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# Occupational Projections and Training Data

## 1984 Edition



A Statistical and Research Supplement to the 1984-85 Occupational Outlook Handbook

U.S. Department of Labor  
Bureau of Labor Statistics  
May 1984

Bulletin 2206



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# A Guide to Using This Book

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To find out:

how the Nation's work force and economy are likely to shape up through the mid-1990's;

which occupations will grow the fastest, which will decline, and which will provide the greatest number of new jobs; and

how significant are replacement needs and which occupations have the highest and lowest turnover rates . . . . .

read *Tomorrow's Jobs*, starting on page I.

To locate:

statistics for detailed occupations on—

- 1982 and projected 1995 employment
- growth
- industry concentration
- demographic characteristics
- part-time employment
- unemployment rate
- replacement rate
- training completions

and descriptions of—

- usual entry level requirements
- characteristics of entrants . . . . .

read the *Employment and Supply Profiles*, starting on page II.

To locate the profile for a specific occupation

see Contents, page V–VIII. The occupations are grouped the same way as in the 1984–85 *Occupational Outlook Handbook*—that is, according to the *Standard Occupational Classification Manual*, 1980 Edition.

If you want to learn more about how the projections of occupational employment are developed . . . . .

read the brief description of the assumptions and methods used, starting on page 75.

If you need career information for specific States . . . . .

refer to the list of State employment security agencies beginning on page 113.

To learn about sources of BLS occupational earnings data . . . . .

see ad on page 116.

To learn about companion publications . . .

see inside back cover.

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A Statistical and Research Supplement  
to the 1984-85 Occupational Outlook Handbook

U.S. Department of Labor  
Raymond J. Donovan, Secretary

Bureau of Labor Statistics  
Janet L. Norwood, Commissioner

May 1984

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# Preface

This statistical and research supplement to the 1984–85 *Occupational Outlook Handbook* presents detailed, comprehensive statistics on current and projected occupational employment; replacement needs, education, and training program completions; and a variety of other data that should be valuable to training officials, education planners, vocational and employment counselors, jobseekers, and others interested in occupational information. It is the seventh in a series dating to 1971 that presents the statistics and technical data underlying the information developed in the Bureau's occupational outlook program; since 1974, *Occupational Projections and Training Data* has been published biennially as a companion to the *Handbook*.

Chapter 1 gives a broad overview of expected trends through the mid-1990's in the population and labor force, and for major industry groups and occupational clusters. Chapter 2 provides a variety of employment and training data for virtually all occupations covered in the *Handbook*. It also presents descriptive information on usual entry require-

ments and the characteristics of entrants. Appendixes include an explanation of the assumptions and methods used in preparing employment projections, statistics on projected employment for about 700 occupations with employment of 5,000 or more, detailed information on education and training program completions, and a list of State employment security agencies.

This bulletin was prepared in the Division of Occupational Outlook under the direction of Michael Pilot and Neal Rosenthal. Patrick Wash supervised its preparation. Alan Eck prepared the material on occupational movements and replacement needs. Thomas Nardone prepared the information on broad occupational trends. Douglas Braddock, Conley Hall Dillon, Jr., Lawrence C. Drake, Jr., and Jon Q. Sargent prepared the employment and training profiles and assembled the detailed training data. Paul Evans helped compile the employment data. Word processing was handled by Vidella H. Hubbard, Brenda A. Marshall, Marilyn Queen, and Beverly A. Williams.

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Comments about the contents of this publication and suggestions for improving it are welcome. Please address them to Chief, Division of Occupational Outlook, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C. 20212.

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# Chapter 1. Tomorrow's Jobs

The number and kinds of jobs needed in tomorrow's economy will depend on the interplay of demographic, economic, social, and technological factors. Some occupations will grow much faster than the average rate of growth in employment; others will decline in importance. Some jobs will emerge as a result of new technologies; others will disappear. And the nature of the work in most occupations will surely undergo change.

This chapter presents information developed by the Bureau of Labor Statistics on the expected changes in the population, the labor force, and employment in major industrial sectors and occupational clusters. It also discusses the importance of replacement needs in the employment outlook.

## Population

Changes in population are among the basic factors that will alter employment opportunities. Changes in the size and characteristics of the population affect the amount and types of goods and services demanded. They also affect the size and characteristics of the labor force—the people who are working or are looking for work—which in turn can influence the competition for jobs in an occupation. Three important population factors are population growth, shifts in the age structure of the population, and movement of the population within the country.

**Growth.** The population of the United States has increased throughout this century. However, the rate of growth was declining until the "baby boom" of the 1950's. During the late 1960's, the rate of population growth began to drop sharply and has remained at a low level since (chart 1).

In 1982, the population was about 232 million. It is expected to increase to about 260 million by 1995. The rate of growth will be faster during the 1980's (0.9 percent a year) than during the early 1990's (0.8 percent a year). Continued population growth will mean more consumers to provide with goods and services, and thus a greater demand for workers in many industries and occupations.

**Age structure.** Over time, the age structure of the population changes, which affects the job market in many ways. The low population growth of the 1960's and 1970's, for example, resulted in fewer school-age children in the 1970's, which lowered the demand for educational services and the employment opportunities in teaching. Also during the 1970's, the entrance into the labor force of the large number of people born during the 1950's increased competition for entry level jobs.

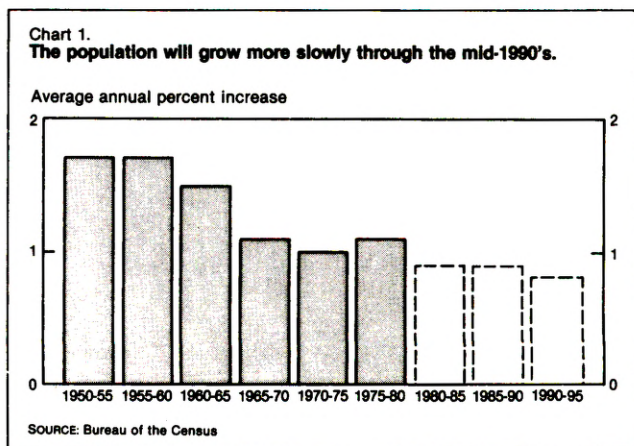
The age structure of the population will continue to shift through the mid-1990's. The number of children under 13 will increase as the large number of people born during the 1950's continue to have children of their own. As the baby-boom group ages, the number of people age 35 to 54 will increase. The number of people 65 and older will rise sharply because of the relatively high population growth before the 1930's and increases in life expectancy. Low rates of population growth during the 1930's and 1970's will result in a decline by 1995 in the number of 55- to 64-year-olds and 14- to 25-year-olds.

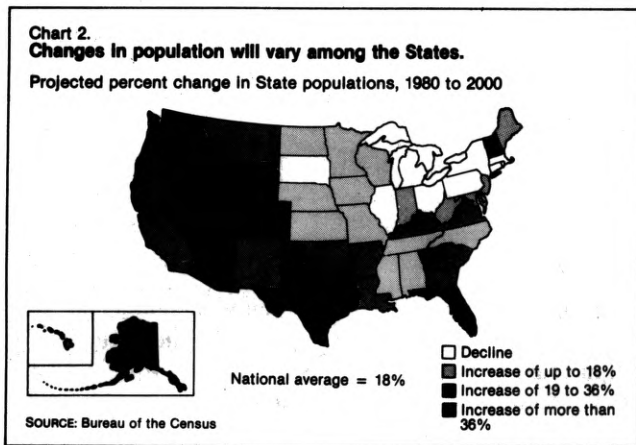
The growing number of children will cause greater demand for elementary school education during the 1980's and secondary school education during the early 1990's. The growing number of older people will add to the demand for health services.

**Movement of population.** Population growth varies among the regions of the Nation. For example, between 1970 and 1980, the population of the Northeast and North Central regions increased by only 0.2 percent and 4.0 percent, respectively, compared with 20.0 percent in the South and 23.9 percent in the West. These patterns reflect the movement of people to find new jobs, to retire, or for other reasons. Chart 2 shows the expected changes in State populations between 1980 and 2000 if these trends continue.

The West will continue to be the fastest growing region, increasing about 45 percent between 1980 and 2000. The South, with the largest absolute increase, will grow about 31 percent.

The North Central region is expected to increase only about 2 percent between 1980 and 1990, and to decline about 1 percent from 1990 to 2000. The population of the





Northeast region will decline about 6 percent. By the year 2000, the West and the South will have about 60 percent of the Nation's population compared to about 52 percent in 1980.

Geographic shifts in the population alter the demand for and supply of workers in local job markets. In areas with a growing population, demand for public services and construction is likely to increase. At the same time, more people looking for work in an area could increase competition for jobs. Therefore, local employment opportunities in an occupation could differ greatly from national projections.

**Labor force**

The size and characteristics of the labor force determine the number and type of people competing for jobs. In addition, the size of the labor force affects the amount of goods and services that can be produced. Growth, alterations in the age structure, and rising educational levels are among the labor force changes that will affect employment opportunities through the mid-1990's.

*Growth.* In 1982, the civilian labor force—people with jobs and people looking for jobs—totaled about 110 million. The labor force will grow through the mid-1990's, but at a slower rate than in the 1960's and 1970's (chart 3). By 1995, the labor force is projected to be about 131 million—an increase of about 19 percent from the 1982 level.

Through the mid-1990's, the chief cause of labor force growth will be the continued though slower rise in the number and proportion of women who seek jobs. Women will account for nearly two-thirds of the labor force growth during 1982–95 (chart 4). Growth will be slower than in the 1960's and 1970's because the low birth rates during those years will result in fewer young people entering the labor force.

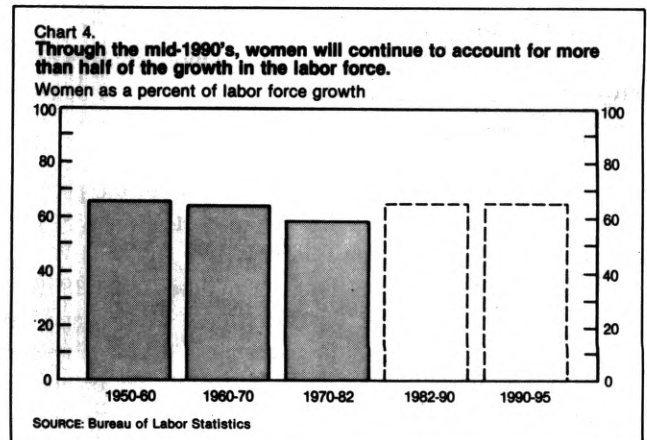
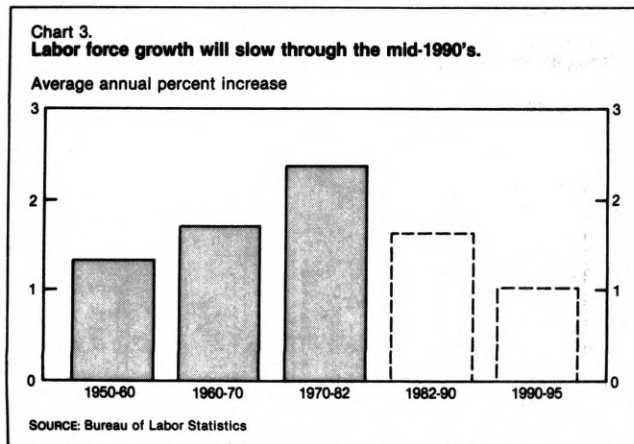
*Age structure.* Through the mid-1990's, the number of people age 16 to 24 in the work force is projected to decline (chart 5). Fewer young entrants into the labor force may ease competition for entry level jobs. In fact, employers may have increasing difficulty in finding young workers. The decline in the number of young workers could be particularly important to the Armed Forces—the single largest employer of men in this age group.

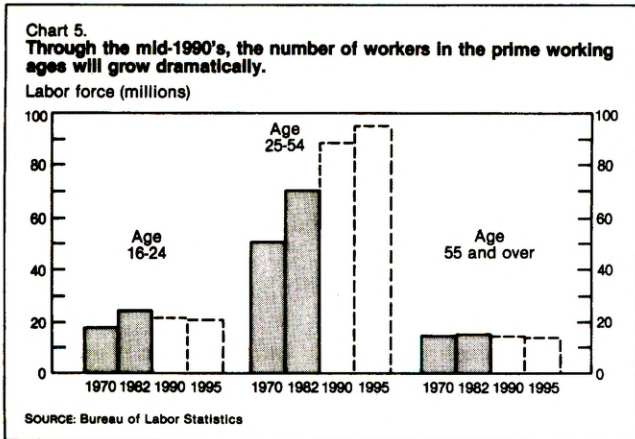
The number of people age 25 to 54 in the labor force is expected to increase from less than two-thirds of the labor force in 1982 to nearly three-fourths by 1995. The growing proportion of workers age 25 to 54 could result in higher productivity growth during this period than in the 1970's, since workers in this age group generally have work experience and tend to be more productive.

The number of people age 55 and over in the labor force is projected to decline slightly, reflecting the trend to early retirement and the drop in the number of people age 55 to 65.

*Education.* Employers seek to hire the best qualified persons available. This does not mean that they always choose those applicants who have the most education. However, individuals planning for a career should be aware of the continuing rise in the educational attainment of the work force. Between 1970 and 1982, for example, the proportion of the labor force age 18 to 64 with at least 1 year of college increased from 26 to 39 percent (chart 6). The increase in educational attainment reflects both the retirement of older workers, many of whom had little formal education, and the influx into the work force of young people who generally have a high level of formal education.

The disadvantage that less educated workers suffer when





seeking jobs is clearly shown in their unemployment rate. In 1982, the unemployment rate among 20- to 24-year-olds with less than 4 years of high school was 32.2 percent compared with 15.5 percent for those with 4 years of high school. The rates for those with 1 to 3 years of college and 4 or more years of college were only 9.6 and 5.6 percent, respectively. The association of higher unemployment rates with low levels of education shows the importance of education in a job market that increasingly requires more training.

It is also important to note that a college degree no longer guarantees success in the job market. Between 1970 and 1982, employment of college graduates more than doubled. The proportion employed in professional, technical, and managerial occupations, however, declined because these occupations did not expand rapidly enough to absorb the growing supply of graduates. As a result, 1 out of 5 college graduates who entered the labor market between 1970 and 1982 took jobs not usually requiring a degree. This oversupply of graduates is likely to continue through the mid-1990's. Not all occupations requiring a college degree will be overcrowded, however. Good opportunities will exist for systems analysts and engineers, for example.

Despite widespread publicity about the poor job market for college graduates, a college degree is still needed for most high-paying and high-status jobs. Persons interested in occupations that require a college degree should not be discouraged from pursuing a career that they believe matches their interests and abilities, but they should be aware of job market conditions.

## Employment

The number of jobs in particular industries and occupations depends in large part on the consumer, government, and business demand for goods and services produced by those industries and workers. In a simple example, there would be fewer jobs for barbers and cosmetologists if people chose to have their hair cut less often. However, because of the complexity of the economy, the connection between demand and employment generally is not simple, and a single change in demand can have far-reaching consequences.

Consumer desire and government regulation, for example,

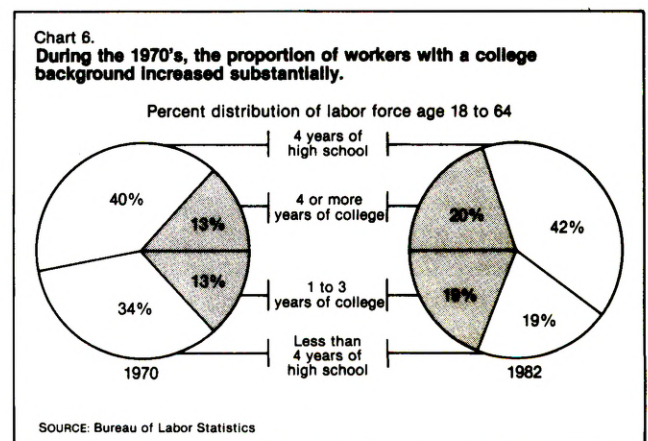
led automobile manufacturers to improve the fuel efficiency of cars. To do this, auto manufacturers lightened the weight of cars by using plastic, aluminum, and specialty steel instead of standard iron and steel. This shift lowered the demand for goods from the iron and steel manufacturing industry, for the products of the iron and coal mining industries, and for products of other industries that supply iron and steel manufacturers. Employment in those industries was adversely affected. At the same time, demand increased for plastic, aluminum, and specialty steel and for products of the industries that supply those manufacturers. Employment in those industries benefited from the change.

Expansion or decline in industries has varying effects on individual occupations because industries employ different mixes of workers (chart 7). Growth of the construction industry, for example, would increase employment of craft workers, operatives, and laborers. In contrast, growth in the finance, insurance, and real estate industries would increase employment of professional, managerial, sales, and clerical workers.

Changes in the manner in which goods are produced and services are provided also affect occupational and industrial employment. For example, as an industry automates production, the mix of workers is likely to change which, in turn, will have different effects on occupational employment growth.

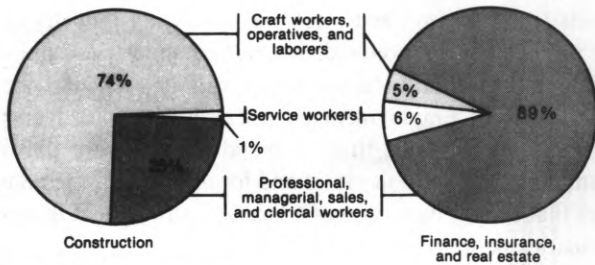
Technological change is expected to affect employment in many industries and occupations through the mid-1990's. The increasing use of automated machinery, for example, is one of the factors expected to limit employment growth in automobile manufacturing. The increasing use of word processing equipment will limit the employment of typists. Even as technology advances, however, employment should continue to increase in most industries and occupations during the 1980's and early 1990's—in fact, some of the increases are a direct result of technological change.

Other factors affecting employment are the fiscal policies of the Federal Government, the monetary policies of the Federal Reserve Board, the level of imports, and the availability of energy. Using information on these and other factors, the Bureau of Labor Statistics has prepared three



**Chart 7.**  
Industries differ substantially in the kinds of workers they employ.

Percent distribution of wage and salary workers, 1982



SOURCE: Bureau of Labor Statistics

sets of projections of employment in industries and occupations. Referred to as the low-, moderate-, and high-trend alternatives, the projections are based on different assumptions concerning growth of the labor force, unemployment, monetary and fiscal policy, and other factors. Each alternative provides a different set of employment estimates in 1995.

None of the three projections should be favored as the most likely. The intent in preparing them was not to forecast future economic performance but, rather, to examine the implications of a reasonable range of demand growth over the projection period. The projections represent only three of many possible responses of the economy to differing fiscal and monetary stimuli. A different perspective on the inner workings of the U.S. aggregate economy could easily lead to completely different results. For this reason, the high- and low-growth alternatives should not be viewed as the “good” and “bad” forecasts but rather as vehicles for presenting a range of growth in gross national product (GNP) and employment to 1995.

Differences in occupational projections among the three alternatives should not be considered as the potential range within which the projections are likely to fall because the range for most occupations is much wider than that shown. The majority of occupations are sensitive to a wide variety of assumptions and economic factors and all of these could not be considered in the three scenarios.

The development of projections is not a precise statistical process. Despite the use of sophisticated economic models and data carefully developed by statistical techniques, the future cannot be precisely predicted. Too many factors can alter economic activity over the 1982–95 period to assure that the projections provide an exact picture of the future.

Some aspects of the development of these projections are more subjective than others. For example, in projecting occupational staffing patterns for automobile manufacturing, judgments had to be made about the use of robots during 1982–95. At this early stage in the development and use of robots in automobile manufacturing, such judgments will vary considerably among analysts.

The assumptions and methods used to develop these alternative projections are discussed in appendix A. The occupational employment projections from the three alternatives are presented in appendix B.

For ease of presentation, the discussions of projections and outlook information in this chapter focus on the moderate-growth alternative, which assumes a period of recovery from the 1981–82 recession followed by stable economic growth through the mid-1990’s.

## Industrial profile

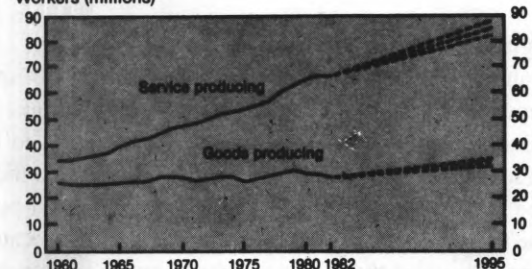
To discuss employment trends and projections in industries, it is useful to divide the economy into nine industrial sectors under two broad groups—service-producing industries and goods-producing industries. In 1982, about 7 of every 10 jobs were in industries that provide services such as health care, trade, education, repair and maintenance, government, transportation, banking, and insurance. Industries that produce goods through farming, construction, mining, and manufacturing accounted for fewer than 3 out of every 10 jobs in the Nation.

*Service-producing industries.* Employment in service-producing industries has been increasing at a faster rate than employment in goods-producing industries (chart 8). Among the factors that have contributed to this rapid growth are rising incomes and living standards that result in greater demand for health care, entertainment, and business and financial services. In addition, the growth of cities and suburbs has brought a need for more local government services. Further, because many services involve personal contact, relatively fewer people have been replaced by machines in service-producing industries.

Through the mid-1990’s, employment is expected to continue to increase faster in service-producing industries than in goods-producing industries. In fact, service-producing industries are projected to account for about 75 percent of all new jobs between 1982 and 1995. Employment in these industries is expected to increase from 66.5 million in 1982 to 86.2 million in 1995, or 30 percent. Growth will vary

**Chart 8.**  
Industries providing services will continue to employ an increasing proportion of the work force.

Workers (millions)<sup>1</sup>



<sup>1</sup>Wage and salary workers, except for agriculture, which includes self-employed and unpaid family workers

NOTE: Dashed lines represent low, moderate, and high projections  
SOURCE: Bureau of Labor Statistics

among industries within the group (chart 9).

*Transportation, communications, and public utilities* was the slowest growing sector of the service-producing industries during the 1970's and early 1980's. Rising employment in trucking and warehousing, and in air transportation, was offset by declining employment in railroads and slow growth in other industries in the sector. Even in the communications industries, where demand increased greatly, technological innovations limited employment growth.

Between 1982 and 1995, employment in transportation, communications, and public utilities is expected to rise from 5.7 to 6.9 million, or 21 percent. Rising demand for new telecommunications services resulting from the increased use of computer systems and the divestiture of the telephone company will make communications the most rapidly growing industry in the sector. Employment in communications industries is projected to grow 40 percent, from 1.4 to 1.9 million. More efficient communications equipment, however, will keep employment from rising as rapidly as output.

Although employment in railroads and water transportation is expected to decline, other transportation industries such as air, local transit, and trucking are expected to increase. Employment in transportation as a whole should rise 12 percent, from 3.5 million to 3.9 million.

Demand for electric power, gas utilities, and water and sanitary services will increase through the mid-1990's as population and industry grow. Employment in industries that deliver these services is expected to increase from 868,000 to 1.1 million, or 25 percent.

*Wholesale and retail trade* employment has increased as the population has grown and as rising incomes have enabled people to buy a greater number and variety of goods. During the 1970's and early 1980's, employment in trade increased at about the same rate as in service-producing industries as a whole. Between 1982 and 1995, wholesale and retail trade employment is expected to grow from 20.6 to 26.8 million, or 31 percent. Employment will increase faster in retail than in wholesale trade, 33 percent compared with 22 percent. Employment will rise despite the use of

laborsaving innovations such as self-service merchandising and computerized inventory systems.

The largest number of new jobs in the trade sector is projected to be in eating and drinking places. Other retail firms expected to have large increases are department stores, grocery stores, and new car dealerships. In wholesale trade, the largest increases will be in machinery, motor vehicles, and electrical goods.

*Finance, insurance, and real estate* grew faster than any other service-producing sector during the 1970's and early 1980's as these industries expanded to meet the financial and banking needs of the population.

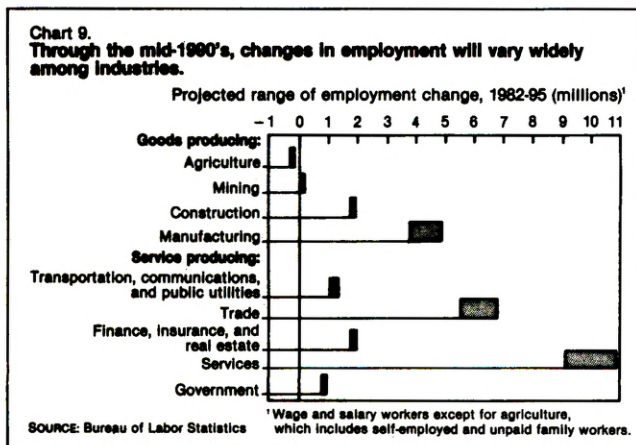
Between 1982 and 1995, employment in this sector is expected to rise from 5.4 to 7.2 million, or 34 percent. Demand for credit and other financial services is expected to grow rapidly, but automatic teller machines and computerized banking and stock transactions will prevent employment from growing as fast as output. However, large increases in employment are expected in banks, savings and loan associations, security brokerages, and real estate firms.

*Services* includes a variety of industries, such as hotels, barber shops, automobile repair shops, hospitals, engineering firms, schools, and nonprofit organizations. During the 1970's and early 1980's, employment in this sector increased faster than in service-producing industries as a whole. Sharply rising demands for health care, data processing, and engineering and legal services were among the forces behind this growth.

From 1982 to 1995, employment in service industries is expected to increase from 27.5 to 37.2 million, or 36 percent. These industries will provide more new jobs than any other industry sector. Business services, including data processing, personnel supply, and commercial cleaning, are expected to grow more rapidly than other industries in the sector. Employment in health services also is expected to increase substantially. Efforts to control rising health costs, however, could sharply lower the projected employment growth in health services. Large increases in employment also are expected in engineering, legal, social, and accounting services.

*Government* services were in increasing demand during the 1970's and early 1980's. Growth in services such as health and welfare services and police and fire protection caused employment in the government sector to rise, although at a slower rate than for service-producing industries as a whole. Employment increased more in State and local governments than in the Federal Government. Between 1982 and 1995, as a result of public desire to limit government growth, employment in government is expected to rise by only 8 percent, from 7.5 to 8 million.

*Goods-producing industries.* Employment in these indus-



tries increased during the 1970's, but the 1980 and 1981–82 recessions caused a drop in construction and manufacturing employment that offset most of the earlier growth. Between 1982 and 1995, employment in goods-producing industries is expected to increase from 27.1 to 33 million—about 22 percent. Some of the increase reflects the rebounding of employment in manufacturing and construction to prerecession levels. Employment growth is expected to vary significantly among goods-producing industries (chart 9).

Employment in *agriculture* has declined while farm output has increased through the use of more and better machinery, fertilizers, feeds, pesticides, and hybrid plants. Domestic demand for food will increase slowly through the mid-1990's. Worldwide demand for food will increase because of population growth, and U.S. food exports will increase through the next decade. Farm productivity, however, will continue to improve—although more slowly than in the past—and employment is expected to decline even as production rises. Between 1982 and 1995, agriculture employment is projected to drop from 3.2 to 3 million jobs, or 7 percent.

Employment in *mining* increased faster than any other sector during the 1970's and early 1980's. Nearly all of this growth occurred in coal mining and oil and gas drilling.

Through the mid-1990's, employment growth in the mining sector will slow dramatically. Between 1982 and 1995, employment is expected to grow from 1.1 to 1.2 million, or 7 percent. The continued importance of coal as an energy source will lead to higher employment in that industry. Employment in oil and gas extraction, however, is expected to decline as domestic production levels off. Other mining industries are expected to attain their prerecession levels but have little long-run growth because of lower demand and improved mining technology.

Employment in *construction* dropped by 550,000 between 1979 and 1982 as high interest rates and low economic activity limited new construction, especially housing. Despite several economic slumps, employment had increased during the 1970's.

As the economic recovery continues, employment in construction is expected to rise to prerecession levels and continue to grow. Between 1982 and 1995, employment in the construction sector is expected to increase from 3.9 to 5.8 million, or 48 percent. Through the late 1980's, the demand for housing is expected to be strong as the number of households continues to increase. During the early 1990's, the growth in households will slow and possibly limit the demand for new housing. Business expansion and maintenance of existing buildings will lead to higher construction activity through 1995.

*Manufacturing* employment dropped between 1979 and 1982 as a result of the recession, following a slight increase during the 1970's. As the economy recovers, overall manu-

facturing employment is expected to increase. By 1995, employment is projected to reach 23.1 million, about 23 percent higher than the 1982 level of 18.8 million. Much of the growth will occur in the mid-1980's as employment rebounds to prerecession levels. However, several key manufacturing industries, such as automobile and steel manufacturing, are not expected to reach previous peak employment levels. A turnaround in demand is expected to boost production in these industries, but foreign competition, productivity improvements, and technological change will limit employment requirements.

Manufacturing is divided into two broad categories—durable and nondurable goods manufacturing. Employment in durable goods manufacturing is expected to increase 29 percent as rising business investment and consumer demand lead to higher demand for computers, machinery, and electronic components. Employment in nondurable goods manufacturing is projected to increase more slowly, by 14 percent, since consumers tend to spend relatively less of their budget on staples such as food and clothing as their income rises.

### Occupational profile

This section gives an overview of the changes expected in employment for 16 broad groups of occupations. These groups are based on the Standard Occupational Classification, which has been adopted as the classification system for all Government agencies that collect occupational employment data.

The economy is expected to generate 25.6 million additional jobs between 1982 and 1995. Forty occupations are expected to account for about one-half of this projected job growth (table 1). In general, these occupations are numerically large—all had more than 250,000 workers in 1982. Occupations that require extensive training are not found to any greater extent in table 1 than are those requiring little formal training. Only one-fourth of the occupations generally require a college degree. Several occupations—for example, trades helpers, blue-collar worker supervisors, and carpenters—are on the list only because the 1980 and 1981–82 recessions caused employment to drop sharply from 1979 to 1982. Thus, growth in these occupations reflects recovery to prerecession levels.

The occupations with the highest growth rates between 1982 and 1995 are shown in table 2. The list is dominated by occupations that are tied to expanding industries and which have been among the fastest growing in the economy for the past decade. Almost half of the 20 occupations in the list are either in the computer or health fields. For some occupations, the high growth rates reflect recovery from the recession. Note also that the fastest growing occupations generally are not found on the list of occupations that will add the most jobs over the period.

Occupations expected to decline over the period generally are concentrated in industries that are contracting or severely affected by technological change (table 3). For example, railroad conductors are employed exclusively in a declining industry, while data entry operators are affected



**Table 1. Forty occupations with largest job growth, 1982-95**

Occupation	Change in total employment (in thousands)	Percent of total job growth	Percent change
Building custodians	779	3.0	27.5
Cashiers	744	2.9	47.4
Secretaries	719	2.8	29.5
General clerks, office	696	2.7	29.6
Salesclerks	685	2.7	23.5
Nurses, registered	642	2.5	48.9
Waiters and waitresses	562	2.2	33.8
Teachers, kindergarten and elementary	511	2.0	37.4
Truckdrivers	425	1.7	26.5
Nursing aides and orderlies	423	1.7	34.8
Sales representatives, technical	386	1.5	29.3
Accountants and auditors	344	1.3	40.2
Automotive mechanics	324	1.3	38.3
Supervisors of blue-collar workers	319	1.2	26.6
Kitchen helpers	305	1.2	35.9
Guards and doorkeepers	300	1.2	47.3
Food preparation and service workers, fast food restaurants	297	1.2	36.7
Managers, store	292	1.1	30.1
Carpenters	247	1.0	28.6
Electrical and electronic technicians	222	.9	60.7
Licensed practical nurses	220	.9	37.1
Computer systems analysts	217	.8	85.3
Electrical engineers	209	.8	65.3
Computer programmers	205	.8	76.9
Maintenance repairers, general utility	193	.8	27.8
Helpers, trades	190	.7	31.2
Receptionists	189	.7	48.8
Electricians	173	.7	31.8
Physicians	163	.7	34.0
Clerical supervisors	162	.6	34.6
Computer operators	160	.6	75.8
Sales representatives, nontechnical	160	.6	27.4
Lawyers	159	.6	34.3
Stock clerks, stockroom and warehouse	156	.6	18.8
Typists	155	.6	15.7
Delivery and route workers	153	.6	19.2
Bookkeepers, hand	152	.6	15.9
Cooks, restaurants	149	.6	42.3
Bank tellers	142	.6	30.0
Cooks, short order, specialty and fast food	141	.6	32.2

Note: Includes only detailed occupations with 1982 employment of 25,000 or more. Data for 1995 are based on moderate-trend projections.

by technological change.

In the following discussion, the employment growth rates of individual occupations usually are compared to the national average for all occupations. The six phrases which describe employment growth are explained in the box on page 11.

*Administrative and managerial occupations.* Workers in these occupations direct and control the activities of businesses, government agencies, and other organizations, or provide technical support to workers who do. In most of these occupations, employment is expected to increase about as fast as the average for all occupations. Although managers and administrators are employed throughout the economy, differences in industry growth will result in differences in the rates of employment growth for managers and administrators. For example, employment of managers in the health industry is expected to increase much faster than the average. Employment of managers also should grow as fast or faster than the average in electronic components manufacturing, data processing services, credit and securities firms, automotive repairs, and social services. In contrast, managerial

employment in government and educational services is likely to grow more slowly than the average due to the anticipated modest growth of these industries.

Because of the increasing number of people seeking managerial and administrative jobs and the increasing technical requirements in many of these occupations, experience, specialized training, or postbaccalaureate study will be needed for many managerial jobs. Familiarity with computers also will be helpful as managers and administrators increasingly rely on computerized information systems to direct their organizations.

*Engineers, scientists, and related occupations.* Workers in these occupations design buildings, machinery, products, and systems; conduct research; and perform related activities. Employment in many occupations in this group is expected to increase faster than the average; in several—electronics engineers, mechanical engineers, and systems analysts—it will increase much faster than the average.

Increased military expenditures, growing demand for computers and other electronics equipment, expansion and automation of industrial production, and development of energy sources are some of the factors expected to lead to higher employment in engineering occupations. The growing application of computers in business and research will contribute to increased employment of systems analysts. Research to expand basic knowledge, develop new technologies and products, and protect the environment is expected to lead to higher employment in many scientific and engineering occupations. However, if the rate of economic growth and the research and development levels differ from those assumed, the job outlook in many of these occupations would be altered. Competition in some smaller occupations that depend on Government funding, such as astronomers, will continue to be keen.

*Social science, social service, and related occupations.* In these occupations, workers provide direct social services

**Table 2. Twenty fastest growing occupations, 1982-95**

Occupation	Percent growth in employment
Computer service technicians	96.8
Legal assistants	94.3
Computer systems analysts	85.3
Computer programmers	76.9
Computer operators	75.8
Office machine repairers	71.7
Physical therapy assistants	67.8
Electrical engineers	65.3
Civil engineering technicians	63.9
Peripheral EDP equipment operators	63.5
Insurance clerks, medical	62.2
Electrical and electronic technicians	60.7
Occupational therapists	59.8
Surveyor helpers	58.6
Credit clerks, banking and insurance	54.1
Physical therapists	53.6
Employment interviewers	52.5
Mechanical engineers	52.1
Mechanical engineering technicians	51.6
Compression and injection mold machine operators, plastics	50.3

Note: Includes only detailed occupations with 1982 employment of 25,000 or more. Data for 1995 are based on moderate-trend projections.

and conduct applied research into the behavior of individuals, groups, and society at large. Employment in many of these occupations is expected to grow about as fast as the average. However, due to the number of people interested in these fields, competition for jobs is expected in many social science occupations—especially for academic positions. Generally, prospects will be better for social scientists with advanced degrees who seek work in applied fields.

Competition also is likely for jobs as social and recreation workers in public and voluntary agencies as well as for salaried positions for lawyers.

*Teachers, librarians, and counselors.* These workers help people learn, acquire information, or gain insight into themselves. Because of anticipated enrollment declines and an abundance of qualified jobseekers, keen competition is expected for jobs in college and university teaching, as librarians, in counseling, and, through 1990, in secondary school teaching. Staff cutbacks in school systems and social service agencies will intensify competition for these jobs.

As school enrollments increase after 1985, job prospects for elementary school teachers are expected to be more favorable than in recent years. Prospects in secondary schools may improve in the early 1990's, as enrollments begin to increase. Teachers and librarians generally will face better job prospects in scientific and technical fields.

*Health-related occupations.* This group includes health practitioners, nurses, health technicians and technologists, health service workers, dietitians, pharmacists, and therapists. These workers care for the sick, help the disabled, and advise individuals and communities on ways of maintaining and improving their health.

Employment in most health occupations is expected to grow faster than average as population growth—especially in the number of older people—increases the demand for health care. Registered nurses, nursing aides, and orderlies, because of their number and anticipated growth, will be

among the occupations providing the most new jobs through the mid-1990's. Despite the anticipated growth in the health industry, physicians, dentists, chiropractors, and veterinarians seeking to establish practices can expect unprecedented competition due to the large number of newly trained practitioners entering those fields each year.

These projections are based on the assumption that health care expenditures will continue to increase rapidly. However, current efforts to control health costs could substantially change reimbursement procedures and, thereby, directly affect the economic incentives of suppliers of health care. Such changes could cause employment to be lower than the level projected in many health occupations. In some, such as health record technicians, new procedures could lead to more growth than currently projected.

*Writers, artists, and entertainers.* This group includes reporters, writers, designers, public relations specialists, and performing artists. In most of these occupations, employment is expected to increase as fast as the average for all occupations. The continued importance of advertising, public relations, print and broadcast communications, and entertainment will spur employment growth.

Stiff competition for these jobs is likely, due to the large numbers of people they attract. Talent and personal drive will continue to play an extremely important role in succeeding. Within individual occupations, some areas will offer better job prospects. The best prospects for writers and editors, for example, will be in technical writing and in preparing business and trade publications.

*Technologists and technicians.* Workers in this group assist engineers, scientists, and other professionals as well as operate and program technical equipment independently. The continued growth in the importance of technology to national defense, office work, manufacturing, and other activities is expected to cause much faster than average employment growth for several occupations in this group, such as legal assistants, programmers, and electrical and electronics technicians.

Growth in some occupations will be limited by changes in technology. Little or no change is expected for drafters because of the increasing use of computer-aided design equipment. Similarly, little or no change is expected for air traffic controllers because of the automation of air traffic control equipment.

*Marketing and sales occupations.* Workers in this group sell goods and services. Employment of travel agents, security sales workers, real estate agents, and wholesale trade sales workers is expected to grow faster than the average due to the anticipated growth of the industries in which these workers are employed.

A large number of part-time and full-time job openings are expected for cashiers and retail trade sales workers due to their number, high turnover, and anticipated employment

**Table 3. Twenty most rapidly declining occupations, 1982-95**

Occupation	Percent decline in employment
Railroad conductors	-32.0
Shoemaking machine operatives	-30.2
Aircraft structure assemblers	-21.0
Central telephone office operators	-20.0
Taxi drivers	-18.9
Postal clerks	-17.9
Private household workers	-16.9
Farm laborers	-15.9
College and university faculty	-15.0
Roustabouts	-14.4
Postmasters and mail superintendents	-13.8
Rotary drill operator helpers	-11.6
Graduate assistants	-11.2
Data entry operators	-10.6
Railroad brake operators	-9.8
Fallers and buckers	-8.7
Stenographers	-7.4
Farm owners and tenants	-7.3
Typesetters and compositors	-7.3
Butchers and meatcutters	-6.3

NOTE: Includes only detailed occupations with 1982 employment of 25,000 or more. Data for 1995 are based on moderate-trend projections.

growth. Higher paying sales occupations, such as insurance agent and real estate agent, tend to be more competitive than retail sales occupations. Well-trained and ambitious people who enjoy selling will have the best chance for economic success.

*Administrative support occupations, including clerical.* Workers in this group prepare and record letters and other documents; collect accounts; gather and distribute information; operate office machines; and handle other tasks that help run businesses, government agencies, and other organizations. Some administrative support occupations, such as computer and peripheral equipment operators, are expected to grow much faster than the average due to the increased use of computer systems.

The increase in office automation systems, on the other hand, will limit employment opportunities in some administrative support occupations. Changes in organizational practices also will affect some of these occupations. Despite a growing volume of mail, little change is expected for mail carriers because of improved routing programs and more centralized mail delivery. Several occupations in this group will provide many full- and part-time job openings due to their large size and high turnover. These include bank tellers, bookkeepers and accounting clerks, secretaries, shipping and receiving clerks, and typists.

*Service occupations.* This group includes a wide range of workers in protective, food and beverage preparation, cleaning, and personal services. Among the protective service occupations, guards are expected to have faster than average growth because of increased concern over crime and vandalism. However, the anticipated slow growth of local government spending is expected to result in slower than average employment growth for police officers and firefighters.

Rising incomes, increased leisure, and the growing number of men and women who combine family responsibilities and a job are expected to contribute to faster than average employment growth among food and beverage preparation and service occupations. Due to the large size, high turnover, and growth of many food service occupations, such as bartenders and waiters/waitresses, full- and part-time job openings will be plentiful.

*Agricultural and forestry occupations.* Workers in these occupations produce the raw materials for food, clothing, and shelter. Demand for food, fiber, and wood is expected to increase as the world population grows. The development and use of more productive farming and forestry methods, however, is expected to result in declining employment in most agricultural and forestry occupations.

*Mechanics and repairers.* These workers adjust, maintain, and repair automobiles, industrial equipment, computers, and many other types of machinery. Employment in most of these occupations is expected to grow about as fast as the

average. In some, employment will increase faster than the average. The increased use of computers and advanced office machinery, for example, will make employment of computer service technicians and office machine repairers grow much faster than the average. For some mechanic and repairer occupations, such as communications equipment mechanics, improvements to machinery will lower maintenance requirements and limit employment growth.

*Construction occupations.* Workers in this group construct, alter, and maintain buildings and other structures. Employment in most of these occupations is expected to grow faster than the average. Some of this growth, however, reflects the return of employment to levels that existed before the 1980 and 1981–82 recessions. Increases in the population and the number of households and a rise in spending for new industrial plants are factors expected to lead to more new construction. Alteration and modernization of existing structures, as well as the need for maintenance and repair on highway systems, dams, and bridges also will increase construction.

Continued technological developments in construction methods, tools and equipment, and materials will limit employment growth by raising the productivity of workers. One important development, for example, is the continued growth in the use of prefabricated materials. These materials limit the number of workers needed at the construction site.

Since the construction industry is sensitive to changes in the Nation's economy, employment in construction occupations may fluctuate from year to year. Construction workers can expect periods of unemployment during downturns in the economy.

*Production occupations.* Workers in these occupations perform tasks involved in the production of goods. They set up, adjust, operate, and tend machinery and equipment, and use handtools and hand-held power tools to fabricate and assemble products.

The recovery of the manufacturing industry from the 1981–82 recession and the growth projected for this sector through the mid-1990's will result in average employment growth in many production occupations. For some, such as patternmakers and job and die setters, most employment growth reflects a rebounding of employment to prerecession levels. Changes in production techniques and the increased use of automated machinery, such as robots, will prevent employment in some production occupations from rising as rapidly as the output of goods.

Many production occupations are sensitive to fluctuations in the business cycle. Just as employment opportunities increase when the economy is healthy, workers may experience shortened workweeks, layoffs, and plant closings when factory orders decline during economic downturns.

*Transportation occupations.* Workers in this group operate the equipment used to move people and materials. In-

ing economic activity will increase the need for transport services. This increase in demand is expected to result in average employment growth for truckdrivers and airplane pilots. Increased use of automated material handling systems, however, is expected to cause slower than average growth of employment of industrial truck operators.

*Handlers, equipment cleaners, helpers, and laborers.* Workers in this group assist skilled workers and perform the routine, unskilled tasks required to complete a project. Jobs in these occupations generally are expected to be plentiful due to the high turnover rate. However, economic downturns can lower substantially the number of openings, particularly for construction laborers and other workers in industries sensitive to changes in the economy. During the projection period, as routine tasks are mechanized, employment in these occupations is expected to grow more slowly than the average.

Since the employment prospects in individual occupations will differ within each of the 16 groups, it is important to check the outlook for each occupation that interests you. Current and projected employment estimates for nearly 700 occupations are presented in appendix B.

### Replacement needs

Most discussions of future job opportunities focus on the employment growth in industries and occupations. Because faster growing industries and occupations generally offer better opportunities for employment and advancement, employment growth is a good gauge of job outlook. Another element in the employment outlook, however, is replacement needs. Replacement openings occur as people leave occupations. Some transfer to other occupations as a step up the career ladder or to change careers. Some temporarily stop working, perhaps to return to school or care for a family. And some leave the labor force permanently—retirees, for example.

Through the mid-1990's, most jobs will become available as the result of replacement needs. However, the proportion of workers who leave annually—the replacement rate—varies significantly among occupations. Factors that determine the separation rate in an occupation include its

size, the earnings and status associated with the occupation, the length of training required, the average age of workers, and the proportion of part-time workers. Occupations with the highest separation rates generally are large, with low pay and status, low training requirements, and a high proportion of young and part-time workers. The following 10 occupations had the highest separation rates in 1981.

Occupation	Percent of workers leaving their occupation over the period of 12 months, 1980-81
Child care workers, private household	58.8
Dining room attendants	57.8
Dishwashers	51.8
Hucksters and peddlers	49.8
Food counter, fountain workers	47.2
Newspaper carriers and vendors	47.1
Garage workers, gas station attendants	44.5
Attendants, recreation and amusement	43.0
Child care workers, except private household	41.7
Waiters and waitresses	40.2

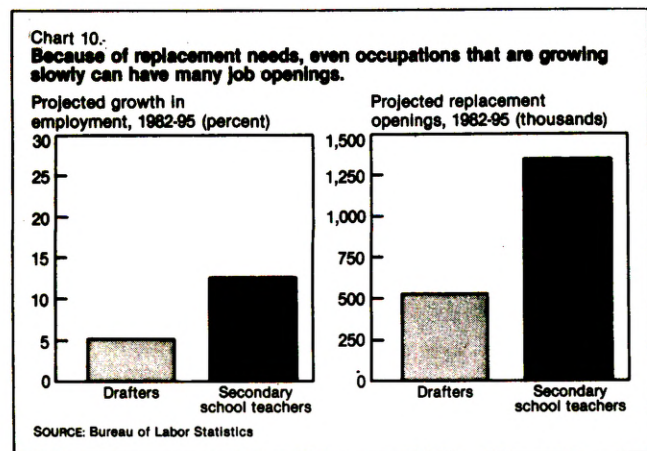
Workers in these occupations who lose their job or leave voluntarily often find a similar job. They also have not spent much money or time in training for their jobs, so the incentive to stay is limited. Occupations with low training requirements often attract workers with limited attachment to the labor force, such as young people working part time.

Occupations with relatively low separation rates, on the other hand, have high pay and status, lengthy training requirements, and a high proportion of prime-working-age, full-time workers. The following 10 occupations had the lowest separation rates in 1981.

Occupation	Percent of workers leaving their occupation over the period of 12 months, 1980-81
Dentists	1.2
Physicians	1.4
Firefighters	4.1
Electrical engineers	4.1
Chemists	4.2
Computer systems analysts	5.3
Lawyers	5.5
Mechanical engineers	6.2
Mail carriers/post office	6.4
Barbers	6.8

Workers in these occupations generally have spent several years acquiring training that often is not applicable to other occupations. These workers enjoy good pay and high status, but would have difficulty changing to other high-paying occupations without extensive retraining.

When considering replacement needs, it is important to note, first, that occupations with little or no employment growth or slower than average growth can still offer many job openings (chart 10). Second, in many occupations with a large number of replacement openings, the pay and status are low. Many available jobs are only part time. These occupations, therefore, may not be suitable for a person planning a long-term career, despite the large number of openings. For more information about replacement needs, see the March, 1984 issue of *Monthly Labor Review*.



## Chapter 2. Employment and Supply Profiles

Chapter 1 presented an overview of broad changes in employment that are projected for the 1982–95 period. For education programs and career planning, information also is needed about detailed occupations. Statistics on 1982 employment and alternative 1995 employment projections are presented for 673 detailed occupations in appendix table B–1. For many purposes, however, additional information about the characteristics of workers, the industries in which they are employed, and general training requirements may also be helpful. Such information is presented in employment profiles in this chapter for most occupations covered in the 1984–85 edition of the *Occupational Outlook Handbook*. Additional information about each occupation can be found in the *Handbook*.

### Employment profile

Each employment profile presents 1982 total employment and lists all industries that account for a significant proportion of wage and salary worker employment. Each profile also presents the 1995 low-, moderate-, and high-trend projections of employment and corresponding rates of change. The source of these data is the 1982–95 National Industry-Occupation Employment Matrix, which is based on the Occupational Employment Statistics (OES) survey. The same adjectives used in the 1984–85 *Occupational Outlook Handbook* are used here to describe how employment change projected for each occupation compares with the average for all occupations. Figure 1 shows the range of data the descriptive terms cover.

