for 1956 and 1960, which included data for the years 1950, 1954, 1955, and 1960. *Census of Government* data provided highway employment and expenditures information for 1950 and 1952 through 1970.

Estimates of employment of scientists and engineers in R&D activities were derived by an analysis of the ratio of scientists and engineers in research and development to total scientists and engineers in the STP survey years. These ratios were used to develop ratios for nonsurvey years which were applied to total science and engineering employment estimates. Estimates of engineers in R&D and scientists in R&D were developed by establishing a ratio of engineers in R&D and scientists in R&D to total scientists and engineers in R&D in survey years. These ratios were used to develop ratios for nonsurvey years which were then applied to the total estimate of scientists and engineers in R&D.

Local government

Estimates of employment in this sector are weaker than those in other sectors because of the dependence on only two surveys of science and engineering employment, one of which was only a pilot survey of employment in six States as of January 1960. Data from the other survey, which reported employment as of October 1963, were adjusted to the desired January levels based on an analysis of the change in total local government employment.

Initial estimates of science and engineering employment for the 1950-66 period were developed by relating the growth of total local government employment (minus education)¹⁸ over this period to the 1963 science and

engineering employment. The initial estimates were adjusted to reflect the changes in employment of local governments serving populations of 50,000 or more to those with less than 50,000 as the former generally have a higher proportion of scientists and engineers.

Information on local government expenditures by function derived from *Census of Government* data provided the means of estimating changes in the occupational composition of scientists and engineers for the 1950-70 period. For the lack of any substantive information on R&D activities in local governments, estimates of employment of scientists and engineers engaged in research and development in this sector were based on the proportion that scientists and engineers in R&D activities made up of total scientists and engineers in State governments. The split between scientists and engineers in R&D was based upon the same ratios established for State governments. The ratios were then applied to the total estimate of R&D scientists and engineers in local governments.

Colleges and Universities

The published NSF studies of scientists and engineers employed by colleges and universities¹⁹ in 1954, 1958, 1961, and biennially from 1965 through 1971 provided the basic employment information. Substantial adjustments to these data were required to make the information comparable among the surveys. For example, the 1954 survey provided information on faculty by occupation but omitted information on

¹⁷ Educational employment was excluded from the series because employment in universities and colleges, which represents the major portion of State educational employment, is included in the coverage of surveys of universities and colleges conducted by the National Science Foundation.

¹⁸ Educational employment was excluded from the local government employment series because those employees in the local school system with science backgrounds, such as instructors in physics or mathematics, are regarded as teachers rather than scientists. Local government employment, minus education, for the years 1955-66, was available from BLS establishment data, and estimates for the years 1950-54 were made using the relationship of employment minus education to total employment for the later period.

¹⁹ Including Federally Funded Research and Development Centers operated by universities and colleges.

nonfaculty and research center employment by occupation; the 1958 survey provided data on faculty and other personnel but omitted information on scientists by occupation.

The employment estimates of scientists and engineers over the 1950-70 period were developed separately for research and development and for teaching. All scientists and engineers engaged in other activities, such as administration, were included with teachers, as they represented a small portion of the total.

Estimates of teachers were based primarily on the ratio of science and engineering graduates to science and engineering teachers in the survey years. It was felt that this relationship would provide the best measure for judging employment changes among science and engineering teachers.

Problems arose in analyzing data for the early 1950's. By applying the graduate-to-teacher ratio which was extrapolated for the entire 1950-70 period based on the data from three surveys (not including 1954), the number of teachers calculated for the early 1950's was much larger than appears probable. This reflected, of course, the large number of graduates in the early 1950's, which resulted from the presence of World War II veterans in those classes. It was assumed, therefore, that the science and engineering graduate-to-teacher ratio was much higher in the earlier years than in the mid-1950's. This was consistent with Office of Education data for all fields of study combined.

R&D scientists and engineering employment was based on the relationship of R&D expenditures to R&D scientists and engineers in addition to survey data. A trend was established from survey-year data of R&D dollar expenditures per R&D scientist or engineer employed. These ratios were plotted over time for the 1950-70 period and then applied to data on R&D dollars expended for research in colleges and universities.

The total employment estimate derived by aggregating the teaching and R&D scientist and engineer totals for each year was checked for consistency. For example, a check was made to assure a logical relationship in the trend of employment in teaching and in research and development.

The occupational distribution of total science and engineering employment was based on an analysis of the 1954, 1961, 1965, 1967, 1969, and 1971 distributions, from which trends were developed for the entire 1950-70 period. The initial estimates were checked and revised to assure consistency with data on degrees granted by field of study.

In deriving the total employment estimates for this sector, it was

assumed that a large majority of all scientists and engineers employed part time by universities and colleges have their primary employment in some other sector. Since no estimates were available of the small number of part-time personnel who are not employed in some other sector, all part-time scientists and engineers were excluded. The total annual estimates are not believed to be significantly affected by their exclusion. However, salaried graduate students employed by universities and colleges in the covered occupations were included in the total annual estimates (about 66,000 in 1970).

