DOCUMENT RESUME

ED 089 646 HE 005 403

TITLE Doctoral Scientists and Engineers in the United States. 1973 Profile.

INSTITUTION National Academy of Sciences - National Research Council, Washington, D.C. Commission on Human Resources.

PUB DATE Mar 74

NOTE 52p.

EDRS PRICE MF-$0.75 HC-$3.15 PLUS POSTAGE

DESCRIPTORS Colleges; *Doctoral Degrees; Educational Research; *Engineers; Graduate Study; *Higher Education; Manpower Utilization; Professional Education; *Scientists; *Surveys; Universities

ABSTRACT

This is the first report on the composition of the nation's doctorate-level scientists and engineers from a survey conducted in the spring of 1973 by the National Academy of Sciences. The survey was based on the roster of doctoral scientists and engineers, which is one of the 3 sources of information about the scientific and engineering population of the country. A summary of findings includes: (1) There were 244,900 doctoral scientists and engineers in the U.S. in 1973 who had received their doctoral prior to July 1, 1972. (2) Nearly 91% of the total population were employed. (3) Women constituted about 9% of the science and engineering doctoral population. (4) Women reported an unemployment rate of 3.9%, whereas men reported 0.9%. (5) Members of minority groups accounted for 5% of the total doctoral scientist and engineers. (6) Half of the doctoral scientists and engineers were in the biosciences or the physical sciences. (7) Educational institutions employed nearly three-fifths of the working doctoral scientists and engineers. Appendices include the survey procedures, supplementary tables, and a sample questionnaire. (Author/PG)

DOCTORAL SCIENTISTS AND ENGINEERS IN THE UNITED STATES

1973 PROFILE

A Report by the
Commission on Human Resources
Based on the
1973 Survey of Doctoral Scientists and Engineers

The Roster of Doctoral Scientists and Engineers
is maintained by the
National Research Council
with the support of the
National Science Foundation

National Academy of Sciences
Washington, D.C.
March, 1974

FOR FURTHER INFORMATION

Further analysis of the data from the 1973 survey reported here is in progress, and additional reports will be forthcoming. Meanwhile, questions may be directed to:

Commission on Human Resources
National Research Council
2101 Constitution Avenue
Washington, D.C. 20418

ACKNOWLEDGMENTS

This report was prepared for the National Science Foundation under the auspices of the Commission on Human Resources (formerly the Office of Scientific Personnel) of the National Research Council. Overall support was provided by the National Science Foundation. Augmentation of the Roster survey sample in the biomedical sciences was made possible by support of the National Institutes of Health.

A subcommittee of the Advisory Committee for the Office of Scientific Personnel, including Robert A. Alberty (Chairman), Lyle V. Jones, and Charles M. Kearns, Jr., provided policy guidance from the inception of the project and made valuable suggestions at each stage. J. James Brown of the Foundation's Division of Science Resources Studies served as the responsible staff officer at the National Science Foundation and, with Robert W. Cain of the Division, gave assistance and good counsel throughout the project.

At the National Research Council the project staff included Porter E. Coggeshall (initially as Project Coordinator and later as Deputy Project Director), Clarebeth M. Cunningham (utilization of Doctorate Records File data), Thomas H. Curry and William C. Kelly (administrative supervision), Lindsey R. Harmon (survey design), Doris E. Rogowski (supervision of mailing and coding), Herbert Soldz (initially project management and later management of data processing), and Lewis C. Solmon (Project Director during the period of preparation of this report and principal author of the report). Other members of the Council's staff also contributed significantly.

Many members of the scientific and engineering communities have been helpful in enabling us to obtain current mailing addresses and to achieve

a high response rate in the survey. They include representatives of the professional societies, graduate deans, academic department chairmen and other university officials, and heads of industrial research departments. Representatives of several of these groups have also made valuable suggestions for this report.

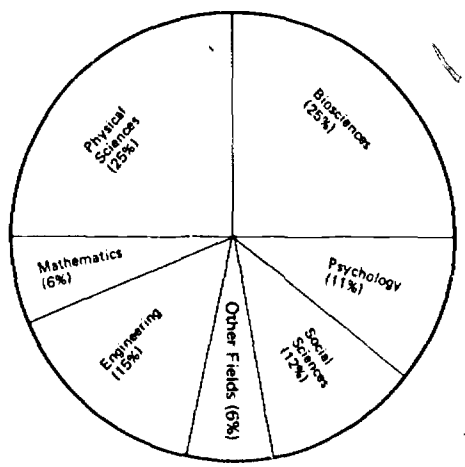
Finally, the doctorate-holding scientists and engineers who responded to this survey deserve the warmest thanks, since it was their efforts that made the survey and this report possible.

CONTENTS

CHARTS

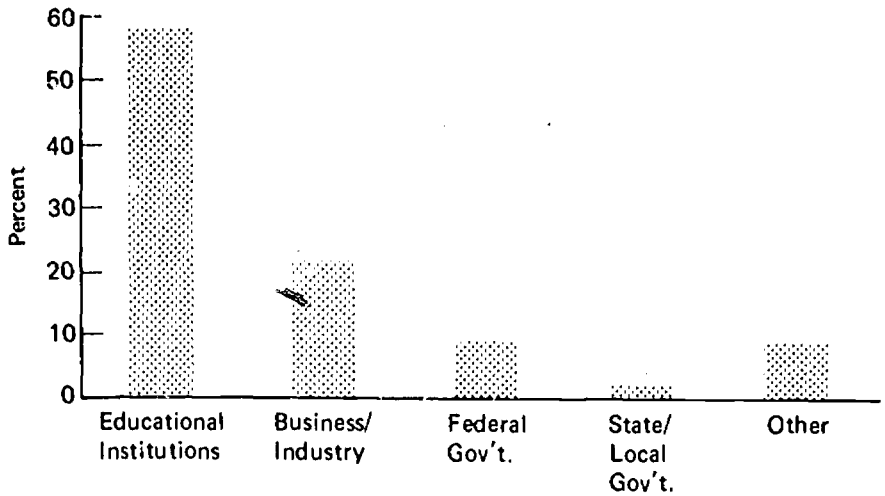
SUMMARY

- There were 244,900 doctoral scientists and engineers in the United States in 1973 who had received their doctorate prior to July 1, 1972.
- Nearly 220,800 (91 percent) of the total population were employed, 213,600 full-time and 7,200 part-time.
- Temporary (short-term) postdoctoral appointments were held by 6,000 doctoral scientists and engineers.
- The 1973 unemployment rate for doctoral scientists and engineers was 1.2 percent; that is, 2,600 people out of the labor force of 229,400 doctorate-holding scientists and engineers were unemployed and seeking employment.
- Women constituted about 9 percent or 21,300 of the science and engineering doctoral population.
- Women reported an unemployment rate of 3.9 percent, whereas men reported 0.9 percent.
- Members of minority racial groups accounted for 5 percent or 13,300 of the total doctoral scientists and engineers.
- Half of the doctoral scientists and engineers were in the biosciences or the physical sciences.



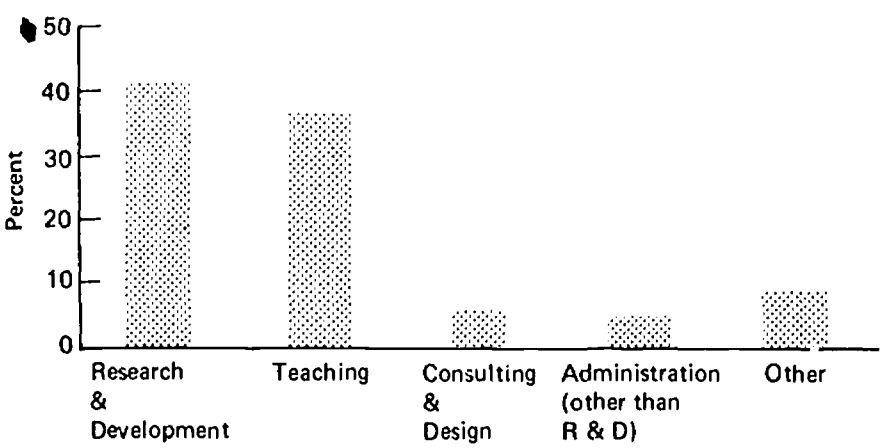
Distribution of Doctoral Scientists and Engineers by Field of Identification, 1973

- Educational institutions employed nearly three fifths of the working doctoral scientists and engineers.



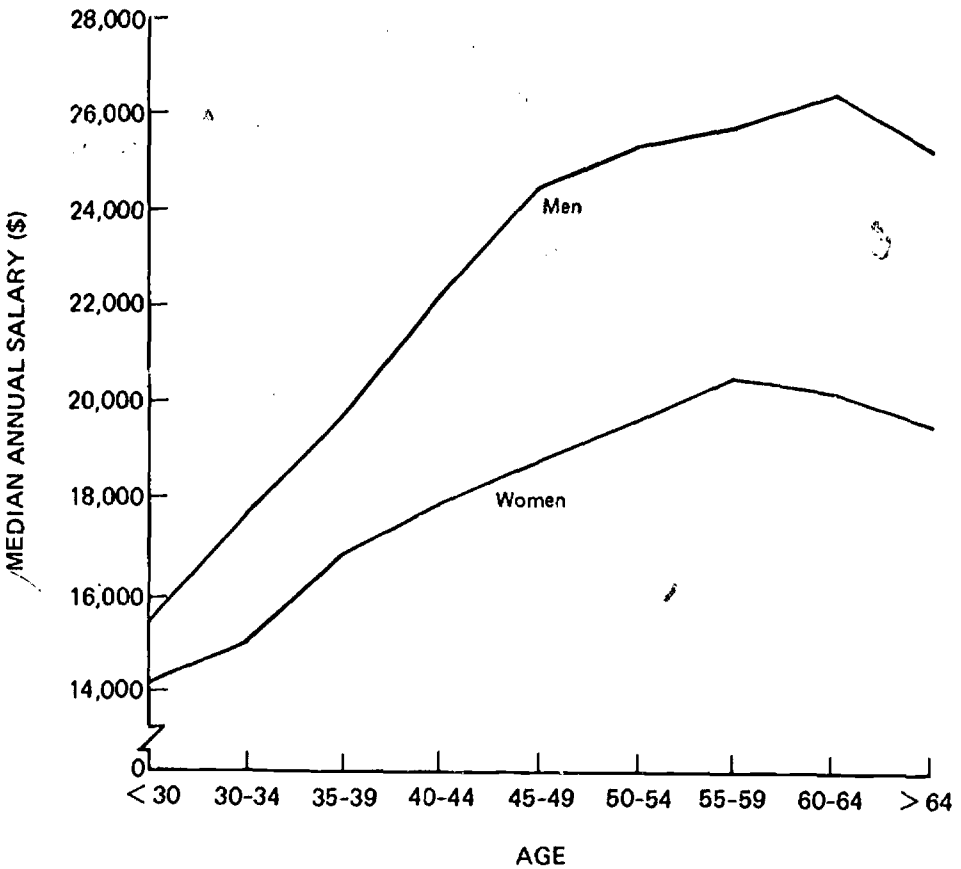
Distribution of Employed Doctoral Scientists and Engineers by Type of Employer, 1973

- Over two fifths of the working doctoral scientists and engineers were primarily engaged in research and development, including its administration, which was slightly more than were in teaching.



Distribution of Employed Doctoral Scientists and Engineers by Primary Work Activity, 1973

- The 1973 median annual salary for doctoral scientists and engineers was $20,890, with those employed in engineering reporting the highest median salary—$22,490.



1973 Median Annual Salaries of Doctoral Scientists and Engineers by Age and Sex

INTRODUCTION

This is the first report on the composition of the Nation's doctorate-level scientists and engineers[1] from a survey conducted in the spring of 1973 by the National Academy of Sciences—National Research Council (NAS—NRC) under the sponsorship of the National Science Foundation (NSF). The survey was based on the Roster of Doctoral Scientists and Engineers, which is one of three sources of information about the scientific and engineering population of the country that the National Science Foundation has been developing as a part of its Manpower Characteristics System. This report presents the first data obtained from that system.

The Roster of Doctoral Scientists and Engineers, compiled by the National Research Council, contains data on individuals in the United States who either received science or engineering doctorates or received doctorates in other fields and were subsequently employed in science and engineering.[2] The Roster was compiled primarily from the NRC's Doctorate Records File and from the NSF's National Register of Scientific and Technical Personnel, but American Men and Women of Science, numerous college and university catalogues, and other sources were also consulted.

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[1]Throughout this study the population of doctorate-holding scientists and engineers was defined to include those with doctorates in the natural and social sciences, mathematics, and engineering. A detailed list of fields included appears as part of the survey questionnaire reproduced in Appendix C.

[2]Individuals who received doctorates between January 1, 1930, and June 30, 1972, were included in the Roster. The Roster has several components of varying degrees of completeness. Over 99 percent of those awarded doctorates from United States institutions were included. We estimate that we have also included two thirds of those with foreign doctorates working in the U.S. Since we have data on 10,400 people falling into this category, it appears that omission of the remainder does not significantly affect the total Roster coverage. A third and most hazy component is the group of nonscience doctorate-holders working in science; some 9,700 of them were included.

From the 272,200 individuals finally included in the Roster, a sample of 59,086 was selected for the 1973 survey. This sample was stratified according to year of doctorate, field of science or engineering, sex, size of doctoral institution (according to the number of science and engineering doctorates awarded), and degree category (i.e., science and engineering doctorates from United States institutions, nonscience doctorates from United States institutions for people who subsequently switched to a science field, and similar holders of doctorates from foreign institutions). A variable sampling ratio was used so that the sample would faithfully represent small groups within the population, such as older people, women, graduates of smaller universities, and graduates in less populous fields. The statistics presented in this report are estimates of total populations; that is, each response was weighted so that the statistics represent, as nearly as possible, the results that would have been obtained if the entire population had been surveyed. A more detailed consideration of sampling error and response bias is presented in Appendix A, along with a description of the survey procedures.

This first report focuses primarily on the 1973 employment status of 1930-1972 recipients of doctorates in science and engineering residing in our Nation—a subject of immediate interest to the scientists and engineers themselves, to the academic community, and to Government agencies concerned with this segment of our human resources. During 1974 additional analyses will be made, developing in further detail employment characteristics and many other important aspects of the population of doctorate-holding scientists and engineers. The results will be reported in later publications. The Commission on Human Resources of the National

Research Council and the Manpower Studies Section of the National Science Foundation's Division of Science Resources Studies will be happy to cooperate with researchers interested in using these unique data.