As indicated, employment data are collected through the Occupational Employment Statistics Survey. Worker characteristics, however, are available only from the Current Population Survey (CPS). Although the occupational classifications used in the two surveys are not identical, many

occupations are sufficiently comparable so that CPS data can provide a reasonable proxy to describe the characteristics of workers in those occupations. Such data, given in the employment profiles for occupations with 1982 CPS employment of 50,000 or more, include the percentage of women, blacks, and part-time workers (usually 34 hours or fewer per week). Also, for occupations with 100,000 or more workers, the unemployment rate is compared with the average for all workers over the 1978–82 period according to the following definitions:

Up to 1st decile . . . . .	much lower than average
Between 1st and 3rd deciles . . . . .	lower than average
Between 3rd and 7th deciles . . . . .	about average
Between 7th and 9th deciles . . . . .	higher than average
9th decile and above . . . . .	much higher than average

The employment profile also includes an annual replacement rate—the proportion of workers who are likely to leave the occupation each year—for occupations of 100,000 or more: (This subject is discussed in chapter 1.)

### Supply profile

Each supply profile includes a brief description of usual entry level requirements. These requirements are stated in general terms and therefore may differ from those of specific employers. For most occupations having comparable OES and CPS definitions, the profile discusses briefly the characteristics of entrants and lists appropriate formal education and training programs.

Statistics on graduates or completions of various education and training programs generally represent only a fraction of the total number of entrants to most occupations. Further, not all persons who complete training programs enter the labor force; some take courses for personal, cultural, or other reasons. In addition, many individuals enroll in general education and training programs to learn skills needed in many different occupations rather than to get a job in a particular occupation. For these reasons, the data on completions of education or training programs in the supply profiles and appendix C should be used analytically to examine the relationship of new graduates to total job openings rather than to estimate shortages or surpluses.

The statements that follow are grouped the same way as in the 1984–85 *Occupational Outlook Handbook*, according to the *Standard Occupational Classification Manual*, 1980 edition.

Figure 1: Changing Employment Between 1982 and 1995

If the statement reads—	Employment is projected to—
Much faster than average . . .	Increase 50 percent or more
Faster than average growth . . .	Increase 30 to 49 percent
Growth about as fast as average . . . . .	Increase 20 to 29 percent
Growing more slowly than average . . . . .	Increase 6 to 9 percent
Little change . . . . .	Increase or decrease 5 percent
Decline . . . . .	Decrease 6 percent or more

## Administrative and Managerial Occupations

### Accountants and auditors

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 856,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 38.6  
 Percent black . . . . . 5.0  
 Percent employed part time . . . . . 6.4

Unemployment rate . . . . . Lower than average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Accounting, auditing, and bookkeeping services . . . . .	19.7
Manufacturing . . . . .	17.4
Government . . . . .	12.7
Wholesale trade . . . . .	8.2
Retail trade . . . . .	5.3

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	1,181,000	1,200,000	1,229,000
Percent change . . . . .	38.0	40.2	43.6

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 8.2 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Many small employers accept completion of a 1- or 2-year program in accounting for entry level positions. Large firms, however, usually require a bachelor's degree in accounting for entry jobs and many prefer a master's degree.

#### Training completions:

Public vocational secondary and postsecondary, 1982<sup>1</sup> . . . . . 113,418  
 Private noncollegiate postsecondary, 1981 . . . . . 19,880  
 Associate and others below baccalaureate, 1982 . . . . . 15,734

#### Earned degrees, baccalaureate and above, 1982:

Accounting:  
 Bachelor's . . . . . 45,542  
 Master's . . . . . 3,246  
 Ph.D. . . . . 61

<sup>1</sup> Accounting and computing occupations.

*Characteristics of entrants.* The majority of all entrants are college graduates. More than one-half of all job openings are filled by persons who have not been working; many were students or homemakers. The remainder transfer from other occupations—mostly students who have been working part time; some are trained accountants working in other occupations as well as bookkeepers and accounting clerks advancing to professional positions.

## Bank officers and managers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 424,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 37.1  
 Percent black . . . . . 3.0  
 Percent employed part time . . . . . 2.2

Unemployment rate . . . . . Lower than average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Commercial and stock savings banks . . . . .	92.2
Mutual savings banks . . . . .	3.6
All other banking . . . . .	4.2

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	611,000	617,000	627,000
Percent change . . . . .	44.0	45.4	47.7

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 9.6 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Experience as a management trainee or as a bank clerk or teller is required for bank officer and management positions. Management trainees usually must have a bachelor's degree in business administration with a major in finance, or in a liberal arts curriculum such as accounting, economics, commercial law, political science, or statistics. Some banks prefer trainees who have a master's degree in business administration (MBA). Some banks promote outstanding clerks and tellers to management positions.

*Characteristics of entrants.* Most entrants transfer from other professional and clerical occupations; some have been working part time while in school. The remaining entrants—mostly full-time students and homemakers reentering the labor force—have not been working. The majority of entrants have some college training, and many are college graduates.

## Buyers, retail and wholesale trade

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 256,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 43.1  
 Percent black . . . . . 2.6  
 Percent employed part time . . . . . 8.4

Unemployment rate . . . . . Lower than average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Department stores . . . . .	15.9
Grocery stores . . . . .	15.1

	Industry		Percent
Miscellaneous retail stores . . . . .			12.2
(includes drug, proprietary, liquor, used merchandise, and related stores)			
Apparel and accessory stores . . . . .			10.6
Projected employment, 1982-95:			
	Low	Moderate	High
1995 employment . . . . .	321,000	331,000	336,000
Percent change . . . . .	25.6	29.5	31.4
Employment change . . . . .	Average		
Annual replacement rate . . . . .	13.9 percent		

## SUPPLY PROFILE

*Usual entry level requirements.* Familiarity with merchandise and with wholesaling and retailing generally is required. Experience is most often gained as an assistant buyer or buyer trainee. High school and postsecondary marketing and distributive education programs can lead to one of these entry positions. An increasing number of employers prefer applicants who have a college degree, with a major in marketing or purchasing.

### Training completions:

Earned degrees, baccalaureate and above, 1982:

Marketing and purchasing:	
Bachelor's . . . . .	26,945
Master's . . . . .	2,022
Ph.D. . . . .	24

*Characteristics of entrants.* This is not an entry level job. Most entrants transfer from other occupations—primarily assistant buyer and buyer trainee. The remaining entrants have not been working—most have been tending to family responsibilities, between jobs, or in school. Because of the importance of work experience, entrants tend to be considerably older than entrants to other occupations. Many entrants have had some college training.

## Construction inspectors, public administration

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . .	39,000		
Industry concentration of employment (wage and salary workers), 1982:			
	Industry		Percent
Local government . . . . .			74.1
Federal Government . . . . .			13.4
State government . . . . .			12.5
Projected employment, 1982-95:			
	Low	Moderate	High
1995 employment . . . . .	46,000	46,000	47,000
Percent change . . . . .	17.2	17.4	21.0
Employment change . . . . .	Slower than average		

### SUPPLY PROFILE

*Usual entry level requirements.* A high school diploma and several years of experience are generally required for construction inspectors. Inspectors need a thorough knowledge of construction materials

and practices in either a general area like heavy construction, or in a specialized area such as electrical or plumbing systems, reinforced concrete, or structural steel. Many employers prefer inspectors who have completed an apprenticeship program, studied engineering or architecture for at least 2 years, or earned a related associate degree from a community or junior college.

*Characteristics of entrants.* Most entrants transfer from other occupations—primarily craft worker, supervisor, or construction contractor. Although many have completed some postsecondary education or training, few are college graduates.

## Health and regulatory inspectors

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . .	101,000		
Selected characteristics of workers, 1982:			
Percent female . . . . .			15.0
Percent black . . . . .			7.5
Percent employed part time . . . . .			2.8
Unemployment rate . . . . .	Lower than average		
Industry concentration of employment (wage and salary workers), 1982:			
	Industry		Percent
Federal Government . . . . .			35.7
State government . . . . .			34.0
Local government . . . . .			26.0
Projected employment, 1982-95:			
	Low	Moderate	High
1995 employment . . . . .	111,000	108,000	113,000
Percent change . . . . .	9.4	6.5	11.0
Employment change . . . . .	Slower than average		
Annual replacement rate . . . . .	6.8 percent		

### SUPPLY PROFILE

*Usual entry level requirements.* Because these workers specialize in the inspection of items ranging from meat to mines to commercial airline operations, a great diversity of detailed technical knowledge, background, and experience exists. Many jobs require a college degree in an engineering or a scientific specialty, while others require experience in a related occupation.

*Characteristics of entrants.* Over half of all entrants have not been working—most have been in school and others have been between jobs. The remaining entrants transfer from other occupations where they have gained the required knowledge and experience. Entrants tend to be considerably older than entrants to other occupations, reflecting the importance of work experience. About half of all entrants have a college degree.

## Health services administrators

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . .	303,000
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**Selected characteristics of workers, 1982:**

Percent female	50.9
Percent black	3.5
Percent employed part time	3.2

Unemployment rate . . . . . Lower than average

**Industry concentration of employment (wage and salary workers), 1982:**

<i>Industry</i>	<i>Percent</i>
Hospitals	46.3
Offices of physicians	18.6
Nursing and personal care facilities	14.7

**Projected employment, 1982-95:**

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . .	472,000	478,000	494,000
Percent change . . . . .	55.9	57.8	63.2

Employment change . . . . . Much faster than average

Annual replacement rate . . . . . 11.1 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* Due to very strong competition for top administrative positions, those who aspire to these jobs generally must have the master's degree in hospital administration, health administration, or public health. This field is quite diverse, however, and offers opportunities for those with degrees or work experience in areas such as finance, public relations, marketing, and management information systems.

*Training completions:*

**Earned degrees, baccalaureate and above, 1982:**

<b>Hospital and health care administration and public health:</b>	
Bachelor's	2,683
Master's	3,952
Ph.D.	227

*Characteristics of entrants.* Most entrants transfer from other occupations—primarily other health occupations. Some have worked in these while attending graduate school. Many of the remaining entrants have been tending to family responsibilities. Because of the emphasis placed on work experience and advanced education, entrants tend to be much older than entrants to other occupations.

**Hotel managers and assistants**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 67,000

**Industry concentration of employment (wage and salary workers), 1982:**

<i>Industry</i>	<i>Percent</i>
Hotels and other lodging places	100.0

**Projected employment, 1982-95:**

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . .	82,000	82,000	84,000
Percent change . . . . .	22.2	23.1	25.0

Employment change . . . . . Average

**SUPPLY PROFILE**

*Usual entry level requirements.* Although most employers will accept applicants without formal training who have previous work experience in this field, a growing number of employers are emphasizing college or specialized postsecondary education.

*Training completions:*

<b>Public vocational secondary and postsecondary, 1982<sup>1</sup></b>		2,224
<b>Private noncollegiate postsecondary, 1981<sup>1</sup></b>		261
<b>Associate and other degrees below baccalaureate, 1982<sup>2</sup></b>		2,535
<b>Earned degrees, baccalaureate and above, 1982<sup>2</sup>:</b>		
Bachelor's		2,169
Master's		97
Ph.D.		2

<sup>1</sup> Hotel and lodging.

<sup>2</sup> Hotel and restaurant management.

**Personnel and labor relations specialists**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 203,000

**Selected characteristics of workers, 1982:**

Percent female	49.6
Percent black	9.2
Percent employed part time	4.6

Unemployment rate . . . . . Lower than average

**Industry concentration of employment (wage and salary workers), 1982:**

<i>Industry</i>	<i>Percent</i>
Durable goods manufacturing	18.7
Business associations	12.3
Federal Government	11.7
Labor unions	10.5

**Projected employment, 1982-95:**

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . .	249,000	250,000	257,000
Percent change . . . . .	22.5	23.2	26.6

Employment change . . . . . Average

Annual replacement rate . . . . . 9.7 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* Educational requirements vary considerably. In filling entry level jobs, firms generally seek college graduates. Some employers prefer applicants who have majored in personnel administration or industrial and labor relations, while others look for college graduates with a technical or business background. Still others feel that a well-rounded liberal arts education is best. Regardless of academic background, many employers stress the importance of prior work experience.

*Training completions:*

**Earned degrees, baccalaureate and above, 1982:**

<b>Personnel management and labor and industrial relations:</b>	
Bachelor's	4,059
Master's	1,482
Ph.D.	21



*Characteristics of entrants.* Most entrants transfer from a variety of other occupations; consequently, they tend to be much older than entrants to other occupations. Others enter directly from school or return to the occupation after tending to family responsibilities.

## Purchasing agents

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 191,000

Selected characteristics of workers, 1982:

Percent female . . . . . 35.7  
 Percent black . . . . . 5.3  
 Percent employed part time . . . . . 1.7

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Federal Government . . . . .	13.6
Nondurable goods manufacturing . . . . .	13.1
Machinery manufacturing, except electrical . . . . .	8.8
Business services . . . . .	7.3
Transportation equipment manufacturing . . . . .	7.3
Electrical and electronic machinery and equipment manufacturing . . . . .	7.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	242,000	242,000	250,000
Percent change . . . . .	26.9	27.1	30.9

Employment change . . . . . Average

Annual replacement rate . . . . . 9.4 percent

### SUPPLY PROFILE

*Usual entry level requirements.* There are no universal educational requirements for entry level jobs. Many smaller companies promote clerks or technicians in the purchasing department or hire graduates of associate degree programs in purchasing. Some small companies and most large organizations require a college degree and prefer applicants with a master's degree in business administration or management.

#### Training completions:

Associate and other degrees below baccalaureate, 1982<sup>1</sup> . . . . . 31,688

Earned degrees, baccalaureate and above, 1982:

Marketing and purchasing:

Bachelor's . . . . . 26,945  
 Master's . . . . . 2,022  
 Ph.D . . . . . 24

<sup>1</sup> Marketing, distribution, purchasing, business, and industrial management technologies.

*Characteristics of entrants.* Over half of all entrants transfer from other occupations—many of these are clerical and technical workers in the purchasing department who move up the career ladder and others who have specialized knowledge of particular products or services. The remaining entrants have not been working—most have been unemployed. Entrants tend to be older than entrants to other occupations.

## School administrators

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 133,000

Selected characteristics of workers, 1982

Percent female . . . . . 36.2  
 Percent black . . . . . 12.4  
 Percent employed part time . . . . . 5.1

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services . . . . .	100.0

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	150,000	153,000	156,000
Percent change . . . . .	12.7	15.1	17.6

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 7.1 percent

### SUPPLY PROFILE

*Usual entry level requirements.* All 50 States and the District of Columbia require certification; certification requirements vary but may include good health and character, U.S. citizenship or State residency, graduate training in education administration, teaching experience, and passing an examination.

#### Training completions:

Earned degrees, baccalaureate and above, 1982:

Educational administration:

Bachelor's . . . . . 34  
 Master's . . . . . 9,019  
 Ph.D. . . . . 1,423

*Characteristics of entrants.* A very high proportion of job openings are filled by persons who transfer from teaching positions. Many of the remaining entrants are former school administrators who have been tending to family responsibilities. The majority of entrants are 35 or older.

## Underwriters

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 76,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Fire, marine, and casualty insurance . . . . .	42.5
Insurance agents, brokers, and services . . . . .	39.2
Life insurance . . . . .	13.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	90,000	92,000	93,000
Percent change . . . . .	19.0	21.1	23.2

Employment change . . . . . Average

## SUPPLY PROFILE

*Usual entry level requirements.* For beginning underwriting jobs, most large insurance companies prefer college graduates who have a degree in liberal arts or business administration, but a major in almost any field provides a good general background. Some small companies hire persons without a college degree for trainee positions. In addition, some experienced underwriting clerks are promoted to underwriter positions.

## Engineers, Surveyors, and Architects

### Architects

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 84,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 8.5  
Percent black . . . . . 3.2  
Percent employed part time . . . . . 4.5

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Engineering, architectural, and surveying services . . . . .	70.6
Federal Government . . . . .	6.3

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	116,000	118,000	121,000
Percent change . . . . .	37.7	39.7	43.3

Employment change . . . . . Faster than average

#### SUPPLY PROFILE

*Usual entry level requirements.* All States and the District of Columbia require individuals to be registered before they may call themselves architects or contract for architectural services. To qualify for the registration examination, applicants generally need at least a Bachelor of Architecture degree from an accredited program and 3 years of experience working for an architect. Additional experience may be substituted for formal education.

#### Training completions:

#### Earned degrees, baccalaureate and above, 1982:

Architecture:  
Bachelor's . . . . . 5,796  
Master's . . . . . 1,610  
Ph.D. . . . . 22

*Characteristics of entrants.* Almost all entrants are recent college graduates.

## Surveyors

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 44,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 1.5  
Percent black . . . . . 1.5  
Percent employed part time . . . . . 4.3

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Engineering, architectural, and surveying services . . . . .	46.1
Local government . . . . .	10.9
Federal Government . . . . .	8.7

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	61,000	62,000	64,000
Percent change . . . . .	40.5	43.1	47.3

Employment change . . . . . Faster than average

#### SUPPLY PROFILE

*Usual entry level requirements.* All States and the District of Columbia require that surveyors be licensed. Requirements vary, but all jurisdictions require applicants to have some combination of formal education and work experience on a surveying crew and pass a written examination. Surveying programs are available in postsecondary vocational schools and community or junior colleges. A few colleges and universities offer the bachelor's degree in surveying; others offer courses in surveying as part of a civil engineering or forestry curriculum.

## Engineers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 1,204,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 5.7  
Percent black . . . . . 2.3  
Percent employed part time . . . . . 1.9

Unemployment rate . . . . . Lower than average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Electrical and electronic machinery and equipment manufacturing . . . . .	13.1
Transportation equipment manufacturing . . . . .	11.1
Machinery manufacturing, except electrical equipment . . . . .	10.5
Engineering, architectural, and surveying services . . . . .	10.4
Federal Government . . . . .	7.5

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	1,787,000	1,788,000	1,831,000
Percent change . . . . .	48.4	48.5	52.0

Employment change . . . . . Faster than average  
 Annual Replacement rate . . . . . 7.3 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* A bachelor's degree in engineering is generally required for beginning engineering jobs. College graduates with a degree in science or mathematics and experienced technicians may also qualify for some jobs. Many engineers obtain a master's degree, which is desirable for promotion or for learning new technologies.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:  
 Bachelor's . . . . . 80,005  
 Master's . . . . . 17,939  
 Ph.D. . . . . 2,636

*Characteristics of entrants.* About half of all entrants are recent engineering graduates. Most of the remainder transfer from other occupations—generally persons with previous training or experience in engineering or a closely related occupation. Other entrants are recent science and mathematics graduates, immigrant engineers, and persons over 55 who have not worked the previous year.

**Aerospace engineers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 44,000

Selected characteristics of workers, 1982  
 Percent female . . . . . 4.2

Unemployment rate . . . . . Much lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Aircraft and parts manufacturing . . . . .	49.8
Federal Government . . . . .	18.3
Business services . . . . .	5.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	65,000	62,000	62,000
Percent change . . . . .	48.8	40.6	42.4

Employment change . . . . . Faster than average

**Chemical engineers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 56,000

Selected characteristics of workers, 1982:  
 Percent female . . . . . 7.3  
 Percent black . . . . . 1.3  
 Percent employed part time . . . . . .9

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Chemical and allied product manufacturing . . . . .	32.8
Durable goods manufacturing . . . . .	13.4
Engineering, architectural, and surveying services . . . . .	8.8
Business services . . . . .	7.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	79,000	80,000	82,000
Percent change . . . . .	40.9	43.5	47.0

Employment change . . . . . Faster than average

**Civil engineers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 155,000

Selected characteristics of workers, 1982:  
 Percent female . . . . . 2.5  
 Percent black . . . . . 2.5  
 Percent employed part time . . . . . 1.6

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Engineering, architectural, and surveying services . . . . .	32.5
State government . . . . .	15.4
Local government . . . . .	13.1
Federal Government . . . . .	12.6
Construction . . . . .	10.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	226,000	228,000	236,000
Percent change . . . . .	45.1	46.8	51.7

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 6.9 percent

**Electrical engineers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 320,000

Selected characteristics of workers, 1982:  
 Percent female . . . . . 4.0  
 Percent black . . . . . 2.2  
 Percent employed part time . . . . . 1.8

Unemployment rate . . . . . Much lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Electrical and electronic machinery and equipment manufacturing . . . . .	26.4
Communications and utilities . . . . .	14.5
Machinery manufacturing, except electrical . . . . .	11.6
Business services . . . . .	7.3

	<i>Industry</i>	<i>Percent</i>
Engineering, architectural, and surveying services		7.0

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment	531,000	528,000	540,000
Percent change	66.0	65.3	69.1

Employment change . . . . . Much faster than average

Annual replacement rate . . . . . 4.1 percent

### Industrial engineers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 160,000

Selected characteristics of workers, 1982:

Percent female	14.2
Percent black	4.2
Percent employed part time	2.8

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Machinery manufacturing, except electrical		20.2
Electrical and electronic machinery and equipment manufacturing		18.1
Transportation equipment manufacturing		13.7

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment	226,000	227,000	232,000
Percent change	41.0	41.6	45.0

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 14.6 percent

### Mechanical engineers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 209,000

Selected characteristics of workers, 1982:

Percent female	2.9
Percent black	2.1
Percent employed part time	1.2

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Durable goods manufacturing		46.6
Engineering, architectural, and surveying services		14.7
Nondurable goods manufacturing		11.6

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment	314,000	318,000	327,000
Percent change	50.1	52.1	56.5

Employment change . . . . . Much faster than average

Annual replacement rate . . . . . 4.3 percent

### Metallurgical engineers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 14,000

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Primary metal industries		24.4
Transportation equipment		10.6
Business services		10.0

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment	20,000	21,000	21,000
Percent change	46.1	47.5	50.2

Employment change . . . . . Faster than average

### Mining engineers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 5,700

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Bituminous coal and lignite mining		29.6
Metal mining		15.3
Federal Government		10.8

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment	6,900	7,000	7,100
Percent change	21.2	22.4	24.7

Employment change . . . . . Average

### Nuclear engineers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 6,300

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Federal Government		40.2
Engineering, architectural, and surveying services		24.5
Electric services		16.4

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment	9,400	9,300	9,700
Percent change	50.5	47.9	53.9

Employment change . . . . . Faster than average

## Petroleum engineers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 26,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Crude petroleum and natural gas . . . . .	62.4
Oil and gas field services . . . . .	19.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	31,000	32,000	30,000
Percent change . . . . .	19.4	21.7	15.7

Employment change . . . . . Average

## Natural Scientists and Mathematicians

### Mathematical Scientists and Systems Analysts

#### Actuaries

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 8,200

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Life insurance . . . . .	39.8
Miscellaneous services (includes consulting actuaries; engineering, architectural, and surveying services; and accounting, auditing, and bookkeeping services) . . . . .	23.5
Insurance agents, brokers, and services . . . . .	13.9
Fire, marine, and casualty insurance . . . . .	12.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	10,800	10,900	11,100
Percent change . . . . .	31.5	33.0	34.8

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* A strong background in mathematics, including statistics, is required. Some employers require a bachelor's degree with a major in mathematics or statistics; others accept a major in engineering, economics, or business administration. Employers generally prefer applicants with a degree in actuarial science, and those who have passed several examinations offered by professional actuarial societies.

*Characteristics of entrants.* Almost all job openings are filled by recent college graduates. A relatively small number of entrants transfer from other occupations that require strong mathematical and statistical skills.

## Computer systems analysts

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 254,000

Selected characteristics of workers, 1982:

Percent female . . . . .	26.4
Percent black . . . . .	5.8
Percent employed part time . . . . .	2.5

Unemployment rate . . . . . Much lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Manufacturing . . . . .	20.4
Computer and data processing services . . . . .	16.9
Durable goods manufacturing . . . . .	14.4
Finance, insurance, and real estate . . . . .	12.5
Federal Government . . . . .	11.4
Nondurable goods manufacturing . . . . .	6.0

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	469,000	471,000	480,000
Percent change . . . . .	84.6	85.3	88.8

Employment change . . . . . Much faster than average

Annual replacement rate . . . . . 5.3 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Almost all jobs require at least a bachelor's degree. Prior work experience is important; employers' preferences for field of study depend on the work being done. For work in a business environment, employers usually want analysts with a background in accounting, business management, or economics. For work in scientifically oriented organizations, a background in the physical sciences, mathematics, or engineering is preferred. Many employers seek applicants with a degree in computer science, information science, information systems, or data processing. Regardless of college major, employers look for people who are familiar with programming languages.

*Training completions:*

Private noncollegiate postsecondary, 1981 . . . . .	99
Earned degrees, baccalaureate and above, 1982	
Computer and information sciences:	
Bachelor's . . . . .	20,267
Master's . . . . .	4,935
Ph.D. . . . .	251

*Characteristics of entrants.* Almost all entrants are college graduates. Most entrants transfer from other occupations, such as computer programmer, engineer, and manager. Consequently, entrants are somewhat older than average. Many of the remaining entrants are recent graduates who have been attending school full time.

## Mathematicians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 11,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Federal Government . . . . .	36.5
Durable goods manufacturing . . . . .	20.3
Miscellaneous business services (includes research and development laboratories and management, consulting, and public relations services) . . . . .	15.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	14,000	14,000	14,000
Percent change . . . . .	33.1	28.1	32.3

Employment change . . . . . Average

## SUPPLY PROFILE

*Usual entry level requirements.* A bachelor's degree in mathematics is required for beginning jobs. However, an advanced degree is preferred by most employers and required for more responsible positions. A master's degree in mathematics is generally required for teaching jobs in 2-year colleges and technical institutes, but a doctorate is needed for full faculty status in most 4-year colleges and universities.

### Training completions:

Earned degrees, baccalaureate and above, 1982:

Mathematics: <sup>1</sup>	
Bachelor's . . . . .	11,341
Master's . . . . .	2,248
Ph.D. . . . .	556

<sup>1</sup> Excludes mathematical and theoretical statistics.

*Characteristics of entrants.* Most entrants are recent college graduates; some have worked part time while in school. Others transfer from related occupations that require mathematics training.

## Statisticians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 20,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Federal Government . . . . .	20.6
Durable goods manufacturing . . . . .	13.6
State government . . . . .	13.1
Business services . . . . .	11.2
Insurance carriers . . . . .	6.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	26,000	26,000	27,000
Percent change . . . . .	29.5	28.3	32.0

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* The minimum educational requirement for beginning jobs in statistics is a bachelor's degree with a

major in statistics, or a major in an applied field, such as economics, and a minor in statistics.

### Training completions:

Earned degrees, baccalaureate and above, 1982:

Statistics: <sup>1</sup>	
Bachelor's . . . . .	615
Master's . . . . .	575
Ph.D. . . . .	136

<sup>1</sup> Includes business statistics and mathematical and theoretical statistics.

*Characteristics of entrants.* Most entrants are recent college graduates. Some transfer from other occupations but most of these have been working part time while in school.

## Physical Scientists

### Chemists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 89,000

Selected characteristics of workers, 1982:

Percent female . . . . .	20.3
Percent black . . . . .	5.3
Percent employed part time . . . . .	5.8

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Chemicals and allied products . . . . .	36.6
Miscellaneous business services (includes research and development and commercial testing laboratories.) . . . . .	11.3
Durable goods manufacturing . . . . .	10.2
Federal Government . . . . .	10.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	107,000	108,000	111,000
Percent change . . . . .	20.5	22.0	24.9

Employment change . . . . . Average

Annual replacement rate . . . . . 4.2 percent

### SUPPLY PROFILE

*Usual entry level requirements.* A bachelor's degree in chemistry or biochemistry is the generally accepted minimum requirement for entry, although graduate training is required for many jobs and is helpful for advancement in all types of work. Most jobs as biochemists require a Ph.D.

### Training completions:

Earned degrees, baccalaureate and above, 1982:

Chemistry and biochemistry:	
Bachelor's . . . . .	12,890
Master's . . . . .	1,891
Ph.D. . . . .	2,057

*Characteristics of entrants.* The majority of entrants are recent college graduates, including many who transfer from other occupations that provide full- or part-time work while attending graduate school.

## Geologists and geophysicists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 49,000

Selected characteristics of workers, 1982:

Percent female . . . . . 6.9  
Percent employed part time . . . . . 4.6

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Crude petroleum and natural gas . . . . .	43.6
Federal Government . . . . .	16.2
Oil and gas field services . . . . .	14.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	60,000	60,000	59,000
Percent change . . . . .	23.6	23.6	20.9

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* A bachelor's degree in geology or geophysics is adequate for entry into some lower level geology jobs, but better jobs with good advancement potential usually require at least a master's degree in geology or geophysics.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:

Geology, geophysics, seismology, and general earth sciences:

Bachelor's . . . . .	6,416
Master's . . . . .	1,663
Ph.D. . . . .	337

*Characteristics of entrants.* Most entrants have a degree in geology or geophysics and enter after graduation; many have worked in other occupations while in graduate school. Many persons with appropriate training and experience transfer from related occupations.

## Physicists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 19,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Federal Government . . . . .	29.9
Miscellaneous business services (includes research and development and commercial testing laboratories) . . . . .	21.3
Miscellaneous services (includes consulting physicists and engineering, architectural, and surveying services) . . . . .	14.5
Electrical and electronic machinery and equipment manufacturing . . . . .	11.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	26,000	26,000	27,000
Percent change . . . . .	40.2	36.6	41.0

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Graduate training in physics or a closely related field generally is required for most entry level jobs. A doctorate is usually required for full faculty status in 4-year colleges and universities, and for jobs in astronomy.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:

Physics, molecular physics, nuclear physics,  
astronomy, and astrophysics:

Bachelor's . . . . .	3,585
Master's . . . . .	1,364
Ph.D. . . . .	949

*Characteristics of entrants.* Most entrants are recent college graduates—including some who have worked part or full time in another occupation while attending graduate school. A relatively small number of entrants with training or experience in physics transfer from other occupations.

## Life Scientists

### Agricultural scientists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 22,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services . . . . .	21.3
Local government . . . . .	16.0
Federal Government . . . . .	14.0
Agricultural services . . . . .	10.6

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	26,000	26,000	26,000
Percent change . . . . .	18.8	18.6	21.5

Employment change . . . . . Slower than average

### SUPPLY PROFILE

*Usual entry level requirements.* A doctorate in an agricultural science specialty usually is required for college teaching and independent research positions. A master's degree is sufficient for some jobs in applied research. The bachelor's degree is adequate preparation for some jobs in sales, inspection, and other nonresearch areas.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:

Agriculture and natural resources:

Bachelor's . . . . .	21,029
Master's . . . . .	4,163
Ph.D. . . . .	1,079

*Characteristics of entrants.* Most entrants are recent graduates with a degree in agricultural science or a related field; some have worked part or full time in another occupation while attending college or graduate school. Some persons with previous training or experience in agriculture transfer from other occupations.

## Biological scientists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 52,000

Selected characteristics of workers, 1982:

Percent female . . . . . 46.0  
 Percent black . . . . . 4.8  
 Percent employed part time . . . . . 10.4

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Federal Government . . . . .	26.4
State government . . . . .	13.8
Chemicals and allied product manufacturing . . . . .	12.0
Miscellaneous business services (includes research and development and commercial testing laboratories) . . . . .	10.5

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . .	71,000	70,000	73,000
Percent change . . . . .	38.1	36.3	40.9

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* The doctorate generally is required for college teaching or research positions. A master's degree is sufficient for some jobs in applied research, and a bachelor's degree may be adequate preparation for some beginning jobs.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:

Biological sciences:  
 Bachelor's . . . . . 41,639  
 Master's . . . . . 5,874  
 Ph.D. . . . . 3,743

*Characteristics of entrants.* Most entrants are recent graduates with a degree in biology or a closely related field; some have worked part or full time while attending college or graduate school. A relatively small number with training or experience in biology transfer from other occupations.

## Foresters and conservationists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 31,000

Selected characteristics of workers, 1982:

Percent female . . . . . 6.6  
 Percent black . . . . . 3.2  
 Percent employed part time . . . . . 2.0

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Federal Government . . . . .	46.3
State government . . . . .	20.7
Forestry . . . . .	15.3

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	35,000	34,000	36,000
Percent change . . . . .	14.1	9.4	15.3

Employment change . . . . . Slower than average

### SUPPLY PROFILE

*Usual entry level requirements.* A bachelor's degree in forestry, range management, range science, or soil conservation is the minimum educational requirement. Many employers prefer applicants with advanced degrees, and for certain jobs, such as teaching and research, employers require advanced degrees.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:<sup>1</sup>

Bachelor's . . . . . 7,816  
 Master's . . . . . 1,824  
 Ph.D. . . . . 449

<sup>1</sup> Includes Agriculture, General; Agronomy; Soils Science; Forestry; Natural Resources Management; Agriculture and Forestry Technologies; and Range Management.

## Social Scientists, Social Workers, Religious Workers, and Lawyers

### Lawyers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 465,000

Selected characteristics of workers, 1982:

Percent female . . . . . 15.5  
 Percent black . . . . . 2.9  
 Percent employed part time . . . . . 7.1

Unemployment rate . . . . . Much lower than average

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Legal services . . . . .	60.7
Local government . . . . .	12.5
Federal Government . . . . .	7.3

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	618,000	624,000	638,000
Percent change . . . . .	32.9	34.3	37.3

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 4.8 percent



## SUPPLY PROFILE

*Usual entry level requirements.* To practice law in any State, a person must be admitted to its bar. Usually, applicants for admission to the bar must pass a written examination. To qualify for the examination in most States, an applicant must complete at least 3 years of college and graduate from an accredited law school. Lawyers who have been admitted to the bar in one State sometimes may be admitted in another State without taking the bar examination, although requirements vary.

### Training completions:

Earned degrees, baccalaureate and above, 1982:  
 Juris Doctor (J.D.) and  
 Bachelor of Law (LL.B) . . . . . 35,991

*Characteristics of entrants.* Most entrants are recent law school graduates age 25 to 34 who have been full-time students. Others transfer into the occupation; many of these are recent law school graduates who have attended law school on a part-time basis while working in other occupations. Some transfer into law after using their law degrees to pursue careers in business, politics, or other fields in which a thorough knowledge of law is valuable.

## Social Scientists and Urban Planners

### Economists

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 30,000

Selected characteristics of workers, 1982:  
 Percent female . . . . . 28.0  
 Percent black . . . . . 4.5  
 Percent employed part time . . . . . 6.5

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Federal Government	29.2
State government	15.7
Business services	9.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	39,000	38,000	39,000
Percent change	28.9	26.6	30.4

Employment change . . . . . Average

Annual replacement rate . . . . . 11.7 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* A graduate degree is required for most jobs. A master's degree generally is the minimum requirement for a job as an instructor in many junior colleges and small 4-year colleges. The Ph.D degree is necessary for faculty positions at most colleges and universities.

In the Federal Government, candidates for entry positions generally need a college degree with a minimum of 21 semester hours of economics and 3 hours of statistics, accounting, or calculus.

### Training completions:

Earned degrees, baccalaureate and above, 1982:  
 Economics:  
 Bachelor's . . . . . 19,876  
 Master's . . . . . 1,964  
 Ph.D. . . . . 677

*Characteristics of entrants.* Almost all entrants are college graduates. Many entrants transfer from other occupations. Some have worked in these part time while in graduate school. The remainder have not been working—most are full-time students and persons who have been tending to family responsibilities. Because of the importance placed on graduate training, entrants tend to be older than entrants to other occupations.

## Psychologists

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 83,000

Selected characteristics of workers, 1982:  
 Percent female . . . . . 55.0  
 Percent black . . . . . 8.0  
 Percent employed part time . . . . . 18.0

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services	41.1
Hospitals	14.4
State government	6.5
Federal Government	6.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	109,000	110,000	112,000
Percent change	32.5	33.2	36.2

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 7.9 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* A doctorate in psychology generally is required for most jobs. All States and the District of Columbia require psychologists who want to enter independent practice to be licensed. Licensure requirements vary but generally include a doctorate in psychology, 2 years of professional experience, and passing written and oral examinations.

### Training completions:

Earned degrees, baccalaureate and above, 1982:  
 Psychology:  
 Bachelor's . . . . . 41,031  
 Master's . . . . . 7,791  
 Ph.D. . . . . 2,780

*Characteristics of entrants.* Almost all entrants are recent college graduates; many have been employed part time or full time in other occupations while in graduate school. Because of the lengthy training involved, entrants tend to be somewhat older than entrants to other occupations.

## Sociologists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 5,700

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
State government . . . . .	19.6
Hospitals . . . . .	19.3
Local government . . . . .	14.4
Miscellaneous business services (includes management, consulting, and public relations services) . . . . .	14.3
Education services . . . . .	11.5
Noncommercial, educational, and residential organizations . . . . .	11.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	7,000	7,100	7,300
Percent change . . . . .	24.3	25.5	28.8

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* A master's degree in sociology is sufficient for most administrative and research positions in public agencies and private industry, provided applicants have adequate training in research, statistical, and computer methods. A doctorate is required for most teaching and research positions in colleges and universities and for some positions in private industry.

#### Training completions:

Earned degrees, baccalaureate and above, 1982:

Sociology:	
Bachelor's . . . . .	16,042
Master's . . . . .	1,145
Ph.D. . . . .	558

*Characteristics of entrants.* Almost all entrants are recent college graduates.

## Urban and regional planners

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 21,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Local government . . . . .	73.3
State government . . . . .	12.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	24,000	25,000	25,000
Percent change . . . . .	13.1	14.6	17.7

Employment change . . . . . Slower than average

## SUPPLY PROFILE

*Usual entry level requirements.* Most entry jobs in Federal, State, and local government agencies require 2 years of graduate study in urban or regional planning or the equivalent in work experience. Persons who have a bachelor's degree in city planning, architecture, or engineering may qualify for some beginning positions.

#### Training completions:

Earned degrees, baccalaureate and above, 1982:

City, community, and regional planning:	
Bachelor's . . . . .	505
Master's . . . . .	1,095
Ph.D. . . . .	38

*Characteristics of entrants.* Almost all entrants are recent college graduates; some have held part time jobs in other occupations while in school. Some transfer into the field from jobs taken on a temporary basis until a job as an urban planner becomes available.

## Recreation and Social Workers

### Recreation workers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 124,000

Selected characteristics of workers, 1982:

Percent female . . . . .	61.9
Percent black . . . . .	13.3
Percent employed part time . . . . .	26.8

Unemployment rate . . . . . Much higher than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Local government . . . . .	37.7
Civic, social, and fraternal organizations . . . . .	21.4
Social services . . . . .	13.4
Nursing and personal care facilities . . . . .	10.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	150,000	152,000	157,000
Percent change . . . . .	20.9	22.9	26.4

Employment change . . . . . Average

Annual replacement rate . . . . . 26.3 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Academic requirements vary widely. Many jobs require a college degree with a major in recreation, leisure studies, or physical education. A liberal arts degree is acceptable for some positions. Some employers accept graduates of associates degree programs in parks and recreation, social work, and other human service technologies. High school graduates are accepted for some jobs. Some jobs require specialized training or experience in a particular field, such as art, music, drama, or athletics.

**Training completions:**

Earned degrees, baccalaureate and above, 1982:

Parks and recreation management:	
Bachelor's	5,335
Master's	526
Ph.D.	33

**Characteristics of entrants.** Most recreation workers are women; consequently, the field is characterized by considerable movement from work to home and back again. Most entrants have not been working—many have been tending to family responsibilities and others have been students. A large proportion of all entrants have worked part time while in school. The majority of entrants have attended college and many have a degree.

**Social workers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 345,000

Selected characteristics of workers, 1982:

Percent female	66.4
Percent black	16.9
Percent employed part time	9.0

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Local government	24.6
State government	23.7
Social services	21.8

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment	409,000	416,000	428,000
Percent change	18.7	20.6	24.3

Employment change . . . . . Average

Annual replacement rate . . . . . 16.3 percent

**SUPPLY PROFILE**

**Usual entry level requirements.** A bachelor's degree is the minimum requirement for most professional positions. In addition to the bachelor's degree in social work (BSW), a major in psychology, sociology, and related fields satisfies hiring requirements in many social service agencies. A master's degree in social work (MSW) is generally required for positions in the mental health field and is almost always necessary for supervisory, administrative, or research positions. A doctorate in social work usually is required for teaching and is desirable for some research and administrative jobs.

**Training completions:**

Earned degrees, baccalaureate and above, 1982:

Social work and helping services:	
Bachelor's	11,813
Master's	9,959
Ph.D.	198

**Characteristics of entrants.** Most entrants to this competitive field are college graduates. The majority of entrants have not been work-

ing—mainly they have been full time students or between jobs. The remaining entrants transfer from other occupations. Many have worked part time while in school; others transfer from jobs taken on a temporary basis until a desirable position could be found.

**Clergy**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 317,000

Selected characteristics of workers, 1982:

Percent female	5.3
Percent black	5.6
Percent employed part time	8.5

Unemployment rate . . . . . Much lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Religious organizations	97.8

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment	327,000	332,000	344,000
Percent change	3.3	4.9	8.4

Employment change . . . . . Little change is expected

Annual replacement rate . . . . . 8.4 percent

**SUPPLY PROFILE**

**Usual entry level requirements.** Entry requirements vary widely. Both rabbis and Roman Catholic priests must complete a course of study in a seminary. Some Protestant denominations require no formal training while many others only ordain those who have been trained in Bible colleges, Bible institutes, or liberal arts colleges. Most important, religious workers must have a deep religious faith and a desire to serve the spiritual needs of others.

**Training completions:**

Earned degrees, first professional, 1982:

Theology (B.D., M. Div., or Rabbi)	6,901
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**Teachers, Librarians, and Counselors**

**College and university faculty**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 744,000

Selected characteristics of workers, 1982:

Percent female	35.4
Percent black	4.9
Percent employed part time	39.5

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services	99.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	619,000	632,000	646,000
Percent change . . . . .	-16.8	-15.0	-13.1

Employment change . . . . . Decline

**SUPPLY PROFILE**

*Usual entry level requirements.* Four-Year colleges and universities generally require faculty members to hold a doctoral degree; 2-year institutions often regard a master's degree as adequate preparation.

*Characteristics of entrants.* Almost all job openings are filled by recent graduates of degree programs. Most have held some part time job while in school.

**Counselors**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 148,000

Selected characteristics of workers, 1982:

Percent female . . . . .	51.8
Percent black . . . . .	12.8
Percent employed part time . . . . .	13.6

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services . . . . .	61.7
Social services . . . . .	17.9
State government . . . . .	12.5

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	159,000	163,000	167,000
Percent change . . . . .	7.4	9.8	12.4

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 13.5 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* A master's degree in some area of counseling or psychology generally is required. In some cases, individuals with a bachelor's degree in psychology, sociology, counseling, and rehabilitation services are qualified, particularly if they have appropriate work experience. Many States require public school counselors to have both counseling and teaching certificates. Counselors in most State vocational rehabilitation agencies must pass a written exam and be evaluated by a board of examiners.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:<sup>1</sup>

Bachelor's . . . . .	568
Master's . . . . .	16,263
Ph.D. . . . .	1,468

<sup>1</sup> Includes educational psychology, student personnel, and psychology for counseling.

*Characteristics of entrants.* Most entrants are college graduates who transfer from related fields such as social work, teaching, interviewing, job placement, psychology, or personnel work. Others are recent college graduates, some of whom have held part time jobs while in school. Some have been tending to family responsibilities. Because prior work experience is usual for counselors, entrants tend to be somewhat older than entrants to other occupations.

**Kindergarten and elementary school teachers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 1,366,000

Selected characteristics of workers, 1982:

Percent female . . . . .	82.4
Percent black . . . . .	10.5
Percent employed part time . . . . .	11.2

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services . . . . .	98.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	1,839,000	1,877,000	1,918,000
Percent change . . . . .	34.6	37.4	40.4

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 10.6 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* All States require teachers in public elementary schools to be certified; some require teachers in private and parochial elementary schools to be certified as well. To become certified, an individual must have a bachelor's degree from an institution with a State-approved teacher education program, student teaching experience, and basic education courses. Almost half the States require teachers to obtain a master's degree within a certain period after beginning work.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:

Number of persons granted bachelor's degrees who are prepared to teach in kindergarten and elementary schools . . . . .	69,188
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*Characteristics of entrants.* Most kindergarten and elementary school teachers are women. Consequently, the occupation is characterized by a pattern of movement from teaching to family responsibilities and back to teaching again. Most job openings are filled by persons who have not been working—many have been tending to household responsibilities and others have been full-time students. Many entrants transfer into the occupation—primarily students who have been working part time while in school.

## Librarians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 151,000

Selected characteristics of workers, 1982:

Percent female . . . . . 83.4  
 Percent black . . . . . 7.3  
 Percent employed part time . . . . . 22.7

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services . . . . .	71.5
Local government . . . . .	10.7

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	167,000	170,000	174,000
Percent change . . . . .	10.7	12.6	15.3

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 13.9 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Entry requirements vary by employment setting. Most States require that school librarians be certified as teachers; for these jobs, a bachelor's or master's degree in library science or a master's degree in media resources, educational technology, or audiovisual communications may be acceptable, depending on the State. A master's degree in library science (MLS) usually is required for jobs in public libraries and most college and university libraries.

#### Training completions:

Earned degrees, baccalaureate and above, 1982:

Library science:  
 Bachelor's . . . . . 307  
 Master's . . . . . 4,506  
 Ph.D. . . . . 84

*Characteristics of entrants.* Most librarians are women, and the occupation is characterized by movement from employment to family responsibilities and back again. Most job openings are filled by homemakers returning to the labor force. The remainder are filled by recent college graduates—a large proportion of whom have a Master of Library Science degree.

## Secondary school teachers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 1,024,000

Selected characteristics of workers, 1982:

Percent female . . . . . 51.9  
 Percent black . . . . . 7.3  
 Percent employed part time . . . . . 10.3

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry . . . . . Percent

Educational services . . . . . 99.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	1,128,000	1,152,000	1,177,000
Percent change <sup>1</sup> . . . . .	10.2	12.5	14.9

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 9.3 percent

<sup>1</sup> Employment is projected to decline through the 1980's, then increase in the early 1990's.

### SUPPLY PROFILE

*Usual entry level requirements.* All States require public secondary school teachers to be certified, many States require teachers in private and parochial schools to be certified as well. To become certified, individuals must have a bachelor's degree from an approved teacher training program with a prescribed number of credits in the subject in which they plan to teach. They also must complete student teaching and other professional education courses. Almost half the States require teachers to obtain a graduate degree within a certain time after being hired.

#### Training completions:

Earned degrees, baccalaureate and above, 1982:

Number of persons granted bachelor's degrees who are prepared to teach in secondary schools . . . . . 74,143

*Characteristics of entrants.* The majority of secondary school teachers are women. Consequently, there is substantial movement from teaching to family responsibilities and back again. Most job openings are filled by people who have not been working, primarily full-time homemakers and students. Some entrants transfer from other occupations, either because they have been working while in school or because they could not immediately find a job as a teacher.

## Health Diagnosing and Treating Practitioners

### Chiropractors

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 25,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Offices of chiropractors . . . . .	99.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	33,000	32,000	32,000
Percent change . . . . .	28.1	27.2	27.2

Employment change . . . . . Average

## SUPPLY PROFILE

*Usual entry level requirements.* All 50 States and the District of Columbia regulate the practice of chiropractic and grant licenses to individuals who meet the educational requirements and pass a State board examination.

### Training completions:

Earned degrees, baccalaureate and above, 1982:  
Chiropractic (D.C. or D.C.M.) . . . . . 2,626

*Characteristics of entrants.* The overwhelming majority of entrants come directly from school and are under 35 years of age.

## Dentists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 173,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 3.3  
Percent black . . . . . 2.5  
Percent employed part time . . . . . 14.3

Unemployment rate . . . . . Much lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Offices of dentists . . . . .	88.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	213,000	213,000	218,000
Percent change . . . . .	23.5	23.7	26.6

Employment change . . . . . Average

Annual replacement rate . . . . . 1.2 percent

### SUPPLY PROFILE

*Usual entry level requirements.* All States and the District of Columbia require dentists to be licensed. To qualify for licensure in most States, a candidate must be a graduate of a dental school approved by the American Dental Association and pass written and practical examinations.

### Training completions:

Earned degrees, baccalaureate and above, 1982:  
D.D.S. and D.M.D. degrees . . . . . 5,282

*Characteristics of entrants.* Almost all entrants are recent dental school graduates between the ages of 25 and 34. A small number are licensed dentists who have been serving in the Armed Forces or tending to family responsibilities.

## Optometrists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 28,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Offices of optometrists . . . . .	70.0
Miscellaneous retail stores (includes optical goods stores) . . . . .	11.6

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	35,000	34,000	35,000
Percent change . . . . .	25.5	25.1	25.7

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* All States and the District of Columbia require that optometrists be licensed. Applicants for licensure must have a Doctor of Optometry degree from an accredited optometric school or college and pass a State board examination.

### Training completions:

Earned degrees, baccalaureate and above, 1982:  
Doctor of Optometry (O.D.) . . . . . 1,110

*Characteristics of entrants.* The overwhelming majority of entrants come directly from school and are under 35 years of age.

## Physicians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 479,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 14.8  
Percent black . . . . . 2.3  
Percent employed part time . . . . . 5.9

Unemployment rate . . . . . Much lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Offices of physicians . . . . .	48.0
Hospitals . . . . .	30.6
Federal Government . . . . .	8.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	640,000	642,000	663,000
Percent change . . . . .	33.6	34.0	38.3

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 1.4 percent

### SUPPLY PROFILE

*Usual entry level requirements.* All States and the District of Columbia require physicians to be licensed. Licensure requirements include a minimum of 8 years of postsecondary education—graduation from an accredited professional school, successful completion of a licensing examination, and, in most States, 1 or 2 years of supervised practice in an accredited graduate medical education program (internship/residency).

