REVIEW OF OCCUPATIONAL
EMPLOYMENT STATISTICS

Employment Of Scientific,
Professional, and
Technical Personnel
in State Governments
January 1964

UNITED STATES DEPARTMENT OF LABOR
W. Willard Wirtz, Secretary

BUREAU OF LABOR STATISTICS
Arthur M. Ross, Commissioner
PREFACE

This report presents the major findings of a survey of scientific, professional, and technical employment in State government agencies in January 1964. The Bureau of Labor Statistics of the U.S. Department of Labor made similar surveys in 1959 and 1962. The State government survey series was originally developed under the sponsorship of the National Science Foundation which published the first report. Subsequently it was established as a regular program of the Bureau of Labor Statistics.

The 1964 report was prepared by Arthur Jaffe with the assistance of Jack Golomb under the supervision of William L. Copeland and Michael D. Wertheimer. The study was conducted under the general direction of Robert B. Steffes, Chief of the Bureau’s Division of Occupational Employment Statistics and Harold Goldstein, Assistant Commissioner of Manpower and Employment Statistics.

The Bureau of Labor Statistics wishes to express its appreciation to the many State government agencies and individuals whose cooperation made this survey possible; and especially to Cora E. Taylor, who headed the Division of Occupational Employment Statistics when the survey was initiated.
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SECTION 1. INTRODUCTION

During recent years State government agencies have been among the fastest growing activities in the United States. This growth has created rapidly mounting needs at the State government level for highly skilled and professionally trained personnel. To keep abreast of this growth the Bureau of Labor Statistics conducts surveys covering the employment of scientific, technical, and professional personnel in State government agencies. The latest survey was conducted in the early months of 1964 to obtain occupational employment information as of January of that year. This survey, like those which preceded it, is part of a broad program conducted by the Bureau of Labor Statistics to develop occupational employment statistics covering scientific, professional, and technical employment across a broad spectrum of the total American economy.

Scope of the Study

The 1964 survey covered most State government agencies within each of the 50 States. Excluded from the survey were State educational institutions, since they are covered in studies conducted by the Office of Education of the U.S. Department of Health, Education, and Welfare and by the National Science Foundation. Special schools, such as schools for the mentally retarded, schools for the deaf and the blind, and industrial schools, as well as administrative personnel in State Departments of Education were included in the survey since they are not covered by other studies. Also excluded were personnel in agricultural experiment stations, agricultural extension services, and hospitals affiliated with State universities. Certain other State agencies such as legislative bodies, judicial tribunals, and boards and commissions with regulatory and licensing functions were excluded from the survey because they do not employ scientific and technical personnel. For the sake of brevity, the coverage of the study will be referred to simply as “nonschool employment.”

Questionnaires were mailed directly to some 1,850 State government agencies. Virtually all responded. Each respondent was requested to provide information, by occupation, on the total number of persons employed and the number primarily engaged in research. A variety of specific occupations were covered within each of five broad occupational categories—engineers, scientists, social workers, health-related professionals, and technicians.

Changes in employment by occupation between the present survey and the preceding surveys are difficult to assess because of changes in personnel classification and differences in the interpretation of definitions by respondents. In addition, changes in definitions for various occupations and the introduction of new occupations in the 1964 survey, no doubt, have changed the reporting patterns of many respondents.

Employment of Scientific, Professional, and Technical Personnel

In early 1964, there were 156,800 persons employed by the 50 State governments working as engineers, scientists, social workers, health-related professionals, and technicians.

workers, selected health-related professionals, and technicians. (See appendix table 1.) These highly skilled State employees represented 13 percent of all State government non-school employment. A distribution of these persons among the five major occupational groups is shown in Chart 1.

California and New York, which respectively have the highest State government employment totals, significantly exceeded all other States in the total number of personnel employed in the surveyed professional and technical occupations and ranked among the top three in each of the five major occupational groupings. These two States--having 18 percent of total State government non-school employment--employed 20 percent of the total scientific, professional, and technical personnel employed by all State governments.