The Population of Doctorate-Holding Scientists and Engineers

Included in the Roster when it was constructed from the sources noted earlier were 272,200 individuals. Based on the survey of a sample of them, it is estimated that there were 244,900 doctoral scientists and engineers in the United States in 1973, since approximately 27,300 of those in the Roster either had left the United States or were deceased.[3] Of the 244,900 doctoral scientists and engineers, 15,500 were retired, were housewives, or were not in the labor force for some other reason; hence, the size of the labor force of doctorate-holding scientists and engineers was 229,400. Some 2,600 of these individuals were unemployed and seeking employment—an unemployment rate for the group of 1.2 percent. Of the 226,800 employed doctoral scientists and engineers, 213,600 were employed full-time, 7,200 were employed part-time, and 6,000 held temporary (short-term) postdoctoral appointments. The data presented in this report are based upon the total population of 244,900 as well as upon several subpopulations.[4]

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[3]This total excludes those persons awarded doctorates after June 30, 1972. In the fiscal year ending June 30, 1973, approximately 20,100 doctorates were awarded in fields covered by the Roster.

[4]The numbers presented in the tables are not rounded, although the statistical significance of the two right-hand digits in each number is low. Text discussion includes rounded figures extracted from the tables. Appendix A provides a discussion of the sampling errors in the data. Also, numbers in each table may not sum exactly to the total figure because of rounding in the sample weighting operation.

TOTAL DOCTORAL POPULATION BY FIELDS

For purposes of analysis the 244,900 doctoral scientists and engineers were classified according to both field of doctorate and field of identification, as shown in Table 1. The field of identification was defined, for those employed (including postdoctoral appointees), as the field of employment and, for all others (those unemployed, those retired, housewives, those not reporting), as the field of doctorate.

A comparison of field of doctorate and field of identification shows, for example, from time of Ph.D. to employment in 1973 a substantial net influx into mathematics (from 13,600 to 16,000), earth sciences (from 7,600 to 10,700), and psychology (from 24,500 to 26,700), whereas physics exhibits a net loss (from 22,300 to 18,400), as do chemistry (from 39,300 to 31,000) and the social sciences (from 32,400 to 29,000).[5]

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[5] The measured amount of field switching is very much dependent upon the method of grouping fields. For example, since biochemistry was defined as a bioscience, a recipient of a Ph.D. in chemistry who was working in biochemistry was considered a field switcher. Of course, a person with a degree in biochemistry working in that field was considered a nonswitcher. Appendix C shows how the detailed fields were collapsed into broad fields.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE 1: DISTRIBUTION BY FIELD OF DOCTORATE, FIELD OF IDENTIFICATION, AND FIELD OF EMPLOYMENT — 1973

FIELD OF DOCTORATE	N	%	FIELD OF IDENTIFICATION+	N	%	FIELD OF EMPLOYMENT*	N	%
ALL FIELDS	244921	100.0	ALL FIELDS	244921	100.0	ALL FIELDS	226750	100.0
MATHEMATICS	13571	5.5	MATHEMATICS	15952	6.5	MATHEMATICS	15104	6.7
PHYSICS/ASTRONOMY	22340	9.1	PHYSICS/ASTRONOMY	18350	7.5	PHYSICS/ASTRONOMY	17029	7.5
CHEMISTRY	39270	16.0	CHEMISTRY	31041	12.7	CHEMISTRY	27836	12.3
EARTH SCIENCES	7595	3.1	EARTH SCIENCES	10761	4.4	EARTH SCIENCES	10289	4.5
ENGINEERING	35067	14.3	ENGINEERING	35912	14.7	ENGINEERING	34550	15.2
BIOSCIENCES	61111	25.0	BIOSCIENCES	61807	25.2	BIOSCIENCES	56763	25.0
PSYCHOLOGY	24483	10.0	PSYCHOLOGY	26664	10.9	PSYCHOLOGY	24598	10.8
SOCIAL SCIENCES	32353	13.2	SOCIAL SCIENCES	29042	11.9	SOCIAL SCIENCES	26182	11.5
NON-SCIENCES	8935	3.6	NON-SCIENCES	11956	4.9	NON-SCIENCES	10927	4.8
UNKNOWN	195	.1	UNKNOWN	3496	1.4	UNKNOWN	3472	1.5

*INCLUDES THOSE EMPLOYED IN SCIENCE AND ENGINEERING.

+SEE TEXT FOR DEFINITION.

*INCLUDES TEMPORARY, SHORT-TERM POSTDOCTORAL APPOINTEES AS WELL AS FULL-TIME AND PART-TIME EMPLOYED.

FIELD SWITCHING AMONG THOSE EMPLOYED

Of the 244,900 doctoral scientists and engineers, 226,800 were employed, and their distribution by field of employment is indicated in Table 1. More detailed data on flows of individuals from field of doctorate to the field of employment reported in 1973 appear in Table 2.

Among all 1930-1972 doctorate-holders, mathematics, earth sciences, biosciences, and psychology were the most retentive fields. More than 89 percent of the scientists who were employed in these fields in 1973 obtained their doctorates in these fields. In contrast, only 70 and 71 percent of those with doctorates in physics and chemistry, respectively, were employed in their field of degree. A substantial portion of the physics doctorate-holders (13 percent) transferred to engineering, whereas many of the chemistry Ph.D.'s (9 percent) were employed in biosciences, primarily in biochemistry. The large proportion of nonscience doctoral recipients working in psychology may be explained by an influx of education doctorate-holders.

In general, the more recent doctorate recipients switched fields less often. This was not surprising, since we would expect more switching as time after the degree increases. The 1972 doctorate recipients in earth sciences were a notable exception. An unusually large proportion of them found employment in physics, engineering, and biosciences, which perhaps reflected the availability of new positions in these fields.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE 21 MANPOWER FLOW FROM FIELD OF DOCTORATE TO FIELD OF EMPLOYMENT -- 1973

YEAR AND FIELD OF DOCTORATE			FIELD OF EMPLOYMENT									
1930-72 DOCTORATES	ALL FIELDS N	ALL FIELDS %	MATH %	PHYS %	CHEM %	EARTH %	ENGIN %	BIOSC %	PSYCH %	SOCSC %	NONSC %	UNK %
ALL FIELDS	226750	100.0	6.7	7.5	12.3	4.5	15.2	25.0	10.6	11.5	4.6	1.5
MATHEMATICS	12723	100.0	88.8	.7	.0	.6	4.4	1.7	.2	.4	2.2	1.1
PHYSICS/ASTRONOMY	21019	100.0	3.4	65.6	1.3	3.4	13.1	2.8	.1	.4	4.3	1.5
CHEMISTRY	36065	100.0	.6	2.2	71.3	2.4	5.6	9.4	.0	.1	5.8	2.5
EARTH SCIENCES	7183	100.0	.7	1.1	.8	87.9	3.7	2.2	.0	.2	2.3	1.1
ENGINEERING	33765	100.0	3.6	3.3	1.5	2.1	83.2	.9	.1	.4	3.7	1.2
BIOSCIENCES	56067	100.0	.2	.2	1.9	2.3	.7	89.5	.3	.6	3.2	1.4
PSYCHOLOGY	22417	100.0	.8	.1	.0	.1	.4	2.0	86.8	1.4	5.5	.9
SOCIAL SCIENCES	29454	100.0	.9	.0	.0	.8	.6	3.8	.9	80.4	10.6	1.6
NON-SCIENCES	7906	100.0	12.8	2.1	2.0	1.6	3.0	4.7	53.2	18.9	.0	1.6
UNKNOWN	171	100.0	14.5	7.0	7.6	1.7	10.5	37.2	1.7	15.4	5.2	1.2

YEAR AND FIELD OF DOCTORATE			FIELD OF EMPLOYMENT									
1968-71 DOCTORATES	ALL FIELDS N	ALL FIELDS %	MATH %	PHYS %	CHEM %	EARTH %	ENGIN %	BIOSC %	PSYCH %	SOCSC %	NONSC %	UNK %
ALL FIELDS	63522	100.0	8.1	7.3	9.9	4.7	17.4	23.8	11.6	12.3	3.7	1.1
MATHEMATICS	4203	100.0	91.9	.8	.0	.3	2.1	1.5	.2	.4	2.1	.6
PHYSICS/ASTRONOMY	5791	100.0	3.8	70.3	1.5	4.7	10.9	2.4	.2	.5	4.7	1.2
CHEMISTRY	7491	100.0	.4	1.0	77.4	1.8	2.7	9.5	.1	.0	5.1	2.1
EARTH SCIENCES	1882	100.0	.7	.2	.7	92.9	1.3	2.2	.0	.0	.5	1.5
ENGINEERING	11544	100.0	3.3	3.1	1.0	2.7	85.1	.7	.2	.2	2.7	1.0
BIOSCIENCES	14969	100.0	.3	.2	1.7	2.4	.8	90.4	.4	.8	2.1	1.1
PSYCHOLOGY	6545	100.0	1.2	.3	.0	.0	.3	1.7	91.9	.9	3.3	.4
SOCIAL SCIENCES	8754	100.0	.9	.0	.0	.9	.3	3.8	.9	83.2	8.7	1.2
NON-SCIENCES	2324	100.0	18.7	3.1	2.3	1.9	3.5	4.6	50.3	13.7	.0	1.9
UNKNOWN	19	100.0	21.1	31.6	.0	.0	5.3	.0	.0	15.8	15.8	10.5

YEAR AND FIELD OF DOCTORATE			FIELD OF EMPLOYMENT									
1972 DOCTORATES	ALL FIELDS N	ALL FIELDS %	MATH %	PHYS %	CHEM %	EARTH %	ENGIN %	BIOSC %	PSYCH %	SOCSC %	NONSC %	UNK %
ALL FIELDS	16931	100.0	7.9	7.3	9.0	4.3	16.2	23.5	11.5	16.1	3.4	.9
MATHEMATICS	1199	100.0	88.8	.0	.0	1.4	3.8	3.0	.2	.8	.9	1.1
PHYSICS/ASTRONOMY	1421	100.0	3.7	76.4	1.5	2.8	8.4	2.6	.0	.0	2.7	1.9
CHEMISTRY	1749	100.0	.3	.7	81.4	4.6	.2	7.2	.0	.0	4.1	1.5
EARTH SCIENCES	540	100.0	.0	4.3	.0	82.8	6.9	4.8	.6	.0	.6	.2
ENGINEERING	2971	100.0	5.2	3.7	.7	1.2	84.6	.9	.4	.4	2.4	.4
BIOSCIENCES	4002	100.0	.0	.2	1.2	2.3	.4	91.1	.6	1.1	2.5	.5
PSYCHOLOGY	1988	100.0	.4	.0	.0	.0	.0	2.1	92.5	1.8	2.9	.5
SOCIAL SCIENCES	3018	100.0	1.6	.0	.0	.3	.5	.8	2.5	86.0	7.2	1.2
NON-SCIENCES	40	100.0	.0	.0	.0	.0	.0	35.0	2.5	62.5	.0	.0
UNKNOWN	2	100.0	.0	.0	100.0	.0	.0	.0	.0	.0	.0	.0

DEMOGRAPHIC CHARACTERISTICS

BY FIELD OF IDENTIFICATION

Table 3 reveals that women and members of racial minorities each were concentrated in several fields. There were 21,300 women among the 244,900 doctoral scientists and engineers included in this study. They were most heavily concentrated in the biosciences, psychology, and the social sciences (75 percent). Engineering had the fewest women doctorate-holders.

Racial minority-group members (Black, American Indian, and Asian) constituted 5 percent of the doctoral population or 13,300 individuals. Of this number approximately 11,000 were Asian and 2,000 were Black. The fields of identification for over one half of these minority scientists and engineers were engineering and the biosciences, with 3,200 and 3,300 respectively. Over 1,000 doctoral physicists, chemists, and social scientists and less than 600 psychologists and 400 earth scientists were members of a minority group.

Engineering, with the largest minority percentage, had the smallest percentage of women; conversely, psychology, with the greatest percentage of women, had the smallest percentage of minority-group members.

The median age for the total doctoral population was 41.6 years, with a range of 38.4 years for mathematicians to 43.2 years for social scientists. The social sciences had the greatest proportion of recent doctorate recipients.

Although a substantial number of foreign citizens were identified with all fields except psychology, comparatively few mathematicians, engineers, bioscientists, and social scientists held foreign doctorates.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE 3: GENERAL CHARACTERISTICS BY FIELD OF IDENTIFICATION -- 1973

GENERAL CHARACTERISTICS	ALL FIELDS	FIELD OF IDENTIFICATION									
		MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
TOTAL POPULATION N	244921	15952	18350	31041	10701	35912	61807	26664	29042	11956	3496
SEX %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
MALE	91.3	93.8	97.3	94.4	97.3	99.6	88.2	79.5	89.1	85.4	92.0
FEMALE	8.7	6.3	2.7	5.6	2.7	.4	11.8	20.5	10.9	11.5	8.0
RACIAL GROUP %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
WHITE/CAUCASIAN	86.8	85.4	85.2	87.7	89.2	85.2	87.4	88.5	86.2	88.7	80.3
MINORITY GROUP*	5.4	5.9	5.8	5.9	3.1	8.9	5.4	2.0	5.0	3.4	7.1
NO REPORT	7.7	8.7	8.9	6.5	7.6	5.9	7.2	9.5	8.8	7.9	12.5
AGE %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UNDER 30	4.4	7.3	4.8	5.3	3.9	4.2	3.9	4.8	3.7	1.8	2.3
30-34	22.1	29.4	26.9	22.3	20.9	25.8	21.0	20.4	18.7	13.4	16.3
35-39	18.5	19.3	22.7	17.3	20.6	22.3	16.9	16.9	17.2	14.8	16.4
40-44	15.5	15.0	14.9	15.1	18.7	15.5	15.3	16.4	15.5	14.0	15.3
45-49	13.0	10.7	12.2	11.1	9.6	11.5	14.6	15.4	13.2	15.2	13.2
50-54	10.4	7.4	7.4	10.2	11.7	10.5	10.0	11.1	11.8	16.0	11.1
55-59	6.9	4.6	4.1	8.7	5.6	4.4	7.5	7.1	8.5	10.0	8.4
60-64	4.2	2.7	3.2	4.1	4.5	2.7	4.8	3.9	4.9	6.5	7.0
OVER 64	4.8	3.4	3.7	5.7	4.5	2.2	5.6	5.6	5.8	7.4	11.3
NO REPORT	.3	.1	.2	.2	.1	.2	.3	.3	.3	.3	.7
CALENDAR YEAR OF PHD %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1930-34	2.4	1.7	2.2	3.9	2.4	1.1	2.7	1.3	2.5	2.2	4.5
1935-39	3.0	2.1	3.3	4.2	3.4	1.8	3.5	1.8	2.9	4.8	6.3
1940-44	3.6	2.1	2.2	6.0	3.5	2.4	4.4	1.7	3.0	5.4	6.4
1945-49	4.1	3.4	2.8	5.9	3.5	3.2	4.3	2.6	4.0	6.5	4.1
1950-54	10.4	8.1	9.6	11.7	8.7	9.7	10.8	10.9	10.0	12.1	13.2
1955-59	12.1	9.1	12.2	13.0	11.4	9.5	12.5	15.1	11.4	14.9	11.5
1960-64	16.6	16.1	18.5	16.0	17.7	16.4	17.0	16.5	15.5	17.3	15.4
1965-69	28.7	34.5	31.0	25.3	30.4	34.4	26.4	29.9	27.8	22.0	23.1
1970-72	19.1	22.9	18.2	13.9	19.0	21.5	15.3	20.3	23.5	14.7	15.2
NO REPORT	.0	.0	.1	.0	.0	.0	.1	.0	.0	.0	.3
CITIZENSHIP %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
U.S.	93.6	92.6	90.5	92.8	93.5	92.1	93.4	97.7	94.1	97.1	90.9
FOREIGN	6.0	7.2	9.4	6.8	6.4	7.7	6.2	1.7	4.8	2.4	8.1
NO REPORT	.5	.1	.1	.4	.1	.2	.5	.5	1.1	.5	1.0
CATEGORY OF PHD %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
U.S. SCIENCE	92.2	89.2	91.0	93.2	93.3	96.1	95.5	81.8	91.9	89.5	91.3
U.S. NON-SCIENCE	3.8	6.5	.9	.5	1.2	.7	.6	16.7	5.7	8.1	3.9
FOREIGN	4.0	4.3	8.1	6.3	5.5	3.2	3.9	1.5	2.4	2.4	4.7

* INCLUDES BLACK, AMERICAN INDIAN, AND ASIAN.