**Training completions:**

Earned degrees, baccalaureate and above, 1982:  
 D.O. and M.D. degrees . . . . . 16,861

*Characteristics of entrants.* Almost all entrants are recent medical school graduates between the ages of 25 and 34. A small number are licensed physicians who have been serving in the Armed Forces or tending to family responsibilities.

**Podiatrists**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 13,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Offices of podiatrists . . . . .	55.2
Hospitals . . . . .	15.8
Nursing and personal care facilities . . . . .	10.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	20,000	20,000	20,000
Percent change . . . . .	52.6	51.9	52.9

Employment change . . . . . Much faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* All States and District of Columbia require podiatrists to be licensed. Applicants for licensure must be a graduate of an accredited college of podiatric medicine and pass both written and oral examinations. Eight States require applicants to serve a 1-year residency in a hospital or clinic following graduation.

*Training completions:*

Earned degrees, baccalaureate, and above, 1982:  
 Pod. D., D.P., and D.P.M. degrees . . . . . 598

*Characteristics of entrants.* The overwhelming majority of entrants come directly from school and are under 35 years of age.

**Veterinarians**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 36,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Agricultural services . . . . .	66.3
Federal Government . . . . .	14.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	48,000	48,000	48,000
Percent change . . . . .	31.2	30.4	31.8

Employment change . . . . . Faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* All States and the District of Columbia require veterinarians to be licensed. Licensure requirements include graduation from an accredited college of veterinary medicine and passing both written and oral State board proficiency examinations.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:  
 D.V.M. . . . . 2,038

*Characteristics of entrants.* Most entrants are recent college graduates; some are transferring from part-time jobs in other occupations that they have held while in school.

**Registered Nurses, Pharmacists, Dietitians, Therapists, and Physician Assistants**

**Dietitians**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 44,000

Selected characteristics of workers, 1982:

Percent female . . . . .	90.1
Percent employed part time . . . . .	19.8

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals . . . . .	38.0
Nursing and personal care facilities . . . . .	16.4
Social services . . . . .	13.5
Local government . . . . .	6.6

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	61,000	62,000	64,000
Percent change . . . . .	38.3	39.9	44.3

Employment change . . . . . Faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* Most employers require a bachelor's degree with a major in foods and nutrition or institution management for entry level positions. Almost all employers prefer dietitians who have been registered by the American Dietetic Association; for higher level jobs, many employers require registration.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:  
 Foods and nutrition and institutional and cafeteria management:  
 Bachelor's . . . . . 3,689  
 Master's . . . . . 779  
 Ph.D. . . . . 41

*Characteristics of entrants.* Most entrants are recent college graduates, including some who have worked part time in other occupations while attending school. Persons who have been tending to

family responsibilities fill most of the remaining jobs. Practically all entrants have attended college; most have a degree.

### Occupational therapists

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 25,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals . . . . .	42.9
Educational services . . . . .	16.6
State government . . . . .	6.0
Local government . . . . .	5.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	40,000	40,000	41,000
Percent change . . . . .	58.5	59.8	64.4

Employment change . . . . . Much faster than average

#### SUPPLY PROFILE

*Usual entry level requirements.* A bachelor's degree in occupational therapy is the minimum requirement for work in this field. In addition, 21 States and the District of Columbia require occupational therapists to be licensed. Applicants for licensure must have a degree from an accredited institution, successfully complete 6 months of supervised field work, and pass the State licensure examination. A graduate degree often is required for teaching, research, or administrative positions.

#### Training completions:

Earned degrees, baccalaureate and above, 1982:

Bachelor's . . . . .	1,663
Master's . . . . .	255

### Pharmacists

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 151,000

Selected characteristics of workers, 1982:

Percent female . . . . .	23.8
Percent black . . . . .	3.6
Percent employed part time . . . . .	11.1

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Drug stores and proprietary stores . . . . .	65.1
Hospitals . . . . .	24.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	188,000	192,000	196,000
Percent change . . . . .	24.3	27.2	30.0

Employment change . . . . . Average

Annual replacement rate . . . . . 5.9 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* All States and the District of Columbia require pharmacists to be licensed. Requirements include graduation from an accredited pharmacy program, passing a State board examination, and completing a specified amount of practical experience or serving an internship under the supervision of a licensed pharmacist.

#### Training completions:

Earned degrees, baccalaureate and above, 1982:

Pharmacy:	
Bachelor's . . . . .	6,367
D. Pharm. . . . .	625

*Characteristics of entrants.* Most entrants are recent graduates of pharmacy school who are under the age of 25.

### Physical therapists

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 43,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals . . . . .	44.5
Offices of physical therapists . . . . .	16.3

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	68,000	69,000	70,000
Percent change . . . . .	57.2	58.2	61.9

Employment change . . . . . Much faster than average

#### SUPPLY PROFILE

*Usual entry level requirements.* A license is required to practice physical therapy. To obtain a license, applicants must have a degree or certificate from an accredited physical therapy educational program and pass a State licensure examination. Physical therapists should have manual dexterity and stamina.

#### Training completions:

Associate and other degrees below baccalaureate, 1982:<sup>1</sup> . . . . . 1,060

Earned degrees, baccalaureate and above, 1982:

Bachelor's . . . . .	1,663
Master's . . . . .	225

<sup>1</sup> Physical therapy technology.

### Physician assistants

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 22,000

Industry concentration of employment (wage and salary workers), 1982:



	Industry	Percent
Offices of physicians	.....	49.9
Hospitals	.....	19.2
Local government	.....	8.2
Federal Government	.....	5.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	28,000	28,000	30,000
Percent change	24.8	26.8	31.8

Employment change ..... Average

### SUPPLY PROFILE

*Usual entry level requirements.* Nearly all States require applicants to complete an approved formal training program offered by hospitals, schools of allied health, community and 4-year colleges and universities, and medical schools.

## Registered nurses

### EMPLOYMENT PROFILE

Total employment, 1982 ..... 1,312,000

Selected characteristics of workers, 1982:

Percent female	.....	95.6
Percent black	.....	8.2
Percent employed part time	.....	28.2

Unemployment rate ..... Lower than average

Industry concentration of employment (wage and salary workers), 1982:

	Industry	Percent
Hospitals	.....	66.6

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	1,943,000	1,954,000	2,022,000
Percent change	48.0	48.9	54.1

Employment change ..... Faster than average

Annual replacement rate ..... 10.2 percent

### SUPPLY PROFILE

*Usual entry level requirements.* To obtain the license to practice that is required by all States and the District of Columbia, nurses must graduate from an approved school of nursing—courses of study range from 2 to 5 years—and pass a national examination administered by each State. Nurses may be licensed in more than one State, either by examination or endorsement of a license issued by another State.

*Training completions:*

Public vocational secondary and post-secondary, 1982 <sup>1</sup>	.....	30,911
Private noncollegiate postsecondary, 1981 <sup>1</sup>	.....	5,061
Associate and other degrees below baccalaureate, 1982	.....	37,468
Earned degrees, baccalaureate and above, 1982:		
Nursing:		
Bachelor's	.....	37,468
Master's	.....	5,312
Ph.D.	.....	134

<sup>1</sup> Nursing (associate degree).

*Characteristics of entrants.* Job openings are filled either by recent nursing school graduates or from the reserve pool of licensed but inactive nurses who have been tending to family responsibilities.

## Respiratory therapists

### EMPLOYMENT PROFILE

Total employment, 1982 ..... 46,000

Industry concentration of employment (wage and salary workers), 1982:

	Industry	Percent
Hospitals	.....	91.0

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	67,000	67,000	70,000
Percent change	44.1	44.9	49.9

Employment change ..... Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Although many respiratory therapists are trained on the job, a growing number of employers are requiring completion of a formal training program. These programs are offered by postsecondary vocational schools, hospitals, medical schools, colleges and universities, and the Armed Forces. Applicants should have mechanical ability and manual dexterity.

*Training completions:*

Public vocational secondary and postsecondary, 1982 <sup>1</sup>	.....	3,272
Private noncollegiate postsecondary, 1981 <sup>2</sup>	.....	3,219
Associate and other degrees below baccalaureate, 1982 <sup>1</sup>	.....	3,494

<sup>1</sup> Inhalation therapy.

<sup>2</sup> Respiratory therapy technology.

## Speech pathologists and audiologists

### EMPLOYMENT PROFILE

Total employment, 1982 ..... 42,000

Industry concentration of employment (wage and salary workers), 1982:

	Industry	Percent
Educational services	.....	71.6
Hospitals	.....	9.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	53,000	54,000	55,000
Percent change	26.9	28.8	31.7

Employment change ..... Average

### SUPPLY PROFILE

*Usual entry level requirements.* Most employers require a master's degree in speech-language pathology or audiology. Thirty-four States require licenses for those offering speech pathology and

audiology services in private practices, clinics, or other settings outside of schools.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:

Speech pathology and audiology:	
Bachelor's	3,414
Master's	3,104
Ph.D.	114

## Health Technologists and Technicians

### Clinical laboratory technologists and technicians

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 209,000

Selected characteristics of workers, 1982:

Percent female	76.7
Percent black	9.8
Percent employed part time	16.9

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals	69.3
Offices of physicians	11.7
Medical and dental laboratories	10.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	291,000	292,000	303,000
Percent change . . . . .	39.2	40.0	45.1

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 10.3 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* The usual requirement for a beginning job as a clinical laboratory technologist is a bachelor's degree with a major in medical technology or in one of the life sciences. Clinical laboratory technicians generally are required to have an associate degree or to have completed the training program in a postsecondary vocational school. Some States require technologists and technicians to be licensed.

*Training completions:*

Public vocational secondary and postsecondary,	
1982 <sup>1</sup>	4,715
Private noncollegiate postsecondary,	
1981 <sup>1</sup>	4,346
Associate and other degrees below baccalaureate,	
1982 <sup>2</sup>	3,568
Earned degrees, baccalaureate and above, 1982:	
Medical laboratory technologies:	
Bachelor's	4,596
Master's	207
Ph.D.	4

<sup>1</sup> Includes medical laboratory assisting and other medical laboratory technology.

<sup>2</sup> Medical or biological laboratory assistant.

*Characteristics of entrants.* Most clinical laboratory technologists and technicians are women. Consequently, the occupation is characterized by considerable movement from employment to the home and back again. Most entrants—mainly homemakers and students—have not been working. The remaining entrants transfer from other occupations; some have been working part time while in school. Most entrants are between the ages of 20 and 34.

## Dental hygienists

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 69,000

Selected characteristics of workers, 1982:

Percent female	97.3
Percent employed part time	49.9

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Offices of dentists	95.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	97,000	99,000	104,000
Percent change . . . . .	39.9	42.8	50.0

Employment change . . . . . Faster than average

#### SUPPLY PROFILE

*Usual entry level requirements.* Dental hygienists must be licensed. To get a license, a candidate must graduate from an accredited dental hygiene school and pass both a written and a clinical examination.

*Training completions:*

Public vocational secondary and post-secondary,	
1982	2,621
Private noncollegiate postsecondary, 1981	
	46
Associate and other degrees below baccalaureate, 1982	
	3,790

*Characteristics of entrants.* Almost all dental hygienists are women and the occupation is characterized by considerable movement from employment to the home and back again. The majority of entrants have not been working—most have been tending to family responsibilities. Most of the remaining entrants transfer from other occupations—many have been working while in school. Virtually all entrants have had some college training, and many have a degree. Most entrants are between the ages of 20 and 34 and work part time.

## Electrocardiograph technicians

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 21,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals	78.4
Federal Government	16.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	29,000	29,000	30,000
Percent change . . . . .	37.9	36.7	42.5

Employment change . . . . . Faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* Most electrocardiograph (EKG) technicians are trained on the job, although a few graduate from formal training programs offered by hospitals, postsecondary vocational schools, and community colleges. Employers generally look for high school graduates with mechanical aptitude who can follow detailed instructions and have presence of mind in emergencies.

*Training completions:*

Private noncollegiate postsecondary, 1981 . . . . .	508
Associate and other degrees below baccalaureate, 1982 <sup>1</sup> . . . . .	203

<sup>1</sup> Electrodiagnostic technology.

**Electroencephalographic technologists**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 5,500

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals . . . . .	88.0
Offices of physicians . . . . .	10.5

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	7,700	7,700	8,000
Percent change . . . . .	40.2	41.2	46.7

Employment change . . . . . Faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* Electroencephalographic (EEG) technicians generally learn their skills on the job. Employers normally require a high school diploma. Many EEG technologists also learn their skills on the job, but some graduate from formal training programs offered by hospitals and medical centers, postsecondary vocational schools, community colleges, and colleges and universities. Applicants for both specialties should have manual dexterity, good vision, an aptitude for working with electronic equipment, and the ability to work with patients as well as other health professionals.

*Training completions:*

Associate and other degrees below baccalaureate, 1982 <sup>1</sup> . . . . .	203
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<sup>1</sup> Electrodiagnostic technology.

**Health record technicians**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 22,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals . . . . .	62.9
Nursing and personal care facilities . . . . .	12.5
Federal Government . . . . .	10.7

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	31,000	31,000	32,000
Percent change . . . . .	43.6	43.5	48.8

Employment change . . . . . Faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* Most employers prefer to hire graduates of accredited 2-year associate degree programs. Due to a shortage of these graduates, however, many experienced record clerks are promoted to technician status.

*Training completions:*

Private noncollegiate postsecondary, 1982 . . . . .	495
Associate and other degrees below baccalaureate, 1982 . . . . .	1,080

*Characteristics of entrants.* Most entrants transfer from other occupations—primarily health record clerks who are promoted following completion of additional on-the-job training. Most entrants have some college training, but few have a degree.

**Licensed practical nurses**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 594,000

Selected characteristics of workers, 1982:

Percent female . . . . .	97.0
Percent black . . . . .	16.3
Percent employed part time . . . . .	27.0

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals . . . . .	57.4
Nursing and personal care facilities . . . . .	16.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	809,000	815,000	841,000
Percent change . . . . .	36.0	37.1	41.4

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 13.9 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* All States and the District of Columbia require practical nurses to be licensed. Applicants for licensure must complete a State-approved program in practical nursing and pass a written examination.

*Training completions:*

Public vocational secondary and post-secondary, 1982 . . . . .	33,502
--	--------

Private noncollegiate postsecondary, 1981 . . . . . 16,973  
 Associate and other degrees below baccalaureate, 1982 . . . . . 15,043

*Characteristics of entrants.* Almost all practical nurses are women. Consequently, the occupation is characterized by considerable movement from employment to the home and back again. Most entrants are recent nursing school graduates or licensed but inactive nurses who have been tending to family responsibilities or not working for other reasons. An unusually large proportion of entrants are 35 and older.

## Radiologic technologists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 110,000

Selected characteristics of workers, 1982:

Percent female . . . . . 72.2  
 Percent black . . . . . 9.3  
 Percent employed part time . . . . . 21.6

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals . . . . .	70.5
Offices of physicians . . . . .	21.3

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	156,000	157,000	164,000
Percent change . . . . .	42.1	43.0	48.7

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 10.0 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Completion of a formal training program in radiography, nuclear medicine technology, radiation therapy technology, or diagnostic medical sonography is required for entry level jobs in hospitals, which employ most radiologic technologists. Technologists employed in physicians' offices may be trained on the job, however. Many jobs require registration or certification with the appropriate professional organization and, in addition, some states require radiologic technologists to be licensed.

*Training completions:*

Associate and other degrees below baccalaureate, 1982 . . . . . 3,755

*Characteristics of entrants.* Most job openings are filled by people who have not been working—primarily full-time students or homemakers attracted by the opportunity to work part time. The remaining entrants have transferred from other occupations, especially other health occupations. Many entrants have attended college, but few have received a degree.

## Surgical technicians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 35,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Hospitals . . . . .	98.0

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	48,000	49,000	51,000
Percent change . . . . .	39.0	39.8	45.1

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Most employers require graduation from a formal training program in surgical technology. These programs last from 9 months to 2 years and are offered by community and junior colleges, postsecondary vocational schools, and hospitals.

*Training completions:*

Private noncollegiate postsecondary, 1981 . . . . . 901  
 Associate and other degrees below baccalaureate,  
 1982 . . . . . 1,132

## Writers, Artists, and Entertainers

### Communications Occupations

#### Public relations specialists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 90,000

Selected characteristics of workers, 1982:

Percent female . . . . . 50.0  
 Percent black . . . . . 3.0  
 Percent employed part time . . . . . 12.7

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Business services . . . . .	12.5
Educational services . . . . .	12.0
Finance, insurance, and real estate . . . . .	11.7
Membership organizations . . . . .	11.6
Government . . . . .	11.3

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	114,000	115,000	118,000
Percent change . . . . .	27.5	28.7	31.1

Employment change . . . . . Average

Annual replacement rate . . . . . 19.4 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Employers generally require a college degree or relevant work experience. Some employers seek persons who have majored in journalism, public relations, or another

of the communications specialties; others look for a technical major related to the firm's business, such as engineering, finance, or computer science. Experience in journalism, sales, or a technical field can provide valuable experience writing copy, dealing with people, and learning about the organization's products or services.

*Training completions:*

Earned degrees, baccalaureate and above, 1982: <sup>1</sup>	
Bachelor's	34,222
Master's	3,327
Ph.D.	200

<sup>1</sup> Degrees in communications, including public relations, journalism, and advertising

*Characteristics of entrants.* The majority of entrants transfer from other occupations—most have been working in jobs that prepare them for public relations work; some probably have been working part time while in school. The remaining entrants have not been working—primarily students and persons tending to family responsibilities. Most entrants have had some college training and about half have a degree. Because so many have work experience, they tend to be older than entrants in other occupations.

**Radio and television announcers and newscasters**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 55,000

Industry concentration of employment (wage and salary workers), 1982:	
<i>Industry</i>	<i>Percent</i>
Radio and television broadcasting	97.0

Projected employment, 1982–95:			
	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . .	70,000	70,000	70,000
Percent change . . . . .	27.3	28.2	28.8

Employment change . . . . . Average

**SUPPLY PROFILE**

*Usual entry level requirements.* Although not always required, formal training usually is necessary to develop one's talents. The video taped audition that presents samples of an applicant's delivery, style, and appearance often is the most important factor in hiring. Announcers must have a pleasant and well-controlled voice, good timing, excellent pronunciation, and good grammar.

*Training completions:*

Associate and other degrees below baccalaureate, 1982	2,515
Earned degrees, baccalaureate and above, 1982:	
Radio-television:	
Bachelor's	5,366
Master's	256
Ph.D.	11

*Characteristics of entrants.* Most entrants are recent college graduates. Many have been working part time in related jobs while in school.

**Reporters and correspondents**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 51,000

Industry concentration of employment (wage and salary workers), 1982:	
<i>Industry</i>	<i>Percent</i>
Newspapers	75.8
Radio and television broadcasting	13.8

Projected employment, 1982–95:			
	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . .	64,000	66,000	67,000
Percent change . . . . .	25.8	29.3	31.1

Employment change . . . . . Average

**SUPPLY PROFILE**

*Usual entry level requirements.* Most employers prefer college graduates who have at least a bachelor's degree in journalism, including training in the liberal arts. Typing skill is necessary, and the ability to take shorthand and to use computerized word processing equipment is an asset. Applicants should be able to present facts and opinions clearly and succinctly.

*Training completions:*

Associate and other degrees below baccalaureate, 1982 <sup>1</sup>	2,429
Earned degrees, baccalaureate and above, 1982	
Journalism:	
Bachelor's	8,841
Master's	901
Ph.D.	27

<sup>1</sup> Communications and broadcasting.

**Writers and editors**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 120,000

Industry concentration of employment (wage and salary workers), 1982:	
<i>Industry</i>	<i>Percent</i>
Newspapers	21.5
Business services	15.7
Membership organizations	7.7
Federal Government	6.3

Projected employment, 1982–95:			
	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . .	160,000	162,000	165,000
Percent change . . . . .	33.9	35.3	38.1

Employment change . . . . . Faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* Many employers require applicants to have a college degree; some prefer a major in the liberal arts or social sciences while others prefer a communications or journalism major. Some jobs—technical writing, for example—require a degree in or detailed knowledge about a specialized field

such as engineering. Aspiring writers and editors should be able to express ideas clearly and logically, and should be familiar with research techniques.

**Training completions:**

Associate and other degrees below baccalaureate, 1982 <sup>1</sup>	2,429
Earned degrees, baccalaureate and above, 1982	
Journalism:	
Bachelor's	8,841
Master's	901
Ph.D.	27

<sup>1</sup> Communications and broadcasting.

## Design Occupations

### Commercial and graphic artists and designers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 133,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Advertising . . . . .	19.3
Mailing, reproduction, commercial art, and stenographic services . . . . .	16.3
Printing, publishing, and allied industries . . . . .	16.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	166,000	167,000	169,000
Percent change . . . . .	25.1	25.7	27.4

Employment change . . . . . Average

#### SUPPLY PROFILE

*Usual entry level requirements.* Employers are more interested in demonstrated ability, as represented by an applicant's portfolio, than in evidence of appropriate training or other qualifications. Nevertheless, most aspiring commercial and graphic artists and designers take postsecondary art programs, which are offered by 4-year colleges and universities, community and junior colleges, and postsecondary vocational schools.

**Training completions:**

Public vocational secondary and postsecondary, 1982 <sup>1</sup>	32,422
Private noncollegiate postsecondary, 1981 <sup>1</sup>	16,354
Associate and other degrees below baccalaureate, 1982 <sup>2</sup>	8,265
Earned degrees, baccalaureate and above, 1982: <sup>3</sup>	
Bachelor's	16,262
Master's	2,220
Ph.D.	13

<sup>1</sup> Commercial art occupations and graphic arts occupations.

<sup>2</sup> Applied, graphic, and fine arts.

<sup>3</sup> Art and applied design.

## Designers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 180,000

Selected characteristics of workers, 1982:

Percent female . . . . .	32.6
Percent black . . . . .	1.8
Percent employed part time . . . . .	10.2

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Miscellaneous retail stores (includes florists and artists' supply and material stores) . . . . .	29.4
Nondurable goods manufacturing . . . . .	8.7
Business services . . . . .	7.6
Engineering, architectural, and surveying services . . . . .	6.7
Machinery manufacturing, except electrical . . . . .	6.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	247,000	253,000	258,000
Percent change . . . . .	37.6	40.8	43.5

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 14.7

#### SUPPLY PROFILE

*Usual entry level requirements.* Employers look for persons with artistic talent to fill entry level jobs. More and more people are developing their talents through formal degree and nondegree training programs in design.

**Training completions:**

Earned degrees, baccalaureate and above, 1982 <sup>1</sup>:

Bachelor's . . . . .	8,581
Master's . . . . .	904
Ph.D. . . . .	41

<sup>1</sup> Includes applied design and general fine arts.

*Characteristics of entrants.* The majority of entrants transfer from other occupations—some have worked part time while in school and others have transferred from jobs they had taken temporarily until a more suitable position could be found. The remaining entrants have not been working—persons tending to family responsibilities, students, and persons between jobs. Most entrants have had some postsecondary training and many are college graduates. Entrants tend to be somewhat older than entrants to other occupations, reflecting the increasing importance of postsecondary training and the difficulty many people have in locating their first design job.

## Photographers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 86,000

Selected characteristics of workers, 1982:

Percent female . . . . .	22.9
Percent black . . . . .	5.0
Percent employed part time . . . . .	20.1

Unemployment rate . . . . . About average

**Industry concentration of employment (wage and salary workers), 1982:**

Industry	Percent
Photographic studios, portrait . . . . .	26.3
Government . . . . .	11.4
Mailing, reproduction, commercial art, and stenographic services . . . . .	11.3
Printing, publishing, and allied industries . . . . .	11.2
Educational services . . . . .	8.5

**Projected employment, 1982-95:**

	Low	Moderate	High
1995 employment . . . . .	101,000	102,000	104,000
Percent change . . . . .	17.8	18.1	20.9

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 12.3 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* There are no formal education requirements for entry level jobs. Employers usually seek applicants who can demonstrate a broad technical understanding of photography as well as other photographic talents, such as imagination, creativity, and a good sense of timing. These skills often are developed through formal training available in colleges and universities, junior and community colleges, postsecondary vocational schools, and the Armed Forces. For a job in scientific or industrial photography, some knowledge of the field may be required.

*Training completions:*

Armed Forces enlisted strength, 1981 . . . . .	6,201
Associate and other degrees below baccalaureate, 1982 . . . . .	1,476
Earned degrees, baccalaureate and above, 1982:	
Bachelor's . . . . .	1,068
Master's . . . . .	84

*Characteristics of entrants.* The majority of all entrants transfer from other occupations—some have been photographer's assistants; others have transferred from occupations they had entered on a temporary basis until a suitable job could be found. The remainder have not been working—mostly persons between jobs, students, and those who have been tending to family responsibilities. The majority of entrants are between the ages of 25 and 34; most have had some college training and many have a degree.

**Performing Artists**

**Actors and actresses**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 34,000

**Industry concentration of employment (wage and salary workers), 1982:**

Industry	Percent
Motion picture production and services . . . . .	66.3
Theatrical producers, bands, and entertainers . . . . .	27.2

**Projected employment, 1982-95:**

	Low	Moderate	High
1995 employment . . . . .	48,000	49,000	52,000
Percent change . . . . .	39.6	43.2	51.0

Employment change . . . . . Faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* Talent is what counts most in getting an acting job. Talent generally is developed through formal training and acting experience.

*Training completions:*

**Earned degrees, baccalaureate and above, 1982:**

Dramatic arts:	
Bachelor's . . . . .	5,286
Master's . . . . .	1,258
Ph.D. . . . .	93

*Characteristics of entrants.* For most actors and actresses, employment is unsteady. Consequently, most enter and reenter the occupation after periods of unemployment or work in temporary jobs such as waiter, waitress, or sales worker.

**Dancers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 7,700

**Industry concentration of employment (wage and salary workers), 1982:**

Industry	Percent
Theatrical producers, bands, and entertainers . . . . .	35.8
Miscellaneous amusement and recreation services . . . . .	18.8
Eating and drinking places . . . . .	15.6
Motion picture production and services . . . . .	14.6

**Projected employment, 1982-95:**

	Low	Moderate	High
1995 employment . . . . .	11,000	11,000	11,000
Percent change . . . . .	40.2	42.7	48.7

Employment change . . . . . Faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* Serious training for a career in dancing traditionally begins by about age 12. Early ballet training begins at age 7 or 8 and is usually given by private teachers and independent ballet schools. Talented students who demonstrate potential in their early teens receive more intensive and advanced professional training at regional ballet schools or schools conducted under the auspices of the major ballet companies. Early and intensive training also is important for the modern dancer, but modern dance does not require as many years of training as ballet.

*Training completions:*

**Earned degrees, baccalaureate and above, 1982:**

Dance	
Bachelor's . . . . .	795
Master's . . . . .	269
Ph.D. . . . .	4

*Characteristics of entrants.* For most dancers, employment is unsteady. Consequently, many enter and reenter the occupation after periods of unemployment or work in temporary jobs. Almost all entrants are under age 25 and few have any formal education beyond high school.

## Musicians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 124,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Theatrical producers, bands, and entertainers . . . . .	36.4
Religious organizations . . . . .	30.4
Eating and drinking places . . . . .	21.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	153,000	155,000	160,000
Percent change . . . . .	23.1	24.5	28.4

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* People who become professional musicians generally begin studying an instrument at an early age. Intensive training is needed to acquire the necessary skill, knowledge of music, and the ability to interpret music. This training may be obtained through private study with an accomplished musician, in a college or university music program, in a music conservatory, or through practice with a group. For study in an institution, an audition frequently is necessary.

#### Training completions:

Earned degrees, baccalaureate and above, 1982:

Music:	
Bachelor's . . . . .	8,275
Master's . . . . .	3,256
Ph.D. . . . .	377

## Singers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 21,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Theatrical producers, bands, and entertainers . . . . .	52.5
Eating and drinking places . . . . .	14.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	26,000	26,000	26,000
Percent change . . . . .	21.0	20.8	22.6

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* While there are no formal educational requirements for most singing jobs, applicants need a broad background in music, including its theory and history, as well as the ability to dance and play the piano. Music training is offered

through private voice lessons and degree programs in music conservatories or departments of music in colleges and universities. In addition to musical talent, aspiring singers should have an attractive appearance, poise and stage presence, and perseverance.

#### Training completions:

Earned degrees, baccalaureate and above, 1982:

Music: <sup>1</sup>	
Bachelor's . . . . .	8,418
Master's . . . . .	3,361
Ph.D. . . . .	406

<sup>1</sup> Includes music performing, composition, and theory; music-liberal arts program; and music history and appreciation.

## Technologists and Technicians, Except Health

### Air traffic controllers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 21,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Federal Government . . . . .	100.0

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	24,000	22,000	23,000
Percent change . . . . .	15.1	4.3	11.6

Employment change . . . . . Little change is expected

### SUPPLY PROFILE

*Usual entry level requirements.* Air traffic controllers must successfully complete the Civil Service exam and training program at the Federal Aviation Administration (FAA) academy in Oklahoma City. Applicants generally must have either 3 years of general work experience or 4 years of college education or a combination of both. Applicants also must pass physical and psychological examinations and have vision correctable to 20/20.

*Characteristics of entrants.* Virtually all entrants are recent FAA academy graduates or former military air traffic controllers.

### Broadcast technicians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 17,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Radio and television broadcasting . . . . .	81.9
Federal Government . . . . .	18.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	22,000	22,000	22,000
Percent change . . . . .	28.2	26.5	28.6



Employment change . . . . . Average

Master's . . . . . 4,935  
Ph.D. . . . . 251

**SUPPLY PROFILE**

*Usual entry level requirements.* Federal law requires persons who operate broadcast transmitters in radio and television stations to have a restricted radiotelephone operator permit, for which no examination is required. Those who work with microwave or other internal radio communications equipment, however, must have a general radiotelephone operator license, issued after passing a series of written examinations. Vocational school, community college, or college training in engineering or electronics is the best preparation.

*Training completions:*

Public vocational secondary and postsecondary, 1982<sup>1</sup> . . . . . 15,947  
Private noncollegiate postsecondary, 1981<sup>1</sup> . . . . . 18,189  
Registered apprenticeship, 1979<sup>1</sup> . . . . . 310

<sup>1</sup> Electronic technologies.

**Computer programmers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 266,000

Selected characteristics of workers, 1982:

Percent female . . . . . 32.0  
Percent black . . . . . 5.7  
Percent employed part time . . . . . 5.4

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Computer and data processing services . . . . .	18.0
Finance, insurance, and real estate . . . . .	15.1
Office, computing, and accounting, machine manufacturing . . . . .	9.3

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	465,000	471,000	480,000
Percent change . . . . .	74.6	76.9	80.0

Employment change . . . . . Much faster than average

Annual replacement rate . . . . . 8.7 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* Training requirements vary widely, reflecting employers' needs. Many employers require a bachelor's degree in computer science or a related field; some require a graduate degree. Other employers accept applicants with fewer than 4 years of college.

*Training completions:*

Public vocational secondary and postsecondary,  
1982 . . . . . 20,521  
Private noncollegiate postsecondary, 1981 . . . . . 22,329  
Associate and other degrees below baccalaureate, 1982 . . . . . 10,026  
Earned degrees, baccalaureate and above, 1982:  
Computer and information sciences:  
Bachelor's . . . . . 20,267

*Characteristics of entrants.* Most entrants are recent graduates of various training programs. Many of the remainder transfer from related occupations, such as mathematics teacher, physics teacher, and engineer. Some of those who transfer are experienced computer operators who are advancing after acquiring appropriate training.

**Drafters**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 302,000

Selected characteristics of workers, 1982:

Percent female . . . . . 18.1  
Percent black . . . . . 5.9  
Percent employed part time . . . . . 5.4

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Engineering, architectural, and surveying services . . . . .	32.6
Machinery manufacturing, except electrical . . . . .	10.8
Electrical and electronic machinery and equipment manufacturing . . . . .	6.5
Fabricated metal product manufacturing . . . . .	5.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	309,000	318,000	327,000
Percent change . . . . .	2.3	5.0	8.2

Employment change . . . . . Little change is expected.

Annual replacement rate . . . . . 12.6 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* Employers prefer applicants who have acquired drafting skills in technical institutes, junior and community colleges, extension divisions of universities, and vocational and technical high schools. Training in the use of computer-aided design equipment is becoming increasingly important.

*Training completions:*

Public vocational secondary and postsecondary,  
1982 . . . . . 31,315  
Private noncollegiate postsecondary, 1981 . . . . . 7,962  
Associate and other degrees below baccalaureate, 1982<sup>1</sup> . . . . . 9,971

<sup>1</sup> Includes engineering graphics and architectural drafting technologies.

*Characteristics of entrants.* Most jobs are filled by young people who enter directly from school or who have completed training programs while working at other jobs. Most other entrants transfer from other occupations.

**Electrical and electronics technicians**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 366,000

Selected characteristics of workers, 1982:	
Percent female	12.4
Percent black	6.5
Percent employed part time	3.2

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Machinery, equipment, and supplies wholesalers	17.2
Electric and electronic machinery and equipment manufacturing	17.0
Transportation, communications, and utilities	10.6
Business services	7.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	585,000	589,000	602,000
Percent change	59.8	60.7	64.3

Employment change . . . . . Much faster than average

Annual replacement rate . . . . . 10.8 percent

## SUPPLY PROFILE

*Usual entry level requirements.* Although persons can qualify through many combinations of work experience and education, most employers prefer applicants who have had some specialized postsecondary training offered by junior and community colleges, colleges and universities, vocational schools, and the Armed Forces.

### Training completions:

Public vocational secondary and postsecondary, 1982 <sup>1</sup>		20,185
Private noncollegiate postsecondary, 1981 <sup>1</sup>		19,505
Registered apprenticeships, 1979 <sup>2</sup>		310
Associate and other degrees below baccalaureate, 1982 <sup>3</sup>		28,446

<sup>1</sup> Electrical and electronic technologies.

<sup>2</sup> Electronics technicians.

<sup>3</sup> Includes electronics and machine and electromechanical technologies.

*Characteristics of entrants.* The majority of all entrants have not been working—most have been in school full time; some have been serving in the Armed Forces. The remaining entrants transfer from other occupations where they have acquired needed skills or worked part time while completing formal training programs. Many entrants have some postsecondary training, but few have a college degree. About half of all entrants are between the ages of 25 and 34.

## Legal assistants

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 45,000  
 Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Legal services	71.3
State government	11.1
Local government	8.5

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	85,000	88,000	91,000
Percent change	88.4	94.3	101.7

Employment change . . . . . Much faster than average

## SUPPLY PROFILE

*Usual entry level requirements.* A few employers require only a high school diploma and train legal assistants on the job. Some employers train other experienced legal personnel, such as legal secretaries, for legal assistant positions. An increasing number of employers, however, require formal training, which is available from law schools, community and junior colleges, postsecondary vocational schools, legal assistant associations, and a few law firms. Many employers prefer applicants with training in a specialized area of the law, such as real estate or criminal law.

### Training completions:

Earned degrees, baccalaureate and above, 1982:

Law:	
Bachelor's	846
Master's	1,893
Ph.D.	22

## Library technicians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 29,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services	79.4
Federal Government	9.3

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	32,000	32,000	33,000
Percent change	9.2	10.2	13.2

Employment change . . . . . Slower than average

## SUPPLY PROFILE

*Usual entry level requirements.* Most employers prefer applicants with postsecondary training in library technology, offered by community and junior colleges and postsecondary vocational schools.

### Training completions:

Private noncollegiate postsecondary, 1981 <sup>1</sup>	2,886
Associate and other degrees below baccalaureate, 1982 <sup>2</sup>	410

<sup>1</sup> Library assistant.

<sup>2</sup> Library assistant technologies.

## Tool programmers, numerical control

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 12,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Machinery, manufacturing, except electrical	31.4
Aircraft and parts manufacturing	12.3

	<i>Industry</i>	<i>Percent</i>
Electrical and electronic machinery and equipment manufacturing . . . . .		10.3
Government . . . . .		10.1

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	22,000	22,000	23,000
Percent change . . . . .	76.2	78.4	83.6

Employment change . . . . . Much faster than average

## SUPPLY PROFILE

*Usual entry level requirements.* Tool programmers learn their jobs through a combination of work experience and vocational study and training. Employers prefer to promote or hire skilled machinists for programmer jobs. Some employers will hire people without machining experience if they have completed vocational school or junior college courses in tool programming and have demonstrated the ability to learn machine operations.

*Characteristics of entrants.* Most entrants transfer from other occupations, primarily machinist and other skilled machining occupations. The rest are recent graduates of training programs in tool programming.

## Marketing and Sales Occupations

### Cashiers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 1,570,000

Selected characteristics of workers, 1982:

Percent female . . . . .	86.8
Percent black . . . . .	10.0
Percent employed part time . . . . .	52.5

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Grocery stores . . . . .		41.9
Services . . . . .		10.2
Miscellaneous retail stores . . . . .		10.0
Eating and drinking places . . . . .		9.8
Drug stores and proprietary stores . . . . .		5.5

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	2,235,000	2,314,000	2,362,000
Percent change . . . . .	42.3	47.4	50.4

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 33.1 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Although there are no formal academic or experience requirements, many employers prefer high school graduates.

*Characteristics of entrants.* Most entrants have not been working; they have been students, full-time homemakers, or persons who have been laid off from other jobs. Many have no prior work experience. The remaining entrants transfer from other clerical and blue-collar occupations. An unusually large proportion of entrants are under 20 years of age.

### Insurance agents and brokers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 361,000

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Life insurance . . . . .		60.1
Insurance agents, brokers, and services . . . . .		26.7

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	447,000	452,000	458,000
Percent change . . . . .	23.8	25.0	26.6

Employment change . . . . . Average

#### SUPPLY PROFILE

*Usual entry level requirements.* Most employers will hire high school graduates with proven sales ability or who have been successful in other types of work. Some employers require a college degree. All agents and brokers must be licensed in the State where they plan to sell insurance. In most States, applicants for licensure must pass written examinations covering insurance fundamentals and State insurance laws.

*Training completions:*

Earned degrees, baccalaureate and above, 1982:

Insurance:	
Bachelor's . . . . .	61.3
Master's . . . . .	46
Ph.D. . . . .	4

*Characteristics of entrants.* Most entrants transfer from other occupations. The remainder were recent graduates or have been tending to family responsibilities. Entrants tend to be older than entrants to other occupations. More than half of all entrants have some college and many have a degree.

### Manufacturers' sales workers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 414,000

Selected characteristics of workers, 1982:

Percent female . . . . .	21.4
Percent black . . . . .	2.6
Percent employed part time . . . . .	7.9

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Food and related product manufacturing . . . . .	15.3
Newspapers . . . . .	12.1
Machinery manufacturing, except electrical . . . . .	9.5
Chemical and allied product manufacturing . . . . .	8.2
Fabricated metal product manufacturing . . . . .	6.7

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	461,000	478,000	491,000
Percent change . . . . .	11.4	15.5	18.8

Employment change . . . . . Slower than average  
Annual replacement rate . . . . . 13.7 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Although a college degree is increasingly desirable, many employers hire individuals without a degree who have sales experience or special knowledge of the product line being sold. Manufacturers of technical products usually require a college degree in science or engineering.

*Characteristics of entrants.* Over half of all entrants transfer from other occupations. The remainder have not been working—some were recent graduates; others were on temporary layoff. Because of the emphasis on work experience, entrants tend to be older than entrants to other occupations. More than half of all entrants have some college and many have a degree.

## Real estate agents and brokers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 337,000

Selected characteristics of workers, 1982:

Percent female . . . . .	50.2
Percent black . . . . .	.8
Percent employed part time . . . . .	20.0

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Real estate agents and managers . . . . .	69.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . .	449,000	450,000	453,000
Percent change . . . . .	33.1	33.3	34.4

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 12.4 percent

### SUPPLY PROFILE

*Usual entry level requirements.* All real estate agents and brokers must be licensed. Prospective agents must be high school graduates,

be at least 18 years old, and pass a written test. Most states require candidates for the general sales license to complete at least 30 hours of classroom instruction. Brokers must complete 90 hours of formal training and have 1 to 3 years of experience in selling real estate.

*Training completions:*

Public vocational secondary and post-secondary, 1982 . . . . .	22,228
Private noncollegiate postsecondary, 1982 . . . . .	78,681

*Characteristics of entrants.* This occupation is characterized by a pattern of movement into and out of the labor force, depending on the strength of the housing market, family responsibilities, and other factors. Most entrants have not been working—for the most part they have been homemakers or retired persons who are attracted by the opportunity to set their own work schedule. Others transfer from a wide variety of occupations. About half of all entrants are age 35 or older.

## Retail trade sales workers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 3,367,000

Selected characteristics of workers, 1982:

Percent female . . . . .	70.0
Percent black . . . . .	5.1
Percent employed part time . . . . .	48.8

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Department stores . . . . .	25.5
Miscellaneous retail stores (includes drug, proprietary, liquor, used merchandise, pet, and related stores) . . . . .	21.9
Apparel and accessories stores . . . . .	16.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	4,086,000	4,265,000	4,354,000
Percent change . . . . .	21.4	26.7	29.3

Employment change . . . . . Average

Annual replacement rate . . . . . 31.0 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Although there are no formal training requirements, employers generally prefer high school graduates. Persons under 18 may need a work permit.

*Characteristics of entrants.* Most job openings are filled by persons who have not been working, primarily students and full-time homemakers. Most entrants are under 25 years of age, have little or no work experience, and are attracted by the opportunity to work part time. Those who transfer into the occupation tend to be older and to take full time jobs.

## Securities sales workers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 78,000

Selected characteristics of workers, 1982:

Percent female . . . . . 19.8  
 Percent black . . . . . 4.1  
 Percent employed part time . . . . . 6.4

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Securities brokers and dealers . . . . .	94.7

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	106,000	107,000	109,000
Percent change . . . . .	35.7	36.4	38.8

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 7.8 percent

### SUPPLY PROFILE

*Usual entry level requirements.* A college education has increasingly become a requirement for employment. Many employers prefer to hire people who have been successful in other fields, particularly sales. Employers seek applicants who are self-confident, have good communication skills, and are well groomed.

*Characteristics of entrants.* Almost all entrants transfer from other occupations—primarily from professional or sales occupations that usually require a college degree. Some entrants are retirees re-entering the labor force. Most entrants are college graduates.

## Travel agents

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 62,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Arrangement of transportation . . . . .	98.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	86,000	88,000	89,000
Percent change . . . . .	39.6	42.7	43.0

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Employers prefer applicants who have taken travel courses; some also prefer college graduates. Travel courses are offered in postsecondary vocational schools, adult education programs in public high schools, community colleges, and 4-year colleges and universities. A few States require travel agents to be licensed.

### Training completions:

Public vocational secondary and postsecondary, 1982<sup>1</sup> . . . . . 4,174  
 Private noncollegiate postsecondary, 1981<sup>1</sup> . . . . . 1,069  
 Associate and other degrees below baccalaureate, 1982<sup>2</sup> . . . . . 2,065  
 Earned degrees, baccalaureate and above, 1982<sup>2</sup>:  
     Bachelor's . . . . . 1,816  
     Master's . . . . . 129  
     Ph.D. . . . . 2

<sup>1</sup> Transportation services.

<sup>2</sup> Transportation and public utilities.

## Wholesale trade sales workers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 1,093,000

Selected characteristics of workers, 1982:

Percent female . . . . . 13.9  
 Percent black . . . . . 1.6  
 Percent employed part time . . . . . 6.1

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Machinery, equipment, and supplies . . . . .	25.2
Electrical goods . . . . .	10.4
Groceries and related products . . . . .	9.0
Motor vehicles and auto parts and supplies . . . . .	8.6
Hardware, plumbing, and heating equipment and supplies . . . . .	5.5

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	1,395,000	1,421,000	1,425,000
Percent change . . . . .	27.6	29.9	30.3

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 13.8 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Requirements vary by product line and market. Sales of complex products, such as drugs or computer equipment, require people with a technical background; many employers in these fields require a college degree with a major closely related to the product line being sold. Employers specializing in nontechnical products—food, for example—often consider sales ability and familiarity with manufacturers and brands more important than knowledge of the product itself.

*Characteristics of entrants.* Most entrants transfer from other occupations—usually from lower level jobs in the same company or from other sales positions. The remainder have not been working—persons who have been laid off, students, or tending to family responsibilities. Entrants tend to be older than entrants to other occupations, reflecting the importance of prior work experience. The majority of entrants have had some college training and many have a degree.

## Administrative Support Occupations, Including Clerical

### Bank tellers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 539,000

Selected characteristics of workers, 1982:

Percent female . . . . . 92.0  
Percent black . . . . . 5.7  
Percent employed part time . . . . . 18.4

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Commercial and stock saving banks . . . . .	71.3
Savings and loan associations . . . . .	18.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	686,000	693,000	703,000
Percent change . . . . .	27.4	28.6	30.4

Employment change . . . . . Average

Annual replacement rate . . . . . 20.9 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Employers generally prefer high school graduates, although few employers have formal educational requirements. Preferred personal qualities include neatness, tact, courtesy, maturity, and attention to detail. Clerical skills are useful but typing proficiency is not needed.

*Characteristics of entrants.* Many job openings are filled by persons who transfer from other occupations—primarily clerical. Because nearly all bank tellers are women, the occupation is characterized by much movement from work to family responsibilities and back again. Most entrants who have not been working have been full time homemakers. Many of the others enter directly from school. Although many entrants have education or training beyond high school, few are college graduates. The majority of entrants are under the age of 25.

### Bookkeepers and accounting clerks

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 1,713,000

Selected characteristics of workers, 1982:

Percent female . . . . . 91.8  
Percent black . . . . . 4.3  
Percent employed part time . . . . . 26.4

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Services . . . . .	23.3
Retail trade . . . . .	21.6

#### Industry

#### Percent

Finance, insurance, and real estate . . . . . 10.6  
Wholesale trade, durable goods . . . . . 7.3

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	1,943,000	1,985,000	2,027,000
Percent change . . . . .	13.4	15.9	18.3

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 18.8 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* High school graduates who have taken business arithmetic, bookkeeping, and principles of accounting meet the minimum requirements for most bookkeeping jobs. Some employers prefer applicants who have completed accounting programs at the community or junior college level or those who have attended business school.

*Characteristics of entrants.* More than half of all job openings are filled by persons who have not been working, primarily full-time homemakers returning to the labor force. Many are attracted by the opportunity to work part time. The remaining entrants transfer from other occupations, mostly other clerical occupations such as secretary and cashier. Although a considerable number of entrants have completed some training beyond high school, few are college graduates.

### Computer and peripheral equipment operators

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 260,000

Selected characteristics of workers, 1982:

Percent female . . . . . 63.3  
Percent black . . . . . 11.7  
Percent employed part time . . . . . 8.4

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Finance, insurance, and real estate . . . . .	20.0
Business services . . . . .	18.4
Durable goods manufacturing . . . . .	13.4
Government . . . . .	8.0
Nondurable goods manufacturing . . . . .	7.6

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	445,000	451,000	460,000
Percent change . . . . .	71.3	73.5	77.0

Employment change . . . . . Much faster than average

Annual replacement rate . . . . . 16.6 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Most employers require computer and peripheral equipment operators to have a high school education, specialized training, or experience. Many employers prefer

persons who have some postsecondary training, especially in data processing.

*Training completions:*

Public vocational secondary and postsecondary, 1982 . . . . .	9,994
Private noncollegiate postsecondary, 1981 . . . . .	3,276
Associate and other degrees below baccalaureate, 1982 . . . . .	1,103

*Characteristics of entrants.* Most entrants transfer from other occupations, such as secretary, typist, bookkeeper, and keypunch operator. The remaining job openings are filled by persons who have been tending to family responsibilities or in school.

### Keypunch operators

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 320,000

Selected characteristics of workers, 1982:

Percent female . . . . .	94.5
Percent black . . . . .	16.8
Percent employed part time . . . . .	13.2

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Business services . . . . .	22.1
Finance, insurance, and real estate . . . . .	14.3
Government . . . . .	12.4
Wholesale trade . . . . .	11.3
Durable goods manufacturing . . . . .	9.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	282,000	286,000	292,000
Percent change, . . . . .	-11.9	-10.6	-8.7

Employment change . . . . . Decline

Annual replacement rate . . . . . 19.7 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Employers prefer high school graduates who have some training in keypunching. Many employers test applicants' ability to enter data quickly and accurately.

*Training completions:*

Private noncollegiate postsecondary, 1981 . . . . .	7,899
Associate and other degrees below baccalaureate, 1982 . . . . .	917

*Characteristics of entrants.* Most keypunch operators are women. The occupation is characterized by considerable movement between employment and the home. About half of all entrants have not been working—mostly persons who have been tending to family responsibilities or in school. The rest transfer from other occupations. Most entrants are young and have a high school diploma or less education.

### Mail carriers and postal clerks

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 541,000

Selected characteristics of workers, 1982:

Percent female . . . . .	26.4
Percent black . . . . .	17.0
Percent employed part time . . . . .	70

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
U.S. Postal Service . . . . .	100.0

Projected employment 1982-95:

	Low	Moderate	High
1995 employment . . . . .	439,000	474,000	485,000
Percent change . . . . .	-18.8	-12.2	-10.3

Employment change . . . . . Decline

Annual replacement rate . . . . . 7.4 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Civil service regulations govern the appointment of mail carriers and postal clerks. Applicants must be U.S. citizens or have been granted permanent resident alien status and be at least 18 years old (16, if they have a high school diploma). They must qualify on a written examination that measures speed and accuracy at checking names and numbers and ability to memorize mail distribution procedures; and pass a physical examination. Applicants for mail carrier positions must have a driver's license, a good driving record, and pass a road test. Applicants for postal clerk jobs operating an electronic sorting machine must pass a special examination that includes a machine aptitude test. Vacancies are filled on the basis of how applicants score on these tests.