Wyoming, Alaska, Vermont, Utah, and Hawaii ranked as the States with the highest ratios (21-25 percent) of scientific, professional, and technical personnel to total State government non-school employment. The States having the lowest ratios (6-8 percent) were West Virginia, South Dakota, Oklahoma, Indiana, North Carolina, and New Mexico. (See appendix table 2.)

Many factors influence the employment of scientific, professional, and technical personnel in individual States. Among the more important factors are the following: the amount of money made available and the types of service undertaken by the State agencies; whether the services and projects are carried out directly by the State or are contracted to consulting and other firms. Other factors affecting the employment of such personnel include natural resources, major industries, and the extent to which local government units assume responsibility for major projects.

**SECTION 2. ENGINEERS**

State agencies employed 34,500 engineers in January 1964. (See appendix table 3.) Approximately 25,700 of these engineers (74 percent) were civil engineers employed in State highway
departments. There were 1,200 sanitary engineers, most of whom were employed by State health departments. Almost a third of the engineers (11,000) were employed in the Far West States where California vastly exceeded all other States in this occupational group. Employment of engineers in the Northeast, Middle West, and Southern groupings of States was distributed more equally.

SECTION 3. SCIENTISTS

There were 16,700 scientists employed in a variety of scientific occupations. (See appendix table 4.) One half (8,300) were life scientists—scientists working in the agricultural, biological, and biomedical fields. Agricultural and biological scientists were concentrated in State agricultural and conservation agencies where 94 percent of these scientists were employed. Most biomedical scientists (95 percent) were in State health and welfare agencies. (See appendix table 5.)

The remaining half of State governments’ scientific personnel consisted of 2,600 physical scientists (chemists, geologists, geophysicists, and other physical scientists), 2,500 psychologists, 2,000 mathematicians and statisticians, and 1,400 social scientists (economists, sociologists, anthropologists, and other social scientists). Among these scientific personnel, psychologists predominated in mental health agencies and economists in such agencies as Departments of Revenue, Commerce, and Labor which collectively dominate the “Miscellaneous” classification of agencies.

SECTION 4. SOCIAL WORKERS

About 9,200 social workers were employed by State government agencies. (See appendix table 6.) The 4,000 psychiatric and medical social workers were employed primarily in State mental institutions. Social workers, not classified as psychiatric or medical (5,200), were engaged principally in welfare activities. New York and California State agencies employed 21 percent of all social workers among the 50 States, a somewhat higher proportion than these two States had of nonschool government employment in all States.

SECTION 5. SELECTED HEALTH-RELATED PROFESSIONS

State governments employed 36,200 health-related professional workers, including 21,600 professional nurses, 4,400 physicians, 3,800 psychiatrists, 3,400 sanitarians, 1,100 veterinarians, 1,000 dentists, and 800 public health officers with M.D.’s. (See appendix table 7.) State agencies dealing with the physical and mental health of the general public were the primary employers of these persons. A significant proportion of physicians (12 percent), dentists (21 percent), and nurses (9 percent), and to a lesser degree psychiatrists (4 percent) and public health officers (2 percent) were employed by State welfare agencies.

New York, Pennsylvania, California, Massachusetts, and Florida, having 31 percent of total State government noneducational employment, employed 43 percent of the total reported number of persons in these selected health-related professions.

SECTION 6. TECHNICIANS

Of the 60,200 technicians, half were employed as engineering technicians and another third were draftsmen and surveyors who were employed, predominately, by State highway departments. (See appendix tables 8 and 9.) Among the remaining technicians, there were 5,400 in the various physical and life science fields, and 3,700 medical and dental technicians. More than half the physical science technicians worked on highway and public works projects. Significant proportions also were employed in agricultural agencies (16 percent) and physical health agencies (16 percent). Agricultural and biological technicians were concentrated in the fields of agriculture and conservation although biological technicians also were
found in fairly large numbers (26 percent) working in the health field. Medical and dental technicians were concentrated principally in health agencies.