EMPLOYMENT STATUS BY FIELD OF IDENTIFICATION

Of the 244,900 doctoral scientists and engineers, 87 percent (213,600) were employed full-time. Among mathematicians, earth scientists, and engineers, this statistic exceeded 91 percent. In addition, about 7,200 (3 percent) reported part-time employment, and 6,000 (2 percent) indicated that they held a temporary postdoctoral appointment. Those unemployed and seeking employment (2,600), together will the full-time and part-time employed and the postdoctoral appointment-holders, constituted the labor force for the purposes of this report. The remaining doctoral scientists and engineers either were not seeking employment, gave no report of their employment status, or were retired.[6]

The 6,000 postdoctoral appointment-holders were concentrated in the recent graduating classes. The most recent class included in this study (1972) accounted for 2,400 such individuals, while the 1971 to 1968 classes totaled 3,000, and the earlier classes reported 600 cases. Of the 2,400 postdoctoral appointees in the 1972 cohort, 84 percent held appointments in physics, chemistry, and the biosciences——fields that are shown in a subsequent table to have had a relatively high percentage of unemployed. The proportion of earth scientists (field of identification) with postdoctoral appointments was 1.5 percent of the 1968-1971 cohort and 15.3 percent of the 1972 cohort.

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[6]Of the 244,900 doctoral scientists and engineers, 4.8 percent were over 64 years of age.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE 4: EMPLOYMENT STATUS BY FIELD OF IDENTIFICATION -- 1973

YEAR OF DOCTORATE AND 1973 EMPLOYMENT STATUS		FIELD OF IDENTIFICATION										
1930-72 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
TOTAL POPULATION	N	244921	15952	18350	31041	10701	35912	61807	26664	29042	11956	3496
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EMPLOYED FULL-TIME	%	87.2	92.5	86.3	84.3	91.9	94.0	84.7	85.3	86.2	85.8	84.4
EMPLOYED PART-TIME	%	2.9	1.4	1.8	1.9	2.6	1.0	2.5	6.1	3.1	5.4	14.2
POSTDOCTORAL	%	2.4	.8	4.7	3.5	1.7	.6	4.7	.9	.9	.2	.7
NOT EMPLOYED	%											
SEEKING*		1.1	1.2	1.7	2.0	.5	.8	1.0	1.0	.9	.6	.0
NOT SEEKING		.6	.5	.6	1.0	.0	.2	.9	.5	.5	.3	.0
RETIRED	%	2.6	1.7	2.5	4.2	1.4	1.0	2.9	1.9	3.5	3.3	.2
OTHER/NO REPORT	%	3.2	2.0	2.4	3.1	1.9	1.8	3.3	4.3	5.0	4.4	.5

YEAR OF DOCTORATE AND 1973 EMPLOYMENT STATUS		FIELD OF IDENTIFICATION										
1968-71 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
TOTAL POPULATION	N	66410	5271	4883	6720	2973	11398	15903	7727	8297	2513	725
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EMPLOYED FULL-TIME	%	88.7	94.8	84.1	85.1	96.5	95.1	83.1	87.8	90.3	69.4	69.0
EMPLOYED PART-TIME	%	2.5	1.8	1.4	1.7	1.4	.7	2.4	6.1	2.5	4.5	10.1
POSTDOCTORAL	%	4.5	.5	10.1	7.2	1.5	.9	9.5	1.5	1.6	.3	1.0
NOT EMPLOYED	%											
SEEKING*		1.3	1.2	2.5	1.9	.5	.7	1.2	1.3	1.4	1.4	.0
NOT SEEKING		.6	.4	.3	1.4	.0	.5	.8	.6	.3	.5	.0
RETIRED	%	.0	.1	.0	.2	.0	.0	.0	.0	.0	.3	.0
OTHER/NO REPORT	%	2.4	.8	1.6	2.5	.1	2.1	3.0	2.7	3.8	3.6	.0

YEAR OF DOCTORATE AND 1973 EMPLOYMENT STATUS		FIELD OF IDENTIFICATION										
1972 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
TOTAL POPULATION	N	17782	1387	1272	1629	764	2814	4204	2127	2864	575	146
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EMPLOYED FULL-TIME	%	79.2	90.2	69.8	60.2	75.0	91.7	65.3	82.6	92.2	93.6	64.2
EMPLOYED PART-TIME	%	2.5	2.2	1.3	1.8	4.1	2.0	1.6	5.6	2.4	5.4	2.7
POSTDOCTORAL	%	13.5	3.6	26.3	31.2	15.3	4.1	27.7	3.5	.5	.0	13.0
NOT EMPLOYED	%											
SEEKING*		1.7	1.5	1.7	3.4	2.6	1.3	1.5	2.6	.9	.0	.0
NOT SEEKING		.4	.3	.3	.7	.0	.0	.9	.1	.3	.0	.0
RETIRED	%	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
OTHER/NO REPORT	%	2.7	2.2	.6	2.6	3.0	1.0	3.0	5.0	3.7	1.0	.0

* PERCENTAGES ARE NOT UNEMPLOYMENT RATES, SINCE THE PERCENTAGES PRESENTED HERE ARE CALCULATED ON THE TOTAL POPULATION, WHICH INCLUDES THOSE RETIRED, THOSE NOT SEEKING EMPLOYMENT, AND THOSE NOT REPORTING STATUS, ALL OF WHOM MAY NOT BE CONSIDERED PART OF THE LABOR FORCE; SEE TABLE 9 FOR UNEMPLOYMENT RATES BY FIELD.

EMPLOYMENT STATUS BY FIELD OF DOCTORATE

Table 5 is presented so that those accustomed to examining employment patterns of holders of degrees in different fields (rather than making comparisons across fields of identification) can relate this study to other studies. The results here are quite similar to Table 4, with several exceptions. The number of postdoctorals whose degrees were in the earth sciences was larger than the number of postdoctoral appointments in the earth-science field of employment, as shown in Table 4. Hence, a significant number of young earth scientists were engaged in postdoctoral work in other fields, perhaps reflecting interdisciplinary opportunities recently developed as a result of interest in environmental problems.

The relatively high proportion of 1972 doctorate recipients in psychology and social sciences employed part-time——5.7 and 2.8 percent, respectively——was notable.

Table 5 reveals that 4.6 percent of those holding doctorates in science and engineering were employed full-time outside science or engineering. However, fully 10.3 percent of all holders of social-science doctorates were employed full-time outside science and engineering as were 5.6 percent of the chemistry doctorate-holders. Smaller proportions of the more recent cohorts worked outside science and engineering.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE 51 EMPLOYMENT STATUS BY FIELD OF DOCTORATE -- 1973

YEAR OF DOCTORATE AND 1973 EMPLOYMENT STATUS		FIELD OF DOCTORATE										
1930-72 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
TOTAL POPULATION	N	244921	13571	22340	39270	7595	35067	61111	24483	32353	8935	195
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EMPLOYED FULL-TIME	%											
SCIENCE		82.7	89.2	83.5	80.1	88.1	90.2	81.6	79.5	76.6	84.3	75.9
NON-SCIENCE		4.6	2.2	3.9	5.6	2.3	3.7	3.0	4.9	10.3	.0	4.6
EMPLOYED PART-TIME	%											
SCIENCE		2.6	1.6	2.1	2.1	2.1	1.3	2.7	5.8	2.8	3.7	5.1
NON-SCIENCE		.3	.1	.5	.5	.2	.1	.3	.3	.5	.0	1.0
POSTDOCTORAL	%	2.4	.7	4.1	3.6	1.9	.8	4.2	1.1	.8	.5	1.6
NOT EMPLOYED	%											
SEEKING*		1.1	1.4	1.4	1.6	.7	.8	1.0	1.1	.8	.8	.0
NOT SEEKING		.6	.6	.5	.8	.1	.3	.9	.0	.5	.4	.0
RETIRED	%	2.6	2.0	2.1	3.4	2.0	1.0	3.0	2.1	3.1	4.4	3.6
OTHER/NO REPORT	%	3.2	2.4	2.0	2.4	2.7	1.9	3.4	4.7	4.5	5.8	6.7

YEAR OF DOCTORATE AND 1973 EMPLOYMENT STATUS		FIELD OF DOCTORATE										
1968-71 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
TOTAL POPULATION	N	66410	4333	6007	7896	1900	11917	15755	6899	9215	2471	19
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EMPLOYED FULL-TIME	%											
SCIENCE		85.1	92.5	80.4	75.1	96.0	92.2	82.5	83.6	82.3	91.0	73.7
NON-SCIENCE		3.6	2.4	4.1	4.6	.9	3.0	2.0	3.2	8.5	.0	26.3
EMPLOYED PART-TIME	%											
SCIENCE		2.2	1.5	2.3	1.9	1.1	.6	2.2	6.4	2.1	2.5	.0
NON-SCIENCE		.2	.0	.7	.6	.1	.0	.3	.0	.2	.0	.0
POSTDOCTORAL	%	4.5	.7	8.9	8.6	1.0	1.2	8.0	1.7	1.8	.6	.0
NOT EMPLOYED	%											
SEEKING*		1.3	1.4	2.1	1.6	.7	.7	1.2	1.4	1.3	1.5	.0
NOT SEEKING		.6	.4	.2	1.2	.1	.5	.8	.7	.3	.5	.0
RETIRED	%	.0	.2	.0	.2	.0	.0	.0	.0	.0	.3	.0
OTHER/NO REPORT	%	2.4	.5	1.3	2.2	.2	2.0	3.0	3.1	3.4	3.7	.0

YEAR OF DOCTORATE AND 1973 EMPLOYMENT STATUS		FIELD OF DOCTORATE										
1972 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
TOTAL POPULATION	N	17782	1254	1454	1859	583	3035	4229	2160	3159	46	2
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EMPLOYED FULL-TIME	%											
SCIENCE		76.0	88.1	71.9	57.9	70.5	90.3	64.3	79.1	64.7	87.0	.0
NON-SCIENCE		3.2	.9	1.8	3.4	.5	2.3	2.2	2.6	7.6	.0	.0
EMPLOYED PART-TIME	%											
SCIENCE		2.4	1.7	1.7	1.6	.7	1.8	2.0	5.7	2.6	.0	.0
NON-SCIENCE		.2	.1	.9	.5	.0	.0	.1	.0	.2	.0	.0
POSTDOCTORAL	%	13.5	4.9	21.5	30.8	20.9	3.4	26.0	4.0	.6	.0	100.0
NOT EMPLOYED	%											
SEEKING*		1.7	1.7	1.4	3.0	3.4	1.2	1.5	2.6	.8	.0	.0
NOT SEEKING		.4	.3	.3	.6	.0	.0	.9	.1	.3	.0	.0
RETIRED	%	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
OTHER/NO REPORT	%	2.7	2.4	.6	2.3	3.9	.9	3.0	5.0	3.4	13.0	.0

*PERCENTAGES ARE NOT UNEMPLOYMENT RATES, SINCE THE PERCENTAGES PRESENTED HERE ARE CALCULATED ON THE TOTAL POPULATION, WHICH INCLUDES THOSE RETIRED, THOSE NOT SEEKING EMPLOYMENT, AND THOSE NOT REPORTING STATUS, ALL OF WHOM MAY NOT BE CONSIDERED PART OF THE LABOR FORCE; SEE TABLE 9 FOR UNEMPLOYMENT RATES BY FIELD.

TYPE OF EMPLOYER BY FIELD OF EMPLOYMENT

Due to the concentration of the postdoctoral population in educational institutions and their uneven distribution among fields, this group of scientists and engineers is excluded from Table 6. For the convenience of those who desire to include the postdoctoral group as part of the employed science and engineering population, Appendix B, Table 1 provides the distribution of type of employer by field of employment for the total 226,800 who were employed, including postdoctorals.

Of the 220,800 employed doctoral scientists and engineers (excluding postdoctoral appointees), 58 percent were working in educational institutions (128,200), 23 percent in industry (50,000), and 9 percent in the Federal Government (19,100). Chemists and engineers accounted for more than 60 percent of those employed in the industrial world, whereas physicists and earth scientists dominated the ranks of the Federal workers with doctoral degrees in science or engineering.