*Characteristics of entrants.* The majority of entrants transfer from other occupations held while waiting to be selected from the list of eligible candidates. The remaining entrants have not been working; they are mainly persons who have been laid off or between jobs and persons who have been tending to family responsibilities. Although some entrants have attended college, the majority have a high school diploma or less. Most entrants are between the ages of 20 and 34.

### Receptionists

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 594,000

Selected characteristics of workers, 1982:

Percent female . . . . .	97.5
Percent black . . . . .	6.7
Percent employed part time . . . . .	31.0

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

	Industry	Percent
Offices of physicians . . . . .		17.9
Hospitals . . . . .		10.1
Offices of dentists . . . . .		9.1
Finance, insurance, and real estate . . . . .		8.1
Wholesale and retail trade . . . . .		7.9

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . . .	844,000	861,000	886,000
Percent change . . . . .	42.1	45.0	49.2

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 27.6 percent

## SUPPLY PROFILE

*Usual entry level requirements.* Employers normally require a high school diploma, and courses in English, typing, shorthand, business arithmetic, basic accounting and bookkeeping, and office procedures are recommended. Employers seek people who are outgoing and have a neat appearance, a pleasant voice, and an even disposition. Many entry level receptionist jobs do not require office or business experience.

*Characteristics of entrants.* About half of all entrants transfer from other occupations—mostly other clerical occupations such as cashier, clerk, secretary, and typist. The others have not been working, primarily women who have been engaged in family responsibilities. About 1 entrant in 3 has some college training. Nearly half of all entrants take part time jobs.

## Reservation agents and transportation ticket clerks

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 108,000

Selected characteristics of workers, 1982:

Percent female . . . . .	47.4
Percent black . . . . .	10.4
Percent employed part time . . . . .	9.8

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Certified air transportation . . . . .	76.4

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . . .	108,000	110,000	112,000
Percent change . . . . .	0.1	1.9	3.8

Employment change . . . . . Little change is expected

Annual replacement rate . . . . . 9.3 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Employers generally require a high school diploma; some prefer postsecondary training. Previous

experience in dealing with the public and prior employment in the transportation industry are viewed favorably by employers. A good appearance, a pleasant personality, and a good speaking voice are assets.

*Characteristics of entrants.* The majority of entrants transfer from other occupations. The remaining entrants have not been working—mainly they have been tending to family responsibilities, on temporary layoff, or in school. An unusually large proportion of entrants have attended college.

## Secretaries

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 2,441,000

Selected characteristics of workers, 1982:

Percent female . . . . .	99.2
Percent black . . . . .	5.9
Percent employed part time . . . . .	16.8

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services . . . . .	12.7
Finance, insurance, and real estate . . . . .	11.8
Wholesale and retail trade . . . . .	9.8
Health services . . . . .	8.6
Government . . . . .	8.6
Legal services . . . . .	8.4

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . . .	3,108,000	3,161,000	3,243,000
Percent change . . . . .	27.3	29.5	32.8

Employment change . . . . . Average

Annual replacement rate . . . . . 17.6 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Most employers seek high school graduates who have mastered basic office skills such as typing. Shorthand is needed for some jobs, and employers increasingly require word processing experience. Formal training usually is not required, but often it is an asset.

*Training completions:*

Public vocational secondary and post-secondary, 1982 <sup>1</sup> . . . . .	127,883
Private noncollegiate postsecondary, 1981 <sup>1</sup> . . . . .	62,486

<sup>1</sup> Stenographic-secretarial.

*Characteristics of entrants.* Most secretaries are women. The occupation is characterized by a pattern of movement from family responsibilities into the labor force and back to the home again. Most job openings are filled by people who have not been working. Some have been unemployed, others have been in school, but most have been full-time homemakers. The remaining entrants transfer from other occupations, especially clerical jobs such as typist, receptionist, stenographer, bank teller, bookkeeper, cashier, or statistical clerk.



Most entrants are between the ages of 25 and 54. Two out of five secretarial positions are filled by people who have had some college education, although only a minority are college graduates.

## Shipping and receiving clerks

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 365,000

Selected characteristics of workers, 1982:

Percent female . . . . . 24.8  
 Percent black . . . . . 11.8  
 Percent employed part time . . . . . 8.1

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Wholesale trade, durable goods . . . . .	19.9
Retail trade . . . . .	19.6
Non-durable goods manufacturing . . . . .	17.9
Durable goods manufacturing . . . . .	17.7
Wholesale trade, non-durable goods . . . . .	11.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	420,000	431,000	439,000
Percent change . . . . .	15.1	18.2	20.4

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 19.1 percent

### SUPPLY PROFILE

*Usual entry level requirements.* High school graduation is usually required for beginning jobs in shipping and receiving departments. Employers prefer applicants who have taken business arithmetic, typing, and other high school business subjects, and who can write legibly and keep orderly records.

*Characteristics of entrants.* Over half of all entrants transfer from a variety of unskilled and semiskilled occupations. The remainder have not been working—primarily students or workers laid off from other jobs.

## Stenographers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 270,000

Selected characteristics of workers, 1982:

Percent female . . . . . 84.8  
 Percent black . . . . . 10.6  
 Percent employed part time . . . . . 7.7

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
State government . . . . .	14.4
Educational services . . . . .	13.2
Hospitals . . . . .	10.4
Local government . . . . .	10.3
Finance, insurance, and real estate . . . . .	9.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	247,000	250,000	256,000
Percent change . . . . .	-8.5	-7.4	-5.1

Employment change . . . . . Decline

### SUPPLY PROFILE

*Usual entry level requirements.* Employers require applicants to be able to take dictation in shorthand at a certain speed and with a certain degree of accuracy. Applicants for court reporter jobs should know how to use a stenotype machine. Some States require court reporters to be certified.

*Training completions:*

Public vocational secondary and post-secondary, 1982<sup>1</sup> . . . . . 127,883  
 Private noncollegiate postsecondary, 1981<sup>1</sup> . . . . . 62,486

<sup>1</sup>Stenographic-secretarial.

*Characteristics of entrants.* Entrants are about evenly divided between those who have not been working and those who transfer from other occupations. Most new entrants are young people who have been in school. Some have been full-time homemakers. Many who transfer have held other clerical jobs, primarily secretary and typist. About 1 out of 2 entrants has some college training but few have a degree.

## Teacher aides

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 463,000

Selected characteristics of workers, 1982:

Percent female . . . . . 92.5  
 Percent black . . . . . 16.7  
 Percent employed part time . . . . . 57.8

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services . . . . .	81.3
Child day care services . . . . .	11.0

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	579,000	593,000	606,000
Percent change . . . . .	25.1	28.1	30.9

Employment change . . . . . Average

Annual replacement rate . . . . . 25.6 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Educational requirements vary widely. Some school districts require a high school diploma; others do not. Still others require some college training. Districts that delegate a significant amount of classroom responsibility to aides

usually require more training than those that use aides for primarily clerical or monitoring duties.

*Characteristics of entrants.* Most job openings are filled by persons who have not been working—primarily homemakers attracted by the opportunity to work part time.

## Telephone operators

### EMPLOYMENT PROFILE

Total employment, 1982	323,000
Selected characteristics of workers, 1982:	
Percent female	91.9
Percent black	16.3
Percent employed part time	14.7
Unemployment rate	About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Telephone communication	47.0
Miscellaneous business services (includes research and development laboratories; management, consulting, and public relations services; detective agencies; and related services)	10.9

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment	342,000	348,000	354,000
Percent change	5.7	7.8	9.5

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 20.1 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Some employers require a high school diploma. Many telephone companies and business firms require applicants to pass a physical examination. Employers prefer applicants who are pleasant, courteous, and good listeners and who have good reading, spelling, and arithmetic skills.

*Characteristics of entrants.* Almost all telephone operators are women. Consequently, there is considerable movement between employment and family responsibilities and back again. About half of all entrants have not been working; most have been students or full-time homemakers. Others transfer from other occupations—many from other clerical occupations such as cashier and keypunch operator.

## Typists

### EMPLOYMENT PROFILE

Total employment, 1982	990,000
Selected characteristics of workers, 1982:	
Percent female	96.6
Percent black	13.9
Percent employed part time	25.4

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Finance, insurance, and real estate	12.2
Local government	11.2
State government	9.6
Federal Government	8.6
Business services	8.4
Health services	8.3
Educational services	8.1

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment	1,136,000	1,145,000	1,175,000
Percent change	14.7	15.7	18.7

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 24.2 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Employers usually require high school graduation and a certain typing speed. An increasing number also require word processing training or experience. Spelling, punctuation, and grammar skills are important, and familiarity with standard office equipment and procedures is an asset.

*Training completions:*

Public vocational secondary and post-secondary, 1982 <sup>1</sup>	80,513
Private noncollegiate postsecondary, 1981 <sup>1</sup>	7,278

<sup>1</sup> Typing and related occupations.

*Characteristics of entrants.* Most openings are filled by people who have not been working. The majority have been attending to family responsibilities; the rest are recent graduates of training programs. The remaining entrants transfer from other clerical occupations, such as bookkeeper, cashier, clerk, and secretary. One entrant in four is a teenager. About 1 entrant in 3 has had some college training, although few have received a degree.

## Service Occupations

### Protective Service Occupations

#### Correction officers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 111,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
State government	57.1
Local government	39.2

Projected employment, 1982–95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	145,000	147,000	150,000
Percent change . . . . .	30.8	32.6	36.1

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Most institutions require that correction officers be at least 18 years old and have a high school diploma or its equivalent, or qualifying work experience. They must be in good health; many States require candidates to meet formal standards of physical fitness, eyesight, and hearing. Strength, good judgment, and the ability to think and act quickly are assets. A few States require candidates to pass a written examination.

## Firefighters

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 252,000

Selected characteristics of workers, 1982:

Percent female . . . . .	.5
Percent black . . . . .	8.3
Percent employed part time . . . . .	.6

Unemployment rate . . . . . Much lower than average

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Local government . . . . .	95.3

Projected employment, 1982–95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	271,000	274,000	282,000
Percent change . . . . .	7.5	8.8	11.7

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 4.1 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Applicants must be at least 18 years of age and have a high school diploma. They also may have to pass a written test, a medical examination, and tests of strength, physical stamina, and agility. Experience as a volunteer firefighter or in the Armed Forces and completion of community or junior college courses in fire science may improve applicants' chances for appointment.

*Training completions:*

Public vocational secondary and post-secondary, 1982 <sup>1</sup> . . . . .	9,227
Private noncollegiate postsecondary, 1981 <sup>1</sup> . . . . .	1,870
Associate and other degrees below baccalaureate, 1982 <sup>2</sup> . . . . .	2,727

<sup>1</sup> Includes fire and fire safety technology and firefighter training.

<sup>2</sup> Fire control technologies.

*Characteristics of entrants.* The overwhelming majority of entrants transfer from other occupations. Some have worked as firefighters

in the Armed Forces. Some entrants have completed education or training beyond high school, but few are college graduates. An unusually large proportion of entrants are between the ages of 25 and 34.

## Guards

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 637,000

Selected characteristics of workers, 1982:

Percent female . . . . .	12.7
Percent black . . . . .	19.6
Percent employed part time . . . . .	16.3

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Miscellaneous business services (includes detective agencies and protective and related services) . . . . .	48.3
Manufacturing . . . . .	10.0

Projected employment, 1982–95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	927,000	937,000	952,000
Percent change . . . . .	45.5	47.1	49.5

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 25.2 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Although there are no formal educational requirements, applicants may be tested for reading and writing ability. Some jobs require a driver's permit. Employers prefer high school graduates with military, State, or local police experience.

*Characteristics of entrants.* The majority of entrants transfer from other occupations—a few are former police officers or other protective service workers. The remaining entrants have not been working—they have been unemployed students, or in the Armed Forces. Most entrants have a high school diploma or less education.

## Police and detectives, public service

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 549,000

Selected characteristics of workers, 1982:

Percent female . . . . .	6.7
Percent black . . . . .	9.3
Percent employed part time . . . . .	1.4

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Local government . . . . .	84.1
State government . . . . .	10.3

Projected employment, 1982-95:			
	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	586,000	592,000	608,000
Percent change . . . . .	6.8	7.9	10.9
Employment change . . . . .	Slower than average		
Annual replacement rate . . . . .	7.1		

**SUPPLY PROFILE**

*Usual entry level requirements.* Civil service regulations govern the appointment of police officers and detectives in most jurisdictions. Appointment depends on performance in competitive written examinations, as well as experience and education. Applicants must be U.S. citizens, usually at least 21 years old, and meet rigorous physical and personal qualifications. In most police departments, a high school education is required. Prospects for appointment are improved by related work experience or by completion of an associate or bachelor's degree program in police science or administration of justice.

*Training completions:*

Public vocational secondary and post-secondary, 1982 <sup>1</sup> . . . . .	28,091
Private noncollegiate postsecondary, 1981 <sup>1</sup> . . . . .	1,042
Armed Forces enlisted strength, law enforcement, 1981 . . . . .	41,882
Associate and other degrees below baccalaureate, 1982 <sup>2</sup> . . . . .	13,251
Earned degrees, baccalaureate and above, 1982:	
Law enforcement, corrections, and criminology:	
Bachelor's . . . . .	14,489
Master's . . . . .	1,625
Ph.D. . . . .	35

<sup>1</sup> Includes police science technology and law enforcement training.  
<sup>2</sup> Includes police, law enforcement, and corrections technologies.

*Characteristics of entrants.* The majority of entrants transfer from other occupations—some have worked in a field related to law enforcement; many others transfer from jobs held temporarily while waiting to be selected from the list of eligible candidates. The remaining entrants have been between jobs, in military service, or in school. About half of all entrants have had some post-secondary training and many have a college degree. Entrants tend to be somewhat older than entrants to other occupations.

**Food and Beverage Preparation and Service Occupations**

**Bartenders**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . .	384,000
Selected characteristics of workers, 1982:	
Percent female . . . . .	50.0
Percent black . . . . .	2.6
Percent employed part time . . . . .	34.7
Unemployment rate . . . . .	Higher than average
Industry concentration of employment (wage and salary workers), 1982:	

	<i>Industry</i>	<i>Percent</i>	
Eating and drinking places . . . . .		70.5	
Projected employment, 1982-95:			
	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	500,000	505,000	511,000
Percent change . . . . .	30.1	31.5	33.1

Employment change . . . . . Faster than average  
 Annual replacement rate . . . . . 31.0 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* Bartenders must be at least 21 years of age, although some employers prefer to hire persons at least 25 years old. Employers seek persons who have a pleasant personality and a neat and clean appearance. There are no formal educational requirements, and most people learn their trade on the job. A few prepare for this occupation by attending a bartending school or taking vocational and technical school courses on bartending.

*Characteristics of entrants.* Many entrants transfer from other occupations, mainly related occupations such as cook, bartender's helper, waiter or waitress, or waiter's assistant. Others have not been working—mostly persons who had been laid off from other jobs, full-time students, and persons who have been tending to family responsibilities.

**Cooks and chefs**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . .	1,211,000	
Selected characteristics of workers, 1982:		
Percent female . . . . .	49.9	
Percent black . . . . .	15.3	
Percent employed part time . . . . .	38.9	
Unemployment rate . . . . .	Higher than average	
Industry concentration of employment (wage and salary workers), 1982:	<i>Industry</i>	<i>Percent</i>
Eating and drinking places . . . . .		54.5
Educational services . . . . .		20.7

Projected employment, 1982-95:			
	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	1,591,000	1,613,000	1,636,000
Percent change . . . . .	31.4	33.2	35.1
Employment change . . . . .	Faster than average		
Annual replacement rate . . . . .	30.2 percent		

**SUPPLY PROFILE**

*Usual entry level requirements.* Many cooks acquire their skills on the job as fry cooks in fast-food restaurants or as kitchen helpers, but years of training and experience are required for highly skilled cook or chef positions. Because competition is keen for jobs in large restaurants and hotels, applicants for these jobs

generally need formal training in commercial food preparation available from colleges and universities, vocational schools, training programs operated by large restaurant and hotels, or through apprenticeship programs. High school graduation is recommended for these training positions, although it is not required for entry level jobs.

*Training completions:*

Public vocational secondary and post-secondary 1982 <sup>1</sup> . . . . .	11,839
Private noncollegiate postsecondary, 1981 <sup>1</sup> . . . . .	3,401
Registered apprenticeships, 1979 <sup>2</sup> . . . . .	194

<sup>1</sup> Quantity food occupations.  
<sup>2</sup> Cooks, bakers.

*Characteristics of entrants.* Most entrants have not been working—mainly students, homemakers, and those who have been laid off from other jobs. Many take jobs as a source of income rather than as the beginning of a career. The majority are 25 or younger, have a high school education or less, and work part time. Other entrants transfer from other occupations—primarily dishwashers, waiters and waitresses, and other food service workers.

### Waiters and waitresses

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 1,665,000

Selected characteristics of workers, 1982:

Percent female . . . . .	88.6
Percent black . . . . .	13.0
Percent employed part time . . . . .	58.1

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Eating and drinking places . . . . .	80.3
Hotels and other lodging places . . . . .	8.9

Projected employment, 1982–95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	2,199,000	2,227,000	2,249,000
Percent change . . . . .	32.1	33.8	35.1

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 39.8 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* There are no formal education requirements for waiter and waitress jobs. Employers seek persons who have a pleasant personality, an even disposition, and a neat and clean appearance. Most waiters and waitresses learn their skills on the job.

*Characteristics of entrants.* Most job openings are filled by persons who have not been working, including students, homemakers, and those who have been laid off from other jobs. Many take jobs as a source of income rather than as the beginning of a career. The remaining entrants transfer from other occupations; some advance from a related job as a waiter’s assistant, carhop, or food counter

worker. About 7 of every 10 entrants are under the age of 25. Many entrants have no more than a high school education, and, although some have completed postsecondary education, few are college graduates.

### Health Service Occupations

#### Dental assistants

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 153,000

Selected characteristics of workers, 1982:

Percent female . . . . .	98.0
Percent black . . . . .	.3
Percent employed part time . . . . .	31.5

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Offices of dentists . . . . .		94.8

Projected employment, 1982–95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	213,000	218,000	229,000
Percent change . . . . .	39.2	42.0	49.3

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 23.6 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* This is an entry level job with no formal academic requirements. An ability to learn the job and a congenial personality are really all that is needed. Some persons are trained in dental assisting programs offered by community and junior colleges and postsecondary vocational schools.

*Training completions:*

Public vocational secondary and post-secondary, 1982 . . . . .	7,792
Private noncollegiate postsecondary, 1981 . . . . .	7,354
Associate and other degrees below baccalaureate, 1982 . . . . .	3,372

*Characteristics of entrants.* Most dental assistants are young women. Thus, the occupation is characterized by considerable movement from work to family responsibilities and back again. Most entrants have not been working—primarily they have been tending to family responsibilities, are recent high school graduates, or are jobseekers with no previous work experience. The remaining entrants transfer from other occupations—many have held part-time jobs while in school.

#### Medical assistants

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 100,000

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Offices of physicians . . . . .		72.3

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	146,000	148,000	154,000
Percent change . . . . .	45.1	47.5	53.1

Employment change . . . . . Faster than average

**SUPPLY PROFILE**

*Usual entry level requirements.* Most medical assistants are trained on the job. Many employers prefer applicants who have completed training programs offered by high schools, postsecondary vocational schools, and community and junior colleges. A high school diploma normally is required, and applicants should have good communication skills and manual dexterity.

*Training completions:*

Public vocational secondary and postsecondary, 1982 . . . . .	7,192
Private noncollegiate postsecondary, 1981 . . . . .	15,035
Associate and other degrees below baccalaureate, 1982 . . . . .	5,302

**Nursing aides, orderlies, and attendants**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 1,218,000

Selected characteristics of workers, 1982:

Percent female . . . . .	87.1
Percent black . . . . .	29.0
Percent employed part time . . . . .	25.1

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Hospitals . . . . .		40.5
Nursing and personal care facilities . . . . .		38.7

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	1,628,000	1,642,000	1,690,000
Percent change . . . . .	33.6	34.8	38.7

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 25.5 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* Employers prefer to hire high school graduates, but a diploma is not always required. Previous work experience ordinarily is not needed. Many States require nursing aides to be certified. To become certified, candidates must pass a State-approved course of instruction.

*Characteristics of entrants.* Most workers in this occupation are women; consequently, there is considerable movement between work and family responsibilities. The majority of entrants have not been working—they have been full-time homemakers, students, or jobseekers with no previous work experience. The remaining

entrants transfer from other occupations. Most entrants have a high school diploma or less education.

**Cleaning Service Occupations**

**Building custodians**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 2,828,000

Selected characteristics of workers, 1982:

Percent female . . . . .	38.3
Percent black . . . . .	24.7
Percent employed part time . . . . .	31.7

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Educational services . . . . .		19.2
Services to dwellings and other buildings . . . . .		14.9
Wholesale and retail trade . . . . .		11.1
Hotels and other lodging places . . . . .		9.9
Hospitals . . . . .		7.8

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	3,554,000	3,606,000	3,682,000
Percent change . . . . .	25.7	27.5	30.2

Employment change . . . . . Average

Annual replacement rate . . . . . 24.6 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* No special education is required for most jobs, but beginners should know basic arithmetic and be able to follow instructions.

*Characteristics of entrants.* Most job openings are filled by persons who have not been working, including students, homemakers, retired persons, and those who have been laid off from other jobs. The remaining entrants transfer from other occupations. Entrants generally are very young although, compared to other occupations, an unusually large number are 55 or older. Most have a high school diploma or less education.

**Personal Service Occupations**

**Barbers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 115,000

Selected characteristics of workers, 1982:

Percent female . . . . .	12.0
Percent black . . . . .	14.0
Percent employed part time . . . . .	17.6

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Barber shops . . . . .	46.7
Beauty shops . . . . .	42.7

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	126,000	127,000	129,000
Percent change . . . . .	9.2	10.4	12.4

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 2.6 percent

## SUPPLY PROFILE

*Usual entry level requirements.* All States and the District of Columbia require barbers to be licensed. In general, applicants must graduate from a State-approved barber school or apprenticeship program and be at least 16 years old. Some States also require a high school diploma. Good health and physical stamina are also necessary.

*Training completions:*

Private noncollegiate postsecondary, 1981 . . . . .	9,927
Registered apprenticeships, 1979 <sup>1</sup> . . . . .	491

<sup>1</sup> Includes barbers and beauticians.

*Characteristics of entrants.* Most entrants are recent graduates of barber schools or apprenticeship programs; many have been working while in training. An unusually large proportion are persons over the age of 55 who are beginning a second career.

## Cosmetologists

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 519,000

Selected characteristics of workers, 1982:

Percent female . . . . .	89.5
Percent black . . . . .	6.8
Percent employed part time . . . . .	39.0

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Beauty shops . . . . .	90.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	609,000	622,000	639,000
Percent change . . . . .	17.4	20.0	23.2

Employment change . . . . . Average

Annual replacement rate . . . . . 12.8 percent

## SUPPLY PROFILE

*Usual entry level requirements.* All States and the District of Columbia require cosmetologists to be licensed. Candidates for a license must graduate from a State-licensed cosmetology school, pass a physical examination, and be at least 16 years old. Some States will accept completion of apprenticeship training in lieu of graduation from cosmetology school.

*Training completions:*

Public vocational secondary and post-secondary, 1982 . . . . .	31,669
Private noncollegiate postsecondary, 1981 . . . . .	113,179
Registered apprenticeships, 1979 <sup>1</sup> . . . . .	491

<sup>1</sup> Includes barbers and beauticians.

*Characteristics of entrants.* Almost all cosmetologists are women. Consequently, the occupation is characterized by considerable movement from work to family responsibilities and back again. All job openings are filled either by recently licensed cosmetologists or from the reserve pool of licensed but inactive cosmetologists who have been tending to family responsibilities or not working for other reasons. An unusually large proportion of entrants take part-time positions.

## Flight attendants

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 54,000

Selected characteristics of workers, 1982:

Percent female . . . . .	83.7
Percent black . . . . .	11.4
Percent employed part time . . . . .	46.4

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Certified air transportation . . . . .	96.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	68,000	69,000	70,000
Percent change . . . . .	27.2	28.8	30.1

Employment change . . . . . Average

## SUPPLY PROFILE

*Usual entry level requirements.* Flight attendants must have a high school diploma and complete a 4- to 6-week company training program. They must be in good physical condition. They should have an attractive appearance, be poised, and be able to deal comfortably with strangers.

*Characteristics of entrants.* Most entrants are young people who have had some college education. Some enter directly from school while others transfer from a wide variety of occupations.

## Mechanics and Repairers

### Vehicle and Mobile Equipment Mechanics and Repairers

#### Aircraft mechanics

##### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 108,000

##### Selected characteristics of workers, 1982:

Percent female . . . . . 3.8  
Percent black . . . . . 6.2  
Percent employed part time . . . . . 1.5

Unemployment rate . . . . . Lower than average

##### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Certified air transportation . . . . .	36.8
Aircraft and parts . . . . .	21.0
Air transportation facilities and services . . . . .	10.0

##### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	132,000	128,000	131,000
Percent change . . . . .	22.2	18.6	21.1

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 8.0 percent

##### SUPPLY PROFILE

*Usual entry level requirements.* Aircraft mechanics must be licensed. Requirements for licensure include high school graduation or the equivalent and completion of a vocational program certified by the Federal Aviation Administration or training in the Armed Forces. Mechanics also must have mechanical aptitude, strength, and agility.

##### Training completions:

Public vocational secondary and post-secondary, 1982<sup>1</sup> . . . . . 5,650  
Private noncollegiate postsecondary, 1981 . . . . . 1,992  
Registered apprenticeships, 1979 . . . . . 26  
Associate and other degrees below baccalaureate, 1982<sup>2</sup> . . . . . 6,355

<sup>1</sup> Includes all aviation occupations  
<sup>2</sup> Includes aeronautical and aviation

*Characteristics of entrants.* Almost all entrants are recent graduates of formal training programs or trained mechanics who have left the Armed Forces. Relatively few job openings are filled by persons transferring from other occupations.

#### Automotive body repairers

##### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 155,000

##### Selected characteristics of workers, 1982:

Percent female . . . . . 1.5  
Percent black . . . . . 5.0  
Percent employed part time . . . . . 7.1

Unemployment rate . . . . . About average

##### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Automobile repair shops . . . . .	49.8
Motor vehicle dealers (new and used) . . . . .	37.7

##### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	191,000	196,000	201,000
Percent change . . . . .	23.1	26.3	29.6

Employment change . . . . . Average

Annual replacement rate . . . . . 12.3 percent

##### SUPPLY PROFILE

*Usual entry level requirements.* Automotive body repairers learn their trade on the job informally as helpers to experienced repairers or through formal apprenticeship programs. Although there are no formal education requirements, many employers prefer high school graduates. A growing number of automotive body repairers learn their basic skills in formal training programs offered by post-secondary vocational schools and community and junior colleges.

##### Training completions:

Public vocational secondary and post-secondary, 1982 . . . . . 21,610  
Private noncollegiate postsecondary, 1981 . . . . . 5,330  
Registered apprenticeships, 1979 . . . . . 346

*Characteristics of entrants.* Most job openings are filled by former helpers. The remaining entrants have not been working—many have been on layoff; some have been in a training program. About half of all entrants are under the age of 25 and most have a high school diploma or less education.

#### Automotive mechanics

##### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 844,000

##### Selected characteristics of workers, 1982:

Percent female . . . . . .9  
Percent black . . . . . 7.5  
Percent employed part time . . . . . 6.7

Unemployment rate . . . . . About average

##### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Motor vehicle dealers (new and used) . . . . .	22.9
Automobile repair shops . . . . .	14.4
Gasoline service stations . . . . .	10.5

##### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	1,134,000	1,168,000	1,195,000
Percent change . . . . .	34.3	38.3	41.6



Employment change . . . . . Faster than average  
 Annual replacement rate . . . . . 15.1 percent

### SUPPLY PROFILE

*Usual entry level requirements.* There are no formal education requirements, but employers look for people with mechanical aptitude and a knowledge of automobiles. Most employers prefer to hire persons with experience in working on cars gained in related occupations, in formal training programs, in the Armed Forces, or as a hobby. Many persons learn the trade on the job.

#### Training completions:

Public vocational secondary and post-secondary, 1982 . . . . . 78,739  
 Private noncollegiate postsecondary, 1981 . . . . . 13,862  
 Registered apprenticeships, 1979 . . . . . 1,466

*Characteristics of entrants.* About half of all entrants transfer from other occupations such as garage worker, gas station attendant, or a related mechanic and repairer occupation. The rest are recent graduates of high school and other training programs or persons who have been vehicle mechanics in the Armed Forces.

## Diesel mechanics

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 173,000

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Trucking, local and long distance . . . . .	22.6
Machinery, equipment, and supplies wholesalers . . . . .	20.9
Automobile repair, services, and garages . . . . .	12.2

#### Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	216,000	222,000	226,000
Percent change . . . . .	24.8	28.0	30.7

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* Diesel mechanics usually develop their skills on the job, through formal apprenticeship programs or informally by working as helpers to experienced mechanics. Most employers prefer graduates of formal training programs offered by postsecondary vocational schools and community and junior colleges. Applicants must have mechanical aptitude, be in good physical condition, and have a State chauffeur's license in order to be able to test-drive trucks or buses on public roads.

#### Training completions:

Public vocational secondary and postsecondary, 1982 . . . . . 8,222  
 Private noncollegiate postsecondary, 1981 . . . . . 9,700  
 Associate and other degrees below baccalaureate, 1982<sup>1</sup> . . . . . 3,546

<sup>1</sup> Diesel technology.

## Farm equipment mechanics

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 26,000

#### Selected characteristics of workers, 1982:

Percent black . . . . . 7.1  
 Percent employed part time . . . . . 4.8

#### Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Machinery, equipment, and supplies wholesalers . . . . .	76.6

#### Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	27,000	27,000	28,000
Percent change . . . . .	3.8	5.3	6.0

Employment change . . . . . Little change is expected

### SUPPLY PROFILE

*Usual entry level requirements.* Employers seek people with mechanical aptitude and knowledge of farm equipment for entry jobs. Employers prefer persons with training or related experience in diesel or gasoline engines, welding, and hydraulic and electrical systems. There are no formal education requirements, but training in agricultural mechanics at a vocational or technical school or community or junior college is desirable.

#### Training completions:

Public vocational secondary and post-secondary, 1982 . . . . . 24,470

*Characteristics of entrants.* The majority of entrants transfer from other occupations where they have developed related skills. Many others are recent graduates from training programs in agricultural mechanics.

## Electrical and Electronic Equipment Repairers

### Appliance installers and repairers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 80,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 3.3  
 Percent black . . . . . 6.0  
 Percent employed part time . . . . . 7.5

Unemployment rate . . . . . About average

#### Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Department stores . . . . .	20.4
Household appliance stores . . . . .	17.7
Fuel and ice dealers . . . . .	10.9

Projected employment growth, 1982–95:

	Low	Moderate	High
1995 employment . . . .	91,000	93,000	95,000
Percent change . . . . .	14.2	16.8	19.5

Employment change . . . . . Slower than average  
 Annual replacement rate . . . . . 9.9 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Appliance repairers learn their trade on the job. Employers prefer to hire high school graduates with mechanical aptitude and knowledge of or work experience in basic electricity and electronics. Some persons prepare for this occupation by taking postsecondary training courses in appliance repair.

#### Training completions:

Public vocational secondary and post-secondary, 1982 . . . . .	3,232
Private noncollegiate postsecondary, 1981 . . . . .	905

*Characteristics of entrants.* Most entrants transfer from other occupations—many are related repairer occupations that require knowledge of basic electricity and electronics. The remainder have not been working—most have been between jobs, in school, or serving in the Armed Forces. Most entrants are under the age of 25 and have a high school diploma or less education.

## Communications equipment mechanics

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 92,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Telephone communication . . . . .	97.4

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . .	92,000	95,000	95,000
Percent change . . . . .	0.0	3.3	3.9

Employment change . . . . . Little change is expected

### SUPPLY PROFILE

*Usual entry level requirements.* Requirements vary, but few employers have formal education requirements. While some trainees are hired from outside the company, preference usually is given to company employees in other jobs. Physical and written examinations often are mandatory. Work involving 2-way radio or microwave transmission requires a Federal Communications Commission general radiotelephone license. A valid State driver's license and a good driving record also may be required.

## Computer service technicians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 55,000

Selected characteristics of workers, 1982:

Percent female . . . . .	7.1
Percent black . . . . .	6.0
Percent employed part time . . . . .	2.1

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Machinery, equipment, and supplies wholesalers . . . . .	71.0
Durable goods manufacturing . . . . .	8.9
Computer and data processing services . . . . .	5.9

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . .	106,000	108,000	108,000
Percent change . . . . .	93.4	96.8	98.3

Employment change . . . . . Much faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Most employers require applicants to have completed 1 to 2 years of postsecondary training in basic electronics or electrical engineering or to have comparable experience. Basic electronics training offered by the Armed Forces is also considered to be excellent training.

#### Training completions:

Public vocational secondary and post-secondary, 1982:

Electronic technology . . . . . 15,947

Private noncollegiate postsecondary, 1981:

Electronic technology . . . . . 7,533

Armed Services enlisted strength, 1981:

Computer repair . . . . . 8,728

Associate and other degrees below baccalaureate, 1982:

Data processing equipment maintenance technologies . . . . . 1,819

*Characteristics of entrants.* Most entrants transfer from related occupations such as office machine repair, television service technician, and electrical or electronic technician. Others have been trained in the Armed Forces. Many of the remainder are recent graduates of postsecondary programs in electronics.

## Line installers and cable splicers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 195,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Telephone communication . . . . .	35.3
Electric services . . . . .	26.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	243,000	248,000	251,000
Percent change . . . . .	24.7	27.3	28.8

Employment change . . . . . Average

## SUPPLY PROFILE

*Usual entry level requirements.* Although few employers require high school graduation, many test applicants for basic verbal, arithmetic, and abstract reasoning skills. Applicants also may be tested for physical ability and mechanical aptitude. Applicants should have stamina, the ability to distinguish colors, and not be afraid of heights.

### Radio and television service technicians

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 80,000

Selected characteristics of workers, 1982:

Percent female . . . . .	5.4
Percent black . . . . .	6.3
Percent employed part time . . . . .	10.0

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Radio, television, and music stores . . . . .	31.4
Electrical repair shops . . . . .	23.8
Communications . . . . .	11.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	101,000	102,000	105,000
Percent change . . . . .	25.1	27.0	30.2

Employment change . . . . . Average

Annual replacement rate . . . . . 15.6 percent

## SUPPLY PROFILE

*Usual entry level requirements.* Training in electronics is required for entry level jobs. Formal training is available from postsecondary vocational schools, community colleges, the Armed Forces, or through on-the-job training in a related occupation. A few radio and television service technicians enter through formal apprenticeship programs.

*Training completions:*

Public vocational secondary and post-secondary, 1982 <sup>1</sup> . . . . .	32,210
Private noncollegiate postsecondary, 1981 <sup>2</sup> . . . . .	1,707
Registered apprenticeships, 1979 <sup>2</sup> . . . . .	130
Armed Services enlisted strength, 1981:	
Radio/radar repair . . . . .	76,302
Associate and other degrees below baccalaureate, 1982 <sup>3</sup> . . . . .	25,181

<sup>1</sup> Electronic occupations.

<sup>2</sup> Radio and TV repair.

<sup>3</sup> Electronics and machine technologies.

*Characteristics of entrants.* The majority of entrants transfer from other occupations—many are related technician and repairer occupations that require knowledge of electricity and electronics. Most of the remainder have not been working—many have been in school, between jobs, or serving in the Armed Forces. Most entrants have a high school diploma or less education.

### Telephone and PBX installers and repairers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 134,000

Selected characteristics of workers, 1982:

Percent female . . . . .	10.9
Percent black . . . . .	8.2
Percent employed part time . . . . .	.7

Unemployment rate . . . . . Lower than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Telephone communications . . . . .	95.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	166,000	171,000	172,000
Percent change . . . . .	23.6	27.5	28.4

Employment change . . . . . Average

Annual replacement rate . . . . . 8.2 percent

## SUPPLY PROFILE

*Usual entry level requirements.* Trainees usually are selected from the ranks of other telephone company workers. For trainee positions, employers require good eyesight and the ability to distinguish colors, good health, and mechanical aptitude. A basic knowledge of electricity and electronics is preferred; this can be developed on the job in another occupation, through a formal training program, or in the Armed Forces. A high school diploma is preferred but not required.

*Characteristics of entrants.* Job openings generally are filled by persons who transfer from other occupations—mainly operators, line installers, service representatives, and other telephone company personnel. Most are in their twenties or early thirties. The majority of entrants have a high school diploma or less education.

### Other Mechanics and Repairers

#### Air-conditioning, refrigeration, and heating mechanics

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 168,000

Selected characteristics of workers, 1982:

Percent black . . . . .	5.1
Percent employed part time . . . . .	5.6

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Plumbing, heating, and air-conditioning contractors . . . . .	47.1
Fuel and ice dealers . . . . .	9.3
Government . . . . .	7.4
Electrical repair shops . . . . .	6.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	220,000	223,000	228,000
Percent change . . . . .	30.6	32.6	35.7

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 10.9 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Most persons learn this trade as helpers, working with experienced air-conditioning, heating, and refrigeration mechanics. A few develop their skills in formal apprenticeship programs. Employers generally seek high school graduates with mechanical aptitude who have had courses in shop math, mechanical drawing, electricity, and blueprint reading. Some employers prefer graduates of programs in air-conditioning, heating, and refrigeration offered by postsecondary vocational schools and community and junior colleges.

#### Training completions:

Public vocational secondary and post-secondary, 1982 . . . . .	14,342
Private noncollegiate postsecondary, 1981 . . . . .	11,680
Registered apprenticeships, 1979 . . . . .	294

*Characteristics of entrants.* The majority of entrants transfer from other occupations—some are experienced mechanics who are entering another occupation because activity in their trade is down. The remaining entrants have not been working—many are experienced mechanics who have been laid off, while some have been in high school or other training program. Most entrants have a high school diploma or less education.

## Coin machine servicers and repairers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 31,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Nonstore retailers (includes automatic merchandising machine operators and related establishments) . . . . .	44.3
Miscellaneous amusement and recreation services (includes amusement parks, coin-operated amusement devices, and related services) . . . . .	27.8
Beverage manufacturing . . . . .	16.6

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	38,000	39,000	40,000
Percent change . . . . .	24.2	28.4	32.0

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* Coin machine servicers who repair electronic games generally are required to have an associate degree in electronics, including training or relevant work experience with computer microprocessors; equivalent military training also is acceptable. Some employers require high school graduation for positions as vending machine repairers. Employers require applicants for mechanic jobs to demonstrate mechanical ability, either through their work experience or by scoring well on mechanical aptitude tests. A commercial driver's license and a good driving record are essential for most coin machine repairer jobs.

#### Training completions:

Associate and other degrees below baccalaureate, 1982<sup>1</sup> . . . . . 25,181

<sup>1</sup> Electronics and machine technologies.

## Industrial machinery repairers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 330,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Government . . . . .	10.2
Food and related product manufacturing . . . . .	8.3
Chemicals and allied product manufacturing . . . . .	7.7
Primary metal manufacturing . . . . .	7.0
Fabricated metal product manufacturing . . . . .	7.0
Transportation equipment manufacturing . . . . .	5.5
Electrical and electronic machinery and equipment manufacturing . . . . .	5.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	416,000	425,000	438,000
Percent change . . . . .	26.1	28.7	32.6

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* Most industrial machinery repairers learn the trade informally by working as helpers to experienced repairers. Some learn through formal apprenticeships. Most employers prefer high school graduates. Mechanical aptitude and manual dexterity are important, as are good physical condition and agility.

#### Training completions:

Public vocational secondary and postsecondary, 1982 <sup>1</sup> . . . . .	3,107
Private noncollegiate postsecondary, 1981 <sup>1</sup> . . . . .	447
Registered apprenticeships, 1979 <sup>2</sup> . . . . .	178
Associate and other degrees below baccalaureate, 1982 <sup>3</sup> . . . . .	3,270

<sup>1</sup> Industrial technology.

<sup>2</sup> Industrial technicians.

<sup>3</sup> Industrial technologies.

## Millwrights

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 91,000

Selected characteristics of workers, 1982:

Percent black . . . . . 2.2  
Percent employed part time . . . . . 2.0

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Nondurable goods manufacturing . . . . .	21.4
Primary metal manufacturing . . . . .	18.5
Miscellaneous fabricated metal product manufacturing . . . . .	11.1
Transportation equipment manufacturing . . . . .	10.6
Miscellaneous special trade contractors (Includes water well drilling, structural steel, glazing, excavating, demolition and wrecking, and related contractors) . . . . .	8.0

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	118,000	121,000	124,000
Percent change . . . . .	29.8	32.9	36.0

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 9.5 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Millwrights learn their trade on the job, either by working as a helper to an experienced millwright or through a formal apprenticeship program. Most employers seek high school graduates in good health who are agile and able to perform heavy work.

*Training completions:*

Registered apprenticeships, 1979 . . . . . 1,038

*Characteristics of entrants.* The majority of all entrants transfer from other occupations—primarily blue-collar jobs. The remaining entrants have not been working. Many are being recalled to a job from which they had been laid off; others have been serving in the Armed Forces. Most have a high school diploma or less education.

## Musical instrument repairers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 14,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Radio, television, and music stores . . . . .	71.4
Miscellaneous repair services (includes musical instrument repair shops, piano and organ tuners and repairers, and related services) . . . . .	10.6

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	16,000	17,000	17,000
Percent change . . . . .	21.1	23.1	24.9

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* Most musical instrument repairers learn their trade on the job, working under the supervision of experienced repairers for 2 to 5 years. Most employers prefer high school graduates. A relatively small number of repairers develop their skills by taking courses offered by postsecondary vocational schools.

## Office machine repairers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 56,000

Selected characteristics of workers, 1982:

Percent female . . . . . 6.4  
Percent black . . . . . 5.1  
Percent employed part time . . . . . 4.1

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Machinery, equipment, and supplies wholesalers . . . . .	76.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	94,000	95,000	96,000
Percent change . . . . .	68.5	71.7	72.9

Employment change . . . . . Much faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* For entry jobs, employers seek persons with a basic knowledge of electricity and electronics, mechanical aptitude, and good eyesight and ability to distinguish colors. Many employers require at least a year of postsecondary training in basic electricity or electronics. A well-groomed appearance and a pleasant, cooperative manner are important, as well as an ability to communicate effectively. A few persons develop their skills through a formal apprenticeship program and others learn their trade in the Armed Forces.

*Training completions:*

Private noncollegiate postsecondary, 1981 . . . . . 335  
Registered apprenticeships, 1979 . . . . . 146

*Characteristics of entrants.* Most entrants transfer from other occupations—many have worked in related occupations where they serviced mechanical and electronic equipment such as home appliances, automotive electrical systems, and radio and television equipment. The remaining job openings are filled by persons who have not been working—some have been students, others between jobs, and others in the Armed Forces.

# Construction and Extractive Occupations

## Construction Occupations

### Bricklayers and stonemasons

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 124,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 7  
 Percent black . . . . . 14.5  
 Percent employed part time . . . . . 9.8

Unemployment rate . . . . . Much higher than average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Masonry, stonework, tile setting, and plastering contractors . . . . .	55.5

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	163,000	166,000	168,000
Percent change . . . . .	31.5	33.4	35.4

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 13.3 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Bricklayers and stonemasons learn their craft on the job, either informally by helping experienced workers or through formal apprenticeship programs. Employers and apprenticeship committees prefer high school or vocational school graduates. Applicants for all jobs must be in good physical condition, and applicants for apprenticeship must be at least 17 years of age.

#### Training completions:

Public vocational secondary and post-secondary, 1982<sup>1</sup> . . . . . 7,844  
 Private noncollegiate postsecondary, 1981<sup>1</sup> . . . . . 1,248  
 Registered apprenticeships, 1979 . . . . . 1,068

<sup>1</sup> Includes all masonry occupations.

*Characteristics of entrants.* Many workers experience periodic layoffs when construction projects end and when construction activity declines in an economic downturn. Consequently, many entrants are experienced workers being recalled from layoff, between jobs, or persons who transfer from other jobs they have taken on a temporary basis. Others are recent graduates of apprenticeship and other training programs.

### Carpenters

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 863,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 1.7  
 Percent black . . . . . 4.2  
 Percent employed part time . . . . . 10.4

Unemployment rate . . . . . Higher than average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Residential building construction . . . . .	28.3
Nonresidential building construction . . . . .	18.0
Special trade contractors . . . . .	14.7

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	1,095,000	1,110,000	1,128,000
Percent change . . . . .	26.9	28.6	30.6

Employment change . . . . . Average

Annual replacement rate . . . . . 20.0 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Carpenters learn their trade on the job. Many learn informally by working under the supervision of experienced workers. Some participate in employer-run training programs or formal apprenticeship programs. Although there are no formal entry requirements, employers prefer high school or vocational school graduates who have manual dexterity, good balance, and are in good physical condition.

#### Training completions:

Public vocational secondary and post-secondary, 1982 . . . . . 34,763  
 Private noncollegiate postsecondary, 1981 . . . . . 4,542  
 Registered apprenticeships, 1979 . . . . . 4,637

*Characteristics of entrants.* Many carpenters face periodic layoffs because of the short-term nature of many construction projects and the cyclical nature of the industry. Carpentry is characterized by large movements of workers into and out of the occupation. Many entrants are experienced carpenters who have been laid off or between jobs. Others are transferring from temporary jobs or are reentering the labor force.

### Cement masons and terrazzo workers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 95,000

#### Selected characteristics of workers, 1982:

Percent black . . . . . 29.0  
 Percent employed part time . . . . . 15.2

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Concrete contractors . . . . .	27.8
Non-residential building construction . . . . .	16.3
Residential building construction . . . . .	10.6
Heavy construction . . . . .	10.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	133,000	135,000	138,000
Percent change . . . . .	40.6	43.5	46.0

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Cement masons and terrazzo workers learn their trade on the job, either informally by helping experienced workers or in formal apprenticeship programs. Employers and apprenticeship committees prefer high school graduates who are at least 18 years old and in good physical condition.

#### Training completions:

Registered apprenticeships, 1979 . . . . . 466

*Characteristics of entrants.* Workers may experience periodic layoffs when construction projects end and when the level of non-residential building falls in an economic downturn. Consequently, many entrants are experienced workers being recalled from layoff, between jobs, or persons who transfer from other jobs they have taken on a temporary basis. Others are recent graduates of apprenticeship and other training programs.

## Drywall applicators and tapers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 76,000

#### Selected characteristics of workers, 1982:

Percent female . . . . .	1.1
Percent black . . . . .	3.5
Percent employed part time . . . . .	15.0

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Masonry, stonework, tile setting, and plastering contractors . . . . .	83.1

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	104,000	106,000	108,000
Percent change . . . . .	38.1	40.8	43.1

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Most drywall applicators and tapers start as helpers and learn their craft on the job. Some develop their skills through formal apprenticeship programs. Employers prefer high school graduates. Manual dexterity and the ability to do simple arithmetic are required.

*Characteristics of entrants.* Workers may experience periodic layoffs when projects end and when construction activity declines in an economic downturn. Consequently, many entrants are experienced workers who are being recalled from layoff or who have been between jobs. Others are transferring from other occupations

they have entered on a temporary basis. Most entrants have a high school diploma or less education.

## Electricians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 542,000

#### Selected characteristics of workers, 1982:

Percent female . . . . .	1.6
Percent black . . . . .	5.7
Percent employed part time . . . . .	2.7

Unemployment rate . . . . . About average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Electrical contractors . . . . .	44.3
Durable goods manufacturing . . . . .	17.8

#### Projected employment 1982-95:

	Low	Moderate	High
1995 employment . . . . .	704,000	715,000	730,000
Percent change . . . . .	29.8	31.8	34.6

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 8.4 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Electricians learn their craft on the job, either informally by working as an electrician's helper or through a formal apprenticeship program. Employers and apprenticeship committees prefer graduates of vocational programs. Applicants for apprentice positions generally need to be 18 years old or older; applicants for all jobs must be in good physical condition, have manual dexterity and good color vision. Most local governments require a license that is obtained by passing an exam that tests knowledge of the craft and local electrical codes.

#### Training completions:

Public vocational secondary and post-secondary, 1982 . . . . .	8,170
Private noncollegiate postsecondary, 1981 . . . . .	2,229
Registered apprenticeships, 1979 . . . . .	4,961

*Characteristics of entrants.* Many construction electricians face periodic layoffs because of the cyclical nature of the construction industry and the short-term nature of most construction projects. Maintenance electricians working in automobile, steel, and other industries that are sensitive to the business cycle also may be laid off from time to time. Consequently, a significant proportion of all entrants are experienced electricians who have been unemployed, between jobs, or working temporarily in another occupation. Other entrants had been trained in the Armed Forces or enter directly from school or after completing their apprenticeship.