Nonprofit institutions

Estimates in this sector were based primarily on information from the 1958, 1965, 1967, and 1970 NSF surveys of science and engineering employment in nonprofit organizations. Substantial adjustment was necessary to make the data from the 1958 survey consistent with the other industry sectors, as the occupational distribution was different and the data were on a full-time-equivalent basis. Since survey data indicated a high ratio of R&D personnel to total science and engineering employment in nonprofit organizations, this area of employment was developed first.

A series of R&D expenditures (in constant dollars) was derived for the entire 1950-70 period, using NSF and Department of Defense data. The 1958, 1965, 1967, and 1970 estimates of expenditures were then related to survey employment data in the respective years to obtain estimates of R&D expenditures per R&D scientist or engineer in these years. Despite the weakness of a trend based on four points in time, a trend was developed which was based heavily on an analysis of the changes in R&D expenditures per scientist or engineer in other industry sectors over the 1950-70 period. This series, in turn, was applied to the estimates of total expenditures for R&D activities by nonprofit organizations in the nonsurvey years to obtain an employment series for scientists and engineers engaged in research and development. The estimate of total employment of scientists and engineers over the 1950-70 period was based on the relationship of R&D employment of scientists and engineers to total employment in the years the surveys were conducted. The occupational distribution over the period also was based on the distributions in the surveys.

Analysis of aggregate science and engineering employment

The estimates of science and engineering employment in all sectors of the economy combined were analyzed on an aggregate basis to assure consistency of the totals with employment indicators on an aggregate basis. For example, an analysis was made of trends in total science and engineering employment compared to trends in total employment, total R&D expenditures, and total professional, technical, and kindred worker employment.

A comparison also was made of the employment growth over the 1950-70 period with the growth that would be indicated by the supply from college graduates, immigrants, workers returning to the labor force, persons in other occupations transferring to science and engineering jobs, and occupational losses that would result from deaths, retirements, and transfers to other occupations.

Engineering employment estimates developed in this report were analyzed in conjunction with estimates from the 1950, 1960, and 1970 decennial censuses. The 96 percent growth in engineering employment from 1950 to 1960 indicated in the employment series developed in this report is more rapid than the 67 percent increase shown by Census data. However, the 37 percent increase in engineering employment between 1960 and 1970 shown in this report is consistent with the 42 percent increase shown by the Census. Substantially different growth rates between 1950 and 1960 primarily reflect the substantially lower level of estimates for engineering employment in 1950 developed in this report, about 80 percent

of the level of the 1950 Census. In 1960 and 1970, the estimates shown in this report were 95 percent and 90 percent of the respective Census totals. The much larger difference in 1950 probably results from an overstatement of engineering employment to a greater degree than occurred in later censuses since there was less familiarity with technician occupations—the lower level occupations most closely related to engineers—at the time of the 1950 census. Overstatement of engineering employment in a census or household survey—compared to a survey of employers—generally can be expected. This is indicated by a special tabulation of the 1950 Census data provided to BLS. This table, which cross-classified engineering employment by age and years of school attended, shows that about 4.5 percent of those reported as engineers were too young, or had insufficient schooling in relation to age, to qualify for the work normally performed by engineers. That these two reporting techniques provide somewhat different results also is indicated by the post-censal report, *The Employment Record Check*²⁰. The tabulations in this study, covering major occupational groups, show higher proportions reported in professional and technical, sales, and craftsman categories, and lower proportions in managerial, service, and laborer classifications in the household count than in data reported by employers.

²⁰ U.S. Department of Commerce, Bureau of the Census, *Evaluation and Research Program of the U.S. Census of Population and Housing*, Series BR60 No. 6 (Washington, D.C., U.S. Government Printing Office, 1965).

Appendix C. Definitions

The scientific and engineering occupational definitions used in this report are the same as those specified in the latest published report on science and engineering employment in private industry, *Scientific and Technical Personnel in Industry, 1969*. The occupational definitions provided by the questionnaire for this survey were furnished as a guide to establishment personnel from whom this information was solicited.

Scientists represent all persons actually engaged in scientific work at a level which requires knowledge of physical, life, engineering, or mathematical sciences equivalent at least to that acquired through completion of a 4-year college course with a major in one of these fields, regardless of whether they hold a college degree in the field. Included are those persons in research-development, production, management, technical service, technical sales, and other positions which require them to use the indicated level of knowledge in their work. Excluded are those persons trained in science but currently employed in positions not requiring the use of such training. Excluded also are psychologists and social scientists.

Engineers represent all persons actually engaged in chemical, civil, electrical, mechanical, metallurgical, and all other types of engineering work at a level which requires knowledge of engineering, physical, life or mathematical sciences equivalent at least to that acquired through completion of a 4-year college course with a major in one of these fields, regardless of whether they hold a college degree in the field. Included are persons in research-development, production, management, technical service, technical sales, and other positions which require them to use the indicated level of knowledge in their work. Included also are architectural engineers, but not architects. Also excluded are persons trained in engineering but currently employed in positions not requiring the use of such training.