Educational institutions were the major employers of 1972 doctoral scientists and engineers, except for the fields of chemistry and engineering, where industry was the largest employer. However, industry also employed over 11 percent of the mathematicians, physicists, earth scientists, and bioscientists.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE 61 TYPE OF EMPLOYER BY FIELD OF EMPLOYMENT FOR FULL-TIME AND PART-TIME EMPLOYED DOCTORAL SCIENTISTS AND ENGINEERS EXCLUDING POSTDOCTORAL APPOINTEES -- 1973

YEAR OF DOCTORATE AND TYPE OF 1973 EMPLOYER		FIELD OF EMPLOYMENT									
1930-72 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BICSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	220790	14979	16164	26736	10109	34317	53849	24365	25924	10901	3446
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EDUCATIONAL INSTITUTIONS*	%	58.0	79.4	55.8	37.0	50.2	35.6	67.0	61.3	83.3	55.6	40.2
FEDERAL GOVERNMENT	%	8.7	4.8	15.0	5.9	19.8	9.0	11.1	4.3	5.0	7.4	5.0
STATE/LOCAL GOV'T.	%	1.6	.4	.2	.6	4.1	.7	1.8	3.9	1.6	2.4	2.0
HOSPITAL/CLINIC	%	2.5	.2	.4	.7	.0	.1	3.3	13.3	.1	.7	.6
OTHER NON-PROFIT ORGANIZATIONS	%	3.5	1.8	4.7	2.1	4.4	3.6	2.8	4.4	4.2	6.2	3.0
BUSINESS/INDUSTRY		22.6	12.3	22.1	52.0	19.4	48.5	11.8	5.4	3.6	22.8	27.7
OTHER/NO REPORT	%	3.1	1.2	1.8	1.7	2.1	2.4	2.2	7.4	2.1	4.8	21.3

YEAR OF DOCTORATE AND TYPE OF 1973 EMPLOYER		FIELD OF EMPLOYMENT									
1968-71 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BICSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	60567	5096	4173	5832	2910	10917	13601	7257	7702	2360	719
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EDUCATIONAL INSTITUTIONS*	%	58.3	80.1	54.1	40.8	49.3	30.4	67.5	63.3	62.4	60.8	42.0
FEDERAL GOVERNMENT	%	9.3	6.0	17.8	4.7	21.7	11.2	11.4	3.4	6.0	6.1	5.1
STATE/LOCAL GOV'T.	%	2.0	.6	.3	.8	4.7	.9	1.9	5.2	1.6	2.8	1.3
HOSPITAL/CLINIC	%	2.9	.1	.5	1.3	.0	.3	3.9	14.6	.0	.6	.7
OTHER NON-PROFIT ORGANIZATIONS	%	3.6	.1	5.5	1.7	4.7	4.4	3.0	4.3	4.7	6.4	4.0
BUSINESS/INDUSTRY		21.4	11.5	19.5	49.4	18.7	50.6	10.7	4.2	2.8	16.5	25.6
OTHER/NO REPORT	%	2.5	1.6	2.4	1.3	.9	2.3	1.6	4.9	2.2	4.7	20.7

YEAR OF DOCTORATE AND TYPE OF 1973 EMPLOYER		FIELD OF EMPLOYMENT									
1972 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BICSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	14537	1282	504	1012	604	2636	2813	1881	2710	569	126
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EDUCATIONAL INSTITUTIONS*	%	59.0	74.8	51.4	37.7	56.7	27.8	70.7	57.4	83.7	52.0	45.2
FEDERAL GOVERNMENT	%	10.6	8.6	24.7	11.6	24.2	14.7	9.3	3.6	4.7	15.3	13.5
STATE/LOCAL GOV'T.	%	1.7	.0	.0	1.9	.0	.8	1.8	4.0	2.1	2.8	.0
HOSPITAL/CLINIC	%	4.2	.0	.0	2.0	.0	.0	4.7	23.8	.3	1.5	.0
OTHER NON-PROFIT ORGANIZATIONS	%	3.8	4.1	2.8	1.1	2.8	4.3	3.6	3.9	5.1	4.7	.0
BUSINESS/INDUSTRY		18.4	11.7	21.0	43.6	14.4	47.9	8.4	6.2	2.0	16.5	34.5
OTHER/NO REPORT	%	2.3	.8	.1	2.2	1.8	4.4	1.6	1.2	2.3	6.3	6.3

*INCLUDES ELEMENTARY AND SECONDARY SCHOOLS AS WELL AS HIGHER EDUCATIONAL INSTITUTIONS.

WORK ACTIVITIES BY FIELD OF EMPLOYMENT

Of the 220,800 employed doctoral scientists and engineers (excluding the 6,000 postdoctoral appointees), 37 percent (81,600) considered teaching and 41 percent (91,300) considered research and development (including administration of R & D) as their primary work activity. More than 60 percent of the mathematicians and social scientists reported teaching as their primary work activity, while research was the dominant work activity for physicists (42 percent), chemists (34 percent), and bioscientists (36 percent). The percentages of 1972 physicists, chemists, and engineers who indicated teaching as their primary work activity were substantially lower than the corresponding percentages for all doctorate-holders working in these fields. An increased proportion of the 1972 doctoral physicists and chemists (as compared to the 1930-1972 doctorate recipients in these fields) considered research as their primary activity, whereas more 1972 doctoral engineers reported that design/development was theirs.

When the 6,000 postdoctoral appointees were included, the proportion of scientists and engineers primarily engaged in research increased in all fields. The distribution of the various activities by field for all those employed, including postdoctoral appointees, appears in Appendix B, Table 2.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE 71: PRIMARY WORK ACTIVITY BY FIELD OF EMPLOYMENT FOR FULL-TIME AND PART-TIME EMPLOYED DOCTORAL SCIENTISTS AND ENGINEERS EXCLUDING POSTDOCTORAL APPOINTEES -- 1973

YEAR OF DOCTORATE AND 1973 PRIMARY WORK ACTIVITY		FIELD OF EMPLOYMENT									
1930-72 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	220790	14979	16164	26736	10109	34317	53849	24365	25924	10901	3446
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TEACHING	%	37.0	60.6	35.3	28.2	31.5	25.0	32.8	37.7	64.3	30.5	21.0
RESEARCH	%	25.2	17.5	42.2	33.7	31.0	22.7	36.3	10.7	12.4	4.9	11.6
ADMINISTRATION OF	%											
-RESEARCH/DEVELOPMENT		12.8	5.6	11.7	19.2	16.9	21.3	11.4	6.7	6.2	14.7	11.7
-OTHER		5.5	3.8	1.8	3.3	4.9	4.7	3.3	8.1	6.3	22.5	11.4
CONSULTING/PROF. SERVICES	%	5.1	1.7	1.0	1.2	2.8	3.4	3.2	2.3	1.8	5.7	2.1
DESIGN/DEVELOPMENT	%	3.8	4.8	3.1	4.0	1.6	14.6	.8	.7	.5	2.3	1.2
REPORT/MARKETING/ PRODUCTION/INSPECTION	%	1.6	.4	.5	3.0	1.5	1.6	1.4	.3	1.0	4.7	5.7
OTHER/NO REPORT	%	9.1	5.7	4.5	7.4	9.7	6.7	10.8	10.5	7.5	14.7	35.2

YEAR OF DOCTORATE AND 1973 PRIMARY WORK ACTIVITY		FIELD OF EMPLOYMENT									
1968-71 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	60567	5096	4173	5832	2910	10917	13601	7257	7702	2360	719
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TEACHING	%	39.1	65.0	36.2	31.5	30.4	21.4	33.4	38.7	68.1	41.6	32.3
RESEARCH	%	29.7	18.3	49.3	42.9	39.5	30.4	42.6	11.8	13.9	8.4	13.5
ADMINISTRATION OF	%											
-RESEARCH/DEVELOPMENT		7.5	3.0	4.6	7.6	10.4	14.8	6.8	5.4	4.5	6.7	4.6
-OTHER		3.4	1.4	.7	1.4	5.2	2.8	1.6	7.0	3.8	14.9	6.4
CONSULTING/PROF. SERVICES	%	5.2	1.5	1.0	.3	1.4	3.0	3.4	25.7	1.9	5.8	1.3
DESIGN/DEVELOPMENT	%	5.7	5.7	3.5	5.6	2.2	21.0	1.1	.6	.6	3.2	2.6
REPORT/MARKETING/ PRODUCTION/INSPECTION	%	1.4	.2	.9	2.5	1.5	1.5	1.2	.3	1.2	4.9	10.3
OTHER/NO REPORT	%	8.0	4.8	3.9	8.2	9.3	5.0	9.9	10.4	6.0	14.5	29.1

YEAR OF DOCTORATE AND 1973 PRIMARY WORK ACTIVITY		FIELD OF EMPLOYMENT									
1972 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	14537	1282	904	1012	604	2636	2813	1881	2710	569	126
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TEACHING	%	40.4	62.4	18.7	23.8	35.3	19.8	37.2	35.5	71.6	44.9	18.4
RESEARCH	%	28.4	14.7	68.3	52.8	38.6	33.5	35.6	10.6	14.2	5.4	41.6
ADMINISTRATION OF	%											
-RESEARCH/DEVELOPMENT		5.5	3.4	3.8	5.3	7.5	10.7	2.5	3.5	4.5	13.5	4.8
-OTHER		2.5	.8	.6	.6	4.0	1.8	2.7	5.5	1.4	10.0	.0
CONSULTING/PROF. SERVICES	%	6.9	2.7	.0	.3	6.6	3.7	6.1	32.5	.3	7.5	.0
DESIGN/DEVELOPMENT	%	5.8	11.0	4.2	7.8	1.3	19.3	1.0	1.9	.1	.5	.0
REPORT/MARKETING/ PRODUCTION/INSPECTION	%	1.6	.1	1.5	2.0	.0	2.0	3.3	1.0	.7	3.7	.0
OTHER/NO REPORT	%	8.8	4.9	3.0	7.4	6.8	9.2	11.7	9.4	7.2	14.4	35.2

SALARIES OF THE FULL-TIME EMPLOYED BY FIELD OF EMPLOYMENT

The median annual salary for the 213,600 full-time-employed doctoral scientists and engineers was estimated to be $20,890, with a range from $19,790 in mathematics to $22,490 in engineering. Chemists, who, along with engineers, were heavily concentrated in industry, had a median salary $1,330 below that for engineers. For 1968-1971 and 1972 doctoral chemists and engineers, this difference widened to $2,500 and $2,900, respectively. The lower decile salary for 1972 doctoral chemists was significantly below corresponding salaries for all other fields. A similar, but less dramatic, pattern was observed with salaries in physics. Perhaps at least some of this could be explained by employment conditions in these two fields for the recent cohorts. An overview of the salary distribution suggested that salary differences among fields remained reasonably stable—with the exception of physics and chemistry, as described above—for all cohorts. This observation is illustrated in the chart of salary levels for 1930-1972, 1968-1971, and 1972 doctorate recipients.

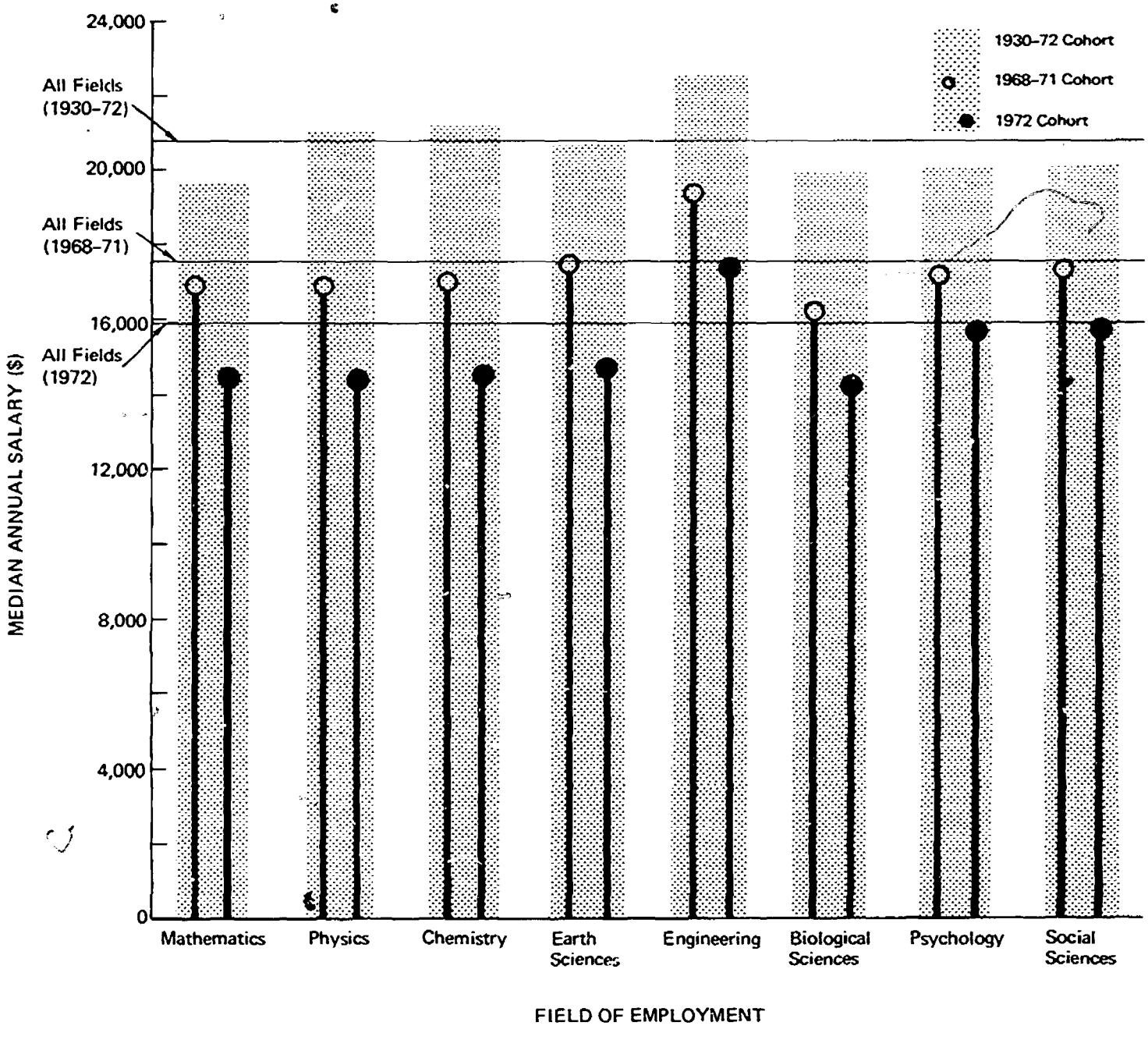
TABLE 8: SALARY RANGE BY FIELD OF EMPLOYMENT FOR FULL-TIME EMPLOYED DOCTORAL SCIENTISTS AND ENGINEERS -- 1973