## Floor covering installers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 79,000

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Carpentering and flooring contractors . . . . .		38.2
Furniture and home furnishings stores, except appliances . . . . .		36.6
Masonry, stonework, tile setting, and plastering contractors . . . . .		17.0

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	100,000	101,000	103,000
Percent change . . . . .	26.2	28.5	30.4

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* Almost all floor covering installers learn the trade by working as helpers to experienced installers. A few learn through formal apprenticeships. Employees prefer high school graduates who have manual dexterity and are mechanically inclined.

*Training completions:*

Registered apprenticeships, 1979 . . . . . 228

## Glaziers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 41,000

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Miscellaneous special trade contractors (includes glass, glazing, and related contractors) . . . . .		42.4
Paint, glass, and wallpaper stores . . . . .		28.6
Durable goods manufacturing . . . . .		8.4

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	53,000	55,000	56,000
Percent change . . . . .	30.7	34.6	37.2

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Glaziers learn their trade on the job, some formally through apprenticeship programs, but most informally by helping experienced workers. Applicants must be in good physical condition; those seeking apprenticeships must be at least 17 years of age.

*Training completions:*

Registered apprenticeships, 1979 . . . . . 189

*Characteristics of entrants.* Glaziers experience periods of unemployment between construction projects and during downturns in construction activity. Consequently, many entrants are experienced workers who have been on temporary layoff or who transfer from other occupations taken on a temporary basis.

## Insulation workers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 47,000

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Masonry, stonework, tile setting, and plastering contractors . . . . .		52.5
Miscellaneous special trade contractors (includes insulation, waterproofing, and related contractors) . . . . .		14.9
Durable goods manufacturing . . . . .		5.9
Nondurable goods manufacturing . . . . .		5.1

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	66,000	67,000	68,000
Percent change . . . . .	40.8	43.6	46.3

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Insulation workers learn their craft on the job, either informally by working as helpers to experienced workers or through formal apprenticeship programs. Insulation contractors prefer high school graduates who are in good physical condition and licensed to drive. High school courses in blueprint reading, shop math, sheet-metal layout, and general construction are important. Applicants for apprenticeship positions must have a high school diploma or its equivalent and be at least 18 years old.

*Training completions:*

Registered apprenticeships, 1979 . . . . . 235

*Characteristics of entrants.* Workers may experience periodic layoffs when construction projects end and when construction activity declines in an economic downturn. Consequently, many entrants are experienced workers—some are being recalled from layoff, some have been between jobs, or some are transferring from other occupations they have entered on a temporary basis. Some entrants have been full-time students. Most entrants have a high school diploma or less education.

## Ironworkers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 93,000

Industry concentration of employment (wage and salary workers), 1982:

	<i>Industry</i>	<i>Percent</i>
Miscellaneous special trade contractors (includes structural steel, fire escape installation, shoring and underpinning, ornamental metal, and related contractors) . . . . .		41.7
Nonresidential building construction . . . . .		17.6
Heavy construction, except highway and street . . . . .		16.2



Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	126,000	130,000	133,000
Percent change . . . . .	35.2	38.7	41.8

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Ironworkers learn the trade informally by working as helpers to experienced ironworkers or through formal apprenticeships. Applicants generally must be at least 18 years old and in good physical condition. Agility and balance also are needed. Graduation from high school usually is preferred.

## Painters and paperhangers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 381,000

Selected characteristics of workers, 1982:

Percent female . . . . .	6.1
Percent black . . . . .	9.3
Percent employed part time . . . . .	19.2

Unemployment rate . . . . . Much higher than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Painting, paperhanging, and decorating contractors . . . . .	43.2
Government . . . . .	9.7
Real estate . . . . .	6.1
Durable goods manufacturing . . . . .	5.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	467,000	468,000	474,000
Percent change . . . . .	22.4	22.8	24.2

Employment change . . . . . Average

Annual replacement rate . . . . . 22.7 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Most people learn the trade informally by helping experienced workers. A few develop their skills in formal apprenticeship programs. Applicants should be in good physical condition and have manual dexterity and a good color sense.

*Training completions:*

Private noncollegiate postsecondary, 1981 <sup>1</sup> . . . . .	476
Registered apprenticeships, 1979 <sup>2</sup> . . . . .	956

<sup>1</sup> Painting and decorating.

<sup>2</sup> Painters.

*Characteristics of entrants.* Many painters and paperhangers experience periods of unemployment because many construction projects are short term construction activity is cyclical. Consequently, many entrants are experienced painters and paperhangers who have been on temporary layoff or working temporarily in another oc-

cupation. Others enter directly from school or apprenticeship programs.

## Plasterers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 20,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Masonry, stonework, tile setting, and plastering contractors . . . . .	88.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	22,000	22,000	22,000
Percent change . . . . .	6.0	7.4	8.9

Employment change . . . . . Slower than average

### SUPPLY PROFILE

*Usual entry level requirements.* Plasterers learn their craft on the job, either informally by working as helpers to experienced workers or through formal apprenticeship programs. Applicants must be at least 17 years old, be in good physical condition, and have manual dexterity.

*Training completions:*

Registered apprenticeships, 1979 . . . . . 121

*Characteristics of entrants.* Workers may experience periodic layoffs when construction projects end and when construction activity declines in an economic downturn. Consequently, many entrants are experienced workers being recalled from layoff or transferring from other occupations they have entered on a temporary basis.

## Plumbers and pipefitters

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 388,000

Selected characteristics of workers, 1982:

Percent female . . . . .	.8
Percent black . . . . .	6.4
Percent employed part time . . . . .	4.8

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Plumbing, heating, and air-conditioning contractors . . . . .	47.0
Durable goods manufacturing . . . . .	11.6
Federal Government . . . . .	5.6

Projected employment growth, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	512,000	518,000	528,000
Percent change . . . . .	32.1	33.7	36.2

Employment change . . . . . Faster than average  
 Annual replacement rate . . . . . 9.8 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Plumbers and pipefitters learn their craft on the job, either informally by working for several years as helpers to experienced plumbers and pipefitters or through formal apprenticeship programs. Applicants for apprentice or helper jobs generally must be at least 18 years of age and in good physical condition. Employers and apprenticeship committees prefer high school or vocational education graduates.

#### Training completions:

Public vocational secondary and post-secondary, 1982 . . . . . 5,266  
 Private noncollegiate postsecondary, 1981 . . . . . 2,213  
 Registered apprenticeships, 1979  
   Plumbers . . . . . 2,322  
   Pipefitters . . . . . 3,089

*Characteristics of entrants.* Plumbers and pipefitters may experience periodic layoffs when construction projects end and when construction activity declines. Consequently, many entrants are experienced workers—some have been on temporary layoff, some have been between jobs, and some are transferring from other occupations entered on a temporary basis. Other entrants are recent graduates of apprenticeship and other training programs.

## Roofers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 102,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 8  
 Percent black . . . . . 7.5  
 Percent employed part time . . . . . 18.0

Unemployment rate . . . . . Much higher than average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Roofing and sheet-metal contractors . . . . .	88.6

#### Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . . .	128,000	129,000	131,000
Percent change . . . . .	25.2	26.7	28.3

Employment change . . . . . Average

Annual replacement rate . . . . . 20.3 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Most roofers acquire their skills informally by working as helpers to experienced roofers. A few learn through apprenticeship programs. Roofers need to be in good physical condition and should have good balance and agility.

#### Training completions:

Registered apprenticeships, 1979 . . . . . 539

*Characteristics of entrants.* Because of the cyclical nature of the construction industry and the short duration of most roofing jobs, many entrants are experienced roofers who have been on temporary layoff, between jobs, or in temporary jobs in other occupations. Other entrants come directly from school.

## Sheet-metal workers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 87,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 3.4  
 Percent black . . . . . 6.2  
 Percent employed part time . . . . . 1.7

Unemployment rate . . . . . About average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Plumbing, heating, and air-conditioning contractors . . . . .	62.1
Roofing and sheet-metal contractors . . . . .	23.3

#### Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . . .	124,000	127,000	130,000
Percent change . . . . .	42.7	46.2	48.9

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 11.1 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Most sheet-metal workers learn their trade through formal apprenticeship. A few learn informally by working as helpers to experienced workers. Local apprenticeship committees and employers may require a high school or vocational school education. Applicants need to be in good physical condition and have mechanical aptitude.

#### Training completions:

Public vocational secondary and post-secondary, 1982 . . . . . 2,731  
 Registered apprenticeships, 1979 . . . . . 1,591

*Characteristics of entrants.* Workers may experience periodic layoffs when construction projects end and when economic conditions result in a decline in construction activity. Consequently, many entrants are experienced sheet-metal workers who have been on temporary layoff or between jobs, or who are transferring from temporary jobs in other occupations. Others are recent graduates of apprenticeship and other training programs.

## Tilesetters

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 20,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Masonry, stonework, tile setting, and plastering contractors	68.6
Carpentering and flooring contractors	13.1

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	26,000	27,000	27,000
Percent change	32.4	34.8	36.9

Employment change . . . . . Faster than average

## SUPPLY PROFILE

*Usual entry level requirements.* Tilesetters learn the trade informally by working as helpers to experienced workers or through formal apprenticeships. Employers usually prefer high school or vocational school graduates who have had courses in general mathematics, mechanical drawing, and shop. Good physical condition, manual dexterity, and a good sense of color harmony are important assets.

*Training completions:*

Registered apprenticeships, 1979<sup>1</sup> . . . . . 1,068

<sup>1</sup> Bricklayers, stone and tile setters.

## Production Occupations

### Blue-collar worker supervisors

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 1,200,000

Selected characteristics of workers, 1982:

Percent female	12.1
Percent black	6.7
Percent employed part time	1.7

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Durable goods manufacturing	31.7
Nondurable goods manufacturing	20.7
Transportation, communications, and utilities	12.6

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	1,483,000	1,520,000	1,554,000
Percent change	23.6	26.6	29.5

Employment change . . . . . Average

Annual replacement rate . . . . . 11.4 percent

#### SUPPLY PROFILE

*Usual entry level requirements.* Most blue-collar worker supervisors are promoted from among the workers they supervise.

Leadership qualities, knowledge of the work being done, and the ability to get along well with others are key attributes valued by employers. High school graduation often is required and college or technical school training can be an asset.

*Characteristics of entrants.* The majority of all entrants transfer from other occupations. Others have served in the Armed Forces. Few entrants come directly from school. Most entrants are in their prime working years, between the ages of 25 and 54.

## Precision Production Occupations

### Boilermakers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 40,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Durable goods manufacturing	20.1
General contractors, except building	12.1
Nondurable goods manufacturing	9.7
Miscellaneous special trade contractors (includes structural steel, boiler construction and related contractors)	9.7
Plumbing contractors	9.4
Federal Government	8.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	42,000	43,000	44,000
Percent change	5.8	7.6	10.8

Employment change . . . . . Slower than average

#### SUPPLY PROFILE

*Usual entry level requirements.* Boilermakers learn their trade on the job, either informally by working for several years as helpers to experienced workers or through formal apprenticeship programs. Most employers prefer high school graduates with mechanical aptitude who are in good physical condition.

*Training completions:*

Registered apprenticeships, 1979 . . . . . 769

### Bookbinders

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 30,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Commercial printing	45.3
Blankbooks and bookbinding	22.7

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	34,000	36,000	37,000
Percent change	14.2	20.3	22.9

Employment change . . . . . Average

## SUPPLY PROFILE

*Usual entry level requirements.* A 4- or 5-year apprenticeship generally is required to qualify as a skilled bookbinder. Apprenticeship applicants usually must have a high school education, mechanical aptitude, and be at least 18 years of age.

### Training completions:

Registered apprenticeships, 1979<sup>1</sup> . . . . . 90

<sup>1</sup> Bookbinders, bindery workers.

## Butchers and meatcutters

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 191,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 6.6  
 Percent black . . . . . 7.6  
 Percent employed part time . . . . . 9.9

Unemployment rate . . . . . About average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Grocery stores . . . . .	73.7
Groceries and related product wholesalers . . . . .	13.0

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	173,000	179,000	182,000
Percent change . . . . .	-9.3	-6.3	-4.6

Employment change . . . . . Decline

Annual replacement rate . . . . . 12.0 percent

## SUPPLY PROFILE

*Usual entry level requirements.* Most butchers and meatcutters acquire their skills informally on the job or through formal apprenticeship programs. Employers prefer applicants who have a high school diploma.

*Characteristics of entrants.* About half of all entrants transfer from other occupations. The rest have not been working because of school or family responsibilities.

## Compositors and typesetters

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 104,000

#### Selected characteristics of workers, 1982:

Percent female . . . . . 38.0  
 Percent black . . . . . 5.2  
 Percent employed part time . . . . . 13.4

Unemployment rate . . . . . About average

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Newspapers . . . . .	39.9
Commercial printing . . . . .	17.8

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	94,000	97,000	99,000
Percent change . . . . .	-10.2	-7.3	-5.5

Employment change . . . . . Decline

Annual replacement rate . . . . . 17.5 percent

## SUPPLY PROFILE

*Usual entry level requirements.* Compositors and typesetters learn their trade on the job, either informally by working as helpers to experience typesetters and compositors or through formal apprenticeship programs. Applicants for training positions or entry jobs must be high school graduates and in good physical condition.

### Training completions:

Registered apprenticeships, 1979 . . . . . 70

*Characteristics of entrants.* Most entrants transfer from other occupations—some are secretaries, typists, and other clerical workers with typing skills. The remainder have not been working—most have been tending to family responsibilities or have been on temporary layoff. Entrants are younger than average and most have a high school diploma or less education.

## Dental laboratory technicians

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 51,000

#### Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Medical and dental laboratories . . . . .	74.6
Offices of dentists . . . . .	17.6

#### Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	63,000	64,000	65,000
Percent change . . . . .	24.6	25.7	28.4

Employment change . . . . . Average

## SUPPLY PROFILE

*Usual entry level requirements.* Dental laboratory technicians generally learn their craft on the job, either by helping experienced technicians or through formal apprenticeship programs. Many employers hire only high school graduates, and high school courses in art, metal shop, and science are important. Applicants who have taken formal training in community and junior colleges, post-secondary vocational schools, or the Armed Forces are preferred.

*Training completions:*

Public vocational secondary and post-secondary, 1982	1,249
Private noncollegiate postsecondary, 1981	740
Registered apprenticeships, 1979 <sup>1</sup>	226
Associate and other degrees below baccalaureate, 1982	678

<sup>1</sup> Medical and dental technicians.

*Characteristics of entrants.* Most entrants have not been working, are under 35 years of age, and have some postsecondary training. Others transfer from other occupations generally entered on a part-time basis while in school.

### Dispensing opticians and ophthalmic laboratory technicians

#### EMPLOYMENT PROFILE

Total employment, 1982	39,000
Selected characteristics of workers, 1982	
Percent female	45.5
Percent black	2.0
Percent employed part time	9.9

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
All other professional and scientific instruments manufacturing (includes optical instruments and lenses, ophthalmic goods, and related manufacturing)	30.4
Miscellaneous retail stores (includes optical goods and related stores)	27.4
Offices of other health practitioners	24.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	47,000	48,000	50,000
Percent change	21.0	24.2	28.2

Employment change . . . . . Average

#### SUPPLY PROFILE

*Usual entry level requirements.* Employers generally prefer applicants who are familiar with the trade and who have had formal training in optical dispensing and fabricating. High school graduation with courses in science and mathematics as well as previous experience in a related job are assets. Some States require dispensing opticians to be licensed. For ophthalmic laboratory technician jobs, employers prefer high school graduates who have had courses in science and mathematics.

*Training completions:*

Private noncollegiate postsecondary, 1981 <sup>1</sup>	383
Registered apprenticeships, 1979 <sup>2</sup>	49
Associate and other degrees below baccalaureate, 1982 <sup>3</sup>	740

<sup>1</sup> Optical technology.

<sup>2</sup> Optical workers.

<sup>3</sup> Optical technologies.

### Furniture upholsterers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 37,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Reupholstery and furniture repair	71.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	40,000	40,000	42,000
Percent change	7.4	8.3	11.9

Employment change . . . . . Slower than average

#### SUPPLY PROFILE

*Usual entry level requirements.* Employers generally prefer to hire persons who have studied upholstery in a high school or post-secondary vocational school program. Applicants should have manual dexterity, good coordination, and be able to do occasional heavy lifting. An eye for detail and flair for creative use of fabrics are helpful.

*Training completions:*

Public vocational secondary and postsecondary, 1982	2,246
Private noncollegiate postsecondary, 1981	1,104

### Hand molders

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 9,100

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Iron and steel foundries	39.8
Nonferrous foundries	20.5
Electrical and electronic machinery and equipment manufacturing	10.3

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	10,000	11,000	11,000
Percent change	15.2	17.9	21.6

Employment change . . . . . Slower than average

#### SUPPLY PROFILE

*Usual entry level requirements.* Hand molders generally learn the trade by helping experienced workers. Many employers prefer to hire high school graduates. Applicants need to be in good physical condition and should have good eye-hand coordination and a high degree of manual dexterity.

*Training completions:*

Registered apprenticeships, 1979 <sup>1</sup>	97
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<sup>1</sup> Molders, coremakers.

## Jewelers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 30,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Miscellaneous shopping goods stores (includes jewelry, camera, and related stores) . . . . .	56.3
Jewelry, silverware, and plated ware manufacturing . . . . .	20.0
Miscellaneous repair services (includes watch, clock, and jewelry repair shops) . . . . .	10.3

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . . .	33,000	34,000	35,000
Percent change . . . . .	11.3	13.3	16.8

Employment change . . . . . Slower than average

### SUPPLY PROFILE

*Usual entry level requirements.* Employers prefer to hire graduates of formal training programs offered in technical schools. Most employers require high school graduation. Applicants need finger and hand dexterity, good eye-hand coordination, patience, and concentration. Artistic ability is an important asset.

## Job and die setters

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 95,000

Selected characteristics of workers, 1982:

Percent female . . . . .	2.7
Percent black . . . . .	9.5
Percent employed part time . . . . .	2.1

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Machinery manufacturing except electrical . . . . .	24.0
Fabricated metal product manufacturing . . . . .	23.6
Motor vehicle equipment manufacturing . . . . .	13.2

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . . .	117,000	121,000	125,000
Percent change . . . . .	23.9	27.4	31.7

Employment change . . . . . Average

### SUPPLY PROFILE

*Usual entry level requirements.* Job and die setters learn their trade on the job. Employers prefer high school graduates who have experience working with machine tools.

*Characteristics of entrants.* Many job openings are filled by promoting experienced machine tool operators.

## Lithographers and photoengravers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 67,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Commercial printing . . . . .	53.0
Printing trade services . . . . .	16.1

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . . .	83,000	87,000	89,000
Percent change . . . . .	23.2	29.4	32.2

Employment change . . . . . Faster than average

### SUPPLY PROFILE

*Usual entry level requirements.* Most lithographers and photoengravers learn their trade informally on the job by helping experienced workers; some learn through formal apprenticeship programs. Applicants usually must be high school graduates, at least 18 years old, and in good physical condition.

*Training completions:*

Registered apprenticeships, 1979 . . . . . 369

*Characteristics of entrants.* Most entrants have not been working—many have been attending school or training programs; some have been tending to family responsibilities. Relatively few entrants transfer from other occupations. Most entrants have a high school diploma or less education.

## Machinists and layout markers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 236,000

Selected characteristics of workers, 1982:

Percent female . . . . .	3.1
Percent black . . . . .	7.8
Percent employed part time . . . . .	2.2

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Machinery manufacturing, except electrical . . . . .	23.4
Nondurable goods manufacturing . . . . .	17.2
Services . . . . .	10.1

Projected employment, 1982–95:

	Low	Moderate	High
1995 employment . . . . .	290,000	298,000	308,000
Percent change . . . . .	23.0	26.2	30.5

Employment change . . . . . Average

Annual replacement rate . . . . . 11.6 percent

## SUPPLY PROFILE

*Usual entry level requirements.* Machinists and layout markers develop their skills on the job through formal apprenticeship programs and informally by working as helpers to experienced machinists. Many employers prefer secondary or postsecondary vocational school graduates. Applicants should have mechanical aptitude and be in good physical condition. Experience working with machine tools is very important.

### Training completions:

Public vocational secondary and post-secondary, 1982 <sup>1</sup> . . . . .	26,334
Private noncollegiate postsecondary, 1981 <sup>1</sup> . . . . .	1,337
Registered apprenticeships, 1979 . . . . .	2,450

<sup>1</sup> Machine shop occupations.

*Characteristics of entrants.* The majority of entrants transfer from other occupations, primarily machine tool operator and job and die setter. Many of the remaining entrants are experienced machinists being recalled from layoffs caused by economic conditions. Others have recently completed postsecondary training.

## Patternmakers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 13,000

Industry concentration of employment (wage and salary workers), 1982:	
<i>Industry</i>	<i>Percent</i>
Machinery manufacturing, except electrical . . . . .	49.4

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	15,000	16,000	16,000
Percent change . . . . .	15.1	16.9	19.6

Employment change . . . . . Slower than average

### SUPPLY PROFILE

*Usual entry level requirements.* Patternmakers learn the trade through formal apprenticeships or by working in other skilled occupations—machinist, for example—followed by additional training. A high school diploma is almost always required for entry into a formal apprenticeship program. Manual dexterity, attention to detail, and the ability to visualize objects in three dimensions also are necessary.

### Training completions:

Registered apprenticeships, 1979 . . . . .	143
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## Photographic process workers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 67,000

Selected characteristics of workers, 1982:	
Percent female . . . . .	48.3
Percent black . . . . .	4.5

Percent employed part time . . . . . 15.9

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
Miscellaneous business services (includes photofinishing, commercial testing, and research and development laboratories and related services) . . . . .	42.7
Manufacturing . . . . .	14.6

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	77,000	78,000	80,000
Percent change . . . . .	14.8	16.5	19.6

Employment change . . . . . Slower than average

## SUPPLY PROFILE

*Usual entry level requirements.* Most photographic process workers learn their skills on the job. Employers prefer high school graduates.

*Characteristics of entrants.* More than half of all job openings are filled by persons who have not been working—recent high school graduates and persons who have been tending to family responsibilities or unemployed. The rest transfer from other occupations. Most entrants have a high school diploma or less education.

## Shoe repair occupations

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 16,000

Industry concentration of employment (wage and salary workers), 1982:

<i>Industry</i>	<i>Percent</i>
All other personal services (includes shoe repair shops, shoe shine parlors, and hat cleaning shops) . . . . .	81.3
Footwear manufacturing, except rubber . . . . .	13.2

Projected employment, 1982-95:

	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment . . . . .	19,000	19,000	20,000
Percent change . . . . .	13.3	14.7	19.6

Employment change . . . . . Slower than average

### SUPPLY PROFILE

*Usual entry level requirements.* There are no formal education requirements; shoe repairers generally learn their trade on the job. They must have manual dexterity and mechanical aptitude to work with various machines and handtools. In addition, they need self-discipline because they often work alone with little or no supervision.

## Toolmakers and diemakers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 154,000

Selected characteristics of workers, 1982:	
Percent female . . . . .	2.5
Percent black . . . . .	2.5
Percent employed part time . . . . .	1.9

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Metalworking machinery equipment manufacturing . . .	23.1
Fabricated metal product manufacturing . . . . .	17.7
Transportation equipment manufacturing . . . . .	16.0
Electrical and electronic machinery and equipment manufacturing . . . . .	10.8

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	181,000	186,000	192,000
Percent change . . . . .	17.8	21.2	25.0

Employment change . . . . . Average

Annual replacement rate . . . . . 6.0 percent

## SUPPLY PROFILE

*Usual entry level requirements.* Toolmakers and diemakers develop their skills on the job through formal apprenticeship programs or informally by working as helpers to experienced toolmakers and diemakers. Many employers prefer persons with a high school or postsecondary school education. Applicants should have a working knowledge of mathematics and physics, as well as mechanical ability, finger dexterity, and an aptitude for precise work.

*Training completions:*

Public vocational secondary and post-secondary, 1982 . . . . .	1,191
Private noncollegiate postsecondary, 1981 . . . . .	443
Registered apprenticeships, 1979 . . . . .	1,807

*Characteristics of entrants.* Most openings are filled by persons who transfer from other occupations—primarily other machining occupations. Because of the emphasis placed on work experience, entrants tend to be considerably older than entrants to other occupations.

## Plant and System Operators

### Stationary engineers

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 58,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Nondurable goods manufacturing . . . . .	18.1
Hospitals . . . . .	15.9
Durable goods manufacturing . . . . .	13.3
Local government . . . . .	8.0
Educational services . . . . .	7.9
Communications and utilities . . . . .	7.7
Federal Government . . . . .	6.3

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	60,000	61,000	62,000
Percent change . . . . .	2.7	3.7	6.5

Employment change . . . . . Little or no change

## SUPPLY PROFILE

*Usual entry level requirements.* Stationary engineers learn the trade by working as helpers to experienced engineers or through formal apprenticeships. Employers generally prefer high school or vocational school graduates. Applicants should have mechanical aptitude and manual dexterity and be in good physical condition. Many States and cities require stationary engineers to be licensed.

*Training completions:*

Registered apprenticeships, 1979 . . . . . 448

### Water and sewage treatment plant operators

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 72,000

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Local government . . . . .	89.6
Utilities and sanitary services . . . . .	4.9

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	78,000	79,000	82,000
Percent change . . . . .	8.6	10.2	13.3

Employment change . . . . . Slower than average

## SUPPLY PROFILE

*Usual entry level requirements.* Water and wastewater treatment plant operators usually learn on the job under the direction of an experienced operator. Employers generally prefer high school graduates; in some States, this is required. Graduation from a postsecondary training program in wastewater technology is an advantage. Written examinations are required for jobs covered by civil service regulations. Applicants should have mechanical aptitude, basic mathematical ability, and physical agility.

*Training completions:*

Public vocational secondary and postsecondary, 1982 <sup>1</sup> . . . . .	909
Registered apprenticeships, 1979 <sup>2</sup> . . . . .	448

<sup>1</sup> Water and wastewater treatment technology.

<sup>2</sup> Stationary engineers.

### Machine Operators, Tenders, and Setup workers

#### Machine tool operators

#### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 914,000



Selected characteristics of workers, 1982:	
Percent female	19.1
Percent black	8.9
Percent employed part time	4.3

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:	
<i>Industry</i>	<i>Percent</i>
Machinery manufacturing, except electrical	39.1
Fabricated metal product manufacturing	23.8

Projected employment, 1982-95:			
	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment	1,088,000	1,114,000	1,153,000
Percent change	19.0	21.8	26.1

Employment change . . . . . Average

## SUPPLY PROFILE

*Usual entry level requirements.* There are no formal education requirements for this semiskilled occupation. Most machine tool operators learn their skills on the job. Applicants should have mechanical aptitude and be in good physical condition.

### *Training completions:*

Public vocational secondary, and postsecondary, 1982	2,720
Private noncollegiate postsecondary, 1981	4,878

*Characteristics of entrants.* Machine tool operators face temporary layoffs when economic conditions cause demand to slacken for products that use machined metal parts. Consequently, most entrants are experienced operators who have been unemployed or temporarily employed in other occupations.

## Printing press operators

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 174,000

Selected characteristics of workers, 1982:	
Percent female	12.6
Percent black	6.0
Percent employed part time	5.0

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:	
<i>Industry</i>	<i>Percent</i>
Commercial printing	46.2
Newspapers	14.4

Projected employment, 1982-95:			
	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment	197,000	205,000	211,000
Percent change	13.2	18.2	21.2

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 12.9 percent

## SUPPLY PROFILE

*Usual entry level requirements.* Most printing press operators learn their trade through apprenticeships or on the job. Mechanical aptitude is required.

*Characteristics of entrants.* Most entrants transfer from other occupations. The remainder are people who have not been working—mostly persons who have been on temporary layoff.

## Fabricators, Assemblers, and Handworking Occupations

### Assembler occupations

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 1,313,000

Selected characteristics of workers, 1982:	
Percent female	53.8
Percent black	12.8
Percent employed part time	4.7

Unemployment rate . . . . . Much higher than average

Industry concentration of employment (wage and salary workers), 1982:	
<i>Industry</i>	<i>Percent</i>
Electrical and electronic machinery and equipment manufacturing	33.9
Machinery manufacturing, except electrical	18.9
Transportation equipment manufacturing	13.3

Projected employment, 1982-95:			
	<i>Low</i>	<i>Moderate</i>	<i>High</i>
1995 employment	1,625,000	1,646,000	1,702,000
Percent change	23.7	25.3	29.6

Employment change . . . . . Average

Annual replacement rate . . . . . 23.4 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Employers seek workers who can do routine work at a fast pace. A high school diploma is helpful but is seldom required. For some types of assembly jobs, applicants may have to meet special requirements such as mechanical aptitude, good eyesight, or absence of color blindness.

*Characteristics of entrants.* Most job openings are filled by persons who have not been working. Because entry requirements are minimal, many entrants are young people taking their first job, homemakers reentering the labor force, or workers who have been unemployed. Few entrants have any training beyond high school.

## Automotive painters

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 36,000

**Selected characteristics of workers, 1982:**

Percent female	15.8
Percent black	14.4
Percent employed part time	7.5

Unemployment rate . . . . . Higher than average

**Industry concentration of employment (wage and salary workers), 1982:**

Industry	Percent
Automobile repair shops	66.4
Motor vehicle dealers (new and used)	27.8

**Projected employment, 1982-95:**

	Low	Moderate	High
1995 employment	51,000	53,000	55,000
Percent change	41.2	45.7	50.6

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 24.4 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* Most automotive painters learn on the job by working with experienced painters. A few automotive painters learn through apprenticeships. Completion of a formal training program in automotive painting in a community or junior college or in a postsecondary vocational education program is an asset. Graduation from high school generally is not required but usually is an advantage.

*Training completions:*

Private noncollegiate postsecondary, 1981 <sup>1</sup>	303
Associate and other degrees below baccalaureate, 1982 <sup>2</sup>	9,888

<sup>1</sup> Other automotive services.  
<sup>2</sup> Automotive technologies.

**Welders and flamecutters**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 490,000

**Selected characteristics of workers, 1982:**

Percent female	4.8
Percent black	9.5
Percent employed part time	2.4

Unemployment rate . . . . . Higher than average

**Industry concentration of employment (wage and salary workers), 1982:**

Industry	Percent
Machinery manufacturing, except electrical	20.4
Transportation equipment manufacturing	17.3
Fabricated structural metal product manufacturing	11.8

**Projected employment, 1982-95:**

	Low	Moderate	High
1995 employment	579,000	595,000	615,000
Percent change	18.1	21.4	25.6

Employment change . . . . . Average

Annual replacement rate . . . . . 14.8 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* Few employers have formal educational requirements. Many welders learn their craft through informal on-the-job instruction while they work as a welder's helper. Physical requirements include manual dexterity, good eyesight, eye-hand coordination, and the ability to bend, stoop, and work in awkward positions.

*Characteristics of entrants.* About half of all entrants transfer from other occupations, mainly laborer and operative positions. The others are people who have not been working—many are welders and flamecutters who have been on layoff.

**Transportation and Material Moving Occupations**

**Airplane pilots**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 80,000

**Selected characteristics of workers, 1982:**

Percent female	3.6
Percent black	1.2
Percent employed part time	22.1

**Industry concentration of employment (wage and salary workers), 1982:**

Industry	Percent
Certified air transportation	46.7
Noncertified air transportation	13.2

**Projected employment, 1982-95:**

	Low	Moderate	High
1995 employment	102,000	103,000	104,000
Percent change	28.3	29.2	31.0

Employment change . . . . . Average

**SUPPLY PROFILE**

*Usual entry level requirements.* Pilots must be licensed by the Federal Aviation Administration (FAA). Applicants for licensure must be at least 18 years old, have 250 hours of flying time, have vision correctable to 20/20, pass a physical exam, and demonstrate their flying ability to an FAA examiner.

*Training completions:*

Public vocational secondary and postsecondary, 1982 <sup>1</sup>	5,650
Associate and other degrees below baccalaureate, 1982 <sup>2</sup>	6,355

<sup>1</sup> Includes all aviation occupations.  
<sup>2</sup> Includes aeronautical and aviation.

*Characteristics of entrants.* Many job openings are filled by pilots who have acquired their training in the Armed Forces. Other entrants are recent graduates of civilian flying schools. Most pilots are college graduates.

## Busdrivers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 473,000

Selected characteristics of workers, 1982:

Percent female . . . . .	46.6
Percent black . . . . .	19.5
Percent employed part time . . . . .	45.3

Unemployment rate . . . . . About average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Educational services . . . . .	50.2
Local and interurban transit . . . . .	31.0
Local government . . . . .	12.6

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	537,000	551,000	572,000
Percent change . . . . .	13.5	16.5	20.8

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 16.3 percent

### SUPPLY PROFILE

*Usual entry level requirements.* In most states, school busdrivers must be at least 18 years old. Local transit busdrivers must be at least 21, and most intercity buslines prefer drivers to be at least 24 years old. Good health and good vision, with or without glasses, are needed. A chauffeur's or school bus license is required but generally can be obtained after the driver begins working.

*Characteristics of entrants.* Most entrants are put into part time jobs; drivers may increase their work hours and get regularly scheduled routes as they advance in seniority. Most jobs for school busdrivers are filled by students or homemakers attracted by the opportunity to work part time while engaged in other activities.

## Construction machinery operators (operating engineers)

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 202,000

Selected characteristics of workers, 1982:

Percent female . . . . .	1.2
Percent black . . . . .	9.6
Percent employed part time . . . . .	3.7

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Construction . . . . .	100.0

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	287,000	292,000	300,000
Percent change . . . . .	40.6	44.2	47.1

Employment change . . . . . Faster than average

Annual replacement rate . . . . . 15.9 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Constructing machinery operators learn the trade by working as helpers to experienced operators or through formal apprenticeships. Most employers prefer high school graduates who are at least 18 years old. Completion of a postsecondary program in the operation of construction equipment can help an applicant get a helper job or an apprentice position. Applicants should be alert and have a good sense of balance as well as good eye-hand-foot coordination and physical strength.

*Training completions:*

Registered apprenticeships, 1979 . . . . . 857

## Industrial truck operators

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 385,000

Selected characteristics of workers, 1982:

Percent female . . . . .	8.0
Percent black . . . . .	19.3
Percent employed part time . . . . .	2.6

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Durable goods manufacturing . . . . .	40.0
Nondurable goods manufacturing . . . . .	26.3
Wholesale trade . . . . .	14.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment . . . . .	443,000	455,000	468,000
Percent change . . . . .	15.1	18.2	21.6

Employment change . . . . . Slower than average

Annual replacement rate . . . . . 19.5 percent

### SUPPLY PROFILE

*Usual entry level requirements.* Few employers have educational requirements. Strength, stamina, and general physical fitness are necessary. Good eyesight, especially depth perception, is essential.

*Characteristics of entrants.* Most entrants transfer from other occupations. The remainder generally are young people who have been in school or workers who have been unemployed. Many entrants have a high school diploma or less education.

## Truckdrivers

### EMPLOYMENT PROFILE

Total employment, 1982 . . . . . 2,402,000

Selected characteristics of workers, 1982:

Percent female	2.1
Percent black	12.2
Percent employed part time	5.7

Unemployment rate . . . . . Higher than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Trucking, local and long distance	37.5
Wholesale trade	21.6
Retail trade	13.9
Nondurable goods manufacturing	10.1
Durable goods manufacturing	6.2

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	2,909,000	2,980,000	3,035,000
Percent change	21.1	24.1	26.4

Employment change . . . . . Average

Annual replacement rate . . . . . 15.2 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* There are no formal education requirements. By Federal law, however, truckdrivers engaged in interstate commerce must be at least 21 years old and pass a physical examination. Most States require a chauffeur's license. Most States permit truckdrivers under 21 to carry goods within the State. Previous experience, especially in truckdriving, is important.

*Training completions:*

Private noncollegiate postsecondary, 1981 . . . . . 34,885

**Characteristics of entrants.** More than half of all entrants have not been working—many have been laid off or between jobs. Most of the rest transfer from other occupations. Relatively few entrants have more than a high school education or enter directly from school.

**Handlers, Equipment Cleaners, Helpers, and Laborers**

**Construction laborers and helpers**

**EMPLOYMENT PROFILE**

Total employment, 1982 . . . . . 576,000

Selected characteristics of workers, 1982:

Percent female	3.2
Percent black	17.6
Percent employed part time	12.0

Unemployment rate . . . . . Much higher than average

Industry concentration of employment (wage and salary workers), 1982:

Industry	Percent
Special trade contractors	37.7
Heavy construction, except highway and street	10.2
Residential building construction	9.2
Nonresidential building construction	7.4

Projected employment, 1982-95:

	Low	Moderate	High
1995 employment	725,000	741,000	757,000
Percent change	25.8	28.7	31.3

Employment change . . . . . Average

Annual replacement rate . . . . . 31.6 percent

**SUPPLY PROFILE**

*Usual entry level requirements.* There are usually no formal education requirements for this job. Applicants generally must be at least 18 years old, in good physical condition, and be willing to work hard.

# Appendix A. Assumptions and Methods Used in Preparing Employment Projections

The Bureau of Labor Statistics prepares projections on a 2-year cycle, using the Economic Growth Model System. This system is composed of a group of separate but related processes. Projections are produced in the following areas: (1) Labor force; (2) aggregate economic performance (3) industry final demand and total industry production; (4) industry employment levels; and (5) occupational employment by industry. Each block of the projections depends upon inputs from an earlier stage and feeds logically into the next.

To develop the projections, assumptions are made concerning the population, fiscal and monetary policy, foreign economic conditions, energy, and other factors. Those variables having the largest impact on the projections are discussed below, first for a moderate-growth scenario and then for alternatives to moderate growth.

## Moderate-growth assumptions

*Population.* The middle-growth projections of the U.S. population, developed by the Bureau of the Census, were chosen for the moderate-growth scenario. Between 1982 and 1995, the population age 16 and over is projected to increase 21.6 million, an average annual rate of growth of 0.9 percent. As in prior projections, the rate of population growth slows over the projection period, dropping from 1.1 percent annually between 1982 and 1988 to 0.8 percent a year between 1988 and 1995.

The civilian labor force grows somewhat more rapidly, reflecting generally increasing participation rates and the shift of persons into age categories with traditionally higher labor force participation. The civilian labor force is projected to attain a level of 131.4 million by 1995, an increase of just under 20 million from 1982. This represents an average annual growth of 1.6 percent for 1982–88, and 1 percent for 1988–95.

*Federal receipts and expenditures.* General fiscal restraint throughout the remainder of this decade is the basic assumption of the moderate-growth projection for government expenditure and tax policies. Federal defense purchases of goods and services are assumed to increase at a real rate of

4.1 percent a year between 1982 and 1986. Thereafter, growth is assumed to drop to the 0.5-to 1-percent range to 1995.

Nondefense purchases of goods and services in real terms are expected to decline in the 1983–87 period, reaching \$35.8 billion in 1987, \$1.8 billion below the 1982 level. This reflects some decline in employment as well as general cutbacks in operating funds for many programs. After 1987, nondefense purchases are assumed to grow, in real terms, about 0.5 to 1 percent a year to 1990, and to accelerate somewhat to the 2.5- to 3-percent range during the first half of the next decade.

Social security payments are expected to grow, in nominal terms, at an annual rate of 7.2 percent in the 1982–88 period, and 7.1 percent between 1988 and 1995. No real benefit increases are assumed through 1988; the growth in social security payments is generated only by inflation and an expanding client population. After 1988, some resumption of real benefit growth is assumed, on the order of 0.5 percent to 1 percent annually.

Medicare payments, on the other hand, are expected to grow at a 10.1-percent nominal rate over the 1982–88 period, to reflect client population growth, a higher-than-average rise in medical care costs, and a real increase in benefits of about 1 percent annually. After 1988, the rate of growth in Medicare payments is assumed to drop to 8 percent annually as inflation continues to moderate.

Unemployment insurance benefits are assumed to decline sharply through 1990 as the economy recovers from the 1982 recession and the number of unemployed drops. Some slight growth is expected after 1990 as the unemployment rate stabilizes. Other transfer payments, including Federal retirement programs and veterans' benefits, are expected to increase at a nominal rate of 8.5 percent annually between 1982 and 1988, and at 7.9 percent during the 1988–95 period. Finally, grants to State and local governments are assumed to grow only in line with the general rise in prices during the entire period.

Projected Federal revenues reflect currently mandated cuts in personal income tax rates and the indexation of personal taxes for the remainder of the period. Corporate taxes are assumed to stabilize at about 26 percent of profits for the

entire projection period. Indirect business taxes are expected to increase annually about 5.8 percent. No change is assumed in the tax rate or income base for social insurance contributions.

The net effect of these assumptions is a Federal budget deficit (National Income Product Account basis) that declines steadily from \$180 billion in 1983 to about \$70 billion by 1990, and then remains at about that level for the remainder of the projection period

**Monetary policy.** In the financial sector, 10 interest rates are derived, based on an assumption as to the Federal funds rate. It is assumed that the Federal funds rate, governed by the rate of growth of the nonborrowed monetary base, excluding currency, will grow at a rate close to 10 percent during 1983, drop to about 7 percent during the 1984–87 period, and then drop to the 5.5- to 6-percent range for the remainder of the projection period. This assumes that the Federal Reserve Board will loosen up somewhat on monetary controls as the economy recovers from the 1982 recession.

Also affecting the financial sector is the assumption concerning the rate of growth of money-market-related mutual funds. This variable affects the distribution of the money stock between the aggregate money supply measures M1 and M2. During the mid-1980's, money-market funds are expected to increase at a rate of about 12 to 15 percent annually, but this strong pace is expected to taper off in the late 1980's and early 1990's to about 10 percent a year.

**Foreign economic conditions.** U.S. exports of goods and services are influenced primarily by international financial markets and by the economic condition of our major trading partners. The following tabulation summarizes the assumed annual percentage rates of growth of the variables in the macro model that reflect these considerations:

	World industrial production	Wholesale price index, rest of the world	Average value of the U.S. dollar
Historical:			
1968–73 . . . . .	—	—	-3.0
1973–77 . . . . .	0.9	11.8	2.4
1977–82 . . . . .	0.7	10.0	3.3
Low-growth projection:			
1982–90 . . . . .	3.0	8.8	1.6
1990–95 . . . . .	2.9	7.9	0.0
Moderate-growth projection:			
1982–90 . . . . .	3.2	8.3	2.1
1990–95 . . . . .	3.1	6.9	1.3
High-growth projection:			
1982–90 . . . . .	3.3	8.5	2.2
1990–95 . . . . .	3.4	7.3	1.5

The assumed growth rates for industrial production appear high from a historical perspective. The historical data in the tabulation are deceptive, however, because the beginning

and ending years of the time spans are cyclical peaks in this country. The world economy tends to lag behind the U.S. business cycle and, as a result, these historical growth rates do not truly represent long-term trend growth patterns. Generally, world industrial production has tended to increase at a 2.5- to 3.5-percent annual rate.

**Energy.** Domestic oil production, currently about 10 million barrels per day (MBPD), is assumed to decline to 9.5 MBPD by 1987 and to remain at that level thereafter. Petroleum imports, on the other hand are expected to increase steadily from 5.1 MBPD in 1982 to 7.8 MBPD in 1990 and 8 MBPD in 1995. The price of imported oil is assumed to rise from the 1983 price of \$28 per barrel to \$41 in 1990 and \$52 by 1995. This rise reflects only an assumption as to the general pace of inflation and does not reflect any real increase in the barrel price of imported crude oil.

Demand for petroleum was projected based on average miles per gallon of new domestically produced autos and the ratio of imports to domestic autos. Mileage figures are assumed to improve from the 1982 level of 26.7 miles per gallon to 37.8 by 1990 and 41.7 by 1995. After declining to a 24-percent share of the market in 1983, imported autos are expected to capture more of the U.S. auto market and to account for 30 percent of domestic sales by 1990. The share is assumed to stabilize at that level.

### Alternatives to moderate growth

The high- and low-growth versions of the projections are derived from different assumptions regarding fiscal and monetary policy. By 1995, real GNP is expected to range between \$2,127 and \$2,265 billion, accompanied by unemployment rates of 6.8 and 5.2 percent for the low and high projections, respectively. Each of the alternatives is summarized below.

**High growth.** The major assumption in the high-growth scenario is that the Federal Reserve Board will pursue a less restrictive monetary policy than in the moderate-growth projections; that is, it will allow more rapid monetary growth to bolster recovery from the 1981–82 recession and to sustain a higher rate of economic growth over the long run.

The assumption of a less restrictive monetary policy, coupled with stronger growth in demand, results in an expected inflation rate different from that of the moderate-growth scenario. The rate of inflation (measured by the implicit GNP deflator) is assumed to be 6.5 percent a year between 1982 and 1990, 1.1 percent a year higher than in the moderate-growth version. However, instead of decelerating after 1990, the inflation rate will rise to 7.2 percent annually until 1995. This was about the rate of inflation during the 1973–77 period.

No differences were assumed for fiscal policy in the high-growth projection. The higher inflation rates do, however, result in a more rapid increase in Federal government expenditures throughout the period, at a rate of 7.8 percent a year between 1982 and 1995 compared to 6.7 percent in the moderate-growth scenario.

Real GNP is expected to grow at an average annual rate of 3.9 percent during 1982–85, compared with 3.3 percent in the moderate-growth version. Between 1990 and 1995, GNP is expected to rise at the same rate in both the moderate- and high-growth alternative—2.5 percent annually. This is due primarily to the much higher rate of import growth in the high-growth version, which tends to mask greater increases in the other categories of GNP. The GNP in 1995 is about \$98 billion higher than in the moderate-growth version.

Major differences in demand projections compared to the moderate-growth version, are in purchases of consumer durables (\$37 billion higher), producers' durable equipment (\$25 billion higher), and in residential investment (\$35 billion higher). As noted earlier, greater income growth in this version leads to higher levels of imports, while exports are virtually unchanged. Net exports are therefore lower by \$63 billion than in the moderate-growth projection. Finally, higher rates of income growth mean greater government revenues, which lead to a balanced Federal budget in 1990.

The distribution of demand shows no change in the share going to government in the high-trend alternative compared to the moderate version. Total personal consumption expenditures show little difference, masking the fact that durable goods expenditures increase at the expense of nondurables and services. This follows from the assumptions of easier money and lower interest rates, which are major inducements for the purchase of durables. Lower interest rates also lead to a larger share of GNP for equipment investment and construction. But increased purchases of goods of manufacturing industries resulting from higher expenditures of government, consumers, and business are more than offset by the large increase assumed for imports. The drop in the export share of GNP is partially reflected in a slight decline in the share of agricultural industries.

*Low growth.* This alternative assumes higher levels of government spending, especially in defense, but also in transfers and grants. Federal expenditures are assumed to grow at a rate of 9.4 percent a year between 1982 and 1990 and at 7 percent during the 1990–95 period. This compares to 7.5–percent and 6.1–percent growth over the same periods in the moderate-growth scenario. Defense growth is about 1.5 percent higher each year between 1982 and 1988, reflecting somewhat higher staff levels and greater expenditures on goods. Transfer payments are higher in every category, with the major increases in social security and Medicare. As a result of the more aggressive (or less controlled) fiscal policy, the Federal Government in this version will run deficits of about \$200 billion for the remainder of the decade, with only modest tapering off after 1990 to about \$160 billion by 1995.

In addition, the monetary authorities are assumed to be generally more restrictive to hold down inflation. Both M1 and M2 will grow at about 0.6-percent lower rates than in the moderate-growth projections. As a result, both short- and long-term interest rates will be pushed higher, remain-

ing in the double-digit range over the entire projection period.

High interest rates and severe competition for funds in the credit markets will limit the growth of demand, especially for durable items. Real GNP will be \$40 billion lower in 1995 than in the moderate-growth case. Personal consumption expenditures will be lower by \$63 billion and gross private investment by \$52 billion than in the 1995 moderate-growth levels. As in the high-growth version, the slower growth in income will lower imports by \$55 billion, which masks, to some extent, the full impact on the domestic economy. Reduced income growth only adds to the Federal deficit, despite assumed increases in personal taxes during the 1980's. Dampened capital goods spending will lower productivity and job growth over the entire period.

Different assumptions in the low-growth case cause minor variations in the level of GNP but significant differences in its distribution compared to the base case. Tight monetary policy leads to higher interest rates that will have a retarding effect on expenditures for consumers' and producers' durable goods and on construction—sectors that purchase heavily from manufacturing industries. However, because imports are assumed to grow at a much slower rate and defense spending at a faster rate than GNP, the adverse impact of low demand on manufacturing is alleviated. Lower consumer expenditures and business investment will cause trade to account for a larger share of GNP.

## Projection methods

The *labor force projections* are developed from Bureau of the Census population projections by age, sex, and race, based on trends in birth rates, death rates, and net migration. BLS projects labor force participation rates—the percent of each group in the population who will be working or seeking work—for 64 age, sex, and race groups. The labor force participation rate for each group is developed by: (a) Analyzing past rates of growth over the 1962–81 period or for selected subperiods; (b) selecting the rate for a period deemed most appropriate for each group; and (c) modifying that rate if past trends are judged not likely to continue throughout the entire projection period. The levels of the anticipated labor force are then calculated by applying the projected participation rates to the Bureau of the Census population projections.