State agencies in the Southern Region employed over 40 percent of the draftsmen, surveyors, and engineering technicians but only 25 percent of the engineers among the 50 States. As a result, in the Southern States the ratio of technicians to total scientists and engineers was significantly higher than in other major sections of the country. The average ratio for all States, other than Southern States, was 9 technicians for each 10 scientists and engineers. In the South this ratio was 19 technicians for each 10 scientists and engineers. The ratios of the number of technicians to each 10 scientists and engineers for other regions of the country were Northeast, 8; Middle West, 12; and Far West, 9.

SECTION 7. SCIENTIFIC, PROFESSIONAL, AND TECHNICAL PERSONNEL ENGAGED IN RESEARCH

Only three percent (4,800) of the scientific, professional, and technical personnel employed by State government agencies were engaged in research. As indicated in Chart 2, the bulk of those whose time was devoted primarily to research were the 2,900 scientists. Research was a significant activity among the biologists, biomedical scientists, economists, geologists, and geophysicists--better than a fourth of these scientists were working in research oriented activities. (See appendix table 10.)

Of the 900 technicians working on research projects, 65 percent were engineering and biological technicians. An additional 27 percent were physical science, medical, and dental technicians. A far greater percentage of all biological technicians (12 percent) were in research work than were other types of technicians.
The remaining 1,000 professional persons engaged in research consisted of 700 engineers (2 percent of all State employed engineers), 100 social workers (1 percent of the social workers on State government payrolls), and 200 in the surveyed health occupations (0.5 percent of the total reported as employed in these selected health occupations). Half the employees in the health occupations were psychiatrists.

Copies of the reporting form and instructions for the 1964 Survey of Scientific and Technical Personnel Employed by State Governments are reproduced following the last appendix table.
APPENDIX TABLES

Most of the tables included in this appendix present data for each State. However, caution is urged in making State-by-State comparisons of employment without acquiring an intimate knowledge of individual State programs, practices, and classification systems. For example, wide differences exist in the types of programs undertaken by States in any given year, in practices such as the hiring of scientific and technical workers or the use of outside consulting services, and in functions performed by agencies having similar names or by personnel having the same occupational titles. Although State tables are presented by region for the reader's convenience, statistics by region are not likely to be comparable, for the reasons cited.
### Table 1.

**Occupational Distribution of Total Number of Scientific, Professional, and Technical Personnel,**

**Employed by State Governments, and Number Engaged in Research, January 1964**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total</th>
<th>Engaged in Research</th>
<th>Occupation</th>
<th>Total</th>
<th>Engaged in Research</th>
</tr>
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<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
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<td>4,816</td>
<td>100.0</td>
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<td>Engineers</td>
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<td>22.0</td>
<td>744</td>
<td>15.4</td>
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<td>Civil engineers</td>
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<td>19.7</td>
<td>659</td>
<td>13.7</td>
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<td>Sanitary engineers</td>
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<td>13</td>
<td>.3</td>
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<td>Other engineers</td>
<td>2,335</td>
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<td>72</td>
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<td>Scientists</td>
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<td>10.6</td>
<td>2,866</td>
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<td>Chemists</td>
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<td>153</td>
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<td>.1</td>
<td>11</td>
<td>.2</td>
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<td>Agricultural scientists</td>
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<td>126</td>
<td>2.6</td>
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<td>829</td>
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<td>.6</td>
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<td>Statisticians</td>
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<td>23</td>
<td>.5</td>
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<td>Other psychologists</td>
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<td>.2</td>
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<td>.5</td>
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<td>Social workers</td>
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<td>5.9</td>
<td>99</td>
<td>2.1</td>
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<td>Medical social workers</td>
<td>448</td>
<td>.3</td>
<td>2</td>
<td>(1/)</td>
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<td>Psychiatric social workers</td>
<td>3,534</td>
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<td>17</td>
<td>.4</td>
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<td>Selected health professions</td>
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<td>23.1</td>
<td>187</td>
<td>3.9</td>
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<tr>
<td>Public health officers  (M.D.)</td>
<td>819</td>
<td>.5</td>
<td>28</td>
<td>.6</td>
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<td>Psychiatrists (M.D.)</td>
<td>3,795</td>
<td>2.4</td>
<td>91</td>
<td>1.9</td>
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<tr>
<td>All other physicians (M. D. and D.O.)</td>
<td>4,443</td>
<td>2.8</td>
<td>21</td>
<td>.4</td>
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<tr>
<td>Dentists (D.D.S. or D.D.M.)</td>
<td>1,019</td>
<td>.6</td>
<td>3</td>
<td>.1</td>
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<td>Professional nurses (R.N.)</td>
<td>21,559</td>
<td>13.7</td>
<td>24</td>
<td>.5</td>
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<tr>
<td>Veterinarians (D.V.M.)</td>
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<td>17</td>
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<td>2.2</td>
<td>3</td>
<td>.1</td>
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<td>Technicians</td>
<td>60,232</td>
<td>38.4</td>
<td>920</td>
<td>19.1</td>
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<td>Draftsmen</td>
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<td>Surveyors</td>
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<td>381</td>
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<td>Physical science technicians</td>
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<td>Medical and dental technicians</td>
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<td>126</td>
<td>2.6</td>
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<td>.5</td>
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<td>.3</td>
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Note: Because of rounding of percentages, sums of individual parts may not equal totals or 100.0