YEAR OF DOCTORATE AND 1973 ANNUAL SALARY*		FIELD OF EMPLOYMENT										
1930-72 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
FULL-TIME EMPLOYED POPULATION	N	213613	14750	15832	26157	9835	33745	52323	22739	25025	10258	2949
LOWER DECILE	$	14,250	13,040	13,680	14,670	13,850	16,100	13,310	14,200	13,840	13,660	13,020
LOWER QUARTILE	$	16,990	16,250	16,930	17,240	16,840	18,730	16,460	16,700	16,650	17,440	17,260
MEDIAN	$	20,890	19,790	21,150	21,160	20,730	22,490	19,940	20,010	20,160	22,700	22,220
UPPER QUARTILE	$	25,590	24,550	25,920	25,140	25,030	27,060	24,770	24,710	25,010	29,430	28,490
UPPER DECILE	$	31,750	30,610	31,320	31,160	32,290	33,110	30,590	30,290	31,150	36,660	35,330

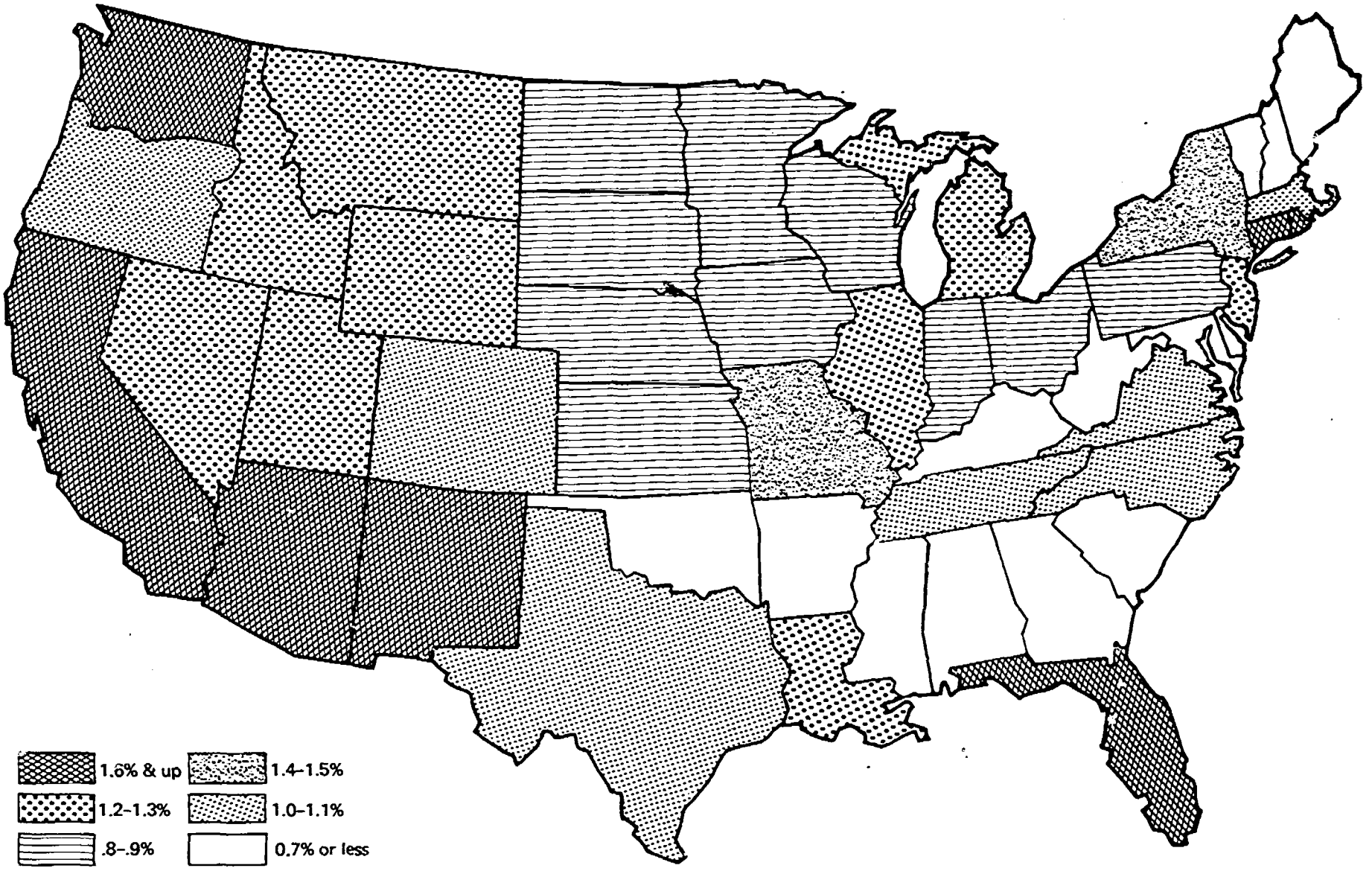
YEAR OF DOCTORATE AND 1973 ANNUAL SALARY*		FIELD OF EMPLOYMENT										
1968-71 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
FULL-TIME EMPLOYED POPULATION	N	58924	4999	4105	5717	2869	10838	13220	6786	7496	2248	646
LOWER DECILE	$	11,960	11,680	11,380	11,460	11,950	15,430	11,190	12,380	12,340	10,990	10,300
LOWER QUARTILE	$	15,220	14,560	14,120	14,910	15,140	17,060	13,800	15,390	15,380	14,590	13,600
MEDIAN	$	17,640	17,120	17,170	17,270	17,710	19,770	16,680	17,560	17,640	17,570	16,990
UPPER QUARTILE	$	20,230	19,480	19,870	19,600	20,610	22,820	19,020	19,730	19,890	20,890	19,690
UPPER DECILE	$	23,780	22,850	23,290	22,720	23,780	24,670	22,210	23,780	24,220	24,730	23,320

YEAR OF DOCTORATE AND 1973 ANNUAL SALARY*		FIELD OF EMPLOYMENT										
1972 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
FULL-TIME EMPLOYED POPULATION	N	14087	1251	888	982	573	2581	2747	1762	2642	538	123
LOWER DECILE	$	10,810	10,800	10,660	8,420	10,750	14,360	10,070	11,210	11,090	10,790	12,130
LOWER QUARTILE	$	12,870	12,320	12,230	11,460	12,370	15,950	11,690	13,140	13,030	12,660	15,120
MEDIAN	$	15,950	14,850	14,840	14,860	15,090	17,760	14,390	15,990	16,030	15,780	17,070
UPPER QUARTILE	$	18,500	17,870	17,640	17,580	18,210	19,570	17,570	18,350	18,660	18,880	19,030
UPPER DECILE	$	20,420	19,700	19,330	19,190	20,460	22,980	19,570	19,770	21,360	22,700	22,200

*ACADEMIC YEAR SALARIES HAVE BEEN MULTIPLIED BY 11/9 TO ADJUST TO A FULL-YEAR SCALE.



1973 Median Annual Salaries of Doctoral Scientists and Engineers by Field of Employment for 1930–72, 1968–71, and 1972 Cohorts



Unemployment Rates for 1930–72 Doctoral Scientists and Engineers

REGIONAL DIFFERENCES IN UNEMPLOYMENT RATES AND SALARIES

Based on a total labor force of 229,400 doctoral scientists and engineers, an unemployment rate of 1.2 percent was estimated. The highest unemployment rates were found in the Mountain and Pacific regions, with New Mexico reporting a rate of almost 3 percent. The South-Central regions reported the lowest rates, with Kentucky, for example, having only .3 percent unemployment. The map on page 21 indicates ranges of unemployment rates for the various states. Bordering states with small labor forces have been combined to present a more reliable and complete picture. Effects of recent cutbacks in Federal Government R & D programs were apparently reflected in the unemployment rates for Washington, California, New Mexico, and Florida.

In terms of geographic location, the District of Columbia clearly had the highest median salary for science and engineering doctorate-holders ($25,380), whereas the Dakotas had the lowest ($17,920). The higher salaries paid by industry and the Federal Government were evident in the median salary levels of the area spanning New York and the District of Columbia. Southern and Midwestern states, where doctoral scientists were concentrated in educational institutions, generally had lower median salaries.

TABLE 91 EMPLOYMENT, UNEMPLOYMENT, AND MEDIAN ANNUAL SALARY BY STATE -- 1973

1973 EMPLOYMENT LOCATION	TOTAL LABOR FORCE* N	UNEMPLOYED+ N	UNEMPLOYMENT RATE‡ %	FULL-TIME EMPLOYED N	MEDIAN SALARY $
ALL LOCATIONS	229394	2643	1.2	213613	20,890
NEW ENGLAND	17612	206	1.2	15974	20,490
CONNECTICUT	4245	57	1.3	3840	20,190
MAINE	756	0	–	709	18,670
MASSACHUSETTS	9989	98	1.0	9021	21,310
NEW HAMPSHIRE	807	16	–	707	18,410
RHODE ISLAND	1213	33	–	1136	19,770
VERMONT	602	2	–	561	17,430
MIDDLE ATLANTIC	45935	554	1.2	42729	22,280
NEW JERSEY	9931	133	1.3	9302	22,860
NEW YORK	23841	327	1.4	21983	22,580
PENNSYLVANIA	12163	94	.8	11444	21,260
EAST NORTH CENTRAL	38880	402	1.0	36541	20,630
ILLINOIS	11013	130	1.2	10247	21,210
INDIANA	5189	45	.9	4941	20,790
MICHIGAN	8165	96	1.2	7600	21,550
OHIO	10067	92	.9	9551	19,790
WISCONSIN	4446	39	.9	4202	19,500
WEST NORTH CENTRAL	14877	161	1.1	13848	19,380
IOWA	2351	22	.9	2242	19,390
KANSAS	1988	12	.6	1857	19,020
MINNESOTA	4079	39	1.0	3759	20,720
MISSOURI	4181	60	1.4	3836	19,380
NORTH DAKOTA	580	0	–	568	18,200
NEBRASKA	1232	28	–	1133	18,260
SOUTH DAKOTA	466	0	–	453	17,510
SOUTH ATLANTIC	38716	381	1.0	36327	21,810
DELAWARE	2714	13	.5	2639	23,210
DISTRICT OF COLUMBIA	6762	69	1.0	6309	25,380
FLORIDA	4871	84	1.7	4480	20,400
GEORGIA	3465	23	.7	3245	19,570
MARYLAND	7773	58	.7	7210	22,980
NORTH CAROLINA	4727	54	1.1	4402	19,700
SOUTH CAROLINA	1724	12	–	1648	20,080
VIRGINIA	5569	64	1.1	5313	20,890
WEST VIRGINIA	1091	4	–	1081	20,000
EAST SOUTH CENTRAL	9209	59	.6	8873	18,980
ALABAMA	2255	9	.4	2199	19,560
KENTUCKY	2158	6	.3	2064	18,530
MISSISSIPPI	1090	4	–	1064	17,980
TENNESSEE	3706	40	1.1	3546	19,410
WEST SOUTH CENTRAL	16081	144	.9	15229	19,440
ARKANSAS	766	0	–	749	18,430
LOUISIANA	2709	35	1.3	2598	18,210
OKLAHOMA	2154	0	.0	2077	19,550
TEXAS	10452	109	1.0	9805	19,930
MOUNTAIN	13634	212	1.6	12640	19,850
ARIZONA	2216	34	1.5	2055	21,020
COLORADO	4266	43	1.0	3880	20,020
IDAHO	837	5	–	801	17,210
MONTANA	714	20	–	656	17,640
NEW MEXICO	2593	75	2.9	2393	21,740
NEVADA	412	2	–	410	19,150
UTAH	2147	25	1.2	2027	19,240
WYOMING	449	8	–	418	18,400
PACIFIC	34444	524	1.5	31444	21,000
ALASKA	348	0	–	328	22,850
CALIFORNIA	26159	418	1.6	23835	21,710
HAWAII	1133	18	–	1057	20,540
OREGON	2354	26	1.1	2114	18,240
WASHINGTON	3897	62	1.6	3582	19,250
US POSSESSIONS	559	0	–	534	17,920

*INCLUDES FULL-TIME AND PART-TIME EMPLOYED, POSTDOCTORAL APPOINTEES, AND THOSE SEEKING EMPLOYMENT.

+INCLUDES ONLY THOSE SEEKING EMPLOYMENT.

‡UNEMPLOYMENT RATES BASED ON LABOR FORCES TOO SMALL TO BE RELIABLE HAVE NOT BEEN CALCULATED, ALTHOUGH THE SIZE OF THE LABOR FORCE AND THE NUMBER UNEMPLOYED ARE REPORTED HERE IN ORDER TO PERMIT THE "POOLING" OF SMALL STATES.

DIFFERENCES IN UNEMPLOYMENT RATES AND SALARIES BY SEX AND AGE

Of the 18,000 female doctorate-holders in the science and engineering labor force, 3.9 percent were unemployed and seeking employment, as compared with only .9 percent of the 211,300 males. The disparity between unemployment rates for men as compared with those for women was far more acute for young doctorate-holders.

The median salaries for men and women differed substantially. The median salary for women ($17,620) was approximately 17 percent below that for men ($21,170). The median salaries by age and sex reveal different patterns. The median salaries of men and women under the age of 40 increased over time at approximately similar rates, although the men's median salary level was substantially higher. Between the ages of 40 and 50, the rate of increase in men's median salaries continued to rise, whereas the rate of increase for women's in this age bracket waned dramatically.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE 10: EMPLOYMENT, UNEMPLOYMENT, AND MEDIAN ANNUAL SALARY BY SEX AND AGE -- 1973

SEX AND AGE IN 1973 BOTH SEXES	TOTAL LABOR FORCE* N	UNEMPLOYED+ N	UNEMPLOYMENT RATE‡ %	FULL-TIME EMPLOYED N	MEDIAN SALARY $
ALL AGES	229394	2643	1.2	213613	20,890
UNDER 30	10394	183	1.8	8305	15,530
30-34	52197	661	1.3	47249	17,490
35-39	44145	440	1.0	42000	19,610
40-44	36743	353	1.0	35359	22,020
45-49	30790	346	1.1	29716	24,150
50-54	24594	280	1.1	23620	25,000
55-59	15905	246	1.5	15155	25,310
60-64	8907	57	.6	8285	25,860
OVER 64	5394	73	1.4	3628	24,710
NO REPORT	320	4	–	295	21,410

SEX AND AGE IN 1973 MALES	TOTAL LABOR FORCE* N	UNEMPLOYED+ N	UNEMPLOYMENT RATE‡ %	FULL-TIME EMPLOYED N	MEDIAN SALARY $
ALL AGES	211345	1940	.9	199905	21,170
UNDER 30	9306	145	1.6	7595	15,650
30-34	48271	425	.9	44648	17,620
35-39	41192	313	.8	39848	19,790
40-44	34157	265	.8	33293	22,260
45-49	28162	257	.9	27513	24,550
50-54	22719	213	.9	22062	25,440
55-59	14472	211	1.5	13920	25,840
60-64	8082	48	.6	7561	26,470
OVER 64	4740	63	1.3	3232	25,350
NO REPORT	244	0	–	233	22,830

SEX AND AGE IN 1973 FEMALES	TOTAL LABOR FORCE* N	UNEMPLOYED+ N	UNEMPLOYMENT RATE‡ %	FULL-TIME EMPLOYED N	MEDIAN SALARY $
ALL AGES	18046	703	3.9	13706	17,620
UNDER 30	1087	38	–	709	14,070
30-34	3925	237	6.0	2602	15,030
35-39	2953	127	4.3	2152	16,950
40-44	2586	87	3.4	2066	17,950
45-49	2628	89	3.4	2203	18,840
50-54	1876	67	–	1558	19,630
55-59	1437	35	–	1235	20,430
60-64	824	9	–	724	20,760
OVER 64	654	10	–	396	20,110
NO REPORT	76	4	–	61	19,330

*INCLUDES FULL-TIME AND PART-TIME EMPLOYED, POSTDOCTORAL APPOINTEES, AND THOSE SEEKING EMPLOYMENT.