Mathematicians represent only those persons whose positions require knowledge of mathematics equivalent at least to that acquired through 4-year college courses with a major in mathematics and who spend the greatest proportion of their time in development or application of mathematical techniques. Included are actuaries and mathematical analysts. Included also are statisticians and programmers, but only if they specialize in mathematical techniques. Accountants are excluded.

Medical scientists represent only those physicians, dentists, public health specialists, pharmacists, and members of other scientific professions concerned with the understanding of human diseases and improvement of human health who spend the greater portion of their time in clinical investigation and other research, production, technical writing, and related activities. Excluded are persons who spend the greatest portion of their time in providing care to patients, dispensing drugs or services, diagnosis, etc. Persons working as pathologists, microbiologists, pharmacologists, etc. are excluded from the figures on medical scientists and included in the figures on biological scientists.

Agricultural scientists represent all persons who spend the greatest portion of their time in understanding and improving agricultural productivity, such as those working in agronomy, animal husbandry, forestry, horticulture, range management, soil culture, and veterinary science. Excluded are veterinarians who are primarily engaged in providing care to animals.

Biological scientists represent all persons who work in sciences which deal with life processes, other than those classified as agricultural and medical sciences. Included are pathologists, microbiologists, pharmacologists, bacteriologists, toxicologists, botanists, zoologists, and kindred specialists.

Appendix D. Bibliography of Source Materials

This bibliography presents a selected list of reports and bulletins on surveys of employment of scientists and engineers conducted by the Federal Government over the 1950-70 period. The items are listed by the sector for which data were collected.

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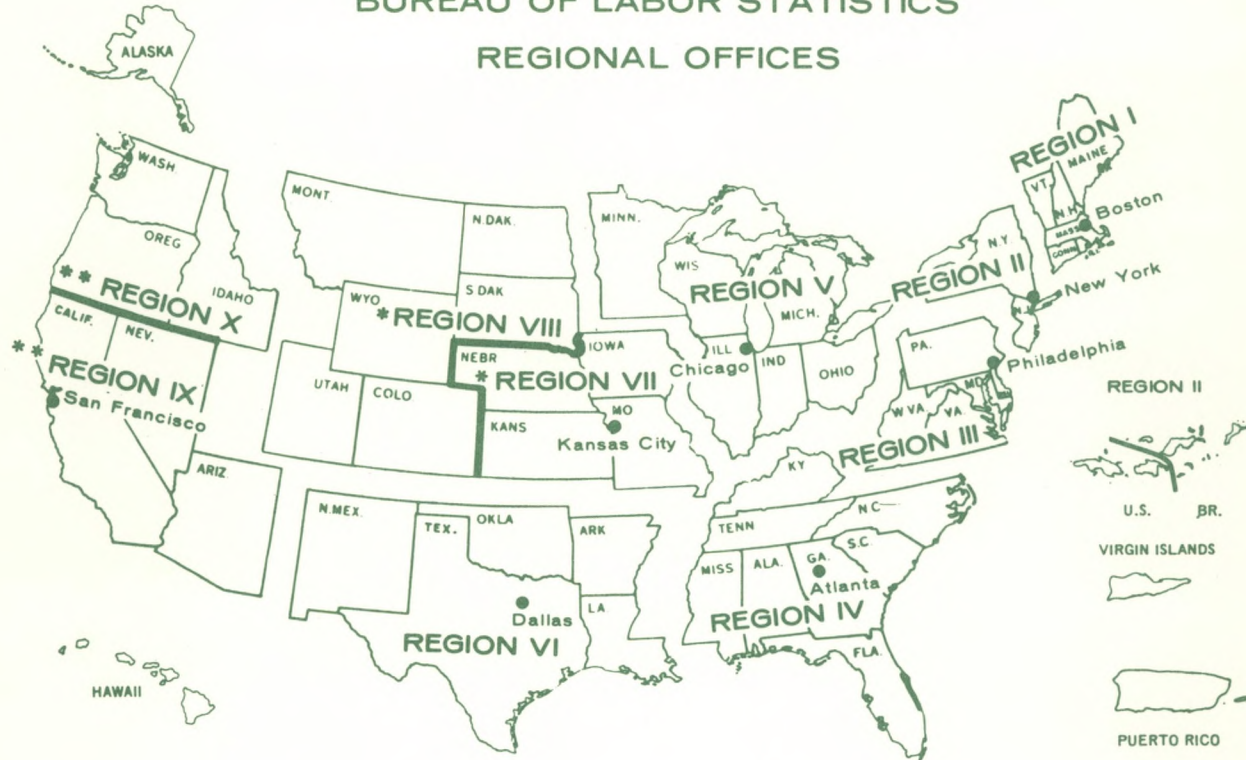
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