1/ Less than 0.05.
<table>
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<th>State</th>
<th>Total</th>
<th>Percent of total employment</th>
<th>Scientists</th>
<th>Engineers</th>
<th>Social workers</th>
<th>Selected health-related professionals</th>
<th>Technicians</th>
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<tr>
<td>Total</td>
<td>156,830</td>
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<td>34,537</td>
<td>9,222</td>
<td>36,153</td>
<td>60,232</td>
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<td>Northeast</td>
<td>36,605</td>
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<td>7,996</td>
<td>2,818</td>
<td>13,374</td>
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<td>261</td>
<td>620</td>
<td>234</td>
<td>604</td>
<td>892</td>
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<td>Maine</td>
<td>1,177</td>
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<td>182</td>
<td>301</td>
<td>92</td>
<td>211</td>
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<td>453</td>
<td>1,303</td>
<td>425</td>
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<td>343</td>
<td>18</td>
<td>160</td>
<td>75</td>
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<td>274</td>
<td>1,077</td>
<td>438</td>
<td>1,164</td>
<td>718</td>
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<td>New York</td>
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<td>10.9</td>
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<td>2,653</td>
<td>1,174</td>
<td>4,938</td>
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<td>805</td>
<td>1,183</td>
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<td>3,616</td>
<td>2,188</td>
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<td>162</td>
<td>248</td>
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<td>Vermont</td>
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<td>79</td>
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<td>Middle West</td>
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<td>8.3</td>
<td>348</td>
<td>624</td>
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<td>632</td>
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<td>Iowa</td>
<td>2,944</td>
<td>16.3</td>
<td>191</td>
<td>321</td>
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<td>340</td>
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<td>427</td>
<td>162</td>
<td>431</td>
<td>1,137</td>
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<td>Michigan</td>
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<td>12.0</td>
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<td>400</td>
<td>821</td>
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<td>543</td>
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<td>859</td>
<td>174</td>
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<td>Nebraska</td>
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<td>North Dakota</td>
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<td>270</td>
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See footnote at end of table
### Table 2.

**Scientists, Engineers, Social Workers, Selected Health-Related Professionals, and Technicians Employed by State Government Agencies, by State, January 1964 -- Continued**

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<th>Social workers</th>
<th>Selected health-related professionals</th>
<th>Technicians</th>
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1/ Excluding employment in State educational institutions.
### Table 3.

**Engineers, by Type of Agency, Occupation, and State, January 1964**

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**Note:**
- The table represents data for engineers by type of agency, occupation, and state as of January 1964.
- The data is categorized into total, civil, sanitary, and other agencies for all agencies, highways and public works, health and welfare, and other agencies.

- **Total:** Sum of all categories.
- **Civil:** Number of civil engineers.
- **Sanitary:** Number of sanitary engineers.
- **Other:** Number of other engineers.