+INCLUDES ONLY THOSE SEEKING EMPLOYMENT.

‡UNEMPLOYMENT RATES BASED ON LABOR FORCES TOO SMALL TO BE RELIABLE HAVE NOT BEEN CALCULATED.

DIFFERENCES IN UNEMPLOYMENT RATES AND SALARIES BY SEX AND FIELD OF IDENTIFICATION

In terms of fields, chemistry and physics had the highest unemployment rates—2.1 and 1.8 percent, respectively. Earth sciences and engineering were the only fields with rates under 1.0 percent.

The salaries of females, as compared with those of males, were lowest in chemistry and earth sciences. Psychology, with the highest proportion of women (20 percent of the labor force), had the highest female-to-male salary ratio, excluding engineering where the data on women were not reliable.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE 11: EMPLOYMENT, UNEMPLOYMENT, AND MEDIAN ANNUAL SALARY BY SEX AND FIELD OF IDENTIFICATION -- 1973

SEX AND FIELD OF IDENTIFICATION BOTH SEXES	TOTAL LABOR FORCE* N	UNEMPLOYED+ N	UNEMPLOYMENT RATE‡ %	FULL-TIME EMPLOYED N	MEDIAN SALARY $
ALL FIELDS	229394	2643	1.2	213613	20,890
MATHEMATICS	15289	185	1.2	14750	19,790
PHYSICS/ASTRONOMY	17343	313	1.8	15832	21,150
CHEMISTRY	28447	611	2.1	26157	21,160
EARTH SCIENCES	10342	53	.5	9835	20,730
ENGINEERING	34830	280	.8	33745	22,490
BIOSCIENCES	57361	558	1.0	52323	19,940
PSYCHOLOGY	24861	263	1.1	22739	20,010
SOCIAL SCIENCES	26445	263	1.0	25025	20,160
NON-SCIENCES	11002	75	.7	10258	22,700
UNKNOWN	3472	0	.0	2949	22,220

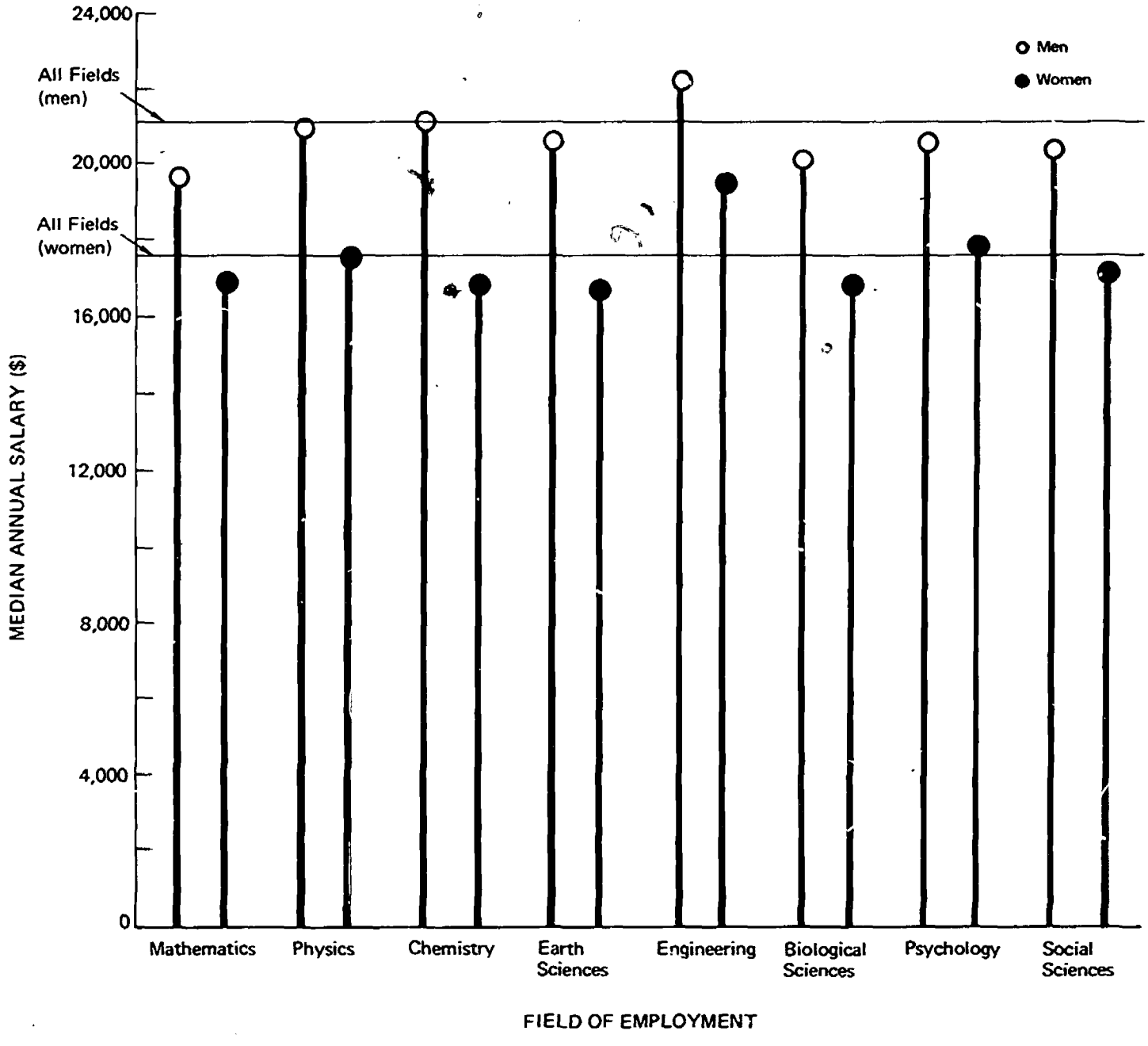
SEX AND FIELD OF IDENTIFICATION MALES	TOTAL LABOR FORCE* N	UNEMPLOYED+ N	UNEMPLOYMENT RATE‡ %	FULL-TIME EMPLOYED N	MEDIAN SALARY $
ALL FIELDS	211345	1940	.9	199905	21,170
MATHEMATICS	14419	170	1.2	14015	19,930
PHYSICS/ASTRONOMY	16925	283	1.7	15541	21,220
CHEMISTRY	27104	492	1.8	25239	21,340
EARTH SCIENCES	10074	49	.5	9631	20,840
ENGINEERING	34689	273	.8	33625	22,500
BIOSCIENCES	51381	322	.6	47852	20,330
PSYCHOLOGY	20008	127	.6	19144	20,580
SOCIAL SCIENCES	23742	177	.7	22777	20,610
NON-SCIENCES	9812	47	.5	9294	23,220
UNKNOWN	3192	0	.0	2788	22,390

SEX AND FIELD OF IDENTIFICATION FEMALES	TOTAL LABOR FORCE* N	UNEMPLOYED+ N	UNEMPLOYMENT RATE‡ %	FULL-TIME EMPLOYED N	MEDIAN SALARY $
ALL FIELDS	18046	703	3.9	13706	17,620
MATHEMATICS	871	15	–	735	17,180
PHYSICS/ASTRONOMY	418	31	–	291	17,830
CHEMISTRY	1344	119	–	917	17,130
EARTH SCIENCES	268	5	–	204	16,920
ENGINEERING	141	7	–	120	19,750
BIOSCIENCES	5980	276	4.6	4471	17,200
PSYCHOLOGY	4853	136	2.8	3596	18,120
SOCIAL SCIENCES	2703	86	3.2	2248	17,460
NON-SCIENCES	1190	29	–	964	18,700
UNKNOWN	280	0	–	162	18,060

*INCLUDES FULL-TIME AND PART-TIME EMPLOYED, POSTDOCTORAL APPOINTEES, AND THOSE SEEKING EMPLOYMENT.

+INCLUDES ONLY THOSE SEEKING EMPLOYMENT.

‡UNEMPLOYMENT RATES BASED ON LABOR FORCES TOO SMALL TO BE RELIABLE HAVE NOT BEEN CALCULATED.



1973 Median Annual Salaries of Doctoral Scientists and Engineers by Field of Employment and Sex

APPENDIX A — Survey Procedures

APPENDIX A — Survey Procedures

General

On March 30, 1973, survey forms were mailed to all individuals in the sample for whom addresses had been found. Primary sources used to obtain these addresses include the Doctorate Records File (NRC), the National Register of Scientific and Technical Personnel (NSF), American Men and Women of Science, the National Faculty Directory, college catalogues, as well as many alumni offices, departments of individuals' baccalaureate and doctoral institutions, and several professional societies. Three follow-up mailings to those who had not yet responded took place on May 17, August 29, and October 17. The Survey terminated on November 26, 1973.

Response Rates

A stratified sample of 59,086 individuals was selected from the Roster of 272,200 doctoral scientists and engineers. Current addresses were found for 55,700 individuals from the total sample of 59,086. Information was collected for 44,017 individuals, including 1,561 deceased. The high overall response rates of 74.5 percent of the total sample and 79.0 percent of the sample cases contacted strongly supports the validity of the statistics in the preceding tables. The consistent response rates within each stratification criterion further suggest the absence of any significant nonresponse bias. Responses somewhat below the overall rate were obtained from social scientists, from those who received doctorates 4 to 15 years ago, and from those who received doctorates from small institutions. However, none of the response rates deviated more than 3.1 percent below the overall rate, with the exception of those holding doctorates from foreign institutions, who understandably were difficult to locate.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE A-1: POPULATION, SAMPLE, AND SURVEY RESPONSE -- 1973

	DOCTORAL ROSTER TOTAL* N	SURVEY SAMPLE: TOTAL SAMPLE N	RESPONSE N	DECEASED N	NON-RESP.+ N	NOT CONTACTED‡ N	RESPONSE RATES§ (A) %	(B) %
TOTAL	272234	59086	42456	1561	11683	3386	74.5	79.0
FIELD OF PHD/EMPLOYMENT								
MATHEMATICS	15919	4409	3166	83	966	194	73.7	77.1
PHYSICS/ASTRONOMY	24659	5139	3670	109	1087	273	73.5	77.7
CHEMISTRY	43113	7907	5830	202	1460	415	76.3	80.5
EARTH SCIENCES	8525	1986	1497	81	315	93	79.5	83.4
ENGINEERING	38518	6362	4633	97	1306	326	74.3	78.4
BIOSCIENCES	68955	17091	12368	478	3044	1201	75.2	80.8
PSYCHOLOGY	30983	7128	5084	197	1489	358	74.1	76.0
SOCIAL SCIENCES	40265	8142	5555	299	1856	432	71.9	75.9
NON-SCIENCES/UNKNOWN	1297	922	653	15	160	94	72.5	80.7
YEAR OF PHD								
CY 1930-35	9927	2353	1302	426	390	275	72.2	81.6
CY 1936-41	12259	2787	1777	334	467	209	75.7	81.9
CY 1942-45	6501	1773	1187	129	334	123	74.2	79.8
CY 1946-49	10088	2356	1639	123	430	164	74.8	80.4
CY 1950-53	21770	4266	3056	151	783	276	75.2	80.4
CY 1954-57	24920	4847	3603	104	884	256	76.5	80.7
CY 1958-FY 61	26039	5733	4126	110	1252	245	73.9	77.2
FY 1962-63	17711	4695	3410	69	996	220	74.1	77.7
FY 1964-65	22481	5488	3977	36	1155	320	73.1	77.7
FY 1966-67	27529	6244	4566	33	1285	360	73.7	78.2
FY 1968-69	33401	6978	4999	23	1509	447	72.0	76.9
FY 1970-71	39371	7481	5652	15	1475	339	75.8	79.3
FY 1972	19774	3699	2975	5	617	102	80.6	82.8
UNKNOWN	465	346	187	3	106	50	54.9	64.2
CATEGORY OF PHD								
U.S. SCIENCE	252190	48870	35016	1423	9916	2515	74.6	78.6
U.S. NON-SCIENCE	9669	5010	4060	81	729	140	82.7	85.0
FOREIGN	10375	5206	3380	57	1038	731	66.0	76.8
SIZE OF PHD INSTITUTION‖								
LESS THAN 50	15190	6615	4708	232	1354	321	74.7	78.5
50 TO 299	98404	18479	13248	524	3842	865	74.5	78.2
MORE THAN 299	138596	23776	17060	667	4720	1329	74.6	79.0
UNCLASSIFIED	20044	10216	7440	138	1767	871	74.2	81.1
SEX								
MALE	248653	47675	34472	1210	9369	2624	74.8	79.2
FEMALE	23581	11411	7984	351	2314	762	73.0	78.3

*FIGURES INCLUDE THOSE DECEASED AND THOSE EMPLOYED IN FOREIGN COUNTRIES AND HENCE EXCEED THE TOTAL POPULATION FIGURES REPORTED IN PREVIOUS TABLES.

+INCLUDES THOSE TO WHOM SURVEY FORMS WERE MAILED AND NOT RETURNED AS WELL AS THOSE WHO INDICATED THEIR RELUCTANCE TO PARTICIPATE IN THE SURVEY.

‡INCLUDES THOSE WHO WERE MEMBERS OF THE SAMPLE BUT FOR WHOM NO CURRENT ADDRESSES COULD BE FOUND.

§BOTH RESPONSE RATES COMBINE THE NUMBER DECEASED WITH THE NUMBER OF VALID RESPONSES. RATE "A" IS CALCULATED ON THE TOTAL SAMPLE; RATE "B" IS CALCULATED ON ONLY THOSE CONTACTED.

‖SIZE DETERMINED BY THE NUMBER OF DOCTORATES GRANTED BY AN INSTITUTION DURING A GIVEN TIME PERIOD (COHORT).