The *aggregate economic projections or gross national product*, in total and by major demand and income category, start with the BLS labor force and Census population projections as inputs. Consistent economic scenarios are developed to provide aggregate controls for the various categories of demand and employment. These scenarios are selected to encompass a likely range of economic growth in the future. Later stages of the projection process develop industry-level projections consistent with these aggregate data.

In the past, the Bureau's aggregate economic projections have been prepared with a modified version of the Thurow

econometric model of the U.S. economy. After the last round of projections, the BLS macro model was determined to be inadequate for further projections studies without major respecification and expansion. The Bureau decided to look to the private sector for a macro model that would satisfy the needs of bureau economists and that, at the same time, would remove the burden of periodic data base maintenance and model reestimation from the Bureau staff. A competitive procurement process was initiated in January 1982 and a contract was awarded to Chase Econometrics Associates, Inc., in October 1982. Under this agreement, the Bureau now uses the Chase macro model to develop its projections.

The Chase model, which is a quarterly model of the U.S. economy, is composed of 312 behavioral equations and 275 identities, thus determining 587 endogenous variables. In addition, it contains 110 exogenous variables. The model can be conveniently decomposed into 13 sectors: (1) Consumption, (2) business fixed investment, (3) residential investment, (4) change in business inventories, (5) foreign trade, (6) Federal Government, (7) State and local government, (8) employment and hours, (9) financial, (10) income, (11) wage and prices, (12) industrial production, and (13) energy.

Assumptions are specified for the 110 exogenous variables. The model is simulated and the results are analyzed for consistency and reasonableness. The exogenous variables and the behavioral relationships are modified until a reasonable set of results has been obtained.

For the *industry output projections*, the U.S. economy is disaggregated to 156 producing sectors, an exhaustive grouping which combines both the public and private sectors. The framework is an input-output model prepared for a base period by the Bureau of Economic Analysis of the U.S. Department of Commerce. The first step at the industry level is to disaggregate the GNP estimate to a set of demands by industry. This projected industry demand, in conjunction with a projected input-output table, is used to calculate total industrial production. The projected change in input-output coefficients in the input-output model capture—among other factors—expected changes in technology. Finally, the employment necessary to produce those levels of output is estimated through use of projected industry productivity measures.

Aggregate demand projections are available from the macro model for 15 categories of consumption, 8 types of investment, 15 end-use categories of foreign trade, and 3 categories of government spending. Where possible, a further disaggregation of the control values is undertaken: Purchases of producers' durable equipment is divided into 23 types of capital equipment. Government spending is grouped into 12 categories.

To allow for shifts in the composition of aggregate demand and in the industrial makeup of a given demand category, "bridge tables" are projected. The bridge table is a set of percent distributions for each given demand category, such as one of the consumption groups or investment, among

each of the 156 industries in the BLS input-output model.

The projection of the input-output table accounts for the changes in the input pattern for each industry. In general, two types of changes are made: (a) Those made to the inputs of a specific industry after an industry study (as for the changes in inputs in the aluminum industry); and, (b) those made to the inputs of all industries for a specific commodity (as for increased use of business services across a wide spectrum of industries.) Output requirements by industry are the result of multiplying the projected input-output table by projected changes in level and distribution of final demand.

The projected changes in industry output are important factors determining the *projections of industry employment*. However, converting output projections into employment estimates requires projections of changes in productivity and average hours for each industry. This is accomplished using a regression model with an equation for each industry that estimates worker hours as a function of the following variables: (1) The industry's output, (2) capacity utilization, (3) the relative price of labor, and (4) a technology variable as approximated by the output/capital ratio. Worker hours are then converted into jobs by dividing by average annual hours, which are projected from past trends. The sum of employment by industry is controlled to total employment as estimated in the macro model. Several iterations are usually necessary to achieve a reasonable balance.

Projections of employment for the 156 sectors in the Economic Growth Model are disaggregated to 372 industries corresponding to the 3-digit Standard Industrial Classification (SIC). This is done to match the industry mix of the industry-occupation matrix described later. The disaggregated 3-digit SIC industry employment projections are reviewed in light of a broad range of economic information. When the industry projections are considered final, they are used as inputs to the process of projecting occupational employment.

One of the main resources in making *occupational employment projections* is the industry-occupation matrix. This matrix is produced from data collected by State employment agencies and brought together by the Bureau of Labor Statistics to produce national estimates. The data are collected from employers on a 3-year cycle—manufacturing one year, some nonmanufacturing industries the next year, and the rest of nonmanufacturing the final year. The data from the 3-year cycle are used to compute annual average estimates for occupational employment in each of the 3-digit SIC industries. The matrix contains over 1,500 detailed occupations, although most industries do not have employment in many of these occupations.

The major occupational cells of the industry-occupation matrix for the base year are reviewed and adjustments are made to the cells in the projected matrix to account for expected changes resulting from technological change, shifts in the product mix, and other factors. The changes introduced into the input-output model for expected technologi-



cal change may also affect the staffing patterns in industries using the new technology. (For example, one would expect greater general employment of computer specialists as computer technology spreads across industries.) The projected

industry employment data are applied to the projected industry occupational employment patterns and the results are aggregated to yield total occupational employment for the projected year.

# Appendix B. Detailed Occupational Projections

This appendix presents estimates of 1982 total occupational employment, three alternative 1995 projections (see discussion of projections in appendix A), and the 1982-95

percent change for 763 detailed occupations with 1982 employment of 5,000 or more.

**Table B - 1. Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)				Percent change		
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Total, all occupations . . . . .	101,510.1	124,846.0	127,109.8	129,902.1	23.0	25.2	28.0
Professional, technical, and related workers . . . . .	16,583.9	21,544.7	21,775.0	22,325.4	29.9	31.3	34.6
Engineers . . . . .	1,204.3	1,787.0	1,788.4	1,830.6	48.4	48.5	52.0
Aero-astronautic engineers . . . . .	43.8	65.2	61.6	62.4	48.8	40.6	42.4
Chemical engineers . . . . .	56.0	78.9	80.3	82.3	40.9	43.5	47.0
Civil engineers . . . . .	155.4	225.5	228.1	235.8	45.1	46.8	51.7
Electrical engineers . . . . .	319.5	530.5	528.2	540.3	66.0	65.3	69.1
Industrial engineers . . . . .	160.2	225.9	226.7	232.3	41.0	41.6	45.0
Mechanical engineers . . . . .	209.1	313.9	318.0	327.2	50.1	52.1	56.5
Metallurgical engineers . . . . .	14.0	20.5	20.7	21.0	46.1	47.5	50.2
Mining engineers . . . . .	5.7	6.9	7.0	7.1	21.2	22.4	24.7
Nuclear engineers . . . . .	6.3	9.4	9.3	9.7	50.5	47.9	53.9
Petroleum engineers . . . . .	26.1	31.2	31.8	30.2	19.4	21.7	15.7
All other engineers . . . . .	208.1	279.1	276.8	282.3	34.1	33.0	35.6
Life and physical scientists . . . . .	271.0	343.0	341.7	348.4	26.6	26.1	28.6
Agricultural scientists . . . . .	21.7	25.7	25.7	26.3	18.8	18.6	21.5
Biological scientists . . . . .	51.6	71.3	70.4	72.7	38.1	36.3	40.9
Chemists . . . . .	88.8	107.0	108.3	110.9	20.5	22.0	24.9
Geologists . . . . .	48.6	60.1	60.1	58.8	23.6	23.6	20.9
Medical scientists . . . . .	7.2	9.4	9.5	9.8	30.1	31.8	35.6
Physicists . . . . .	18.8	26.4	25.7	26.6	40.2	36.6	41.0
All other life and physical scientists . . . . .	34.2	43.0	41.9	43.3	25.8	22.6	26.5
Mathematical specialists . . . . .	47.9	62.6	61.6	63.3	30.5	28.6	32.1
Actuaries . . . . .	8.2	10.8	10.9	11.1	31.5	33.0	34.8
Mathematicians . . . . .	10.6	14.1	13.5	14.0	33.1	28.1	32.3
Statisticians . . . . .	20.1	26.1	25.8	26.6	29.5	28.3	32.0
All other mathematical specialists . . . . .	9.1	11.7	11.4	11.7	28.8	25.6	29.7
Engineering and science technicians . . . . .	1,243.3	1,648.6	1,660.8	1,704.6	32.6	33.6	37.1
Broadcast technicians . . . . .	17.1	21.9	21.6	22.0	28.2	26.5	28.6
Civil engineering technicians . . . . .	35.2	56.0	57.7	59.5	59.1	63.9	69.0
Drafters . . . . .	302.4	309.3	317.6	327.3	2.3	5.0	8.2
Electrical and electronic technicians . . . . .	366.2	585.0	588.5	601.7	59.8	60.7	64.3
Estimators and drafters, utilities . . . . .	6.0	7.2	7.3	7.3	19.6	21.2	22.3
Industrial engineering technicians . . . . .	27.4	35.9	35.4	36.6	30.9	28.9	33.4
Mechanical engineering technicians . . . . .	47.8	72.0	72.4	74.0	50.8	51.6	54.8
Surveyors . . . . .	43.6	61.3	62.4	64.3	40.5	43.1	47.3
All other engineering and science technicians . . . . .	397.6	500.0	497.8	511.9	25.7	25.2	28.7
Medical workers, except technicians . . . . .	2,463.5	3,470.7	3,491.1	3,599.6	40.9	41.7	46.1
Chiropractors . . . . .	25.5	32.6	32.4	32.4	28.1	27.2	27.2
Dentists . . . . .	172.5	213.0	213.5	218.3	23.5	23.7	26.6
Dietitians . . . . .	44.3	61.3	62.0	64.0	38.3	39.9	44.3
Nurses, registered . . . . .	1,312.4	1,942.8	1,954.2	2,021.9	48.0	48.9	54.1
Optometrists . . . . .	27.5	34.6	34.4	34.6	25.5	25.1	25.7
Pharmacists . . . . .	151.0	187.7	192.1	196.3	24.3	27.2	30.0
Physicians . . . . .	479.1	640.0	641.8	662.5	33.6	34.0	38.3
Podiatrists . . . . .	12.9	19.6	19.6	19.7	52.6	51.9	52.9

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)			Percent change			
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Therapists . . . . .	201.8	291.2	293.6	301.8	44.3	45.5	49.5
Respiratory therapists . . . . .	46.5	67.0	67.3	69.7	44.1	44.9	49.9
Manual arts, music, recreational therapists . . . . .	18.3	25.8	26.0	26.8	41.3	42.3	46.6
Occupational therapists . . . . .	25.1	39.7	40.1	41.2	58.5	59.8	64.4
Physical therapists . . . . .	43.4	68.3	68.7	70.3	57.2	58.2	61.9
Speech pathologists and audiologists . . . . .	41.8	53.1	53.9	55.1	26.9	28.8	31.7
All other therapists . . . . .	26.7	37.3	37.7	38.7	39.5	40.8	44.8
Veterinarians . . . . .	36.4	47.8	47.5	48.0	31.2	30.4	31.8
Health technologists and technicians . . . . .	627.4	891.3	897.9	931.9	42.1	43.1	48.5
Clinical laboratory technologists and technicians . . . . .	208.7	290.6	292.2	302.9	39.2	40.0	45.1
Biochemistry technologists . . . . .	11.6	16.3	16.4	17.0	40.8	41.6	46.9
Blood bank technology specialists . . . . .	17.0	25.1	25.3	26.2	47.9	49.1	54.1
Cytotechnologists . . . . .	4.7	7.1	7.1	7.3	50.8	52.3	57.1
Histologic technologists . . . . .	6.6	9.5	9.5	9.9	43.8	44.8	49.9
Medical laboratory technicians . . . . .	57.4	69.9	70.7	73.3	21.9	23.3	27.8
Medical laboratory technologists . . . . .	102.8	150.2	150.4	156.1	46.2	46.4	51.9
Microbiology technologists . . . . .	8.8	12.6	12.6	13.1	42.8	43.7	48.9
Dental hygienists . . . . .	69.4	97.1	99.2	104.2	39.9	42.8	50.0
Dietetic technicians . . . . .	13.4	20.3	20.5	21.1	50.8	52.5	56.9
EEG technologists . . . . .	5.5	7.7	7.7	8.0	40.2	41.2	46.7
EKG technicians . . . . .	20.9	28.8	28.5	29.7	37.9	36.7	42.5
Emergency medical technicians . . . . .	5.5	7.0	7.3	7.8	26.4	31.8	41.2
Health record technicians . . . . .	21.6	31.0	30.9	32.1	43.6	43.5	48.8
Physical therapy assistants . . . . .	32.7	54.5	54.9	56.2	66.7	67.8	71.8
Physician assistants . . . . .	22.4	28.0	28.4	29.6	24.8	26.8	31.8
Radiologic technologists . . . . .	110.0	156.3	157.3	163.5	42.1	43.0	48.7
Radiologic technologists and nuclear medical technicians . . . . .	36.2	50.5	50.4	52.4	39.7	39.4	44.9
X-ray technicians . . . . .	73.8	105.8	106.9	111.1	43.3	44.8	50.6
Surgical technicians . . . . .	34.8	48.4	48.7	50.5	39.0	39.8	45.1
All other health technologists and technicians . . . . .	82.4	121.7	122.4	126.3	47.7	48.5	53.3
Technicians, exc. health, science, and engineering . . . . .	364.3	450.9	453.1	465.4	23.8	24.4	27.8
Airplane pilots . . . . .	79.7	102.2	103.0	104.4	28.3	29.2	31.0
Air traffic controllers . . . . .	20.9	24.1	21.8	23.3	15.1	4.3	11.6
Embalmers . . . . .	11.1	9.3	9.7	10.7	-15.8	-12.2	-3.2
Flight engineers . . . . .	5.6	1.5	1.5	1.5	-73.0	-72.7	-72.4
Library technicians . . . . .	29.1	31.8	32.1	32.9	9.2	10.2	13.2
Radio operators . . . . .	6.7	8.1	8.3	8.4	21.2	23.9	26.1
Tool programmers, numerical control . . . . .	12.3	21.7	22.0	22.7	76.2	78.4	83.6
All other tech., exc. health, science, and engineering . . . . .	198.8	252.1	254.6	261.3	26.8	28.1	31.4
Computer specialists . . . . .	520.8	934.8	942.8	960.0	79.5	81.0	84.3
Computer programmers . . . . .	266.4	465.3	471.3	479.6	74.6	76.9	80.0
Computer systems analysts . . . . .	254.4	469.5	471.4	480.3	84.6	85.3	88.8
Social scientists . . . . .	205.6	266.8	266.7	273.2	29.8	29.7	32.9
Economists . . . . .	30.0	38.7	38.0	39.1	28.9	26.6	30.4
Financial analysts . . . . .	19.3	26.0	26.0	26.5	34.2	34.6	37.2
Psychologists . . . . .	82.5	109.3	109.9	112.4	32.5	33.2	36.2
Sociologists . . . . .	5.7	7.0	7.1	7.3	24.3	25.5	28.8
Urban and regional planners . . . . .	21.4	24.2	24.5	25.2	13.1	14.6	17.7
All other social scientists . . . . .	46.7	61.6	61.1	62.6	32.0	30.9	34.2
Teachers . . . . .	3,980.0	4,612.2	4,706.1	4,806.5	15.9	18.2	20.8
Adult education teachers . . . . .	124.7	163.9	165.0	169.7	31.4	32.3	36.1
Athletic coaches . . . . .	15.8	17.8	18.2	18.6	13.0	15.4	17.9
College and university faculty . . . . .	744.0	619.4	632.5	646.2	-16.7	-15.0	-13.1
Dance instructors . . . . .	26.6	34.9	35.2	36.3	31.0	32.0	36.1
Extension service specialists . . . . .	13.5	15.3	15.6	15.9	13.0	15.4	17.9
Graduate assistants . . . . .	139.8	121.6	124.2	126.9	-13.1	-11.2	-9.3
Preschool, kindergarten, elem. sch. teachers . . . . .	1,647.0	2,226.0	2,274.3	2,322.3	35.2	38.1	41.0
Preschool teachers . . . . .	280.9	387.3	397.0	404.1	37.9	41.3	43.9
Kindergarten and elementary school teachers . . . . .	1,366.1	1,838.6	1,877.3	1,918.2	34.6	37.4	40.4
Secondary school teachers . . . . .	1,024.1	1,128.3	1,152.2	1,177.1	10.2	12.5	14.9
Vocational education teachers . . . . .	97.9	139.4	142.7	145.7	42.4	45.7	48.8
All other teachers . . . . .	146.6	145.7	146.3	147.9	-7	-2	8

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)			Percent change			
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
<b>Selected writers, artists, and entertainers</b> . . . . .	1,020.0	1,299.4	1,315.1	1,343.5	27.4	28.9	31.7
Actors . . . . .	34.4	48.0	49.2	51.9	39.6	43.2	51.0
Athletes . . . . .	23.0	24.1	24.3	24.8	5.0	5.8	7.8
<b>Commercial and graphic artists and designers</b> . . . . .	132.8	166.1	166.9	169.1	25.1	25.7	27.4
Dancers . . . . .	7.7	10.8	11.0	11.5	40.2	42.7	48.7
Designers . . . . .	179.7	247.3	252.9	257.9	37.6	40.8	43.5
Musicians . . . . .	124.5	153.2	155.0	159.8	23.1	24.5	28.4
Painters, artistic . . . . .	25.2	29.5	29.2	29.3	17.2	16.1	16.3
Photographers . . . . .	86.1	101.4	101.7	104.1	17.8	18.1	20.9
Public relations specialists . . . . .	89.6	114.2	115.3	118.1	27.5	28.7	31.8
<b>Radio and TV announcers and newscasters</b> . . . . .	54.7	69.6	70.1	70.4	27.3	28.2	28.8
Announcers . . . . .	45.9	57.6	58.0	58.3	25.4	26.3	27.0
Broadcast news analysts . . . . .	8.8	12.0	12.1	12.1	36.8	37.8	38.3
Reporters and correspondents . . . . .	51.1	64.3	66.1	67.0	25.8	29.3	31.1
Singers . . . . .	21.2	25.6	25.6	26.0	21.0	20.8	22.6
Sports instructors . . . . .	52.7	63.1	63.7	65.8	19.6	20.8	24.7
Writers and editors . . . . .	119.7	160.3	161.9	165.3	33.9	35.3	38.1
Writers, artists, entertainers, nec . . . . .	17.8	21.9	22.1	22.6	23.3	24.3	27.2
<b>Other professional and technical workers</b> . . . . .	4,635.9	5,777.5	5,849.8	5,998.5	24.6	26.2	29.4
Accountants and auditors . . . . .	855.8	1,180.5	1,199.8	1,229.1	38.0	40.2	43.6
Architects . . . . .	84.2	116.0	117.7	120.7	37.7	39.7	43.3
Assessors . . . . .	27.7	30.2	30.8	31.5	9.1	11.0	13.8
Audiovisual specialists, education . . . . .	6.3	6.7	6.9	7.0	7.5	9.8	12.2
Brokers' floor reps and security traders . . . . .	12.5	14.9	15.0	15.3	18.8	19.5	21.8
Buyers, retail and wholesale trade . . . . .	255.7	321.2	331.2	335.8	25.6	29.5	31.4
Claim examiners, property/casualty insurance . . . . .	22.4	28.2	28.6 <sup>1</sup>	29.1	26.1	28.0	30.1
Claims takers, unemployment benefits . . . . .	14.7	13.8	14.0	14.4	-6.3	-4.6	-2.2
Clergy . . . . .	316.9	327.4	332.3	343.7	3.3	4.9	8.4
Cost estimators . . . . .	92.4	130.5	133.8	136.9	41.3	44.9	48.2
Counselors . . . . .	148.4	159.4	162.9	166.7	7.4	9.8	12.4
County agricultural specialists . . . . .	10.9	12.3	12.6	12.9	12.9	15.3	17.8
Credit analysts, chief . . . . .	8.7	12.2	12.3	12.5	40.4	41.7	44.1
Credit analysts . . . . .	21.6	30.3	30.5	31.1	40.0	41.2	43.6
Curriculum specialists . . . . .	23.7	26.7	27.3	27.9	12.6	14.9	17.4
Directors, religious education and activities . . . . .	42.7	44.2	44.8	46.3	3.4	5.0	8.5
Employment interviewers . . . . .	56.5	85.2	86.1	87.3	50.8	52.5	54.6
Foresters and conservationists . . . . .	30.9	35.2	33.8	35.6	14.1	9.4	15.3
Insurance investigators . . . . .	11.4	14.6	14.8	15.0	27.9	29.6	31.5
Judges . . . . .	19.7	24.1	24.1	24.9	22.2	22.6	26.3
Law clerks . . . . .	40.5	55.4	56.4	58.7	36.9	39.2	44.9
Lawyers . . . . .	464.5	617.5	623.7	637.6	32.9	34.3	37.3
Lease buyers . . . . .	9.9	10.1	10.3	9.5	2.1	4.4	-3.6
Legal assistants . . . . .	45.3	85.4	88.0	91.4	88.4	94.3	101.7
Librarians . . . . .	150.6	166.7	169.6	173.7	10.7	12.6	15.3
Magistrates . . . . .	11.4	12.0	12.2	12.5	4.9	6.8	9.5
Personnel and labor relations specialists . . . . .	202.9	248.7	249.9	257.0	22.5	23.2	26.6
Purchasing agents and buyers . . . . .	190.8	242.2	242.4	249.6	26.9	27.1	30.9
Media buyers . . . . .	14.1	17.0	17.1	17.3	21.3	21.9	23.1
Purchasing agents and/or buyers . . . . .	176.7	225.1	225.3	232.3	27.4	27.5	31.5
Recreation workers . . . . .	124.0	149.9	152.4	156.7	20.9	22.9	26.4
Safety inspectors . . . . .	7.7	11.3	11.5	11.6	46.2	48.5	50.9
Social workers . . . . .	344.7	409.2	415.8	428.3	18.7	20.6	24.3
Caseworkers . . . . .	292.4	347.9	353.2	363.6	19.0	20.8	24.4
Community organization workers . . . . .	52.3	61.3	62.6	64.7	17.2	19.7	23.8
Special agents, insurance . . . . .	30.5	43.8	44.4	45.1	43.4	45.5	47.7
Tax examiners, collectors, and revenue agents . . . . .	46.9	54.3	51.8	54.3	15.7	10.3	15.8
Tax preparers . . . . .	32.4	44.8	46.4	49.2	38.2	43.1	51.6
Title examiners and abstractors . . . . .	11.0	15.9	16.4	16.8	45.3	49.2	53.4
Underwriters . . . . .	75.8	90.2	91.8	93.4	19.0	21.1	23.2
All other professional workers . . . . .	784.0	906.8	907.7	929.7	15.7	15.8	18.6
<b>Managers, officials, and proprietors</b> . . . . .	9,532.2	12,008.3	12,212.4	12,466.8	26.0	28.1	30.8
Auto parts department managers . . . . .	44.2	60.7	62.9	64.0	37.2	42.2	44.7
Auto service department managers . . . . .	54.3	75.6	78.4	79.8	39.3	44.4	47.1
Captains, water vessel . . . . .	13.9	14.4	14.9	15.1	3.2	6.6	8.1
Chief executives, legislative . . . . .	10.3	9.6	9.8	10.1	-6.3	-4.6	-2.2
Construction inspectors, public administration . . . . .	39.1	45.8	45.9	47.3	17.2	17.4	21.0

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)				Percent change		
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Health and regulatory inspectors . . . . .	101.4	111.0	108.0	112.6	9.4	6.5	11.0
Postmasters and mail superintendents . . . . .	28.3	22.6	24.4	25.0	-20.2	-13.8	-11.8
Railroad conductors . . . . .	26.9	17.1	18.3	19.7	-36.4	-32.0	-26.9
Restaurant, cafe, and bar managers . . . . .	573.5	706.3	710.6	714.8	23.1	23.9	24.6
Sales managers, retail trade . . . . .	271.5	352.2	361.8	365.5	29.8	33.3	34.6
School administrators . . . . .	132.8	149.7	152.8	156.1	12.7	15.1	17.6
Assistant principals . . . . .	38.0	43.8	44.7	45.7	15.4	17.9	20.4
Principals . . . . .	81.8	93.1	95.1	97.1	13.8	16.2	18.7
Superintendents . . . . .	13.0	12.8	13.0	13.3	-2.0	.1	2.2
Store managers . . . . .	970.5	1,218.4	1,262.4	1,285.4	25.5	30.1	32.4
Wholesalers . . . . .	247.4	298.0	302.4	303.3	20.5	22.2	22.6
All other managers . . . . .	7,018.1	8,926.8	9,059.8	9,268.8	27.2	29.1	32.1
<b>Sales workers . . . . .</b>	<b>6,966.7</b>	<b>8,535.5</b>	<b>8,771.5</b>	<b>8,911.0</b>	<b>22.5</b>	<b>25.9</b>	<b>27.9</b>
Broker and market operators, commodities . . . . .	5.8	7.6	7.7	7.8	30.8	31.4	33.7
Contribution solicitors . . . . .	7.7	9.6	9.9	10.3	25.2	28.3	33.6
Crating and moving estimators . . . . .	7.2	9.4	9.5	9.7	29.2	31.5	33.5
Real estate agents and brokers . . . . .	337.3	448.8	449.6	453.4	33.1	33.3	34.4
Real estate brokers . . . . .	41.5	53.1	53.1	53.5	27.9	27.9	28.8
Sales agents, sales reps., real estate . . . . .	295.7	395.7	396.5	399.9	33.8	34.1	35.2
Real estate appraisers . . . . .	31.5	46.8	46.9	47.7	48.5	48.8	51.2
Sales agents and brokers, insurance . . . . .	361.4	447.4	451.8	457.6	23.8	25.0	26.6
Sales agents and reps., financial services . . . . .	22.5	33.2	33.5	34.1	47.2	48.6	51.2
Sales representatives, nontechnical . . . . .	583.4	724.3	743.1	749.4	24.1	27.4	28.5
Sales representatives, technical . . . . .	1,320.3	1,651.9	1,706.7	1,729.7	25.1	29.3	31.0
Sales clerks . . . . .	2,915.9	3,472.0	3,601.1	3,670.1	19.1	23.5	25.9
Security salesworkers . . . . .	78.3	106.3	106.8	108.7	35.7	36.4	38.8
Travel agents . . . . .	61.9	86.4	88.3	88.5	39.6	42.7	43.0
Vendors . . . . .	7.7	8.9	8.9	9.1	15.8	15.9	18.1
All other sales workers . . . . .	1,225.7	1,483.0	1,507.7	1,535.0	21.0	23.0	25.2
<b>Clerical workers . . . . .</b>	<b>19,048.9</b>	<b>23,533.2</b>	<b>23,998.3</b>	<b>24,538.1</b>	<b>23.5</b>	<b>26.0</b>	<b>28.8</b>
Adjustment clerks . . . . .	35.7	47.7	49.1	50.1	33.5	37.7	40.2
Admissions evaluators . . . . .	10.5	11.8	12.1	12.3	13.0	15.4	17.9
Bank tellers . . . . .	538.8	686.1	693.0	702.8	27.4	28.6	30.4
New accounts tellers . . . . .	67.3	79.1	79.9	81.1	17.6	18.8	20.5
Tellers . . . . .	471.5	607.0	613.1	621.7	28.7	30.0	31.9
Bookkeepers and accounting clerks . . . . .	1,713.0	1,942.8	1,984.6	2,027.1	13.4	15.9	18.3
Accounting clerks . . . . .	756.4	861.5	875.9	895.5	13.9	15.8	18.4
Bookkeepers, hand . . . . .	956.7	1,081.3	1,108.7	1,131.6	13.0	15.9	18.3
Brokerage clerks . . . . .	16.5	20.2	20.3	20.8	21.9	23.0	25.6
Car rental clerks . . . . .	16.2	20.7	21.6	22.9	27.6	33.3	41.2
Cashiers . . . . .	1,570.2	2,235.1	2,314.1	2,361.9	42.3	47.4	50.4
Checking clerks . . . . .	18.6	23.1	23.3	23.6	23.9	25.1	26.7
Circulation clerks . . . . .	9.5	11.4	11.8	12.0	19.9	23.9	25.9
Claims adjusters . . . . .	66.0	98.7	98.3	100.9	49.5	48.8	52.8
Claims clerks . . . . .	66.4	93.7	92.9	95.5	41.0	39.9	43.8
Claims examiner, insurance . . . . .	47.3	61.1	62.2	63.3	29.1	31.4	33.7
Clerical supervisors . . . . .	466.7	617.5	628.2	640.7	32.3	34.6	37.3
Coin machine operators and currency sorters . . . . .	5.1	5.9	6.0	6.1	17.3	18.5	20.0
Collectors, bill and account . . . . .	94.0	133.2	134.9	137.1	41.7	43.6	45.9
Court clerks . . . . .	27.3	28.9	29.5	30.2	6.0	7.9	10.6
Credit authorizers . . . . .	21.3	30.4	31.6	32.2	42.5	48.3	51.2
Credit clerks, banking and insurance . . . . .	49.6	75.7	76.4	77.8	52.7	54.1	56.9
Credit reporters . . . . .	16.2	21.2	21.4	21.7	31.3	32.6	34.4
Customer service representatives . . . . .	88.9	120.4	123.8	124.8	35.4	39.2	40.3
Customer service reps., print and publish . . . . .	8.4	9.9	10.3	10.5	16.9	22.2	24.7
Desk clerks, bowling floor . . . . .	15.4	17.4	17.8	18.6	13.2	15.4	21.0
Desk clerks, except bowling floor . . . . .	87.5	106.7	107.4	109.1	21.8	22.7	24.6
Dispatchers, police, fire, and ambulance . . . . .	47.8	52.5	53.4	54.7	9.7	11.6	14.4
Dispatchers, vehicle service or work . . . . .	90.3	110.7	113.4	116.1	22.5	25.6	28.5
Eligibility workers, welfare . . . . .	31.5	31.6	32.1	33.0	.2	2.0	4.6
File clerks . . . . .	294.7	316.2	321.4	329.1	7.3	9.1	11.7
General clerks, office . . . . .	2,348.4	2,989.9	3,044.3	3,113.0	27.3	29.6	32.6
In-file operators . . . . .	5.0	6.9	7.0	7.1	37.7	39.0	40.9
Insurance checkers . . . . .	15.0	22.1	22.5	22.8	47.1	49.8	52.4
Insurance clerks, except medical . . . . .	10.6	14.4	14.6	14.8	35.8	37.6	40.0
Insurance clerks, medical . . . . .	85.7	137.5	139.1	144.7	60.3	62.2	68.7
Library assistants . . . . .	81.1	94.2	95.8	98.0	16.1	18.1	20.8
License clerks . . . . .	5.7	5.4	5.5	5.6	-5.7	-4.0	-1.6
Loan closers . . . . .	45.3	63.4	64.1	65.2	40.0	41.5	44.0

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)				Percent change		
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Mail carriers and postal clerks . . . . .	540.6	439.0	474.4	485.2	-18.8	-12.2	-10.3
Postal mail carriers . . . . .	234.1	206.0	222.7	227.7	-12.0	-4.9	-2.7
Postal service clerks . . . . .	306.5	233.0	251.8	257.5	-24.0	-17.9	-16.0
Mail clerks . . . . .	99.8	132.4	130.9	134.8	32.6	31.2	35.0
Messengers . . . . .	51.1	65.6	66.8	68.4	28.2	30.7	33.8
Meter readers, utilities . . . . .	30.5	37.3	37.9	38.5	22.4	24.0	26.1
Mortgage closing clerks . . . . .	15.3	22.4	22.6	23.0	45.9	47.2	49.9
Office machine operators . . . . .	935.5	1,178.7	1,196.1	1,219.7	26.0	27.8	30.4
Bookkeeping and billing operators . . . . .	227.0	285.5	291.0	296.1	25.7	28.2	30.4
Bookkeeping, billing machine operators . . . . .	172.4	217.9	222.8	226.9	26.4	29.2	31.7
Proof machine operators . . . . .	47.4	58.7	59.4	60.1	23.9	25.2	26.7
Transit clerks . . . . .	7.3	8.8	8.9	9.0	21.4	22.6	24.2
Computer operating personnel . . . . .	579.9	727.1	736.8	752.1	25.4	27.1	29.7
Computer operators . . . . .	210.9	366.2	370.7	378.3	73.7	75.8	79.4
Data entry operators . . . . .	320.0	281.9	285.9	292.2	-11.9	-10.6	-8.7
Peripheral EDP equipment operators . . . . .	49.0	79.0	80.2	81.6	61.0	63.5	66.5
Duplicating machine operators . . . . .	38.2	44.2	44.8	45.7	15.6	17.2	19.5
All other office machine operators . . . . .	90.4	121.9	123.4	125.9	34.9	36.5	39.3
Order clerks . . . . .	265.2	329.2	337.0	342.2	24.1	27.1	29.0
Payroll and timekeeping clerks . . . . .	201.6	264.7	269.3	276.5	31.3	33.5	37.1
Personnel clerks . . . . .	102.6	132.0	131.3	135.4	28.7	28.1	32.0
Policy change clerks . . . . .	27.6	30.0	30.5	31.0	8.5	10.5	12.4
Procurement clerks . . . . .	47.3	59.9	59.6	61.7	26.6	26.1	30.5
Production clerks . . . . .	201.1	259.5	261.8	268.3	29.1	30.2	33.4
Proofreaders . . . . .	16.5	19.8	20.7	21.1	20.3	25.8	28.4
Protective signal operators . . . . .	7.0	11.8	11.9	12.0	68.4	69.7	71.4
Purchase and sales clerks, security . . . . .	5.2	4.9	4.9	5.0	-6.3	-5.4	-3.4
Rate clerks, freight . . . . .	10.2	12.1	12.5	12.8	19.4	22.6	25.6
Raters . . . . .	52.7	67.8	69.0	70.2	28.7	31.1	33.3
Real estate clerks . . . . .	16.6	23.6	23.5	24.1	42.2	41.8	45.2
Receptionists . . . . .	386.7	564.6	575.5	594.2	46.0	48.8	53.7
Reservation agents and transportation ticket clerks . . . . .	107.5	107.7	109.6	111.6	.1	1.9	3.8
Reservation agents . . . . .	52.9	54.0	54.9	55.6	2.1	3.7	5.1
Ticket agents . . . . .	49.3	47.9	48.9	49.9	-2.7	-7.7	1.2
Travel counselors, auto club . . . . .	5.4	5.8	5.9	6.1	6.8	9.1	13.5
Safe deposit clerks . . . . .	13.9	17.9	18.1	18.3	29.2	30.5	32.2
Secretaries and stenographers . . . . .	2,711.1	3,354.8	3,410.4	3,498.4	23.7	25.8	29.0
Secretaries . . . . .	2,441.5	3,108.0	3,160.8	3,242.6	27.3	29.5	32.8
Stenographers . . . . .	269.6	246.8	249.5	255.9	-8.5	-7.4	-5.1
Typists . . . . .	990.0	1,135.7	1,145.3	1,174.8	14.7	15.7	18.7
Service clerks . . . . .	23.6	33.6	35.0	35.7	42.0	48.1	51.0
Shipping and receiving clerks . . . . .	364.8	419.7	431.0	439.4	15.1	18.2	20.4
Shipping packers . . . . .	339.7	393.6	403.1	410.2	15.9	18.7	20.8
Sorting clerks, banking . . . . .	7.4	9.2	9.3	9.4	24.2	25.5	27.1
Statement clerks . . . . .	33.6	43.8	44.2	44.8	30.4	31.7	33.5
Statistical clerks . . . . .	98.1	112.4	113.6	116.1	14.6	15.8	18.4
Stock clerks, stockroom and warehouse . . . . .	830.9	961.4	987.1	1,005.4	15.7	18.8	21.0
Survey workers . . . . .	53.5	77.9	78.2	79.2	45.7	46.1	48.2
Switchboard operators/receptionists . . . . .	207.0	279.2	285.1	291.7	34.9	37.7	40.9
Teachers' aides . . . . .	462.9	579.1	593.2	605.8	25.1	28.1	30.9
Telephone ad takers, newspapers . . . . .	10.4	14.1	14.6	14.9	35.5	40.3	42.7
Telegraph operators . . . . .	13.4	12.8	13.5	14.0	-4.3	.8	5.0
Telephone operators . . . . .	317.9	336.7	343.4	348.9	5.9	8.0	9.8
Switchboard operators . . . . .	171.7	210.8	213.3	218.0	22.8	24.3	27.0
Central office operators . . . . .	108.7	84.2	86.9	87.5	-22.6	-20.0	-19.5
Directory assistance operators . . . . .	37.5	41.8	43.1	43.4	11.3	15.0	15.7
Title searchers . . . . .	5.1	7.4	7.6	7.8	43.7	47.9	52.4
Town clerks . . . . .	26.0	28.6	29.1	29.8	9.8	11.7	14.5
Traffic agents . . . . .	17.8	21.7	22.3	22.7	21.9	25.1	27.6
Traffic clerks . . . . .	7.1	10.4	10.5	10.5	45.9	47.0	47.5
Transportation agents . . . . .	20.6	27.7	28.1	28.4	34.6	36.3	37.6
Weighers . . . . .	24.9	28.7	29.4	29.9	15.3	18.1	20.2
Welfare investigators . . . . .	11.8	12.0	12.3	12.6	2.1	4.0	6.6
Worksheet clerks . . . . .	10.6	15.1	15.3	15.6	41.6	44.1	46.7
All other clerical workers . . . . .	1,275.5	1,572.5	1,588.9	1,631.6	23.3	24.6	27.9
Craft and related workers . . . . .	11,591.0	14,476.1	14,769.0	15,099.3	24.9	27.4	30.3
Construction craft workers . . . . .	2,894.9	3,725.1	3,777.0	3,841.1	28.7	30.5	32.7
Insulation workers . . . . .	46.7	65.7	67.0	68.3	40.8	43.6	46.3
Bricklayers and stonemasons . . . . .	124.3	163.4	165.7	168.2	31.5	33.4	35.4
Bricklayers . . . . .	110.9	148.4	150.4	152.7	33.9	35.7	37.7
Refractory materials repairers . . . . .	6.8	8.0	8.3	8.4	17.1	20.9	22.5
Stone masons . . . . .	6.6	7.0	7.1	7.2	6.1	7.6	9.1

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)			Percent change			
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Carpenters . . . . .	863.1	1,095.1	1,109.8	1,127.7	26.9	28.6	30.6
Cement masons and terrazzo workers . . .	94.7	132.5	135.5	138.0	39.9	43.0	45.6
Drywall applicators and tapers . . . . .	75.6	104.4	106.5	108.2	38.1	40.8	43.1
Drywall applicators . . . . .	53.4	72.8	74.2	75.4	36.5	39.0	41.2
Tapers . . . . .	22.2	31.5	32.2	32.8	41.9	45.2	47.7
Electricians . . . . .	542.3	703.7	715.0	730.0	29.8	31.8	34.6
Fitters, pipelaying . . . . .	9.1	11.7	12.0	12.2	29.1	32.3	34.8
Floor covering installers . . . . .	78.9	99.5	101.4	102.9	26.2	28.5	30.4
Carpet cutters, carpet layers . . . . .	52.7	66.2	67.3	68.2	25.4	27.6	29.4
Floor layers . . . . .	26.1	33.4	34.1	34.6	27.7	30.4	32.5
Glaziers . . . . .	40.8	53.3	54.9	55.9	30.7	34.6	37.2
Ironworkers . . . . .	93.5	126.4	129.6	132.6	35.2	38.7	41.8
Reinforcing-iron workers . . . . .	32.9	43.8	44.8	45.7	32.8	35.9	38.6
Structural steel workers . . . . .	60.5	82.6	84.8	86.9	36.5	40.2	43.6
Lathers . . . . .	9.2	8.4	8.6	8.7	-8.6	-6.6	-4.9
Painters and paperhangers . . . . .	381.3	466.7	468.3	473.5	22.4	22.8	24.2
Painters, construction and maintenance . . . . .	362.0	442.7	444.3	449.4	22.3	22.7	24.1
Paperhangers . . . . .	19.3	24.0	24.0	24.1	24.1	24.1	24.6
Plasterers . . . . .	20.3	21.5	21.8	22.1	6.0	7.4	8.9
Plumbers and pipefitters . . . . .	387.9	512.3	518.4	528.3	32.1	33.7	36.2
Roofers . . . . .	102.1	127.9	129.4	131.0	25.2	26.7	28.3
Shipwrights . . . . .	5.5	6.8	6.6	6.6	23.5	20.4	20.3
Tile setters . . . . .	19.7	26.0	26.5	26.9	32.4	34.8	36.9
<b>Mechanics, repairers, and installers . . . . .</b>	<b>3,936.0</b>	<b>5,003.9</b>	<b>5,107.5</b>	<b>5,223.0</b>	<b>27.1</b>	<b>29.8</b>	<b>32.7</b>
Air conditioning, refrigeration, and heating mech. . . . .	168.2	219.6	223.0	228.3	30.6	32.6	35.7
Aircraft mechanics . . . . .	108.0	131.9	128.1	130.8	22.2	18.6	21.1
Appliance installers and repairers . . . . .	79.9	91.3	93.4	95.5	14.2	16.8	19.5
Gas and electric appliance repairers . . . . .	61.9	70.6	72.4	74.3	14.2	16.9	20.0
Household appliance installers . . . . .	18.0	20.6	21.0	21.2	14.5	16.5	17.8
Automotive body repairers . . . . .	155.0	190.9	195.8	200.8	23.1	26.3	29.6
Auto seat cover and top installers . . . . .	5.9	7.8	8.0	8.4	33.1	36.8	42.3
Automotive mechanics . . . . .	844.3	1,134.1	1,167.9	1,195.3	34.3	38.3	41.6
Auto repair service estimators . . . . .	10.6	15.2	15.7	16.0	43.2	48.5	51.3
Bicycle repairers . . . . .	14.1	16.8	17.1	17.3	19.0	21.1	22.7
Coin machine servicers and repairers . . . . .	30.5	37.9	39.2	40.3	24.2	28.4	32.1
Communications equipment mechanics . . . . .	91.8	91.8	94.8	95.4	.0	3.3	3.9
Central office repairers . . . . .	50.2	47.4	48.9	49.2	-5.6	-2.5	-1.9
Frame wipers . . . . .	13.1	16.1	16.6	16.8	23.3	27.3	28.1
Trouble locators, test desk . . . . .	19.2	16.3	16.9	17.0	-15.1	-12.3	-11.7
All other communications equipment mechanics . . . . .	9.3	12.0	12.3	12.4	28.9	33.1	33.9
Computer service technicians . . . . .	54.6	105.7	107.6	108.4	93.4	96.8	98.3
Diesel mechanics . . . . .	173.1	216.1	221.6	226.4	24.8	28.0	30.7
Electrical instrument and tool repairers . . . . .	9.1	12.4	12.1	12.6	36.0	33.1	38.0
Electric motor repairers . . . . .	19.3	27.6	28.6	31.2	43.0	48.1	61.2
Line installers and cable splicers . . . . .	194.6	242.7	247.8	250.7	24.7	27.3	28.8
Cable installers . . . . .	8.9	15.9	16.4	16.5	79.7	85.5	86.7
Cable repairers . . . . .	10.3	13.5	14.0	14.1	31.1	35.4	36.3
Cable splicers . . . . .	48.0	59.3	60.2	61.0	23.6	25.5	27.2
Line installers, repairers . . . . .	127.4	154.0	157.2	159.1	20.8	23.4	24.8
Troubleshooters, power line . . . . .	8.0	9.6	9.7	9.8	19.4	21.0	22.1
Engineering equipment mechanics . . . . .	83.4	93.4	94.1	95.8	12.0	12.8	14.9
Farm equipment mechanics . . . . .	26.0	26.9	27.3	27.5	3.8	5.3	6.0
Hydroelectric machine mechanics . . . . .	13.7	16.2	16.3	16.6	18.3	19.0	20.9
Instrument repairers . . . . .	41.4	50.3	51.1	52.5	21.7	23.6	26.9
Knitting machine fixers . . . . .	7.9	8.8	9.2	9.4	11.9	17.1	19.6
Locksmiths . . . . .	13.0	17.2	17.5	18.6	31.8	34.3	42.2
Loom fixers . . . . .	13.2	10.9	10.9	11.2	-17.9	-17.1	-15.4
Industrial machinery repairers . . . . .	330.3	416.5	425.3	437.9	26.1	28.7	32.6
Maintenance repairers general utility . . . . .	694.4	870.2	887.2	908.4	25.3	27.8	30.8
Marine mechanics and repairers . . . . .	26.5	35.9	35.8	35.9	35.4	35.2	35.7
Millwrights . . . . .	91.0	118.2	121.0	123.8	29.8	32.9	36.0
Mine machinery mechanics . . . . .	12.8	16.8	17.2	17.3	31.7	35.0	35.6
Musical instrument repairers . . . . .	13.6	16.5	16.8	17.0	21.1	23.1	24.9
Office machine repairers . . . . .	55.6	93.7	95.4	96.1	68.5	71.7	72.9
Pinsetter mechanics, automatic . . . . .	7.1	8.0	8.2	8.6	12.3	14.5	20.1
Protective signal installers and repairers . . . . .	6.9	11.0	11.1	11.2	58.8	59.8	61.2
Radio and television service technicians . . . . .	80.4	100.6	102.2	104.7	25.1	27.0	30.2

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)				Percent change		
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Railroad car repairers . . . . .	24.2	18.5	19.8	21.3	-23.7	-18.3	-12.2
Section repairers and setters . . . . .	11.0	11.3	11.4	11.6	2.7	3.7	5.9
Sewing machine mechanics . . . . .	10.6	15.4	15.6	15.3	45.9	47.6	45.0
Shoe repair occupations . . . . .	16.4	18.6	18.8	19.6	13.3	14.7	19.6
Telephone and PBX installers and repairers . . . . .	134.2	165.9	171.1	172.3	23.6	27.5	28.4
Installers, repairers, section maintainers . . . . .	75.4	96.7	99.6	100.4	28.3	32.2	33.1
Station installers . . . . .	58.9	69.3	71.5	72.0	17.7	21.5	22.3
Treatment plant mechanics . . . . .	7.5	8.7	8.8	9.1	15.6	17.7	20.8
Water meter installers . . . . .	5.6	6.2	6.3	6.4	9.8	11.7	14.5
All other mechanics, repairers, and installers . . . . .	242.1	297.0	298.6	307.9	22.7	23.4	27.2
<b>Metalworking craft workers, except mechanics . . . . .</b>	<b>817.5</b>	<b>994.7</b>	<b>1,018.8</b>	<b>1,050.7</b>	<b>21.7</b>	<b>24.6</b>	<b>28.5</b>
Blacksmiths . . . . .	6.9	4.9	4.9	5.0	-29.7	-28.9	-27.6
Boilermakers . . . . .	40.0	42.3	43.0	44.3	5.8	7.6	10.8
Coremakers, hand, bench, floor . . . . .	7.3	8.3	8.5	8.8	14.7	17.7	21.1
Forging press operators . . . . .	7.0	8.6	8.9	9.1	22.5	26.7	29.9
Heat treaters, annealers, and temperers . . . . .	22.6	23.0	23.5	24.1	1.7	3.8	6.3
Machinists and layout markers . . . . .	236.0	290.3	297.9	308.0	23.0	26.2	30.5
Layout markers, metal . . . . .	16.0	19.4	20.2	21.2	21.5	26.6	32.6
Machinists . . . . .	220.0	271.0	277.7	286.9	23.2	26.2	30.4
Job and die setters . . . . .	94.6	117.1	120.5	124.6	23.9	27.4	31.7
Machine tool setters, metalworking . . . . .	54.8	67.1	68.3	70.3	22.5	24.6	28.4
Punch press setters, metal . . . . .	20.2	24.8	25.6	26.7	23.2	27.1	32.2
Setters, plastic molding machine . . . . .	7.8	10.5	11.5	11.9	35.1	47.2	52.7
Shear and slitter setters . . . . .	6.2	7.7	7.9	8.2	22.5	26.8	31.6
All other job and die setters . . . . .	5.6	7.0	7.2	7.5	25.6	29.2	33.5
Molders, metal . . . . .	25.5	28.8	29.5	30.5	12.9	15.7	19.6
Patternmakers . . . . .	13.5	15.5	15.7	16.1	15.1	16.9	19.6
Patternmakers, metal . . . . .	7.0	8.0	8.1	8.3	14.5	16.6	19.5
Patternmakers, wood . . . . .	6.5	7.5	7.6	7.8	15.6	17.1	19.6
Rolling mill operators and helpers . . . . .	11.0	12.5	12.9	13.1	13.6	17.5	18.9
Sheet-metal workers and tinsmiths . . . . .	187.8	248.0	252.3	259.9	32.0	34.4	38.4
Toolmakers and diemakers . . . . .	153.9	181.2	186.5	192.4	17.8	21.2	25.0
All other metalworking craft workers . . . . .	11.5	14.1	14.7	14.9	22.6	27.3	29.3
<b>Printing trades craft workers . . . . .</b>	<b>393.2</b>	<b>428.8</b>	<b>447.2</b>	<b>457.4</b>	<b>9.1</b>	<b>13.7</b>	<b>16.3</b>
Bookbinders . . . . .	29.8	34.0	35.8	36.6	14.2	20.3	22.9
Bookbinders, hand . . . . .	6.1	7.1	7.4	7.6	15.4	21.1	23.6
Bookbinders, machine . . . . .	23.7	26.9	28.4	29.0	13.8	20.2	22.8
Bindery machine setters . . . . .	5.5	6.0	6.4	6.5	8.6	14.8	17.3
Typesetters and compositors . . . . .	104.4	93.8	96.8	98.7	-10.2	-7.3	-5.5
Etchers and engravers . . . . .	12.4	15.4	15.6	16.1	24.3	26.2	30.0
Lithographers and photoengravers . . . . .	67.3	82.9	87.1	89.0	23.2	29.4	32.2
Camera operators, printing . . . . .	21.9	28.1	29.5	30.1	28.6	34.9	37.9
Photoengravers . . . . .	9.3	8.4	8.6	8.8	-9.4	-6.9	-5.2
Platemakers . . . . .	12.6	15.0	15.8	16.1	19.5	25.5	28.3
Strippers, printing . . . . .	23.6	31.4	33.2	34.0	33.0	40.6	43.7
<b>Printing press operators . . . . .</b>	<b>173.8</b>	<b>196.7</b>	<b>205.5</b>	<b>210.5</b>	<b>13.2</b>	<b>18.2</b>	<b>21.2</b>
Letter press operators . . . . .	33.7	34.2	35.8	36.6	1.4	6.4	8.5
Offset lithographic press operators . . . . .	88.2	107.2	112.6	115.1	21.6	27.6	30.6
Press operators and plate printers . . . . .	41.9	44.0	45.2	46.8	5.1	7.9	11.6
All other press and plate printers . . . . .	10.0	11.2	11.8	12.1	12.4	18.5	21.1
<b>Other craft and related workers . . . . .</b>	<b>3,549.5</b>	<b>4,323.6</b>	<b>4,418.6</b>	<b>4,527.1</b>	<b>21.8</b>	<b>24.5</b>	<b>27.5</b>
Auxiliary equipment operators . . . . .	8.7	7.9	8.0	8.2	-8.2	-7.1	-5.9
Bakers . . . . .	65.2	73.2	76.1	77.6	12.3	16.8	19.0
Blue collar workers supervisors . . . . .	1,200.1	1,483.2	1,519.7	1,554.2	23.6	26.6	29.5
Cabinetmakers . . . . .	77.5	94.6	96.2	98.5	22.1	24.1	27.1
Control room operators, steam . . . . .	7.9	6.9	7.0	7.0	-13.4	-12.2	-11.3
Crane, derrick, and hoist operators . . . . .	110.6	133.1	136.8	139.6	20.4	23.7	26.3
Dental lab technicians . . . . .	50.6	63.0	63.6	65.0	24.6	25.7	28.4
Dispensing opticians & ophthalmic lab technicians . . . . .	38.9	47.0	48.3	49.8	21.0	24.2	28.2
Lens grinders . . . . .	7.5	8.7	8.9	9.3	16.3	19.5	25.3
Opticians, dispensing and optical mechanics . . . . .	31.4	38.3	39.4	40.5	22.1	25.3	28.9
Furniture finishers . . . . .	19.1	23.5	24.2	25.4	23.1	26.6	32.9
Furniture upholsters . . . . .	37.2	39.9	40.3	41.6	7.4	8.3	11.9
Glass installers . . . . .	6.1	8.3	8.6	9.0	36.5	40.9	47.3
Heavy equipment operators . . . . .	384.0	480.1	489.8	499.9	25.0	27.5	30.2
Inspectors . . . . .	410.1	520.3	528.8	542.8	26.9	28.9	32.3
Jewelers . . . . .	29.7	33.1	33.7	34.7	11.3	13.3	16.8