---

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http://fraser.stlouisfed.org/

Federal Reserve Bank of St. Louis
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Scientists in All Agencies, by Occupation and State, January 1964

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Scientists in All Agencies, by Occupation and State, January 1964 -- Continued

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Selected Health Professions in All Agencies, by Occupation and State, January 1964

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Selected Health Professions in All Agencies, by Occupation and State, January 1964 -- Continued

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Table 10.

Scientists, Engineers, Social Workers, Selected Health-Related Professionals, and Technicians

Primarily Engaged in Research, by State, January 1964

<table>
<thead>
<tr>
<th>State</th>
<th>Number engaged in research</th>
<th>Number engaged in research as percent of total number in occupation</th>
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<tr>
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<tr>
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## Table 10.

### Scientists, Engineers, Social Workers, Selected Health-Related Professionals, and Technicians

Primarily Engaged in Research, by State, January 1964 -- Continued

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<tr>
<th>State</th>
<th>All occupations</th>
<th>Scientists</th>
<th>Engineers</th>
<th>Social workers</th>
<th>Selected health related professionals</th>
<th>All occupations</th>
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<th>Social workers</th>
<th>Selected health related professionals</th>
<th>All occupations</th>
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<th>Engineers</th>
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<td>2.2</td>
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</table>
Gentlemen:

The Bureau of Labor Statistics is conducting a survey to provide data on the 1964 employment of scientific and technical personnel by the 50 State governments.

The findings of this survey, together with similar studies of other segments of our economy, will be used in assessing the country's present and future needs for scientists, engineers, technicians, and other selected specialists, and in formulating policies and programs to strengthen our resources of such personnel. We hope the results will also be useful to State governments in evaluating their own scientific manpower needs and policies.

Two labeled questionnaires are enclosed for your use. Please return one in the enclosed envelope, which requires no postage, and retain the other for your files.

We would greatly appreciate your careful attention to the following:

1. It is important that we receive your reply even if your organization does not employ scientists, engineers, technicians, or any of the other specialists indicated on the questionnaire.

2. Where precise information is not available, please make estimates.

We shall be extremely grateful for your very early response—within the next few days, if possible. If you have any questions regarding coverage or the interpretation of the questionnaire, please call Mr. Jack Golomb of our Washington staff (Area Code 202, 961-2465) or write to me.

Sincerely yours,

Ewan Clague
Commissioner

Enclosures
A SURVEY OF SCIENTIFIC AND TECHNICAL PERSONNEL
EMPLOYED BY STATE GOVERNMENTS
1964

Conducted by the
U.S. DEPARTMENT OF LABOR
Bureau of Labor Statistics

All information supplied on this form will be used for statistical purposes only and will not be published in a manner which will disclose information concerning individual agencies without their permission.

If you employ ENGINEERS, SCIENTISTS, SOCIAL WORKERS, persons in any of the SELECTED HEALTH PROFESSIONS listed under item 5.00 on page 2, or TECHNICIANS, please complete the entire questionnaire, supplying as much information as possible. Reasonable estimates will be satisfactory if precise data are not available. PLEASE NOTE—Even if you do not have employees in these occupational categories, please complete this page.

IDErIFICATION OF REPORTING UNIT

REPORTING UNIT
(See definition 1)

This questionnaire should cover the REPORTING UNIT identified at left, unless a special letter is enclosed asking you to omit certain subdivisions.

Please complete and return one copy of this report in the enclosed envelope. The extra copy is for your files.

Terms in HEAVY CAPITALS are defined on Pages 3, 4, and 5. Please read definitions carefully.