Sampling Error

The sampling error estimates reported here are based on a variety of sample sizes and percentages. The actual statistics appropriate for a given table depend on the particular sample sizes and percentages cited. These estimates are based on the assumption of a random sampling from a finite population. In fact, a stratified random sample was used, and hence, the sampling errors are somewhat overestimated. For simplicity of presentation, more precise estimates were not calculated for all of these tables. However, an estimate of sampling error, based on stratified random sampling, was computed for the overall unemployment rate in Tables 9 to 11 to determine the reliability of this important statistic. A sampling error of .00056 was found. Hence, with 99 percent confidence, the true employment rate for all 1930-1972 doctoral scientists and engineers lies between 1.008 and 1.297. Of course, this confidence interval assumes no response bias—something which will be investigated in further detail in a later report.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE A-2: RANDOM SAMPLING ERROR FOR VARYING STATISTICS AND POPULATION SIZES

		POPULATION SIZE*		
		244,900	66,400	17,800
	1 or 99%	.00047	.00091	.00176
REPORTED	3 or 97%	.00080	.00164	.00302
STATISTIC	10 or 90%	.00141	.00288	.00531
	25 or 75%	.00203	.00415	.00767
	50%	.00235	.00480	.00886

*The corresponding sampling sizes are approximately .157 of the population sizes; the formula used to calculate sampling error is

$$S_e = \sqrt{\frac{N_p - N_s}{N_p - 1}} \cdot \sqrt{\frac{pq}{N_s}}$$

Item Response

In general, the number of respondents reporting information on particular survey items was very satisfactory. Item #8, which pertained to ethnic-group membership, was a notable exception, probably because of the unfamiliar categorizations. The percentage response concerning salaries was also somewhat less than that for other items——91.1 percent.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE A-3: NUMBER AND PERCENTAGE OF RESPONDENTS REPORTING SURVEY ITEMS USED IN PRECEDING TABLES

ITEM #	AND DATA	RESPONDENTS REPORTING N	%
1	AGE	42332	99.5
4	SEX	42524	100.0
5	CITIZENSHIP	42248	99.4
7	RACIAL GROUP	38945	91.6
8	ETHNIC GROUP	29782	70.0
9	PHD FIELD	42383	99.7
11	1973 EMPLOYMENT LOCATION*	38231	98.4
12	1973 SALARY+	32827	91.1
13	EMPLOYMENT STATUS	41433	97.4
15B	1973 TYPE OF EMPLOYER*	38160	98.2
16A	1973 PRIMARY WORK ACTVTY*	38084	98.0
17	1973 EMPLOYMENT FIELD*	38218	98.4

*PERCENTAGES BASED ON TOTAL EMPLOYED (INCLUDING POSTDOCTORAL APPOINTEES).

+PERCENTAGES BASED ON TOTAL FULL-TIME EMPLOYED.

APPENDIX B — Supplementary Tables

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE B-11: TYPE OF EMPLOYER BY FIELD OF EMPLOYMENT FOR FULL-TIME AND PART-TIME EMPLOYED DOCTORAL SCIENTISTS AND ENGINEERS INCLUDING POSTDOCTORAL APPOINTEES -- 1973

YEAR OF DOCTORATE AND TYPE OF 1973 EMPLOYER		FIELD OF EMPLOYMENT										
1930-72 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BICSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	226750	15104	17029	27836	10289	34550	56763	24598	26182	10927	3472
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EDUCATIONAL INSTITUTIONS*	%	58.5	79.2	56.5	38.8	50.6	35.9	67.7	61.3	83.0	55.6	40.3
FEDERAL GOVERNMENT	%	8.7	4.9	14.9	6.0	19.9	9.1	10.8	4.3	5.1	7.4	5.0
STATE/LOCAL GOV'T.	%	1.6	.4	.3	.6	4.0	.7	1.8	3.8	1.6	2.4	2.0
HOSPITAL/CLINIC	%	2.5	.2	.4	.8	.0	.2	3.4	13.4	.1	.7	.8
OTHER NON-PROFIT ORGANIZATIONS	%	3.6	1.9	4.8	2.2	4.4	3.6	3.0	4.5	4.5	6.3	3.2
BUSINESS/INDUSTRY		22.1	12.2	21.1	50.0	19.1	48.2	11.2	5.4	3.6	22.8	27.5
OTHER/NO REPORT	%	3.1	1.2	2.1	1.6	2.0	2.4	2.2	7.4	2.1	4.8	21.2

YEAR OF DOCTORATE AND TYPE OF 1973 EMPLOYER		FIELD OF EMPLOYMENT										
1968-71 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BICSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	63522	5142	4667	6314	2555	11025	15117	7374	7836	2367	725
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EDUCATIONAL INSTITUTIONS*	%	59.1	79.9	56.0	43.7	50.0	30.7	68.6	63.3	81.8	60.6	42.8
FEDERAL GOVERNMENT	%	9.3	6.1	17.3	5.4	21.4	11.2	10.9	3.5	6.0	6.1	5.1
STATE/LOCAL GOV'T.	%	1.9	.6	.3	.7	4.7	.9	1.8	5.1	1.8	2.8	1.2
HOSPITAL/CLINIC	%	3.0	.1	.5	1.5	.0	.4	4.1	14.6	.0	.6	.7
OTHER NON-PROFIT ORGANIZATIONS	%	3.8	.3	5.6	1.7	4.6	4.3	3.2	4.5	5.4	6.4	4.0
BUSINESS/INDUSTRY		20.4	11.4	17.4	45.7	18.4	50.2	9.7	4.2	2.7	18.5	25.6
OTHER/NO REPORT	%	2.6	1.5	3.0	1.3	.8	2.3	1.6	4.9	2.2	5.0	20.5

YEAR OF DOCTORATE AND TYPE OF 1973 EMPLOYER		FIELD OF EMPLOYMENT										
1972 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BICSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	16931	1332	1239	1520	721	2750	3976	1955	2723	569	146
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EDUCATIONAL INSTITUTIONS*	%	61.7	74.3	54.6	55.1	57.2	30.4	74.1	57.2	83.5	52.0	46.6
FEDERAL GOVERNMENT	%	10.2	8.9	22.4	9.3	25.6	14.5	7.6	3.4	4.7	15.3	11.6
STATE/LOCAL GOV'T.	%	1.6	.0	.9	1.3	.0	.8	1.6	3.9	2.1	2.8	.0
HOSPITAL/CLINIC	%	4.0	.0	.0	2.2	.0	.0	4.1	24.0	.3	1.9	.0
OTHER NON-PROFIT ORGANIZATIONS	%	4.2	4.7	3.7	1.6	3.6	4.1	4.7	4.4	5.0	4.7	6.2
BUSINESS/INDUSTRY		16.0	11.3	17.4	29.1	12.1	45.9	6.1	5.9	1.9	16.9	30.1
OTHER/NO REPORT	%	2.3	.8	1.1	1.4	1.5	4.3	1.9	1.1	2.5	6.3	5.5

*INCLUDES ELEMENTARY AND SECONDARY SCHOOLS AS WELL AS HIGHER EDUCATIONAL INSTITUTIONS.

1930-72 UNITED STATES DOCTORAL SCIENTISTS AND ENGINEERS

TABLE B-21 PRIMARY WORK ACTIVITY BY FIELD OF EMPLOYMENT FOR FULL-TIME AND PART-TIME EMPLOYED DOCTORAL SCIENTISTS AND ENGINEERS INCLUDING POSTDOCTORAL APPOINTEES -- 1973

YEAR OF DOCTORATE AND 1973 PRIMARY WORK ACTIVITY		FIELD OF EMPLOYMENT										
1930-72 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	226750	15104	17029	27836	10289	34550	56763	24598	26182	10927	3472
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TEACHING	%	36.0	60.2	33.6	27.1	30.9	24.9	31.1	37.3	63.7	30.4	20.9
RESEARCH	%	26.9	17.9	44.7	35.9	32.2	23.0	39.1	11.2	13.1	5.0	12.2
ADMINISTRATION OF	%											
-RESEARCH/DEVELOPMENT		12.5	5.5	11.1	18.5	16.6	21.2	10.8	6.6	6.2	14.7	11.6
-OTHER		5.3	3.8	1.7	3.1	4.8	4.7	3.1	8.1	6.2	22.6	11.4
CONSULTING/PROF. SERVICES	%	5.0	1.6	1.0	1.1	2.8	3.4	3.2	25.3	1.8	5.7	2.1
DESIGN/DEVELOPMENT	%	3.8	4.8	3.0	4.0	1.6	14.5	.8	.7	.5	2.3	1.2
REPORT/MARKETING/ PRODUCTION/INSPECTION	%	1.5	.4	.5	2.9	1.5	1.6	1.3	.3	1.0	4.6	5.7
OTHER/NO REPORT	%	8.9	5.6	4.4	7.2	9.5	6.7	10.5	10.4	7.6	14.8	35.0

YEAR OF DOCTORATE AND 1973 PRIMARY WORK ACTIVITY		FIELD OF EMPLOYMENT										
1968-71 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	63522	5142	4667	6314	2955	11025	15117	7374	7836	2367	725
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TEACHING	%	37.4	64.6	32.3	29.3	30.0	21.3	30.2	38.1	67.1	41.4	32.0
RESEARCH	%	32.4	18.9	53.5	46.2	40.4	30.8	47.6	12.7	15.2	8.7	13.8
ADMINISTRATION OF	%											
-RESEARCH/DEVELOPMENT		7.2	3.0	4.1	7.2	10.2	14.8	6.1	5.3	4.5	6.7	4.5
-OTHER		3.2	1.3	.6	1.3	5.1	2.8	1.4	6.9	3.7	14.8	6.5
CONSULTING/PROF. SERVICES	%	5.0	1.5	.9	.3	1.4	3.0	3.2	25.9	1.9	5.7	1.2
DESIGN/DEVELOPMENT	%	5.5	5.7	3.5	5.6	2.2	20.9	1.0	.6	.6	1.2	2.6
REPORT/MARKETING/ PRODUCTION/INSPECTION	%	1.4	.2	1.0	2.3	1.5	1.5	1.1	.3	1.2	4.9	10.2
OTHER/NO REPORT	%	7.8	4.8	4.0	7.8	9.2	4.9	9.3	10.2	5.9	14.5	29.2

YEAR OF DOCTORATE AND 1973 PRIMARY WORK ACTIVITY		FIELD OF EMPLOYMENT										
1972 DOCTORATES		ALL FIELDS	MATH	PHYS	CHEM	EARTH	ENGIN	BIOSC	PSYCH	SOCSC	NONSC	UNK
EMPLOYED POPULATION	N	16931	1332	1239	1520	721	2750	3976	1955	2723	569	146
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TEACHING	%	34.9	60.7	14.7	16.4	29.5	19.0	26.3	34.1	71.3	44.9	15.9
RESEARCH	%	37.4	17.1	75.0	65.9	48.3	35.4	52.8	12.7	14.3	5.4	45.7
ADMINISTRATION OF	%											
-RESEARCH/DEVELOPMENT		4.8	3.3	2.7	3.7	6.2	10.3	2.0	3.4	4.4	13.5	4.1
-OTHER		2.2	.8	.4	.4	3.3	1.7	1.9	5.3	1.4	10.0	.0
CONSULTING/PROF. SERVICES	%	6.1	2.6	.0	.2	5.5	3.5	4.4	32.6	.3	7.5	.0
DESIGN/DEVELOPMENT	%	5.1	10.6	3.1	6.6	1.1	18.5	.7	1.8	.1	.5	.0
REPORT/MARKETING/ PRODUCTION/INSPECTION	%	1.5	.1	1.5	1.3	.0	1.9	2.6	1.0	.7	3.7	.0
OTHER/NO REPORT	%	8.0	4.8	2.6	5.5	6.0	9.0	9.2	9.1	7.4	14.4	30.3

APPENDIX C — Questionnaire

NATIONAL RESEARCH COUNCIL

NATIONAL ACADEMY OF SCIENCES NATIONAL ACADEMY OF ENGINEERING

2101 CONSTITUTION AVENUE WASHINGTON, D.C. 20418

OFFICE OF SCIENTIFIC PERSONNEL

March 1973

Dear Colleague:

The National Science Foundation has asked the National Academy of Sciences-National Academy of Engineering-National Research Council to assist it in operating the Manpower Characteristics System. The Foundation has established the System to provide data needed to assay this Nation's human resources in the sciences and engineering and guide in the development of national policies and programs.

As our part of the task, we shall maintain information about recipients of the earned doctorate in the natural and social sciences, mathematics, and engineering. Already available data will be utilized to the greatest extent possible. We believe the Survey of Doctoral Scientists and Engineers will provide critically needed data bearing on the problem of utilization and supply of doctoral scientists and engineers, the support of graduate education, and the support of research and development and postdoctoral activities.

We seek your help. You are one of a carefully drawn sample of doctoral scientists and engineers who are being asked to provide current data. The questionnaire on the following pages has been designed to make minimum demands upon your time and yet to provide data that in the aggregate will be statistically significant and useful. Some data already available to us have been preprinted on the form to conserve your time.

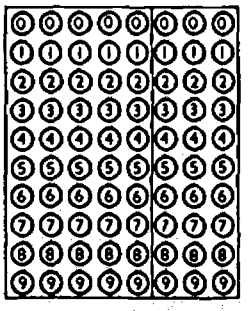
Information provided will be treated as privileged and used only for purposes of statistical description. Summaries will be published after analysis of the results.

Please complete and return the questionnaire promptly. A self-addressed envelope is enclosed for your convenience. Your assistance will be greatly appreciated and, indeed, is essential to the success of this project.

Sincerely yours,

Robert A. Alberty

Robert A. Alberty
Chairman, Advisory Committee



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SURVEY OF DOCTORAL SCIENTISTS AND ENGINEERS

OMB No. 99-S73001
Approval expires Dec. 31, 1975

CONDUCTED BY THE NATIONAL RESEARCH COUNCIL WITH THE SUPPORT OF THE NATIONAL SCIENCE FOUNDATION.

The letter on the adjacent page requests that you assist in this survey of doctoral scientists and engineers – including the fields of the natural and social sciences, mathematics, and engineering.

Please print or type your answers on this first page. If selected information has been printed by computer, check to be certain the entries are CORRECT and COMPLETE. The second page has special instructions. After the form has been completed, please return it in the enclosed envelope to: Manpower Studies Branch, Office of Scientific Personnel, National Research Council, 2101 Constitution Avenue, Washington, D. C. 20418.

NOTE: ALL INFORMATION IS REGARDED AS CONFIDENTIAL AND WILL BE USED FOR STATISTICAL PURPOSES ONLY. IT WILL NOT BE RELEASED IN ANY WAY THAT WILL ALLOW IT TO BE IDENTIFIED WITH YOU.