**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)				Percent change		
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Locomotive engineers . . . . .	38.0	36.6	39.0	41.6	-3.7	2.7	9.6
Yard engineers . . . . .	14.6	14.9	15.9	16.9	1.8	8.3	15.1
Hostlers . . . . .	6.9	6.0	6.5	6.9	-12.7	-6.4	.6
Locomotive engineers . . . . .	16.5	15.6	16.7	17.9	-4.9	1.4	8.5
Locomotive engineer helpers . . . . .	8.9	.0	.0	.0	-100.0	-100.0	-100.0
Logging tractor operators . . . . .	15.7	17.3	17.7	18.2	10.1	12.9	16.2
Lumber graders . . . . .	5.7	6.5	6.6	6.8	14.7	16.3	19.8
Machine setters, paper goods . . . . .	9.8	9.8	10.1	10.5	.6	3.2	7.7
Machine setters, woodworking . . . . .	5.5	6.9	7.1	7.5	24.8	27.8	34.6
Merchandise displays and window trimmers . . . . .	26.7	37.0	38.2	38.9	38.7	43.2	45.7
Millers . . . . .	5.0	5.0	5.1	5.2	-.4	1.8	3.8
Motion picture projectionists . . . . .	17.1	13.5	13.9	14.6	-20.9	-18.8	-14.3
Oil pumpers . . . . .	17.8	17.8	18.2	16.7	-.1	2.1	-6.3
Power station operators . . . . .	16.3	19.2	19.3	19.6	17.9	18.7	20.5
Pumpers, head . . . . .	10.2	10.0	10.2	9.6	-1.9	.3	-5.7
Shipfitters . . . . .	17.9	23.9	23.0	22.8	33.3	28.4	27.2
Ship engineers . . . . .	9.7	10.2	10.4	10.6	5.2	7.7	9.4
Stationary engineers . . . . .	58.5	60.1	60.6	62.3	2.7	3.7	6.5
Tailors . . . . .	63.3	82.2	85.1	87.0	29.8	34.3	37.4
Testers . . . . .	116.1	151.2	152.1	156.5	30.2	31.0	34.8
Upholsterers . . . . .	15.5	19.1	19.7	21.3	23.1	26.8	37.1
Upholstery cutters . . . . .	5.9	7.3	7.6	8.2	23.9	27.8	38.4
Upholstery workers, nec . . . . .	12.9	15.8	16.3	17.8	22.5	26.3	37.8
Watchmakers . . . . .	13.7	12.6	12.8	13.0	-8.1	-6.3	-4.5
Water and sewage treatment plant operators . . . . .	72.0	78.2	79.4	81.6	8.6	10.2	13.3
All other craft and related workers . . . . .	541.5	669.0	685.2	703.3	23.6	26.5	29.9
<b>Operatives . . . . .</b>	<b>12,995.3</b>	<b>15,044.0</b>	<b>15,419.5</b>	<b>15,809.3</b>	<b>15.8</b>	<b>18.7</b>	<b>21.7</b>
<b>Assembler occupations . . . . .</b>	<b>1,313.4</b>	<b>1,625.2</b>	<b>1,645.7</b>	<b>1,702.4</b>	<b>23.7</b>	<b>25.3</b>	<b>29.6</b>
Aircraft structure assemblers . . . . .	33.4	28.3	26.4	26.2	-15.4	-21.0	-21.4
Assemblers . . . . .	307.2	363.1	379.2	397.9	18.2	23.5	29.5
Clock, watch assemblers . . . . .	5.9	7.4	7.0	7.3	25.6	18.5	23.5
Coil finishers . . . . .	12.3	17.7	17.8	18.3	43.8	44.3	48.4
Electrical machinery equipment assemblers . . . . .	99.0	131.5	132.8	136.9	32.8	34.2	38.3
Electrical and electronic assemblers . . . . .	285.5	365.3	362.2	371.5	28.0	26.9	30.1
Instrument makers/assemblers . . . . .	29.5	42.9	43.0	43.9	45.5	45.9	49.2
Machine assemblers . . . . .	170.5	209.5	213.7	221.8	22.9	25.3	30.1
Mobile home set-up operators . . . . .	5.4	4.8	5.0	5.1	-12.0	-7.9	-5.8
Power screwdriver operators . . . . .	10.9	13.9	14.3	15.0	27.4	30.6	37.5
Writers, electronic . . . . .	37.1	50.5	49.9	51.6	36.0	34.3	38.9
All other assemblers . . . . .	316.7	390.4	394.5	407.0	23.3	24.6	28.5
Bindery operatives . . . . .	82.1	82.0	85.7	87.6	-.2	4.3	6.6
Bindery workers, assembly . . . . .	37.6	39.5	41.2	42.0	5.1	9.7	11.8
Bindery workers, stitching . . . . .	8.5	8.2	8.7	8.9	-3.5	1.9	4.1
All other bindery operatives . . . . .	36.1	34.3	35.8	36.7	-5.0	-.7	1.8
Laundering, drycleaning, and press. mach. operators . . . . .	307.3	331.8	337.8	352.3	8.0	9.9	14.6
Drycleaners, hand and machine . . . . .	13.9	13.2	13.7	15.1	-5.3	-1.4	8.5
Folders, laundry . . . . .	13.7	10.4	10.8	12.0	-24.4	-21.0	-12.8
Laundry operators, small establishment . . . . .	38.0	44.3	44.4	45.0	16.5	16.6	18.3
Markers, classifiers, and assemblers . . . . .	17.7	14.7	14.8	16.0	-17.1	-16.5	-9.4
Pressers, hand . . . . .	27.0	30.5	30.9	30.7	12.8	14.4	13.5
Pressers, machine . . . . .	50.0	50.8	52.0	53.9	1.5	4.0	7.8
Pressers, machine laundry . . . . .	64.4	67.9	69.2	73.5	5.3	7.5	14.2
Rug cleaners, hand and machine . . . . .	7.2	5.5	5.8	6.4	-23.1	-19.7	-11.2
Spotters, drycleaning and washable materials . . . . .	7.0	5.2	5.5	6.0	-24.8	-21.5	-13.2
Washers, machine and starchers . . . . .	57.8	78.1	79.2	82.0	35.2	37.1	41.9
All other laundering, drycleaning, and press machine operators . . . . .	10.6	11.3	11.5	11.7	6.9	8.9	10.5
Meat cutters and butchers . . . . .	57.0	61.9	62.7	63.9	8.6	9.9	12.0
<b>Metalworking operatives . . . . .</b>	<b>1,492.2</b>	<b>1,767.4</b>	<b>1,812.5</b>	<b>1,874.0</b>	<b>18.4</b>	<b>21.5</b>	<b>25.6</b>
Dip platers, nonelectrolytic . . . . .	10.4	12.4	12.7	13.0	20.1	22.4	25.5
Electroplaters . . . . .	31.9	34.2	35.3	36.1	7.3	10.7	13.3
Furnace operators, cupola tenders . . . . .	13.1	15.2	15.6	16.0	15.6	19.1	22.3
Heaters, metal . . . . .	6.1	7.1	7.3	7.5	16.5	19.7	22.1
Machine tool operators . . . . .	914.4	1,088.0	1,114.2	1,152.9	19.0	21.8	26.1
Drill press and boring machine operators . . . . .	115.2	136.6	139.4	143.9	18.6	21.0	24.9
Grinding and abrading machine operator, metal . . . . .	117.7	125.8	129.1	133.4	6.8	9.6	13.3
Lathe machine operators, metal . . . . .	136.6	155.4	159.1	164.0	13.7	16.5	20.0
Milling/planning machine operators . . . . .	60.7	67.7	68.7	70.8	11.6	13.3	16.7
Machine tool operators, combination . . . . .	168.6	217.3	220.4	228.8	28.9	30.8	35.8
Machine tool operators, numerical control . . . . .	66.1	93.6	95.5	98.7	41.6	44.5	49.4

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)				Percent change		
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Machine tool operators, tool room . . .	34.5	43.1	43.8	45.0	25.0	27.0	30.6
Punch press operators, metal . . . . .	146.7	166.6	172.7	179.6	13.6	17.7	22.4
Power brake, bending machine operators, metal . . . . .	41.5	50.5	52.5	54.7	21.8	26.6	31.7
Shear and slitter operators, metal . . .	26.8	31.6	32.9	34.1	17.6	22.6	27.2
Pourers, metal . . . . .	11.7	15.4	15.8	16.2	31.7	35.3	38.6
Welders and flamecutters . . . . .	489.9	578.7	594.8	615.1	18.1	21.4	25.6
All other metalworking operatives . . . .	14.7	16.3	16.8	17.1	10.7	14.3	16.6
Mine operatives, not elsewhere classified . .	214.8	206.0	211.4	213.3	-4.1	-1.6	-0.7
Continuous mining machine operators . . .	7.8	10.2	10.5	10.6	31.9	34.9	36.7
Derrick operators, petroleum and gas . . .	16.9	14.6	15.0	15.2	-13.8	-11.6	-10.6
Gagers . . . . .	6.5	6.2	6.3	6.5	-4.5	-3.0	-8
Loading machine operators . . . . .	7.1	8.3	8.6	8.8	16.2	20.0	23.5
Mill and grinder operators, minerals . . . .	9.8	10.0	10.5	11.0	2.4	7.3	12.3
Roof bolters . . . . .	11.0	14.4	14.8	15.0	31.5	34.6	36.4
Roustabouts . . . . .	93.8	78.4	80.3	79.9	-16.4	-14.4	-14.8
Service unit operators, oil well . . . . .	12.4	10.8	11.0	11.1	-13.1	-11.0	-10.3
Shuttle car operators . . . . .	11.2	12.4	12.7	12.8	11.1	13.5	15.0
Well pullers . . . . .	6.6	6.0	6.2	6.1	-8.8	-6.6	-8.5
All other mine operatives nec . . . . .	31.7	34.6	35.6	36.3	9.0	12.1	14.5
Packing and inspecting operatives . . . . .	843.6	902.3	933.9	956.0	7.0	10.7	13.3
Baggers . . . . .	242.3	219.4	229.0	233.7	-9.4	-5.5	-3.5
Bundlers . . . . .	13.9	19.6	19.8	19.3	41.2	42.4	38.7
Cloth graders . . . . .	5.8	6.3	6.4	6.5	9.3	10.9	12.9
Graders, food and skins . . . . .	7.1	8.2	8.3	8.6	15.2	17.3	20.9
Production packagers . . . . .	547.9	615.9	637.1	653.8	12.4	16.3	19.3
Selectors, glassware . . . . .	19.0	25.7	25.9	26.1	35.0	35.7	36.9
All other packing and inspecting operatives . . . . .	7.6	7.1	7.5	8.0	-6.3	-1.5	5.6
Painters, automotive . . . . .	36.5	51.5	53.1	54.9	41.2	45.7	50.6
Painters, production . . . . .	101.2	115.8	118.8	123.0	14.5	17.4	21.5
Sawyers . . . . .	75.3	91.1	93.0	96.5	21.0	23.5	28.1
Cut-off saw operators, lumber . . . . .	15.5	19.7	20.0	20.8	27.0	29.5	34.6
Edgers, automatic and pony . . . . .	5.9	6.6	6.7	6.9	12.3	13.5	16.8
Head sawyers . . . . .	6.8	7.8	7.8	8.1	13.8	15.1	18.4
Ripsaw operators . . . . .	12.2	15.3	15.7	16.4	26.1	28.7	34.8
Sawyers, metal . . . . .	15.8	19.5	20.1	20.7	23.5	27.0	31.3
Trim saw operators . . . . .	6.7	7.9	8.0	8.3	18.1	19.7	23.1
All other sawyers . . . . .	12.4	14.2	14.7	15.3	14.7	18.0	23.0
Sewers and stitchers . . . . .	803.7	869.5	882.1	872.7	8.2	9.8	8.6
Menders . . . . .	7.3	7.0	7.3	8.0	-3.5	.2	9.5
Sewing machine oprs., regular equip., garment . . . . .	532.6	561.4	567.4	555.6	5.4	6.5	4.3
Sewing machine oprs., special equip., garment . . . . .	77.8	83.8	84.8	83.3	7.7	9.0	7.1
Sewing machine oprs., regular equip., nongarm. . . . .	127.6	151.7	155.4	157.7	18.9	21.8	23.6
Sewing machine oprs., special equip., nongarm. . . . .	41.8	48.5	49.8	50.6	16.0	19.2	21.2
All other sewers and stitchers . . . . .	16.7	17.2	17.5	17.6	2.8	4.9	5.4
Textile operatives . . . . .	312.3	345.4	351.5	359.1	10.6	12.6	15.0
Battery loaders . . . . .	5.4	4.1	4.2	4.3	-23.4	-22.9	-21.5
Beam warper tenders and beamers . . . . .	7.4	7.9	8.1	8.4	7.6	9.6	14.2
Card tenders and comber tenders . . . . .	8.3	10.0	10.1	10.4	19.5	21.1	24.5
Creelers, yarn . . . . .	13.5	16.6	16.9	17.5	23.1	25.1	29.9
Doffers . . . . .	18.4	19.8	20.1	20.7	7.2	8.9	12.4
Drawing frame and gill box tenders . . . . .	6.0	6.7	6.7	6.9	10.2	11.3	13.9
Folders, hand . . . . .	23.4	26.9	27.5	27.5	14.9	17.5	17.4
Knitting machine operators . . . . .	19.5	21.2	22.2	22.6	9.0	13.8	16.2
Spinners, frame . . . . .	25.7	24.5	24.8	25.3	-4.6	-3.7	-1.8
Spooler operators, automatic . . . . .	5.7	5.1	5.2	5.3	-10.2	-9.3	-7.1
Turners . . . . .	9.0	10.4	10.5	10.2	15.4	16.4	13.5
Twister tenders . . . . .	13.6	17.4	17.6	18.2	27.7	29.4	33.6
Weavers . . . . .	29.7	30.6	30.9	31.5	3.3	4.1	6.1
Winder operators, automatic . . . . .	14.8	15.5	15.7	16.1	4.9	6.2	8.7
Yarn winders . . . . .	15.8	19.0	19.2	19.7	20.5	21.8	24.9
All other textile operatives . . . . .	96.1	109.6	112.0	114.7	14.1	16.6	19.4
Transport equipment operatives . . . . .	3,551.2	4,180.7	4,286.9	4,387.4	17.7	20.7	23.5
Ambulance drivers and ambulance attendants . . . . .	27.6	34.1	34.8	36.4	23.5	26.1	31.7
Busdrivers . . . . .	473.0	536.7	551.2	571.6	13.5	16.5	20.8
Busdrivers, local and intercity . . . . .	228.8	248.6	256.7	270.7	8.6	12.2	18.3
Busdrivers, school . . . . .	244.2	288.2	294.5	300.9	18.0	20.6	23.2
Chauffeurs . . . . .	48.2	61.0	62.6	64.5	26.6	29.9	34.0
Industrial truck operators . . . . .	385.1	443.1	455.1	468.2	15.1	18.2	21.6

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)				Percent change		
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Parking attendants . . . . .	36.7	37.2	38.2	39.7	1.2	3.9	7.9
Railroad brake operators . . . . .	59.8	50.5	53.9	57.7	-15.6	-9.8	-3.6
Rental car delivery workers . . . . .	7.9	9.4	9.9	10.5	20.1	25.5	32.9
Sailors and deckhands . . . . .	32.2	33.2	34.3	34.8	3.3	6.6	8.2
Streetcar operators . . . . .	8.7	9.3	9.5	9.7	7.6	9.5	12.2
Taxi drivers . . . . .	64.2	51.6	52.0	53.5	-19.6	-18.9	-16.7
Truckdriving occupations . . . . .	2,401.5	2,908.8	2,979.5	3,034.7	21.1	24.1	26.4
Delivery and route workers . . . . .	797.3	923.6	950.5	967.0	15.8	19.2	21.3
Truck drivers . . . . .	1,604.2	1,985.2	2,029.0	2,067.7	23.7	26.5	28.9
Transport equipment operatives, nec . . . . .	6.2	5.6	5.9	6.1	-9.9	-5.9	-1.7
All other operatives . . . . .	3,804.7	4,413.5	4,544.3	4,666.1	16.0	19.4	22.6
Batch plant operators . . . . .	6.3	7.6	8.3	8.8	21.5	32.6	40.3
Blasters . . . . .	8.0	9.1	9.3	9.5	12.7	16.2	18.5
Cutters, machine . . . . .	24.1	27.9	28.9	29.5	15.7	19.6	22.2
Cutters, portable machine . . . . .	14.0	15.8	16.1	16.0	13.0	14.8	14.0
Cutting machine operators, food . . . . .	8.9	8.7	8.9	9.1	-2.9	-0.3	2.0
Die cutters and clicking machine operators . . . . .	18.8	18.0	18.8	18.8	-4.4	-2	-2
Dressmakers, except factory . . . . .	61.1	66.0	65.9	66.4	8.0	7.7	8.6
Drillers, hand and machine . . . . .	16.1	20.4	20.8	21.2	26.4	28.9	31.2
Dyers . . . . .	11.1	14.3	14.6	15.0	28.8	31.3	34.4
Exterminators . . . . .	21.6	31.2	31.3	31.7	44.4	45.1	46.8
Filers, grinders, buffers, and chippers . . . . .	106.6	133.9	137.0	141.5	25.6	28.5	32.7
Fuel pump attendants and lubricators . . . . .	388.3	429.8	451.0	462.2	10.7	16.1	19.0
Furnace operators and tenders, except metal . . . . .	57.6	58.7	59.7	61.9	1.8	3.6	7.3
Furniture assemblers and installers . . . . .	8.4	10.6	11.1	11.3	25.8	31.1	33.6
Miscellaneous machine operatives, meat and dairy products . . . . .	42.5	38.7	39.9	41.1	-8.9	-6.0	-3.3
Miscellaneous machine operatives, all other food products . . . . .	70.8	74.8	77.7	79.7	5.7	9.7	12.5
Miscellaneous machine operatives, tobacco . . . . .	6.8	5.2	5.4	6.0	-23.4	-20.3	-11.0
Miscellaneous machine operatives, lumber and furniture . . . . .	39.0	48.8	49.8	51.7	25.1	27.6	32.4
Miscellaneous machine operatives, paper and allied products . . . . .	92.1	97.1	100.2	105.0	5.5	8.8	14.0
Miscellaneous machine operatives, chemicals and allied products . . . . .	146.1	172.4	177.6	183.2	18.0	21.5	25.4
Miscellaneous machine operatives, rubber and miscellaneous plastics . . . . .	190.1	250.8	266.6	276.6	31.9	40.3	45.5
Miscellaneous machine operatives, leather and leather goods . . . . .	6.3	5.5	5.9	5.9	-12.3	-7.3	-6.0
Miscellaneous machine operatives, stone, clay, and glass . . . . .	40.6	48.5	50.9	52.9	19.6	25.5	30.5
Miscellaneous machine operatives, primary metals . . . . .	69.5	82.1	84.9	87.8	18.2	22.3	26.4
Miscellaneous machine operatives, manufacturing, nec., . . . . .	82.9	99.1	101.7	104.0	19.6	22.7	25.5
Miscellaneous machine operatives, nonmanufacturing . . . . .	39.4	42.3	43.7	44.7	7.3	10.8	13.4
Miscellaneous operatives, nec., durable goods . . . . .	86.5	103.2	107.7	112.1	19.3	24.5	29.7
Miscellaneous operatives, nec., nondurable goods . . . . .	218.2	231.4	238.2	241.7	6.1	9.2	10.8
Mixing operatives . . . . .	41.3	43.5	45.0	46.2	5.2	8.8	11.6
Nailing machine operators . . . . .	8.4	11.5	11.7	12.2	36.0	39.0	44.6
Oilers . . . . .	36.5	44.1	45.2	46.4	21.1	24.1	27.3
Photographic process workers . . . . .	67.2	77.1	78.3	80.3	14.8	16.5	19.6
Punch and stamping press operators, except metal . . . . .	5.2	6.8	7.2	7.5	31.5	39.9	45.9
Riveters . . . . .	13.9	17.2	17.3	17.6	24.2	25.1	27.3
Rotary drill operators . . . . .	28.0	27.5	27.8	28.0	-2.0	-8	-2
Rotary drill operator helpers . . . . .	33.3	28.7	29.4	29.8	-13.8	-11.6	-10.6
Sandblasters and shotblasters . . . . .	10.0	12.5	12.8	13.3	25.0	28.1	33.0
Sanders, wood . . . . .	20.2	25.3	25.9	27.6	25.0	28.4	36.5
Shoemaking machine operators . . . . .	51.5	34.3	36.0	34.1	-33.4	-30.2	-33.8
Surveyor helpers . . . . .	39.9	61.3	63.3	65.4	53.6	58.6	63.7
Termite treaters and helpers . . . . .	7.2	10.3	10.4	10.5	44.0	45.2	46.6
Tire changers and repairers . . . . .	60.5	83.8	87.3	89.1	38.6	44.4	47.4

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)			Percent change			
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Winding operatives, not elsewhere classified	42.8	49.2	49.8	51.7	14.8	16.2	20.8
Coil winders	26.7	31.8	31.8	33.1	19.1	19.3	24.2
Paper reel and rewinder operators	6.7	7.3	7.4	7.7	8.4	10.1	14.2
All other winding operators, nec.	9.4	10.1	10.5	10.9	7.2	11.9	15.8
Wood machinists	20.6	26.9	27.8	28.6	30.8	34.9	39.0
Operatives, not elsewhere classified	1,436.3	1,701.4	1,737.1	1,782.5	18.5	20.9	24.1
Service workers	16,240.7	20,416.3	20,705.8	21,113.3	25.7	27.5	30.0
Building custodians	2,827.7	3,553.6	3,606.4	3,682.3	25.7	27.5	30.2
Food service workers	6,203.7	8,112.9	8,220.6	8,322.2	30.8	32.5	34.1
Bakers/bread and pastry	36.2	46.1	46.5	46.9	27.4	28.5	29.7
Bartenders	384.1	499.7	505.1	511.2	30.1	31.5	33.1
Butchers and meat cutters	190.9	173.2	178.9	182.1	-9.3	-6.3	-4.6
Cooks and chefs	1,211.0	1,591.3	1,613.2	1,635.7	31.4	33.2	35.1
Cooks, institutional	423.0	527.1	535.8	548.8	24.6	26.7	29.7
Cooks, restaurant	351.2	494.0	499.8	504.5	40.7	42.3	43.7
Cooks, short order and specialty fast foods	436.7	570.2	577.6	582.4	30.5	32.2	33.4
Food preparation and service workers, fast food restaurant	808.9	1,092.0	1,105.8	1,112.9	35.0	36.7	37.6
Hosts/hostesses, restaurant, lounge, coffee shop	113.3	152.3	154.1	155.3	34.4	36.0	37.1
Kitchen helpers	850.3	1,139.1	1,155.3	1,173.9	34.0	35.9	38.1
Pantry, sandwich, and coffee makers	83.5	110.6	112.1	113.6	32.5	34.3	36.0
Waiters and waitresses	1,665.0	2,198.7	2,227.1	2,248.9	32.1	33.8	35.1
Waiters assistants	301.7	383.7	388.2	393.7	27.2	28.7	30.5
All other food service workers	559.0	726.1	734.3	747.8	29.9	31.4	33.8
Selected health service workers	2,240.1	3,038.0	3,065.9	3,165.7	35.6	36.9	41.3
Dental assistants	153.3	213.4	217.7	228.8	39.2	42.0	49.3
Health aides, except nursing	9.3	13.3	13.3	13.7	43.5	43.7	48.4
Licensed practical nurses	594.3	808.6	814.5	840.5	36.1	37.1	41.4
Medical assistants	100.5	145.8	148.2	153.8	45.1	47.5	53.1
Nursing aides, orderlies and attendants	1,218.3	1,627.6	1,641.7	1,689.8	33.6	34.8	38.7
Pharmacy helpers	33.0	45.3	45.5	47.2	37.5	38.1	43.2
Psychiatric aides	131.5	184.0	185.0	191.9	39.9	40.6	45.9
Selected personal service workers	1,632.1	1,929.9	1,960.6	2,010.0	18.2	20.1	23.2
Barbers	115.0	125.6	126.9	129.3	9.2	10.4	12.4
Baggage handlers and porters	5.1	5.0	5.2	5.4	-1.6	1.9	5.6
Bellhops, bag porters, and doorkeepers	26.1	28.3	28.7	29.3	8.6	10.0	12.6
Checkroom and locker room attendants	11.6	15.3	15.7	16.5	32.0	34.8	41.8
Child care attendants	47.1	56.4	57.1	58.3	19.7	21.3	23.8
Child care workers	414.3	494.6	498.9	504.2	19.4	20.4	21.7
Cosmetologists	518.7	608.9	622.2	638.9	17.4	20.0	23.2
Cosmetologists/women's hairstylists	491.1	576.5	588.6	603.9	17.4	19.9	23.0
Manicurists	16.0	18.3	18.7	19.3	14.0	16.8	20.4
Shampooers and scalp treatment operators	11.6	14.1	14.9	15.7	21.3	28.2	35.3
Flight attendants	53.7	68.3	69.1	69.8	27.2	28.8	30.1
Funeral attendants	12.7	10.7	11.1	12.3	-16.2	-12.5	-3.4
Game and ride operators and concession workers	53.1	62.0	63.1	65.9	16.8	18.9	24.2
Guides, sightseeing and establishment	9.1	11.3	11.5	11.9	25.4	27.3	31.9
Housekeepers, hotel and motel	100.8	129.7	130.2	132.7	28.6	29.2	31.7
Masseurs and masseuses	5.5	6.7	6.8	7.2	22.8	25.3	32.8
Pin chasers	9.6	9.5	9.7	10.2	-7	1.2	6.2
Recreation facility attendants	71.9	86.9	88.4	91.6	20.8	23.0	27.4
Reducing instructors	34.6	44.4	46.2	50.6	28.5	33.6	46.4
Ushers, lobby attendants, and ticket takers	39.9	38.3	39.3	41.4	-4.0	-1.5	3.7
Welfare service aides	92.7	116.4	118.6	122.1	25.5	27.9	31.7
Personal service workers, nec.	10.8	11.6	11.9	12.3	7.2	9.5	13.4
Protective service workers	1,706.7	2,121.0	2,146.4	2,194.4	24.3	25.8	28.6
Bailiffs	7.9	8.6	8.8	9.0	8.5	10.4	13.1
Checkers, fitting room	9.2	12.8	13.4	13.7	39.0	45.2	48.2
Correction officials and jailers	110.5	144.6	146.5	150.4	30.8	32.6	36.1
Crossing or bridge tenders	27.3	28.9	29.5	30.2	5.9	8.1	10.8
Crossing guards, school	37.9	41.6	42.4	43.4	9.8	11.7	14.5
Firefighting occupations	252.2	271.1	274.4	281.7	7.5	8.8	11.7
Fire fighters	200.6	214.4	216.7	222.6	6.9	8.0	11.0
Fire inspectors	5.4	5.9	6.0	6.2	9.8	11.7	14.5
Fire officers	46.3	50.8	51.7	53.0	9.8	11.7	14.5

**Table B-1. Continued—Civilian employment in occupations with 5,000 workers or more, actual 1982 and projected 1995**

Occupation	Total employment (In thousands)				Percent change		
	1982	1995			1982-1995		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Fish and game wardens . . . . .	6.8	6.5	6.6	6.8	-3.7	-2.6	.1
Guards . . . . .	637.0	926.9	936.9	952.3	45.5	47.1	49.5
Lifeguards . . . . .	33.5	43.3	44.0	45.7	28.9	31.1	36.3
Police and detectives, public service	548.8	586.0	592.1	608.4	6.8	7.9	10.9
Parking enforcement officers . . . .	6.8	8.1	8.3	8.5	20.2	22.4	25.4
Police detectives . . . . .	59.5	69.4	67.9	70.6	16.8	14.2	18.7
Police officers . . . . .	96.8	106.2	106.8	109.9	9.7	10.3	13.5
Police patrolmen/women . . . . .	363.3	383.4	390.2	399.9	5.5	7.4	10.1
Sheriffs and U.S. Marshalls . . . . .	22.4	18.8	18.9	19.4	-15.9	-15.7	-13.2
Private detectives . . . . .	16.5	24.3	24.4	24.6	47.1	47.7	49.0
Store detectives . . . . .	18.9	26.4	27.6	28.2	39.4	45.6	48.6
Private household workers . . . . .	1,022.8	818.2	850.3	864.1	-20.0	-16.9	-15.5
Child care workers, private household	407.5	325.9	338.6	344.1	-20.0	-16.9	-15.6
Cooks, private household . . . . .	24.0	19.2	19.9	20.3	-20.0	-16.8	-15.5
Housekeepers, private household	89.8	71.7	74.6	75.8	-20.1	-16.9	-15.6
Laundresses, private household	6.0	4.0	4.2	4.2	-32.1	-30.0	-29.0
Maids and servants, private household	495.5	397.4	413.0	419.7	-19.8	-16.7	-15.3
Supervisors, nonworking, service . . .	209.6	275.4	279.4	284.9	31.4	33.3	35.9
All other service workers . . . . .	398.1	567.4	576.3	589.9	42.5	44.8	48.2
Laborers, except farm . . . . .	5,860.5	6,883.5	7,051.6	7,215.5	17.5	20.3	23.1
Animal caretakers . . . . .	104.5	118.8	120.3	122.8	13.6	15.1	17.5
Construction laborers, except trade helpers	255.1	292.8	298.7	305.4	14.8	17.1	19.7
Air hammer operators . . . . .	10.1	14.1	14.5	14.7	39.7	43.1	45.7
Asphalt rakers . . . . .	14.9	20.9	21.4	21.7	40.2	43.4	45.6
Fence erectors . . . . .	13.9	17.9	18.4	18.7	29.3	32.5	35.0
Form setters, metal road forms . . .	5.2	6.9	7.1	7.2	33.7	37.0	39.5
Highway maintenance workers . . . .	165.0	172.0	175.0	179.4	4.2	6.1	8.7
Pipelayers . . . . .	42.3	55.7	56.9	58.1	31.5	34.5	37.3
All other construction laborers . . . .	3.7	5.3	5.4	5.5	42.5	45.6	48.0
Cannery workers . . . . .	55.9	67.4	68.7	70.9	20.5	22.8	26.8
Chain offbearers, lumber . . . . .	21.0	23.7	24.0	24.7	12.8	14.3	17.9
Cleaners, vehicle . . . . .	100.2	132.7	138.1	142.9	32.5	37.8	42.6
Conveyor operators and tenders . . . .	46.1	52.7	54.2	55.5	14.3	17.6	20.5
Forest conservation workers . . . . .	11.5	11.0	10.9	11.3	-4.2	-4.9	-1.9
Furnace operators and heater helpers	7.1	8.1	8.3	8.5	13.8	17.5	20.2
Garbage collectors . . . . .	110.2	127.0	129.1	132.8	15.2	17.2	20.5
Gardeners and groundskeepers, except farm	661.3	732.2	744.1	758.6	10.7	12.5	14.7
Helpers, trades . . . . .	608.2	776.5	798.1	818.5	27.7	31.2	34.6
Line service attendants . . . . .	30.1	40.9	41.4	41.8	36.1	37.9	39.2
Loaders, cars and trucks . . . . .	6.0	7.3	7.5	7.7	22.9	25.0	28.9
Loaders, tank cars and trucks . . . . .	8.9	10.0	10.2	10.4	12.1	15.0	17.5
Off-bearers . . . . .	18.4	23.1	23.6	24.8	25.5	28.3	34.7
Riggers . . . . .	26.9	33.0	33.4	34.1	22.8	24.1	27.0
Septic tank servicers . . . . .	5.1	7.2	7.5	8.2	39.0	44.9	58.9
Shakeout workers, foundry . . . . .	7.0	10.0	10.2	10.5	42.6	46.3	50.4
Stock handlers . . . . .	962.5	1,110.8	1,150.4	1,171.0	15.4	19.5	21.7
Order fillers . . . . .	354.7	419.7	429.8	435.4	18.3	21.2	22.8
Stock clerk, sales floor . . . . .	607.8	691.1	720.6	735.6	13.7	18.6	21.0
Timbercutting and logging workers . . .	61.3	55.0	55.8	57.0	-10.3	-8.9	-7.0
Choker setters, lumber . . . . .	9.7	8.6	8.7	8.9	-12.2	-10.6	-8.7
Fallers and buckers . . . . .	38.5	34.6	35.2	35.9	-10.1	-8.7	-6.8
All other timbercutting and logging workers	13.0	11.8	12.0	12.2	-9.4	-8.2	-6.3
Work distributors . . . . .	14.5	18.5	18.7	18.3	27.7	29.0	26.2
All other laborers, except farm . . . . .	2,738.9	3,225.0	3,298.5	3,379.6	17.7	20.4	23.4
Farmers and farm workers . . . . .	2,690.9	2,404.3	2,406.7	2,423.5	-10.6	-10.6	-9.9
Farmers and farm managers . . . . .	1,447.7	1,370.3	1,356.7	1,358.6	-5.3	-6.3	-6.2
Farmers (owners and tenants) . . . . .	1,407.3	1,319.0	1,304.5	1,305.4	-6.3	-7.3	-7.2
Farm managers . . . . .	40.3	51.3	52.2	53.2	27.1	29.5	31.8
Farm supervisors and laborers . . . . .	1,243.2	1,034.0	1,050.0	1,065.0	-16.8	-15.5	-14.3
Farm supervisors . . . . .	32.6	30.8	31.4	31.9	-5.6	-3.7	-2.0
Farm laborers . . . . .	1,210.6	1,003.2	1,018.6	1,033.0	-17.1	-15.9	-14.7

# Appendix C. Detailed Training Statistics

This appendix presents information on one component of supply— structured training programs. It discusses the status of education and training programs and provides the latest available data on enrollments and completions. The type of data presented and the time period covered vary. Training programs discussed and available data presented include:

- Public vocational education (table C-1)
- Noncollegiate postsecondary vocational education (table C-2)
- Employer training
- Apprenticeship programs (table C-3)
- Federal employment and training programs
- Armed Forces training (table C-4)
- Home study schools
- Community and junior colleges (table C-5)
- Colleges and universities (tables C-6 and C-7).

Users who wish to relate training statistics to data on job openings should consult *Vocational Preparation and Occupations* (VPO), developed by the National Occupational Information Coordinating Committee (NOICC). Education programs in the VPO are coded according to the *Classification of Instructional Programs* (CIPS),<sup>1</sup> developed by the National Center for Education Statistics (NCES). CIPS replaces the two NCES classification systems that previously were used—the *Standard Terminology for Curriculum and Instruction in Local and State School Systems*, commonly referred to as *Handbook VI*, and *A Taxonomy of Instructional Programs in Higher Education*, commonly known as the HEGIS Taxonomy.

## Public vocational education

Vocational education programs are conducted on three levels: Secondary; postsecondary; and adult, in which persons— many already in the labor force—retrain or update and improve their job skills. During the 1970's, the Federal Government provided categorical grants (targeted for specific purposes) to elementary and secondary schools to conduct vocational, technical, and continuing education programs. During the 1980's, Federal Government funding is

<sup>1</sup> The VPO includes only CIPS codes related to secondary and postsecondary vocational education. Baccalaureate and higher level programs are not included.

expected to continue in the form of block grants to the States (for discretionary use) to administer many of these programs. States in the past have strongly supported vocational education programs and are likely to continue this policy.

*Types of training available.* Vocational education includes programs in agriculture, distribution, health, home economics, and office, technical, and trade and industrial education. Other programs, such as consumer and homemaking training and industrial arts, do not generally lead directly to an occupational skill. Special vocational programs for the disadvantaged and handicapped also are provided.

Curriculums generally prepare trainees for specific occupations. Table C-1 provides data on enrollments and completions in occupationally specific public vocational education programs during 1981-82. These programs, which are offered at or above grade 11, are designed to impart entry level job skills.

*Enrollments.* Total enrollments in public vocational education programs grew from 4.2 million in 1963 to 16.9 million in 1981-82, including over 2.5 million disadvantaged and 550,000 handicapped persons. The following tabulation, based on data from the NCES, shows the level and percent distribution of total enrollments by major program area.

Program area	Total enrollments (in thousands)	Percent distribution
Total . . . . .	16,862	100
Office . . . . .	3,615	21
Trade and industrial . . . . .	3,222	19
Consumer and homemaking . . . . .	3,189	19
Industrial arts . . . . .	1,900	11
Health . . . . .	950	6
Distribution . . . . .	930	6
Agriculture . . . . .	843	5
Occupational home economics . . . . .	574	3
Technical . . . . .	506	3
Other . . . . .	1,134	7

Occupationally specific enrollments, which totaled nearly 6 million in 1981-82, accounted for 34 percent of all public vocational education enrollments. About 34 percent of the occupationally specific enrollments were in office programs, and 30 percent were in trade and industrial programs (table C-1).

**Completions.** Over 1.6 million persons, including 252,000 disadvantaged and 45,000 handicapped, completed occupationally specific public vocational education programs during 1981–82. The distribution of completions by major program area is similar to that of enrollments. About 30 percent of completions were in office programs; another 30 percent were in trade and industrial programs (table C–1).

### Noncollegiate postsecondary vocational education

During the year ended June 30, 1981, over 1.5 million persons were enrolled in nearly 6,500 noncollegiate postsecondary schools with occupational programs. The following tabulation shows the distribution of these schools by type of school:

	<i>Percent</i>
Cosmetology/barber . . . . .	34
Business/commercial . . . . .	20
Trade . . . . .	12
Hospital . . . . .	12
Allied health . . . . .	6
Arts/design . . . . .	4
Technical . . . . .	2
Vocational/technical . . . . .	10

Of the more than 6,000 noncollegiate postsecondary schools included here, 75 percent were proprietary schools, 12 percent were independent nonprofit schools, and 13 percent were public schools. Over 70 percent of the proprietary schools were either cosmetology/ barber schools or business/commercial schools. Hospital schools made up 75 percent of the independent nonprofit schools, and vocational/technical institutes, make up over 70 percent of the public schools.

Large schools typically offer a variety of programs in several vocational areas. Some business schools, for example, offer shorthand, typing, stenography, and fundamentals of accounting and computer operations, while many trade schools offer courses ranging from air-conditioning installation and repair to welding and cutting operations. On the other hand, small schools generally specialize in a single type of program, such as cosmetology or radiologic technology. Some programs—flight training, for instance—require considerable individual attention and generally have low pupil/teacher ratios; less technically complex programs—real estate, for example—can accommodate large numbers of students.

**Enrollments.** Enrollments in noncollegiate postsecondary schools vary considerably by program. The seven major program areas are: Agribusiness, marketing and distribution, health, home economics, technical, business and office, and trade and industrial. In 1981, 40 percent of total enrollments were in trade and industrial programs, 24 percent were in business/office programs, and 16 percent were in marketing and distribution programs (table C–2).

**Completions.** Almost 900,000 persons completed occupational programs in noncollegiate postsecondary schools in 1981. Approximately 40 percent were in trade and indus-

trial programs; 22 percent were in marketing/distribution; and 20 percent were in business/office programs. Almost 100,000 students did not complete their training but left with a marketable job skill. Table C–2 provides complete information on enrollments, completions, and persons leaving with or without a marketable job skill, by detailed occupational program.

### Employer training

Many companies in private industry have developed their own educational training programs. Generally, these programs serve three purposes: (1) to train new employees, (2) to improve the performance of employees in their present jobs, and (3) to prepare employees for new jobs and responsibilities.

Training varies among occupations. Skilled and semi-skilled occupations have three on-the-job training paths—apprenticeship, learning by doing, and structured on-the-job instruction. Formal apprenticeship programs are discussed in the following section. Unstructured training or learning by doing often involves simple directions for performing a routine task on a machine; further skills then are acquired through work experience or developed at the employee’s initiative. Structured instruction may range from scheduled training conducted by designated instructors to periodic training from supervisors and fellow employees.

In many companies, structured training usually consists of “in-house” programs that offer courses during or after working hours. These courses normally are designed to meet specific company needs and often are offered by professional associations. In the banking industry, for example, the American Institute of Banking offers programs in 19 areas of banking, such as trusts, commercial lending, and bank marketing.

In addition, companies may allow employees to enroll in college or university courses. For example, under the tuition-aid program, employees may be partially or fully reimbursed for job-related courses taken after working hours. Occasionally, employees are permitted to take outside courses on company time or even to arrange for extended educational leaves of absence.

Studies indicate that companies use education and training programs extensively. For example, a recent study conducted by the American Society for Training and Development estimates that 11 million workers are receiving job-related training. About two-thirds of these training programs are provided in house and the remainder are offered by colleges and universities, vocational schools, labor unions, government agencies, and community-based organizations.<sup>2</sup>

<sup>2</sup> Anthony Carnevale and Harold Goldstein, *Employee Training: Its Changing Role and An Analysis of New Data* (The American Society for Training and Development, 1983). See also: Seymour Lusterman, *Education In Industry*, Report 719 (New York, The Conference Board, Inc., 1977); and *Occupational Training in Selected Metalworking Industries: A Report on a Survey of Selected Occupations, 1974*, BLS Bulletin 1976/ETA R&D Monograph 53 (U.S. Department of Labor, Bureau of Labor Statistics and Employment and Training Administration, 1977).

## **Apprenticeship programs**

Training authorities generally recommend apprenticeship as the best way to acquire all-round proficiency in a craft. Most apprenticeships range from 3 to 5 years, depending upon the particular trade involved. These programs involve planned on-the-job training in conjunction with related classroom instruction—generally 144 hours each year. Mastery of a particular trade requires: (1) Learning the skills of the trade, (2) perfecting the use of each specific skill, and (3) bringing each skill up to the required speed and accuracy.

Most apprenticeship programs have committees of employers and local trade unions that interview applicants, review the trainee's progress, and determine when an apprenticeship has been completed satisfactorily. It has been estimated that only about one-half of all programs are registered with Federal and State apprenticeship agencies. Many companies unilaterally plan, control, and tailor apprenticeship programs to their particular needs and, therefore, prefer not to register their programs with apprenticeship agencies. Unfortunately, no estimate is available of the number of apprentices in programs that are not registered.

The Department of Labor's Bureau of Apprenticeship and Training (BAT) registers, but does not finance apprenticeship programs. BAT provides technical assistance and support to State apprenticeship agencies and to employers and unions in establishing and maintaining apprenticeship programs. Data on new registrations, completions, and cancellations of apprenticeships for each apprenticeable trade by State are available for 1941–79.<sup>3</sup>

Of the 43,000 registered apprenticeship completions in 1979, about 55 percent were in construction occupations, nearly 15 percent each in production occupations and mechanic and repairer occupations, and the remaining 16 percent in service, technologist and technician, transportation and material moving, and other miscellaneous occupations.

Although apprenticeship cancellations represent a potential loss of highly trained workers, many dropouts eventually become skilled craft workers through less structured means. In some instances, particularly when jobs are abundant, apprentices drop their training program to earn a skilled worker's wage immediately. When the job market is depressed, however, they are more likely to complete their apprenticeships. In other instances, trainees who cancel may have acquired enough experience to reenter the occupation at another time. Trainees sometimes are dropped involuntarily during prolonged periods of construction inactivity or high unemployment.

<sup>3</sup> *Apprenticeship Registration Actions, by Region and State* (annual) through 1979 may be obtained from the Division of Reporting Operations, Employment and Training Administration, U.S. Department of Labor, Washington, D.C. 20210. In addition, the 1981 *Employment and Training Report of the President* contains a tabulation of the training status of registered apprentices through 1979—the last year for which data were collected. There are no plans at this time to resume collection of these data.

## **Federal employment and training programs**

The Federal Government has conducted structured employment and training programs since the enactment of the Manpower Development and Training Act (MDTA) of 1962. With the passage of the Comprehensive Employment and Training Act (CETA) of 1973 and CETA amendments of 1978, programs were decentralized. Although the Federal Government retained a few programs, such as the Work Incentive (WIN) Program, most Federal employment and training funds were distributed to State and local governments, along with the responsibility for planning and managing these programs.

Further changes were mandated by the Job Training Partnership Act (JTPA) of 1982. Its major feature is a greater reliance on the private sector through local Private Industry Councils (PIC'S), which plan, organize, dispense funds, and evaluate the success of employment and training programs within their jurisdiction. JTPA focuses on training the economically disadvantaged as well as displaced workers—those long attached to the labor force who have been laid off permanently from their jobs and who need assistance to regain employment through training, job search, and job relocation. JTPA is expected to serve 1 million unemployed and underemployed persons in fiscal year 1984.

JTPA also provides for two specific youth programs: (1) The Job Corps, with over 100 centers throughout the United States that annually assist nearly 88,000 young men and women ages 16 to 21 to learn a job skill or obtain the educational base needed to advance in society; and (2) the Summer Youth Employment Program, that annually provides approximately 800,000 temporary summer jobs in city, county, and State government agencies.

Other Federal programs administered by the Employment and Training Administration include the following: The Trade Adjustment Act program, which assists workers who have lost their jobs due to foreign competition; the Work Incentive (WIN) program, which helps employable recipients of Aid to Families with Dependent Children to get and keep jobs; occupational, social, and educational assistance provided to migrant and seasonal farm workers; help for workers 55 and older to get part-time jobs and social services; and a variety of training and aid programs that are designed to benefit Native Americans.

## **Armed Forces training**

The Armed Forces provide training in hundreds of specialized occupational skills. Each year, thousands of military recruits complete extensive training in computer repair, medical care, food service, metalworking, and many other fields. When these persons leave military service, they often possess skills that qualify them for civilian occupations.

Some military occupations are not directly comparable to civilian ones or are specific only to the needs of the Armed Forces. Individuals in these fields may need additional training after they leave the service to qualify for civilian jobs that are similar to their military jobs. For example, a navigation/bombing training and flight simulator specialist



has many, but not all, of the skills needed to become an electronic technician. A few military skills, such as those learned by infantry specialists, are unique to the Armed Forces and have limited or no application to civilian jobs.

To assist military personnel in utilizing their training to qualify for civilian jobs, the Army, Navy, and Marine Corps, in concert with the Bureau of Apprenticeship and Training, have established registered apprenticeship programs for uniformed personnel. Only occupations that are comparable or identical to civilian occupations are registered. Individuals participating in a program record their hours of training and work assignments in a logbook that documents their service experience and which can be presented to an employer, labor union, or joint apprenticeship committee when they apply for a job.