1. Total employment, by major occupational group:
   1.00 Enter the TOTAL NUMBER OF PAID EMPLOYEES of the REPORTING UNIT—definition 2; include both full- and part-time employees

   2.00 ENGINEERS—Enter here and on line 2.00, column 2, page 2—(definition 3)

   3.00 SCIENTISTS—Enter here and on line 3.00, column 2, page 2—(definition 6)

   4.00 SOCIAL WORKERS—Enter here and on line 4.00, columns 3, page 2—(definition 18)

   5.00 SELECTED HEALTH PROFESSIONS—Enter here and on line 5.00, column 3, page 2—(definition 19)

   6.00 TECHNICIANS (exclude skilled craftsmen)—Enter here and on line 6.00, columns 5, page 2—(definition 21)

   7.00 All other employees (line 1.00 minus lines 2.00, 3.00, 4.00, 5.00, and 6.00)

IF YOU EMPLOY ANY SCIENTISTS, ENGINEERS, TECHNICIANS, SOCIAL WORKERS, OR PERSONS IN SELECTED HEALTH PROFESSIONS (ENTRIES ON LINES 2.00, 3.00, 4.00, 5.00 AND 6.00), PLEASE COMPLETE THE REMAINDER OF THIS FORM. COMPLETE ONLY THIS PAGE IF ENTRIES ON LINES 2.00, 3.00, 4.00, 5.00 AND 6.00 ARE ALL ZERO

Person to be contacted if questions arise concerning this report:

Name ____________________________ Telephone No. ____________________

Title _____________________________

January 1964
2. OCCUPATION AND FUNCTION. Please enter below the total number of employees in each listed occupation and the number primarily engaged in RESEARCH in January 1964.

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<th>OCCUPATION</th>
<th>TOTAL</th>
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<td>4.00 Total SOCIAL WORKERS — definition 18</td>
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<tr>
<td>2.02 SANITARY (exclude sanitarians—see line 5.07) — definition 5</td>
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<td>4.01 Medical — (see definition 18)</td>
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<td>2.09 Other engineers</td>
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<td>3.00 Total SCIENTISTS — definition 6</td>
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<td>4.09 Other social workers — (see definition 18)</td>
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<td>6.00 Total TECHNICIANS — definition 21</td>
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<td>3.52 Social — (see definition 17)</td>
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<td>6.04 Physical science technicians (working in chemistry, geology, physics, etc.)</td>
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</tr>
<tr>
<td>3.59 Other psychologists — (see definition 17)</td>
<td></td>
<td>6.05 Agricultural technicians</td>
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Please do not enter "0" where applicable.
7.00 Please list major organizational divisions or sections of the **REPORTING UNIT** and give the total number of paid employees in each.

<table>
<thead>
<tr>
<th>Name of sub-unit</th>
<th>Total number of paid employees January 1964</th>
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**NOTE:** We would appreciate receiving copies of pamphlets or other printed material describing the work performed by scientific and technical personnel in the **REPORTING UNIT**.

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**DEFINITIONS**

1. **REPORTING UNIT**—The State government agency or other State unit identified on the front page of this questionnaire. Include all the subdivisions and organizational units within that State agency, except for the exclusions specifically listed in this definition. Exclude State universities and colleges, agricultural experiment stations, agricultural extension services, and hospitals affiliated with State universities. However, include all other State agencies which are located at State colleges and universities.

2. **TOTAL NUMBER OF PAID EMPLOYEES**—All permanent and temporary employees paid by the reporting unit, except for the exclusions specifically listed in this definition. Include employees on State payrolls who work with local and county agencies. All classified, unclassified, and contract employees, exempt employees, laborers, and others paid directly by the reporting unit should be included. Consultants and practitioners (medical doctors, nurses, etc.), whether paid by project, fee, or other basis, should be included only if they were employed full time during the reporting period or if it is known that their part-time employment by the reporting unit was their primary employment. Exclude unpaid personnel, part-time consultants primarily employed elsewhere, and personnel on the payroll of contracting firms.

3. **ENGINEERS**—Count as engineers all persons actually engaged in chemical, civil, electrical, mechanical, metallurgical, and all other types of professional engineering work at a level which requires knowledge of engineering 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. Include engineers in research, planning, inspection, administration, technical writing, and other positions which require them to use the indicated level of knowledge in their work. Exclude personnel trained in engineering but now employed in positions not requiring the use of such training. Include architectural engineers but exclude architects. Also exclude stationary engineers. Draftsmen and engineering aides should be counted in the **TECHNICIANS** category.