If your name and address are incorrect, please enter correct information to the right. Include zip code.

(10)

(2-9)

If there is an alternate address through which you could be reached, please provide it in the space below.

C/O Number Street City State Zip Code (11)

VITA

1. Date of Birth (12-16) Mo. Day Yr.
2. State or Foreign Country of Birth (17-18)
3. State or Foreign Country of Secondary School Graduation (19-20)
4. Sex: (21) ☐ 1- Male ☐ 2- Female
5. Citizenship: (22) ☐ 0- USA ☐ 1- Non-USA (specify country) _____
6. Social Security No. (23 31)
7. Race: (32) (Please check one) ☐ 0- White/Caucasian ☐ 1- Black/Negro ☐ 2- American Indian ☐ 3- Asian, specify _____ ☐ 4- Other, specify _____
8. Ethnic Group: (33) (Please check one) ☐ 0- Puerto Rican American ☐ 1- Mexican American/Chicano ☐ 2- Spanish American ☐ 3- Afro-American ☐ 4- None of these. (Please specify any other) _____
9. List in the table below all collegiate and graduate degrees that have been awarded to you; e.g., BA/BS, MA/MS, PhD. If some information has been entered by computer, please be sure it is CORRECT and COMPLETE (including the number and name of the specialty field from the list on the reverse side).

Type of Degree	Granted Mo.	Granted Yr.	Major Field (Use Specialties List) Name	Major Field Number	Institution Name	City (or campus) and State
BS						
MS						
PhD						
.....						

10. Name of your doctoral thesis advisor: (please print FULL name) (First Name) (Middle Initial) (Last Name) (23-44)

PROFESSIONAL EMPLOYMENT

11. Please give the name of your present principal employer (organization, company, etc. or, if self-employed, "self"), and actual place of employment.

Name of present principal employer (45-50) Actual place of employment (city, state and zip code) (51-55)

If employed by a university, college, or junior college, please check the rank of your present position: (56)

☐ 0- Professor ☐ 1- Associate Professor ☐ 2- Assistant Professor ☐ 3- Instructor ☐ 4- Lecturer ☐ 5- Other, specify _____

12. Please give the basic annual salary associated with your principal professional employment in 1972 and 1973. If you were on a postdoctoral appointment (e.g., fellowship, traineeship, research associateship) give your annual stipend plus allowances below.

1972 - $ _____ (57-59) 1973 - $ _____ (60-62)

If academically employed, check whether salary is for:

	1972	1973
9-10 mos.	☐ (63)	☐ (64)
11-12 mos.	☐	☐

(Basic Annual Salary is your annual salary before deductions for income tax, social security, retirement, etc., but does not include bonuses, overtime, summer teaching, or other payment for professional work.)

Please Do Not Write In This Space

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63 64

PLEASE CONTINUE

DIRECTIONS: Your responses to this portion of the questionnaire will be read by an optical mark reader. Your careful observance of these few simple rules will be most appreciated.

- Use only black lead pencil (No. 2½ or less).
- Make heavy black marks that fill the circle.
- Erase cleanly any answer you wish to change.
- Make no stray markings of any kind.

EXAMPLE:

Will marks made with ball pen, felt tip, or fountain pen be properly read?

Yes ○ No ●

PLEASE NOTE that we are requesting that you furnish the following information for both the current year, as of the time you receive this form, and last year, as of March 31, 1972. Fill in the category of each item which most appropriately describes your status in 1972 and 1973. Unless otherwise specified, mark only one category in each year.

SPECIALTIES LIST

MATHEMATICAL SCIENCES

000 · Algebra
010 · Analysis & Functional Analysis
020 · Geometry
030 · Logic
040 · Number Theory
052 · Probability
055 · Math. Statistics (see also 544, 670, 725, 729)
060 · Topology
080 · Computing Theory & Practice
082 · Operations Research (see also 477)
085 · Applied Mathematics
089 · Combinatorics & Finite Mathematics
091 · Physical Mathematics
098 · Mathematics, General
099 · Mathematics, Other*

ASTRONOMY

101 · Astronomy
102 · Astrophysics

PHYSICS

110 · Atomic & Molecular Physics
120 · Electromagnetism
130 · Mechanics
132 · Acoustics
134 · Fluids
135 · Plasma Physics
136 · Optics
138 · Thermal Physics
140 · Elementary Particles
150 · Nuclear Structure
160 · Solid State
198 · Physics, General
199 · Physics, Other*

CHEMISTRY

List A

Fields used to classify academic degrees. Use for Item 9 on questionnaire. Also see note below.

200 · Analytical
210 · Inorganic
220 · Organic
230 · Nuclear
240 · Physical
250 · Theoretical
260 · Agricultural & Food
270 · Pharmaceutical
298 · Chemistry, General
299 · Chemistry, Other*

List B

Fields used to classify present professional employment. Use for Item 17 on questionnaire. Also see note below for the doctoral field in Item 9.

205 · Analytical Chemistry
215 · Synthetic Organic & Organometallic Chemistry
225 · Synthetic, Inorganic & Natural Products
235 · Nuclear Chemistry
245 · Quantum Chemistry
255 · Structural Chemistry
265 · Thermodynamics & Material Properties
275 · Polymers
285 · Chemical Dynamics

NOTE. Please use List B fields to classify your doctoral degree in Item 9. This is a classification which is requested in addition to the field chosen from List A. Print the List B field beside the doctoral code number from List A.

EARTH, ENVIRONMENTAL & MARINE SCIENCES

301 · Mineralogy, Petrology
305 · Geochemistry
310 · Stratigraphy, Sedimentation
320 · Paleontology
330 · Structural Geology
340 · Geophysics (Solid Earth & Atmospheric)
350 · Geomorph., Glacial Geology
360 · Hydrology
370 · Oceanography
380 · Meteorology
388 · Environmental Sciences, General
389 · Environmental Sciences, Other*
391 · Applied Geology, Geol. Engr., Econ. Geol.
397 · Marine Sciences, Other*
398 · Earth Sciences, General
399 · Earth Sciences, Other*

ENGINEERING

400 · Aeronautical & Astronautical
410 · Agricultural
415 · Biomedical
420 · Civil
430 · Chemical
435 · Ceramic
440 · Electrical
445 · Electronics
450 · Industrial, Manufacturing
455 · Nuclear
460 · Engineering Mechanics
465 · Engineering Physics
470 · Mechanical
475 · Metallurgy & Phys. Met. Engr.
477 · Operations Research, Systems (see also 082)
479 · Fuel Technology, Petrol Engr.
480 · Sanitary/Environmental
486 · Mining
497 · Materials Science Engr.
498 · Engineering, General
499 · Engineering, Other*

AGRICULTURAL SCIENCES

500 · Agronomy
501 · Agricultural Economics
502 · Animal Husbandry
504 · Fish & Wildlife
505 · Forestry
506 · Horticulture
507 · Soils & Soil Science
510 · Animal Sciences
511 · Phytopathology
517 · Food Science & Technology (see also 573)
518 · Agriculture, General
519 · Agriculture, Other*

MEDICAL SCIENCES

520 · Medicine & Surgery
522 · Public Health
523 · Veterinary Medicine
524 · Hospital Administration
527 · Parasitology
534 · Pathology
536 · Pharmacology
537 · Pharmacy
538 · Medical Sciences, General
539 · Medical Sciences, Other*

BIOLOGICAL SCIENCES

540 · Biochemistry
542 · Biophysics
543 · Biomathematics
544 · Biometrics, Biostatistics (see also 055, 670, 725, 729)
545 · Anatomy
546 · Cytology
547 · Embryology
548 · Immunology
550 · Botany
560 · Ecology
562 · Hydrobiology
564 · Microbiology & Bacteriology
566 · Physiology, Animal
567 · Physiology, Plant
569 · Zoology
570 · Genetics
571 · Entomology
572 · Molecular Biology
573 · Food Science & Technology (see also 517)
574 · Behavior/Ethology
578 · Biological Sciences, General
579 · Biological Sciences, Other*

PSYCHOLOGY

600 · Clinical
610 · Counseling & Guidance
620 · Developmental & Gerontological
630 · Educational
635 · School Psychology
641 · Experimental
642 · Comparative
643 · Physiological
650 · Industrial & Personnel
660 · Personality
670 · Psychometrics (see also 055, 544, 725, 729)
680 · Social
698 · Psychology, General
699 · Psychology, Other*

SOCIAL SCIENCES

700 · Anthropology
703 · Archeology
708 · Communications*
709 · Linguistics
710 · Sociology
720 · Economics (see also 501)
725 · Econometrics (see also 055, 544, 670, 729)
729 · Social Statistics (see also 055, 544, 670, 725)
740 · Geography
745 · Area Studies*
750 · Political Science, Public Admin.
755 · International Relations
770 · Urban & Reg. Planning
775 · History & Phil. of Science
798 · Social Sciences, General
799 · Social Sciences, Other*

ARTS & HUMANITIES

841 · Fine & Applied Arts (including Music, Speech, Drama, etc.)
842 · History
843 · Philosophy, Religion, Theology
845 · Languages & Literature
846 · Other Arts and Humanities*

EDUCATION & OTHER PROFESSIONAL FIELDS

938 · Education

882 · Business Administration
883 · Home Economics
884 · Journalism
885 · Speech and Hearing Sciences
886 · Law, Jurisprudence
887 · Social Work
891 · Library & Archival Science
898 · Professional Field, Other*

899 · OTHER FIELDS*

BROAD FIELDS

000-099	Mathematics
101-199	Physics
200-299	Chemistry
301-399	Earth Sciences
400-499	Engineering
500-579	Biosciences
600-699	Psychology
700-799	Social Sciences
841-899	Nonsciences

* Identify the specific field in the space provided on the questionnaire.

PLEASE READ DIRECTIONS ON ADJACENT PAGE.

13. What is your employment status?

	1972	1973
Employed full-time, science or engineering related position	O	O
Employed full-time, nonscience or nonengineering related position. (Complete 13a below)	O	O
Employed part-time, science or engineering related position (Complete 13b below)	O	O
Employed part-time, nonscience or nonengineering related position (Complete 13b below)	O	O
Postdoctoral appointment (fellowship, traineeship, research associateship, etc.) Complete 13c below	O	O
Unemployed and seeking employment	O	O
Specify number of months unemployed: ___ ___		
Unemployed and not seeking employment	O	O
Retired and not seeking employment	O	O
Specify year of retirement: ___ ___		
Other, specify _____	O	O

13a. If you are employed full-time in 1973 in a position unrelated to science or engineering, what was the MOST important reason for taking the position?

	1973
Prefer nonscience or nonengineering position	O
Promoted out of science or engineering position	O
Pay is better	O
Locational preference	O
Science or engineering position not available	O
Other, specify _____	O

13b. If employed part-time in 1973, are you seeking full-time employment?

	1973
Yes	O
No	O

13c. If on postdoctoral appointment in 1973, what was the MOST important reason for taking the appointment?

	1973
Sought additional research experience in field	O
Opportunity to change to another field	O
Employment position not available	O
Other, specify _____	O

14. If employed or on a postdoctoral appointment in 1973, please indicate the term of employment or appointment:

	1973
Three months or less	O
More than 3 months, not more than one year	O
More than one year, not more than 3 years	O
More than 3 years, not more than 5 years	O
Permanent or tenured position	O

15. Which categories best describe the sector of the economy and type of organization of your principal employer or postdoctoral affiliation?

	1972	1973
A. Sector: Public	O	O
Private	O	O
B. Type of organization:		
Business or industry	O	O
Junior college, 2-year college, technical institute	O	O
Medical school	O	O
4-year college or university, other than medical school	O	O
Elementary or secondary school system	O	O
Hospital or clinic	O	O
U.S. military service, active duty, or Commission Corps., e.g., USPHS, NOAA	O	O
U.S. government, civilian employee	O	O
State government	O	O
Local or other government, specify _____	O	O
International agency	O	O
Non-profit organization, other than hospital, clinic, or educational institution	O	O
Other, specify _____	O	O

16. What are the primary (A) and secondary (B) work activities related to your position?

	1972 A	1972 B	1973 A	1973 B
Management or administration of:				
Research and development	O	O	O	O
Other than research and development	O	O	O	O
Both	O	O	O	O
Basic research	O	O	O	O
Applied research	O	O	O	O
Development of equipment, products, systems, data	O	O	O	O
Design	O	O	O	O
Teaching	O	O	O	O
Report or other technical writing, editing	O	O	O	O
Production	O	O	O	O
Consulting, specify _____	O	O	O	O
Professional services to individuals	O	O	O	O
Quality control, inspection, testing	O	O	O	O
Sales, marketing, purchasing, estimating	O	O	O	O
Other, specify _____	O	O	O	O

17. From the specialties list on the adjacent page, select and enter both the number and title of the scientific specialty most closely related to your principal employment or postdoctoral appointment. Write in your specialty if it is not on the list.

1972 [ ][ ][ ] Number _____

1973 [ ][ ][ ] Number _____

18. Is ANY of your work being supported or sponsored by U.S. government funds?

	Yes	No	Don't Know
1972	O	O	O
1973	O	O	O

If yes, which of the following federal agencies or departments are supporting the work? (Mark all that apply.)

	1972	1973
NASA	O	O
NSF	O	O
EPA	O	O
AEC	O	O
AID	O	O
Dept. of Health, Educ., & Welfare		
NIH	O	O
Health Services & Mental Health Admin.	O	O
Office of Educ.	O	O
Other HEW, specify _____	O	O
Dept. of Defense	O	O
Dept. of Commerce	O	O
Dept. of Agriculture	O	O
Dept. of Transportation	O	O
Dept. of Justice	O	O
Dept. of Housing and Urban Development	O	O
Dept. of Interior	O	O
Other agency or dept., specify _____	O	O
Don't know source	O	O

This is the end of the questionnaire. Thank you.

Please Do Not Write In This Space

0 0	0 0	0 0 0	0 0 0	0 0 0 0 0 0
1 1	1 1	1 1 1	1 1 1	1 1 1 1 1 1
2 2	2 2	2 2 2	2 2 2	2 2 2 2 2 2
3 3	3 3	3 3 3	3 3 3	3 3 3 3 3 3
4 4	4 4	4 4 4	4 4 4	4 4 4 4 4 4
5 5	5 5	5 5 5	5 5 5	5 5 5 5 5 5
6 6	6 6	6 6 6	6 6 6	6 6 6 6 6 6
7 7	7 7	7 7 7	7 7 7	7 7 7 7 7 7
8 8	8 8	8 8 8	8 8 8	8 8 8 8 8 8
9 9	9 9	9 9 9	9 9 9	9 9 9 9 9 9