4. **CIVIL ENGINEERS**—Count as civil engineers all personnel engaged in architectural, construction, highway, and all other civil engineering specialties, except sanitary engineering, which is reported separately. Include city planners if their work is essentially engineering (per definition 3, above).

5. **SANITARY ENGINEERS**—Count as sanitary engineers those engineers who conceive, design, appraise, direct, and manage engineering works and projects developed, as a whole or in part, for the protection and promotion of the public health, particularly as it relates to the improvement of man's environment. Also, count those engineers who investigate and correct engineering works and other projects that are capable of injury to the public health by being or becoming faulty in conception, design, direction, or management. Examples of areas of work are water supply, treatment, and distribution; collection, treatment, and disposal of community wastes; control of water and atmospheric pollution; milk and food sanitation; housing and institutional sanitation; and prevention of radiation exposure. Do not include sanitarians; they are to be reported on line 5.07.

6. **SCIENTISTS**—Count as scientists all persons actually engaged in scientific work at a level which requires a knowledge of physical, mathematical, statistical, biological, agricultural, social, economic, political, psychological or other sciences equivalent at least to that acquired through completion of a 4-year college course with a major in these fields, regardless of whether they hold a degree in the field. Include scientists in research, planning, inspection, administration, technical service, technical writing, technical drawing and exhibit design, data collection, and all other positions which require them
to use the indicated level of scientific knowledge in their work. Exclude personnel trained in these science fields but now employed in positions not requiring the use of such training. Medical doctors, dentists, veterinarians, and sanitarians should be counted in selected health professions; see definition 19. (See definitions 7 to 17 for specific categories of scientists.)

7. MATHEMATICIANS—Count as mathematicians only those persons whose position requires knowledge of mathematics equivalent at least to that acquired through a 4-year college course with a major in mathematics and who spend the greatest amount of their time in understanding and improving mathematical productivity. These scientists work in such fields as agronomy, animal husbandry, dairy technology, food technology, forestry, horticulture, farm or range management, and soil culture. Veterinarians should be reported in selected health professions (see definition 19).

8. STATISTICIANS—Count as statisticians all persons other than those reported as mathematicians, who are primarily engaged in the recurrent application of statistical techniques which involve the use of mathematical-statistical theory equivalent to that taught at the college level, regardless of type of college degree held. Statistical techniques include the design of surveys or experiments as well as the collection, organization, interpretation, or analysis of numerical data. Such data may represent either complete enumeration or statistical samples. Persons covered in the framework of this definition may be employed in social science fields such as economics, political science, demography, or psychology; in engineering fields; or in physical or life science fields, such as biology, agriculture, pharmacology, or medicine. Do not include statisticians who are engaged solely in the development of mathematical theory associated with the general application of statistical techniques—these persons should be reported in mathematicians. Exclude accountants.

9. STATISTICIANS—Count as statisticians all persons other than those reported as mathematicians, who are primarily engaged in the recurrent application of statistical techniques which involve the use of mathematical-statistical theory equivalent to that taught at the college level, regardless of type of college degree held. Statistical techniques include the design of surveys or experiments as well as the collection, organization, interpretation, or analysis of numerical data. Such data may represent either complete enumeration or statistical samples. Persons covered in the framework of this definition may be employed in social science fields such as economics, political science, demography, or psychology; in engineering fields; or in physical or life science fields, such as biology, agriculture, pharmacology, or medicine. Do not include statisticians who are engaged solely in the development of mathematical theory associated with the general application of statistical techniques—these persons should be reported in mathematicians. Exclude accountants.

10. SOCIAL SCIENTISTS—Count as social scientists all persons actually engaged in social scientific work at a level which requires a knowledge of social, economic, political, or cultural 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. Include anthropologists, archaeologists, criminologists, demographers, economists, historians, penologists, political scientists, sociologists, etc. Include those engaged in research, planning, administration, technical service, technical writing, and all other positions which require them to use the indicated level of knowledge in their work. Exclude accountants (see lines 4.00, 4.01, 4.02, 4.09).

11. ECONOMISTS—Count as economists those social scientists who analyze, forecast, or interpret economic conditions and trends. Their work will normally include the study of economic factors and their interrelationships. Examples of such factors are: employment, taxes, revenues, and wage rates. Exclude accountants.

12. SOCIOLOGISTS—Count as sociologists those social scientists who study the groups which man forms—families, tribes, communities, villages, and states, and a great variety of other organizations which have arisen out of living together. Sociologists study the behavior of these groups, trace their origin and growth, and analyze the influence of group activities on individual members. They may specialize in certain areas of study such as intergroup relations, the effects of urban living, or social organization.

13. PSYCHOLOGISTS—Count as psychologists all persons concerned with the investigation, application, or establishment of principles of human behavior. Clinical psychologists . . . Count as clinical psychologists those psychologists who interview patients, give diagnostic tests, and provide individual and group psychotherapy to maladjusted or disturbed people. Their research functions are concerned with psychotherapy, personality development, and adjustment. These people generally work in mental hospitals or clinics. Social psychologists . . . Count in this category the psychologists employed in the study of the social forces of groups, cultures, and societies that affect individual behavior. Psychologists, all other . . . Include in this category such groups as the comparative (animal), counseling, developmental, educational, experimental, industrial, and physiological psychologists.

14. SOCIAL WORKERS—Count in this category all persons actually working as social workers who either have a master's degree in social work (M.S.W.) or are working at a level requiring knowledge equivalent to that which would be acquired in obtaining the M.S.W. degree. Medical social workers are those providing administration, supervision, and services in hospitals and their outpatient departments, clinics, and health programs; and those administering and providing staff consultation and conducting research with respect to medical and public health social work programs. Psychiatrists.
Social workers are those providing administration, supervision and services in mental hospitals, clinics, mental health demonstration programs, community mental health centers, and mental retardation services and those administering, consulting, and providing staff assistance and conducting research with respect to psychiatric social work and mental health programs. Social workers, all other are those engaged in the provision of social services (excluding medical and psychiatric) in important related agencies such as welfare, education and correction.

19. SELECTED HEALTH PROFESSIONS—Include in this category physicians, dentists, psychiatrists, registered nurses, veterinarians, public health officers, and sanitarians, whether engaged in practice, research, or other activities. Exclude school nurses, practical nurses, auxiliary nursing workers, nursing aides, orderlies and attendants. Please note definition 2, TOTAL NUMBER OF PAID EMPLOYEES, regarding exclusion of certain part-time employees.

20. SANITARIANS—Count as sanitarians persons concerned with health and sanitation standards and regulations and other environmental health programs. Include those persons who plan and supervise the administration of sanitation laws and regulations, develop and conduct sanitation tests, and inspect and investigate sanitation conditions and facilities. Do not include sanitary engineers; they are to be reported on line 2.02.

21. TECHNICIANS—Count as technicians all persons actually engaged in technical work at a level which requires knowledge of engineering, mathematical, medical, dental, biological or other natural sciences comparable to the knowledge acquired through technical institutes, junior colleges, or other formal post-high school training less extensive than 4-year college training, or through equivalent on-the-job training or experience. Some typical job titles are: draftsmen, surveyors, engineering aides, laboratory technicians, and assistants, serology technicians, conservationist aides, electronic technicians, X-ray technicians, and museum technicians. Computer programmers who meet the above definition of technician should be reported on line 6.09 “other technicians.” Exclude personnel whose positions require knowledge or training consistent with definitions for scientists, engineers, and mathematicians. Exclude skilled workers and craftsmen such as electricians, machinists, plumbers, and radio and T.V. repairmen.

22. RESEARCH—Enter in columns 3 and 6 on page 2 the number of persons included in columns 1 and 4 who spend the greatest amount of their time performing or supervising basic and applied investigation in order to advance knowledge in the natural and social sciences, engineering, or the health professions. Include those persons primarily engaged in technical development activities concerned with solving nonroutine problems encountered in applying research findings or other general scientific knowledge to specific projects or processes. Exclude persons who spend the greatest amount of their time in quality control, routine testing, routine gathering of statistics, or other nontechnical activities or technical services. Include those social scientists who spend the greatest amount of their time in analyzing and testing data.