The largest proportion of Armed Forces enlistees train in the mechanical and technical areas. The following tabulation shows the number of enlisted personnel in each of the nine major occupational groups as of September 30, 1982:

	<i>In thousands</i>
Infantry, guncrews, and seamanship specialists . . . . .	250
Electronic equipment repairers . . . . .	165
Communications and intelligence specialists . . . . .	161
Medical and dental specialists . . . . .	83
Other technical and allied specialists . . . . .	41
Functional support and administration . . . . .	288
Electrical and mechanical equipment repairers . . . . .	368
Craft workers . . . . .	73
Service and supply handlers . . . . .	168

Table C-4 provides more detail on these occupational groups.

To aid in "translating" military job titles, the Department of Defense has compiled a job comparability manual. The *Military-Civilian Occupational Source Book* relates military jobs by service branch to their civilian counterparts as identified in the Department of Labor's *Dictionary of Occupational Titles*. Although intended for use by high school guidance counselors, the manual can also serve as a useful tool for employers and vocational counselors involved in job placement for veterans.

### Home study schools

Home study (correspondence) schools provide an alternative means of education and training for many individuals who are unable to attend school for one reason or another. Courses offered through home study programs vary in length, skill level, and degree of specialization, and emphasize vocational training, academic study, or simply personal enrichment.

In 1982, about 2.5 million persons were enrolled in home study courses, according to the National Home Study Council (NHSC). Enrollment in Federal Government and military programs totaled 1.5 million; 1.1 million students took courses offered by the 77 schools accredited by the NHSC; most of the remaining home study students were enrolled in programs offered by religious organizations and colleges and universities.

Correspondence schools generally require students to complete a certain number of lessons within a specified length of time to obtain a certificate of completion.

### Community and junior colleges

Community and junior colleges play an integral part in the American educational system. By offering a wide variety of courses and programs, these schools enable many students from diverse backgrounds to obtain occupational and educational training beyond high school. For students interested in transferring to a 4-year college, many programs are designed to provide a general educational background in arts and sciences. Students who wish to specialize in a particular field may enroll in vocational or occupational curriculums, such as dental hygiene or data processing. Typically, programs in junior and community colleges last 2 years and lead to an associate degree. Some programs last less than 2 years and students are granted certificates or other formal awards upon completion.

According to the NCES, enrollments in 2-year institutions of higher education grew rapidly over the 1981-82 period—from 2.8 million to 4.8 million. NCES projects that enrollments in 2-year institutions will increase steadily through the 1980's—to 5 million by 1990.

During the 1978-82 period, awards of associate degrees increased 49 percent, according to recent surveys.<sup>4</sup> A shift in student attitudes, placing more value on job training, was apparently a factor in the upsurge in associate degrees awarded. Associate degrees in occupational curriculums grew 107 percent over the 1972-82 period, while degrees in the arts and sciences remained virtually unchanged. In academic year 1981-82, 64 percent of all associate degrees were awarded in occupational curriculums, while 36 percent were awarded in arts and sciences and general programs. Table C-5 provides detailed data for the academic year 1981-82 on associate degrees and other formal awards below the baccalaureate.

Because community and junior colleges can quickly adjust their programs to local employer needs as well as student interests, radical changes in enrollments in particular curriculums can and do take place in a short time. For this reason, NCES does not project the number of enrollments in specific curriculums. Information on future enrollments may be obtained from State and local community and junior college administrators.

### College and universities

Colleges and universities serve many purposes, including providing individuals with specific occupational training. A college education provides the necessary background to

<sup>4</sup> The Higher Education General Information Survey (HEGIS) of NCES provides annual data on associate degrees and other awards below the baccalaureate, including those granted by 4-year colleges. In 1979-80, 2-year institutions awarded 86 percent of these degrees.

enter fields such as engineering, law, business, the humanities, and the natural sciences.

The length of a college education depends on the student's interests and career goals. Most students seek employment after obtaining a bachelor's degree, which usually requires 4 years. Those who wish to qualify for positions requiring more specialized knowledge often continue their study. Master's, doctoral, and first professional degree programs require several additional years of study after the bachelor's degree. Occasionally, these programs accept exceptional students after 2 or 3 years of undergraduate work.

College and university enrollments increased steadily during the 1960's and early 1970's—from 4.8 million in 1965 to 7.2 million in 1975. The rate of increase slowed during the late 1970's—to 7.7 million by 1982. The NCES projects that enrollments will level off in the early 1980's—to 7.8 million in 1982—then decline slowly during the late 1980's to 7.1 million by 1990.

The number of degrees conferred by colleges and universities is closely related to enrollments. During academic year 1981–82, nearly 1.4 million persons earned degrees—953,000 bachelor's degrees, 295,000 master's degrees, 33,000 doctoral degrees, and 72,000 first professional degrees. NCES projects that the total number of degrees will increase to 1.4 million in academic year 1984–85, then taper off to 1.3 million by 1989–90.<sup>5</sup>

Tables C–6 and C–7 show the number of degrees con-

ferred by major field of study. Although many graduates do not pursue careers in their field of study, the proportion of graduates of occupational curriculums who directly enter related occupations tends to be very high, particularly if training takes a number of years. For example, nearly all medical school graduates enter medicine and most engineering school graduates enter engineering. However, for many liberal arts graduates, whose training is less occupationally oriented, entry rates into occupations related to a college major are substantially lower. This is especially true at the bachelor's degree level since many graduates enter professional school, teaching, or occupations for which a college degree in any one of a number of fields may be adequate preparation.

A recent survey by NCES collected data on the labor force status in May 1981 of people who received bachelor's degrees between July 1979 and June 1980.<sup>6</sup> The Bureau of Labor Statistics also has analyzed these data for all graduates and for each of 19 major fields of study. Information on the labor force, occupational, and graduate school status of each of these groups is presented in an article, "College Majors and Jobs," in the Summer 1984 issue of the *Occupational Outlook Quarterly*. Additional followup studies of college students and graduates are available from surveys conducted by college placement offices, professional societies, and other organizations. Most of these data are limited to graduates from a single institution or field.

<sup>5</sup> Projections, along with a discussion of the projection methodology, are published by NCES in *Projections of Education Statistics to 1990–91*.

<sup>6</sup> The results of the survey are published by NCES in *New Teachers in the Job Market, 1981 update* and *Occupations of Recent College Graduates*.

**Table C-1. Enrollments and completions in occupationally specific public vocational education programs, 1981-82**

DOE Instructional code	Title	Enrollments	Completions
	Total . . . . .	5,984,238	1,816,075
01.	Agriculture, total . . . . .	393,439	139,975
01.0100	Agricultural production . . . . .	187,977	70,488
01.0200	Agricultural supplies/services . . . . .	20,650	8,393
01.0300	Agricultural mechanics . . . . .	62,554	24,470
01.0400	Agricultural products . . . . .	4,048	1,778
01.0500	Horticulture . . . . .	69,745	21,503
01.0600	Renewable natural resources . . . . .	10,010	3,234
01.0700	Forestry . . . . .	19,520	3,790
01.9900	Other agriculture . . . . .	18,935	6,319
04.	Distribution, total . . . . .	540,528	189,356
04.0100	Advertising services . . . . .	20,250	2,921
04.0200	Apparel and accessories . . . . .	29,030	11,936
04.0300	Automotive . . . . .	5,816	2,665
04.0400	Finance and credit . . . . .	31,907	5,645
04.0500	Floristry . . . . .	6,443	2,419
04.0600	Food distribution . . . . .	27,889	15,249
04.0700	Food services . . . . .	31,363	15,179
04.0800	General merchandise . . . . .	175,781	67,734
04.0900	Hardware, building materials . . . . .	2,890	1,651
04.1000	Home furnishings . . . . .	2,486	986
04.1100	Hotel and lodging . . . . .	10,655	2,224
04.1200	Industrial marketing . . . . .	17,719	3,155
04.1300	Insurance . . . . .	5,188	1,327
04.1500	Personal services . . . . .	6,091	3,005
04.1700	Real estate . . . . .	53,474	16,355
04.1800	Recreation and tourism . . . . .	17,936	5,423
04.1900	Transportation . . . . .	14,036	4,899
04.2000	Retail trade, other . . . . .	15,570	6,028
04.9900	Other distributive education . . . . .	66,004	20,555
07.	Health, total . . . . .	489,615	167,881
07.0101	Dental assisting . . . . .	18,640	7,792
07.0102	Dental hygiene (associate) . . . . .	7,118	2,621
07.0103	Dental laboratory technology . . . . .	4,051	1,249
07.0203	Medical laboratory assisting . . . . .	6,963	2,103
07.0299	Other medical laboratory technology . . . . .	10,086	2,612
07.0301	Nursing, associate degree . . . . .	115,492	30,911
07.0302	Practical (vocational) nursing . . . . .	81,856	33,502
07.0303	Nursing assistance (aide) . . . . .	57,779	29,685
07.0399	Other nursing . . . . .	24,358	6,644
07.0400	Rehabilitation . . . . .	7,430	2,151
07.0501	Radiologic technology (X-ray) . . . . .	11,120	3,136
07.0800	Mental health technology . . . . .	8,017	1,498
07.0903	Inhalation therapy technology . . . . .	10,947	3,272
07.0904	Medical assisting . . . . .	22,072	7,192
07.0906	Community health aide . . . . .	8,343	3,817
07.0907	Medical emergency technician . . . . .	24,528	8,301
07.9900	Other health education . . . . .	70,815	21,395
09.02	Occupational preparation, total . . . . .	252,597	88,862
09.0201	Care and guidance of children . . . . .	104,082	30,766
09.0202	Clothing management, production, and services . . . . .	28,294	9,644
09.0203	Food management, production, and services . . . . .	83,666	35,581
09.0204	Home furnishing, equipment, and services . . . . .	8,404	2,284
09.0205	Institutional and home management and services . . . . .	8,448	4,004
09.0299	Other occupational preparation for homemaking . . . . .	19,703	6,583
14.	Office occupations, total . . . . .	2,089,685	576,846
14.0100	Accounting and computing occupations . . . . .	420,837	113,418
14.0201	Computer and console operators . . . . .	57,441	14,267
14.0203	Programmers . . . . .	144,804	20,521
14.0299	Other business data processing . . . . .	146,334	30,775
14.0300	Filing, office machines, clerical occupations . . . . .	372,045	139,348
14.0400	Information, communication occupations . . . . .	18,134	5,656
14.0500	Materials support, transportation, etc. . . . .	4,863	1,536
14.0600	Personnel, training, and related occupations . . . . .	12,969	1,609
14.0700	Stenography, secretarial, and related occupations . . . . .	397,700	127,883
14.0800	Supervisory and administrative management occupations . . . . .	174,843	22,633
14.0900	Typing and related occupations . . . . .	242,015	80,513
14.9900	Other office occupations . . . . .	97,700	18,687

See footnotes at end of table.

**Table C-1. Enrollments and completions in occupationally specific public vocational education programs, 1981-82—Continued**

DOE Instructional code	Title	Enrollments	Completions
16.	Technical, total . . . . .	459,968	77,798
16.0103	Architectural technology . . . . .	25,929	3,881
16.0104	Automotive technology . . . . .	15,680	1,728
16.0106	Civil technology . . . . .	18,486	3,534
16.0107	Electrical technology . . . . .	23,748	4,238
16.0108	Electronic technology . . . . .	101,546	15,947
16.0110	Environmental control technology . . . . .	6,718	1,437
16.0111	Industrial technology . . . . .	18,867	3,107
16.0113	Mechanical technology . . . . .	26,680	4,472
16.0117	Scientific data technology . . . . .	21,163	3,809
16.0601	Commercial pilot training . . . . .	7,594	1,018
16.0602	Fire and safety technology . . . . .	16,072	3,934
16.0605	Police science . . . . .	58,826	12,327
16.9902	Water and wastewater technology . . . . .	3,883	909
16.9900	Other technical education . . . . .	114,776	17,457
17.	Trade and industrial, total . . . . .	1,713,176	563,490
17.0100	Air-conditioning . . . . .	50,758	14,342
17.0200	Appliance repair . . . . .	9,675	3,232
17.0301	Body and fender repair . . . . .	67,611	21,610
17.0302	Auto mechanic . . . . .	230,726	78,739
17.0399	Automotive specialization . . . . .	13,676	5,506
17.0400	Aviation occupations . . . . .	22,530	5,650
17.0700	Commercial art occupations . . . . .	41,227	9,446
17.0900	Commercial photographic occupations . . . . .	19,606	4,325
17.1001	Carpentry, construction . . . . .	89,527	34,763
17.1002	Electricity, construction . . . . .	24,959	8,170
17.1004	Masonry . . . . .	23,454	7,844
17.1007	Plumbing and pipefitting . . . . .	17,602	5,266
17.1099	Other construction and maintenance trades . . . . .	69,844	24,400
17.1100	Custodial services . . . . .	7,048	2,902
17.1200	Diesel mechanic . . . . .	26,434	8,222
17.1300	Drafting occupations . . . . .	106,219	31,315
17.1400	Electrical occupations . . . . .	40,823	12,592
17.1500	Electronic occupations . . . . .	100,466	32,210
17.1700	Supervisor and management development . . . . .	12,162	1,796
17.1900	Graphic arts occupations . . . . .	65,899	22,976
17.2100	Instrument maintenance and repair occupations . . . . .	2,717	798
17.2200	Maritime occupations . . . . .	3,247	1,169
17.2302	Machine shop occupations . . . . .	78,220	26,334
17.2303	Machine tool operations . . . . .	9,082	2,720
17.2305	Sheet metal . . . . .	8,722	2,731
17.2306	Welding and cutting . . . . .	131,715	39,338
17.2307	Tool and die making . . . . .	4,380	1,191
17.2399	Other metalworking occupations . . . . .	20,155	8,374
17.2400	Metallurgy occupations . . . . .	533	135
17.2602	Cosmetology . . . . .	83,528	31,669
17.2699	Other personal services . . . . .	11,342	1,332
17.2700	Plastics occupations . . . . .	2,313	564
17.2801	Firefighter training . . . . .	16,255	5,293
17.2802	Law enforcement training . . . . .	57,043	15,764
17.2899	Other public services . . . . .	16,559	3,109
17.2900	Quantity food occupations . . . . .	36,182	11,839
17.3000	Refrigeration . . . . .	3,395	1,192
17.3100	Small engine repair . . . . .	22,752	8,617
17.3200	Stationary energy sources occupations . . . . .	2,319	1,130
17.3300	Textile production and fabrication . . . . .	11,193	3,921
17.3500	Upholstering . . . . .	8,402	2,246
17.3600	Woodworking occupations . . . . .	25,889	9,231
17.9900	Other trade and industrial occupations . . . . .	116,967	49,487
	Other programs, greater than 1 percent of total <sup>2</sup> . . . . .	43,328	11,005
	Other programs, less than 1 percent of total <sup>3</sup> . . . . .	1,902	559

<sup>1</sup> Occupationally specific enrollments include students above grade 10 enrolled in programs which are designed to train individuals for specific occupations. Excluded are all programs in industrial arts and consumer and home-making training, as well as prevocational, counseling and guidance, and cluster programs (those programs that include 4 or more subjects that cannot be separated and identified as a complete program).

<sup>2</sup> Includes those programs that are more than 1 percent of a program area (e.g., Agriculture) that are not listed separately.

<sup>3</sup> Includes those programs that are less than 1 percent of a program area that are not listed separately.

SOURCE: U.S. Department of Education, National Center for Education Statistics, preliminary data.

**Table C-2. Total enrollments, total completions, total who left with or without a marketable skill, and total still enrolled, by individual programs for non-collegiate postsecondary schools with occupational programs: 1980-81**

DOE instructional code and title	Total enrollments	Completions	Left with marketable skill	Left without marketable skill	Still enrolled
Total, all programs	1,555,526	889,969	92,188	249,614	323,755
01. Agribusiness, total	8,426	3,516	643	1,706	2,563
01.0100 Agricultural production	1,546	510	171	192	674
01.0200 Agricultural supplies/services	1,679	1,034	102	265	278
01.0300 Agricultural mechanics	725	275	38	149	263
01.0400 Agricultural products	1,285	504	116	247	419
01.0500 Ornamental horticulture	2,773	977	186	783	827
01.0600 Agricultural resources	171	121	8	5	37
01.0700 Forestry	247	95	22	65	65
04. Marketing and distribution, total	246,967	191,778	8,462	28,383	18,348
04.0100 Advertising services	145	59	4	28	55
04.0200 Apparel and accessories	12,369	6,388	2,030	1,485	2,466
04.0400 Finance and credit	19,053	17,111	182	1,379	381
04.0500 Floristry	4,264	3,453	231	310	270
04.0600 Food distribution	99	73	9	18	0
04.0700 Food service technology	782	291	88	162	240
04.0800 General merchandise	6,011	3,635	243	998	1,135
04.0900 Hardware, building materials	27	19	5	3	0
04.1000 Home furnishings management	69	16	10	43	0
04.1100 Hotel and lodging	1,108	261	153	218	476
04.1300 Insurance	7,517	6,048	373	819	276
04.1600 Petroleum sales	52	14	4	15	19
04.1700 Real estate	97,399	78,681	2,484	11,637	4,597
04.1800 Recreation and tourism	44,717	34,012	840	5,146	4,720
04.1900 Transportation services	2,385	1,069	427	128	762
04.2000 Retail trade, other	1,479	842	86	362	190
04.3100 Wholesale trade, other	723	708	0	16	0
04.9900 Other	48,768	39,098	1,293	5,616	2,761
07. Health occupations, total	164,057	91,603	7,667	21,589	43,209
07.0101 Dental assistant	11,140	7,354	432	1,518	1,836
07.0102 Dental hygiene (associate)	97	46	10	18	23
07.0103 Dental laboratory technology	1,897	740	77	305	775
07.0199 Other dental	3,708	2,448	341	490	429
07.0201 Cytology	131	92	0	39	0
07.0202 Histology	54	53	0	0	1
07.0203 Medical laboratory assisting	3,356	2,069	124	422	742
07.0204 Hematology	253	129	16	33	75
07.0299 Medical laboratory technology, other	3,608	2,277	83	608	640
07.0301 Nursing (associate degree)	12,738	5,061	247	1,242	6,188
07.0302 Practical (vocational) nursing	30,921	16,973	2,127	4,808	7,013
07.0303 Nursing assistant (aide)	24,792	18,532	1,203	3,169	1,888
07.0304 Psychiatric aide	370	62	64	33	212
07.0305 Surgical technician	1,401	901	44	203	254
07.0399 Nursing, other	19,604	6,367	538	1,956	10,743
07.0401 Occupational therapy	155	55	8	36	57
07.0499 Rehabilitation services, other	28	10	4	6	8
07.0501 X-ray technician	7,353	3,383	94	817	3,060
07.0502 Radiation therapy	21	21	0	0	0
07.0503 Nuclear medical technology	331	214	0	48	69
07.0599 Radiologic, other	222	114	0	0	108
07.0600 Optical technology	675	383	50	114	128
07.0800 Mental health technology	111	55	0	35	22
07.0900 Veterinary assistant	1,146	849	31	225	41
07.0901 Electroencephalograph technology	70	0	0	0	70
07.0902 Electrocardiograph technology	791	508	53	124	106
07.0903 Respiratory therapy technology	6,163	3,219	297	973	1,675
07.0904 Medical assisting (office)	24,160	15,035	1,544	3,196	4,385
07.0906 Community health aide	75	69	1	3	3
07.0907 Medical emergency technician	1,885	1,260	36	230	360
07.0909 Mortuary science	560	296	0	165	100
07.0915 Medical records technician	958	495	82	163	218
07.9900 Health occupations, other	5,283	2,533	161	610	1,980

See footnotes at end of table.

**Table C-2. Continued—Total enrollments, total completions, total who left with or without a marketable skill, and total still enrolled, by individual programs for non-collegiate postsecondary schools with occupational programs: 1980–81**

DOE instructional code and title	Total enrollments	Completions	Left with marketable skill	Left without marketable skill	Still enrolled
09. Home economics, total	9,005	4,702	753	1,539	2,011
09.0201 Child care	3,136	1,202	235	574	1,125
09.0202 Clothing management, production, and services	2,337	1,379	251	403	303
09.0203 Food management, production, and services	1,305	582	97	265	361
09.0204 Home furnishings	593	300	40	148	105
09.0205 Institutional/home management	783	522	109	102	50
09.0299 Home economics, other	851	717	21	47	67
14. Business and office, total	366,759	180,455	35,166	73,046	78,096
14.0100 Accounting	45,630	19,880	4,130	9,888	11,732
14.0201 Computer operator	8,949	3,276	2,867	2,340	466
14.0202 Key punch operator	13,670	7,899	882	2,851	2,039
14.0203 Computer programmer	40,246	22,329	2,539	7,370	8,009
14.0204 Systems analyst	206	99	10	36	61
14.0299 Business data processing	45,880	21,580	3,147	8,658	12,496
14.0300 General office	26,469	11,497	2,533	7,172	5,268
14.0400 Information, communication occupations	3,843	1,559	345	1,063	876
14.0500 Materials support occupations	136	100	0	36	0
14.0600 Personnel occupations	59	23	0	12	23
14.0700 Stenographic, secretarial, and related occupations	117,507	62,486	11,879	20,535	22,608
14.0800 Supervisory and administrative management occupations	21,850	10,134	1,751	4,988	4,977
14.0900 Typing and related occupations	11,247	7,278	669	1,644	1,659
14.9900 Office occupations, other	31,067	12,315	4,416	6,453	7,882
16. Technical occupations, total	132,997	65,534	8,597	21,650	37,218
16.0101 Aeronautical technology	1,036	510	8	180	338
16.0102 Agriculture technology	1,510	53	42	99	1,316
16.0103 Architectural technology	2,238	748	135	558	797
16.0104 Automotive technology	10,384	5,085	391	2,107	2,800
16.0105 Chemical technology	386	213	27	72	75
16.0106 Civil technology	9,502	3,478	695	2,067	3,261
16.0107 Electrical technology	3,328	1,316	395	753	863
16.0108 Electronic technology	45,919	18,189	2,687	7,623	17,421
16.0109 Electromechanical technology	2,997	1,090	166	812	929
16.0110 Environmental control technology	2,524	1,525	39	465	495
16.0111 Industrial technology	1,298	447	160	321	370
16.0112 Instrumentation technology	727	231	99	120	278
16.0113 Mechanical technology	1,408	473	136	268	531
16.0114 Metallurgical technology	435	135	25	84	191
16.0115 Nuclear technology	79	28	0	13	38
16.0116 Petroleum technology	241	173	5	31	33
16.0117 Scientific data processing	64	64	0	0	0
16.0203 Food processing technology	87	87	0	0	0
16.0601 Commercial pilot training	291	184	4	8	95
16.0602 Fire and fire safety technology	1,265	1,225	6	0	34
16.0603 Forestry technology	147	35	8	80	24
16.0605 Police science technology	889	763	0	6	120
16.0606 Teacher's assistant	700	238	50	195	217
16.0607 Library assistant	4,235	2,886	388	439	522
16.0608 Broadcast technician	17,632	10,057	1,253	2,780	3,543
16.0695 Performing artists	18,655	13,960	1,310	1,646	1,739
16.0699 Technology, other	5,020	2,341	568	923	1,188
17. Trade and industrial, total	627,318	352,389	30,951	101,711	142,497
17.0100 Air conditioning installation and repair	22,240	8,999	1,685	4,546	7,009
17.0200 Appliance repair	2,309	905	264	482	658
17.0301 Body and fender repair	13,535	5,330	1,218	2,930	4,058
17.0302 Auto mechanic	40,457	13,862	4,140	8,238	14,217
17.0303 Auto specialization, repair	8,770	5,824	335	1,335	1,276
17.0399 Automotive services, other	871	303	57	327	183
17.0401 Aircraft maintenance	7,667	1,992	373	1,966	3,335
17.0500 Blueprint reading	1,043	613	14	322	94
17.0600 Business machine maintenance	976	335	52	272	317
17.0700 Commercial art occupations	25,650	12,910	799	3,502	8,439
17.0800 Commercial fishery occupations	136	37	0	5	94
17.0900 Commercial photography occupations	7,109	3,999	191	790	2,130

See footnotes at end of table.

**Table C-2. Continued—Total enrollments, total completions, total who left with or without a marketable skill, and total still enrolled, by individual programs for non-collegiate postsecondary schools with occupational programs: 1980–81**

DOE instructional code and title	Total enrollments	Completions	Left with marketable skill	Left without marketable skill	Still enrolled
17.1001 Carpentry, construction . . . . .	9,619	4,542	830	2,002	2,246
17.1002 Electricity, construction . . . . .	5,449	2,229	562	1,050	1,607
17.1003 Heavy equipment maintenance operations . . . . .	5,297	2,845	327	898	1,226
17.1004 Masonry . . . . .	3,522	1,248	363	937	975
17.1005 Painting and decorating . . . . .	970	476	43	236	216
17.1007 Plumbing and pipefitting . . . . .	4,261	2,213	363	767	918
17.1010 Roofing . . . . .	111	67	22	18	5
17.1099 Construction and maintenance trades, other . . . . .	5,983	3,027	326	1,035	1,595
17.1100 Custodial services . . . . .	3,180	1,234	153	555	1,237
17.1200 Diesel mechanic . . . . .	19,975	9,700	1,348	2,957	5,971
17.1300 Drafting occupations . . . . .	21,363	7,962	1,647	4,696	7,058
17.1400 Electrical occupations, other . . . . .	6,340	2,641	481	1,401	1,817
17.1503 Radio and TV repair . . . . .	4,388	1,707	406	1,074	1,201
17.1599 Electronics occupations, other . . . . .	12,155	5,503	657	2,624	3,372
17.1600 Fabric maintenance services . . . . .	380	250	58	64	8
17.1900 Graphic arts occupations . . . . .	7,876	3,444	564	1,794	2,073
17.2000 Industrial atomic energy occupations . . . . .	506	159	29	153	165
17.2100 Instrument maintenance and repair occupations . . . . .	2,256	1,419	120	324	392
17.2200 Maritime occupations . . . . .	11,293	8,453	288	1,513	1,038
17.2302 Machine shop occupations . . . . .	2,565	1,337	115	393	721
17.2303 Machine tool operations . . . . .	14,208	4,878	1,252	3,369	4,710
17.2306 Welding and cutting . . . . .	64,525	35,030	4,563	12,288	12,645
17.2307 Tool and diemaking . . . . .	920	443	62	84	331
17.2399 Metalworking, other . . . . .	3,274	1,566	332	506	869
17.2400 Metallurgy occupations . . . . .	744	369	39	145	192
17.2601 Barbering . . . . .	13,400	9,927	477	1,352	1,645
17.2602 Cosmetology . . . . .	167,388	113,179	2,743	21,894	29,572
17.2699 Personal services, other . . . . .	8,930	6,336	137	916	1,542
17.2700 Plastics occupations . . . . .	622	273	33	138	178
17.2801 Firefighter training . . . . .	1,046	645	31	83	288
17.2802 Law enforcement training . . . . .	762	279	145	154	184
17.2899 Public service occupations, other . . . . .	160	86	5	38	31
17.2900 Quantity food occupations . . . . .	8,283	3,401	749	1,666	2,466
17.3000 Refrigeration engineering . . . . .	7,363	2,681	285	1,487	2,909
17.3100 Small engine repair, internal combustion . . . . .	2,285	896	230	594	565
17.3200 Stationary energy sources . . . . .	6,021	4,968	206	484	363
17.3300 Textile production and fabrication . . . . .	613	512	2	51	49
17.3400 Leatherworking . . . . .	74	20	6	19	28
17.3500 Upholstering . . . . .	2,088	1,104	120	338	527
17.3600 Woodworking occupations . . . . .	3,513	1,321	240	963	989
17.4000 Truckdriving . . . . .	43,393	34,885	834	3,418	4,256
17.5000 Dog grooming . . . . .	2,420	1,768	107	530	16
17.9900 Trade and industrial occupations, other . . . . .	17,034	12,257	478	1,988	2,310

<sup>1</sup> Table does not include collegiate, flight, and other schools. Details may not add to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics.

**Table C-3. Apprenticeship registration actions, calendar year 1979**

Trade	Beginning of period 1-1-79	During period			End of period 12-31-79
		Added	Cancelled <sup>1</sup>	Completed	
U.S. totals . . . . .	289,168	136,786	58,634	43,454	323,866
Technologists and technicians, except health:					
Drafters, designers . . . . .	841	317	230	124	804
Service occupations:					
Food and beverage preparation and service occupations:					
Butchers, meatcutters . . . . .	2,259	1,007	499	694	2,073
Cooks, bakers . . . . .	2,352	1,168	625	194	2,701
Personal service occupations:					
Barbers, beauticians . . . . .	1,403	1,066	604	491	1,374
Mechanics and repairers:					
Air-conditioning and refrigeration mechanics . . . . .	2,041	855	399	294	2,203
Aircraft mechanics . . . . .	660	134	32	26	736
Auto and related body repairers . . . . .	3,207	1,260	739	346	3,382
Auto and related mechanics . . . . .	9,909	4,786	2,524	1,466	10,705
Car repairers . . . . .	3,149	1,259	708	680	3,020
Electronic technicians . . . . .	1,610	622	146	310	1,776
Industrial technicians . . . . .	1,310	488	222	178	1,398
Maintenance mechanics . . . . .	4,853	1,946	744	913	5,142
Millwrights . . . . .	5,636	2,241	679	1,038	6,160
Office machine servicers . . . . .	1,084	233	241	146	930
Radio, TV repairers . . . . .	718	176	190	130	574
Not classified above . . . . .	4,344	2,058	771	757	4,874
Construction occupations:					
Bricklayers, stone and tile setters . . . . .	8,488	3,884	1,992	1,068	9,312
Carpenters . . . . .	43,212	23,672	13,397	4,637	48,850
Cement masons . . . . .	3,092	1,792	824	466	3,594
Electrical workers . . . . .	920	424	228	170	946
Electricians . . . . .	35,118	13,833	4,843	4,961	39,147
Floor coverers . . . . .	1,697	955	523	228	1,901
Glaziers . . . . .	1,143	688	323	189	1,319
Insulation workers . . . . .	1,683	504	194	235	1,758
Lathers . . . . .	1,357	804	400	155	1,606
Line erectors, light and power . . . . .	4,651	2,173	754	816	5,254
Ornamental ironworkers . . . . .	166	48	14	15	185
Painters . . . . .	6,732	3,941	1,991	956	7,726
Pipefitters, sprinkler fitters, steamfitters . . . . .	15,859	5,755	1,662	3,089	16,863
Plasterers . . . . .	1,229	827	347	121	1,588
Plumbers . . . . .	17,607	5,965	2,482	2,322	18,768
Roofers . . . . .	5,670	4,335	2,410	539	7,056
Sheet-metal workers . . . . .	11,265	4,773	1,771	1,591	12,676
Structural steel workers . . . . .	8,066	5,145	1,370	1,568	10,273
Tapers, dry-wall applicators . . . . .	1,910	1,136	803	412	1,831
Not classified above . . . . .	1,394	639	477	283	1,273
Production occupations:					
Precision production occupations:					
Boilermakers . . . . .	3,931	1,381	417	769	4,126
Bookbinders, bindery workers . . . . .	631	273	108	90	706
Cabinetmakers, wood machinists . . . . .	1,968	1,039	629	242	2,136
Compositors . . . . .	385	100	94	70	321
Lithographers, photoengravers . . . . .	2,173	724	653	369	1,875
Machinists . . . . .	15,528	6,397	2,748	2,450	16,727
Medical and dental technicians . . . . .	3,457	2,882	529	226	5,584
Molders, coremakers . . . . .	646	257	139	97	667
Optical workers . . . . .	389	109	119	49	330
Patternmakers . . . . .	852	383	74	143	1,018
Printing and publishing workers . . . . .	875	396	111	80	1,080
Toolmakers, diemakers . . . . .	12,730	5,379	2,044	1,807	14,258
Plant and system operators:					
Stationary engineers . . . . .	1,899	713	212	448	1,952
Machine operators, tenders, and setup workers:					
Machine set-up and operators . . . . .	1,437	699	353	205	1,578
Press operators . . . . .	1,134	258	189	187	1,016
Transportation and material moving occupations:					
Operating engineers (construction machinery operators) . . . . .	5,496	2,775	875	857	6,539
Miscellaneous trades, not classified above . . . . .	19,002	12,112	3,182	3,757	24,175

<sup>1</sup> Includes voluntary quits, layoffs, discharges, out-of-State transfers, upgrades within certain trades, and suspensions or interruptions for military service.

SOURCE: U.S. Department of Labor, Bureau of Apprenticeship and Training.



**Table C-4. Enlisted strength in Department of Defense (DOD) occupational groups, September 30, 1982**

DOD code	Group title and description of coverage	Enlisted strength
0	INFANTRY, GUN CREWS, AND SEAMANSHIP SPECIALISTS . . . . .	250,415
01	<i>Infantry</i> – includes weapon specialists, ground reconnaissance specialists and crew-served artillery specialists, armor and amphibious crews, and specialists in combat engineering and seamanship . . . . .	108,860
02	<i>Armor and Amphibious</i> . . . . .	23,242
03	<i>Combat Engineering</i> – includes specialists in hasty and temporary construction of airfields, roads, and bridges and in demolition, field illumination, and chemical warfare . . . . .	22,700
04	<i>Artillery/Gunnery, Rockets, and Missiles</i> – includes conventional field, anti-air and shipboard guns and artillery, and rocket and missile specialists . . . . .	51,698
05	<i>Air Crew</i> – includes pilots and navigators, flight engineers, and other air crew . . . . .	6,877
06	<i>Seamanship</i> – includes boatswains, navigators, and other seamanship specialists . . . . .	14,187
07	<i>Installation Security</i> – includes specialists who guard weapon systems, defend installations, and protect personnel, equipment, and facilities . . . . .	22,851
0	ELECTRONIC EQUIPMENT REPAIRERS . . . . .	165,025
10	<i>Radio/Radar</i> – includes fixed and mobile radio, air traffic and tracking radar, communication, navigation, and electronic countermeasure gear . . . . .	76,302
11	<i>Fire Control Electronic System (Non-Missile)</i> . . . . .	8,212
12	<i>Missile Guidance, Control and Checkout</i> – includes specialists in guidance, control, and checkout equipment for guided and ballistic missiles . . . . .	23,184
13	<i>Sonar Equipment</i> – includes specialists in underwater detection and fire control systems, oceanographic equipment, and related antisubmarine gear . . . . .	7,700
14	<i>Nuclear Weapons Equipment</i> . . . . .	1,524
15	<i>ADP Computers</i> . . . . .	8,728
16	<i>Teletype and Cryptographic Equipment</i> . . . . .	14,053
19	<i>Other Electronic Equipment</i> – includes training devices, inertial navigation systems, and electronics instruments specialists . . . . .	25,322
2	COMMUNICATIONS AND INTELLIGENCE SPECIALISTS . . . . .	160,887
20	<i>Radio and Radio Code</i> – includes operators of radio, radio teletype, and visual communications equipment . . . . .	47,702
21	<i>Sonar</i> . . . . .	4,919
22	<i>Radar and Air Traffic Control</i> . . . . .	27,835
23	<i>Signal Intelligence/Electronic Warfare</i> – includes the intercept, translation, and analysis of foreign communications, and the operation of electronic countermeasures equipment . . . . .	25,121
24	<i>Intelligence</i> – includes the gathering, receipt, and analysis of nonsignal intelligence data, the interrogation of prisoners, other language translators and interpreters, image interpretation, and specialists in counterintelligence and investigational activities . . . . .	10,114
25	<i>Combat Operations Control</i> – includes specialists in forward area tactical operations and intelligence and in command post control activities . . . . .	23,337
26	<i>Communications Center Operations</i> – includes the receipt and distribution of messages, the operation of communications center equipment, and the operation of major field communications systems . . . . .	21,859
3	MEDICAL AND DENTAL SPECIALISTS . . . . .	83,302
30	<i>Medical Care</i> . . . . .	57,167
31	<i>Technical Medical Services</i> – includes laboratory, pharmaceutical, and X-ray services . . . . .	11,434
32	<i>Related Medical Services</i> – includes specialists in sanitation, health preservation, and veterinary services and preventive medical services . . . . .	5,316
33	<i>Dental Care</i> – Includes specialists in dental care and treatment and in related technical and laboratory services . . . . .	9,385
4	OTHER TECHNICAL AND ALLIED SPECIALISTS . . . . .	41,430
40	<i>Photography</i> – includes still, motion, and television camera operators, precision photographic processing, editing, and broadcasting . . . . .	6,201
41	<i>Mapping, Surveying, Drafting, and Illustrating</i> . . . . .	7,997
42	<i>Weather</i> – includes specialists in the collection of weather and sea condition data and in weather forecasting . . . . .	5,406
43	<i>Ordnance Disposal and Diving</i> – includes the excavation and rendering safe of explosive ordnance and of chemical and nuclear agents, and underwater demolition and other types of diving . . . . .	1,667
45	<i>Musicians</i> . . . . .	4,931
49	<i>Technical Specialists, N.E.C.</i> – includes physical science laboratory analysts, specialists in memorial activities, safety, NBC warfare, and firefighting and damage control, and other technical specialists and aids such as scientific engineering assistants . . . . .	15,218
5	FUNCTIONAL SUPPORT AND ADMINISTRATION . . . . .	287,756
50	<i>Personnel</i> – includes specialists in personnel administration, personnel and manpower management, and recruiting and counseling . . . . .	45,452
51	<i>Administration</i> – includes clerks, typists, and stenographers and legal and medical administrative specialists . . . . .	77,941
52	<i>Clerical/Personnel</i> – includes combined personnel and administrative specialists and senior enlisted personnel whose primary responsibilities are non-technical . . . . .	7,078
53	<i>Data Processing</i> – includes computer operators, analysts, and programmers and electric accounting machine operators . . . . .	16,906
54	<i>Accounting, Finance, Disbursing</i> . . . . .	15,430
55	<i>Other Functional Support</i> – includes specialists who provide support in the functional areas of supply accounting and procurement, transportation, flight operations, and related areas . . . . .	113,406
56	<i>Religious, Morale, and Welfare</i> – includes chaplains' assistants and specialists in theater, arts, sports, and related activities . . . . .	5,795
57	<i>Information and Education</i> – includes specialists in public affairs, radio/TV, and other types of information and education . . . . .	5,748

See footnotes at end of table.

**Table C-4. Enlisted strength in Department of Defense (DOD) occupational groups, September 30, 1982**

DOD code	Group title and description of coverage	Enlisted strength
6	ELECTRICAL/MECHANICAL EQUIPMENT REPAIRERS . . . . .	367,632
60	<i>Aircraft and Related</i> – includes aircraft engines, electrical systems, structural components and surfaces, and launch equipment . . . . .	161,127
61	<i>Automotive</i> – includes construction equipment and other wheel and track vehicles . . . . .	62,182
62	<i>Wire Communications</i> – includes specialists in the installation and maintenance of telephones, switchboards, and central office and related interior communications equipment . . . . .	27,342
63	<i>Missile, Mechanical and Electrical</i> – includes missiles and missile systems and related components . . . . .	4,678
64	<i>Armament and Munitions</i> – includes small arms, artillery, mines, bombs and associated mountings, nuclear weapons, and ammunition renovation . . . . .	38,214
65	<i>Shipboard Propulsion</i> – includes marine main engines, boilers, and auxiliary equipment . . . . .	40,880
66	<i>Power Generating Equipment</i> – includes nuclear power reactors and primary electric generating plants . . . . .	28,902
67	<i>Precision Equipment</i> – includes optical and other precision instruments and office machines . . . . .	2,815
69	<i>Other Mechanical and Electrical Equipment</i> – includes specialists in the maintenance and repair of mechanical and electrical equipment which is not readily classifiable in another group . . . . .	1,492
7	CRAFT WORKERS . . . . .	73,486
70	<i>Metalworking</i> – includes specialists in the machining, shaping, and forming of metal and in the fabrication of metal parts . . . . .	13,188
71	<i>Construction</i> – includes specialists in construction trades and construction equipment operation . . . . .	27,079
72	<i>Utilities</i> – includes plumbers, heating and cooling specialists, and electricians . . . . .	18,969
74	<i>Lithography</i> . . . . .	2,038
75	<i>Industrial Gas and Fuel Production</i> – includes specialists in the production of liquid oxygen, hydrogen, nitrogen, and carbon dioxide . . . . .	593
76	<i>Fabric, Leather, and Rubber</i> . . . . .	2,597
79	<i>Other Craft Workers, N.E.C.</i> – includes specialists in trades such as molding, camouflage, and plastic work, which are not readily classifiable elsewhere in this section . . . . .	9,022
8	SERVICE AND SUPPLY HANDLERS . . . . .	167,764
80	<i>Food Service</i> . . . . .	49,182
81	<i>Motor Transport</i> – includes the operation of wheel and track vehicles (except construction equipment) and railway equipment . . . . .	35,102
82	<i>Material Receipt, Storage, and Issue</i> – includes specialists in the receipt, storage, issue, and shipment of general and specialized classes of supplies, excluding ammunition . . . . .	33,722
83	<i>Law Enforcement</i> – includes military police, protective and corrections specialists, and criminal and noncriminal inspectors and investigators . . . . .	41,882
84	<i>Personal Service</i> – includes laundry, dry cleaning, and related services . . . . .	2,148
86	<i>Forward Area Equipment</i> – includes specialists in parachute packing and repair, in aerial delivery operations, and in flight equipment fitting and maintenance . . . . .	5,728

NOTE: Definitions are provided for most occupational groups. The lack of explanatory material for a few occupational groups indicates that the title of the grouping is considered a sufficient definition.

SOURCE: U.S. Department of Defense, Defense Manpower Data Center—Enlisted Master File.

**Table C-5. Associate degrees and other formal awards below the baccalaureate granted in an occupational curriculum of at least 1 year, 1981-82<sup>1</sup>**

Curriculum	HEGIS code <sup>2</sup>	Curriculums of at least 2 but less than 4 years		Curriculums of at least 1 but less than 2 years
		Associate degrees	Other formal recognition	
All curriculums, total . . . . .	—	434,526	29,061	97,118
Arts and science of general programs . . . . .	—	158,039	1,400	1,555
Occupational curriculums, total . . . . .	—	276,493	27,661	95,563
<b>Business and commerce technologies . . . . .</b>	<b>5000</b>	<b>96,854</b>	<b>7,783</b>	<b>25,244</b>
Business and commerce technologies, general . . . . .	5001	21,585	1,033	1,970
Accounting technologies . . . . .	5002	12,811	477	2,446
Banking and finance technologies . . . . .	5003	996	40	455
Marketing distribution, purchasing, business and industrial management . . . . .	5004	25,874	3,483	2,331
Secretarial technologies (includes office machine training) . . . . .	5005	19,399	1,155	11,473
Personal service technologies (flight attendant, cosmetologist, etc.) . . . . .	5006	762	532	2,986
Photography technologies . . . . .	5007	1,113	83	280
Communications and broadcasting technologies (radio/television, newspapers) . . . . .	5008	2,169	37	223
Printing and lithography technologies . . . . .	5009	863	141	625
Hotel and restaurant management technologies . . . . .	5010	2,253	63	219
Transportation and public utilities technologies . . . . .	5011	1,111	104	850
Applied arts, graphic arts, and fine arts technologies (includes advertising design) . . . . .	5012	6,696	536	1,033
Other . . . . .	5099	1,222	99	353
<b>Data processing technologies . . . . .</b>	<b>5100</b>	<b>21,101</b>	<b>1,054</b>	<b>4,930</b>
Data processing technologies, general . . . . .	5101	11,086	465	1,476
Keypunch operator and other input preparation technologies . . . . .	5102	65	20	855
Computer programmer technologies . . . . .	5103	8,167	355	1,504
Computer operator and peripheral equipment operation technologies . . . . .	5104	374	114	726
Data processing equipment maintenance technologies . . . . .	5105	1,365	88	366
Other . . . . .	5199	44	12	3
<b>Health services and paramedical technologies . . . . .</b>	<b>5200</b>	<b>61,435</b>	<b>4,281</b>	<b>24,716</b>
Health services assistant . . . . .	5201	1,713	458	2,384
Dental assistant technologies . . . . .	5202	842	400	2,130
Dental hygiene technologies . . . . .	5203	3,319	389	82
Dental laboratory technologies . . . . .	5204	596	67	15
Medical or biological laboratory assistant technologies . . . . .	5205	3,078	110	380
Animal laboratory assistant technologies . . . . .	5206	929	42	71
Radiologic technologies (X-ray, etc.) . . . . .	5207	3,494	130	131
Nursing, R.N. (less than 4-year program) . . . . .	5208	36,231	366	871
Nursing, practical (L.P.N. or L.V.N.-less than 4-year program) . . . . .	5209	1,144	1,043	12,856
Occupational therapy technologies . . . . .	5210	724	173	25
Surgical technologies . . . . .	5211	182	69	881
Optical technologies (includes ocular care, ophthalmic, optometric technologies) . . . . .	5212	610	16	114
Medical record technologies . . . . .	5213	830	70	180
Medical assistant and medical office assistant technologies . . . . .	5214	2,052	182	3,068
<b>Inhalation therapy technologies . . . . .</b>	<b>5215</b>	<b>2,231</b>	<b>221</b>	<b>1,042</b>
Psychiatric technologies (includes mental health aide programs) . . . . .	5216	1,459	252	120
Electrodiagnostic technologies (includes EKG, EEG, etc.) . . . . .	5217	152	17	34
Institutional management technologies (rest home, etc.) . . . . .	5218	140	9	4
Physical therapy technologies . . . . .	5219	995	39	26
Other . . . . .	5299	714	228	394
<b>Mechanical and engineering technologies . . . . .</b>	<b>5300</b>	<b>57,913</b>	<b>10,714</b>	<b>30,126</b>
Mechanical and engineering technologies, general . . . . .	5301	6,875	352	1,214
Aeronautical and aviation technologies . . . . .	5302	4,127	980	1,248
Engineering graphics (tool and machine drafting and design) . . . . .	5303	4,207	379	1,600
Architectural drafting technologies . . . . .	5304	2,862	297	626
Chemical technologies (includes plastics) . . . . .	5305	733	33	15
Automotive technologies . . . . .	5306	3,797	1,480	4,611
Diesel technologies . . . . .	5307	1,019	839	1,688
Welding technologies . . . . .	5308	939	436	3,712
Civil technologies (surveying, photogrammetry, etc.) . . . . .	5309	1,990	41	181

See footnotes at end of table.

**Table C-5. Continued—Associate degrees and other formal awards below the baccalaureate granted in an occupational curriculum of at least 1 year, 1981–82<sup>1</sup>**

Curriculum	HEGIS code <sup>2</sup>	Curriculums of at least 2 but less than 4 years		Curriculums of at least 1 but less than 2 years
		Associate degrees	Other formal recognition	
Electronics and machine technologies (television, appliance, office machine repair, etc.) . . . . .	5310	16,563	3,323	5,295
Electromechanical technologies . . . . .	5311	2,760	170	335
Industrial technologies . . . . .	5312	2,288	202	780
Textile technologies . . . . .	5313	147	95	52
Instrumentation technologies . . . . .	5314	722	26	270
Mechanical technologies . . . . .	5315	2,739	703	2,028
Nuclear technologies . . . . .	5316	162	0	39
Construction and building technologies (carpentry, electric work, plumbing, sheet-metal, air conditioning, heating, etc.) . . . . .	5317	4,461	1,288	5,827
Other . . . . .	5399	1,522	70	605
Natural science technologies . . . . .	5400	13,719	898	5,399
Natural science technologies, general . . . . .	5401	1,207	17	642
Agriculture technologies (includes horticulture) . . . . .	5402	5,109	477	2,787
Forestry and wildlife technologies (includes fisheries) . . . . .	5403	1,333	38	164
Food services technologies . . . . .	5404	3,401	165	954
Home economics technologies . . . . .	5405	1,627	123	653
Marine and oceanographic technologies . . . . .	5406	239	25	41
Laboratory technologies, general . . . . .	5407	153	0	13
Sanitation and public health inspection technologies (environmental health technologies) . . . . .	5408	432	17	114
Other . . . . .	5499	218	36	31
Public-service-related technologies . . . . .	5500	25,471	2,931	5,056
Public service technologies, general . . . . .	5501	1,883	47	253
Bible study or religion-related occupations . . . . .	5502	621	731	120
Education technologies (teacher aide and 2-year teacher training programs) . . . . .	5503	5,085	499	931
Library assistant technologies . . . . .	5504	282	47	81
Police, law enforcement, correction technologies . . . . .	5505	10,268	928	2,055
Recreation and social work and related technologies . . . . .	5506	3,416	128	516
Fire control technology . . . . .	5507	1,820	320	587
Public administration and management technologies . . . . .	5508	703	62	98
Other . . . . .	5599	1,393	169	415

<sup>1</sup> These data do not include associate degrees and other formal awards below the baccalaureate granted in specific arts and sciences curriculums.

<sup>2</sup> HEGIS codes are from the Higher Education General Information Survey. See a *Taxonomy of Instructional Programs in Higher Education* (U.S. Department of Education, 1970).

ment of Education, 1970).

SOURCE: U.S. Department of Education, National Center for Education Statistics.

**Table C-6. Bachelor's, master's, and doctor's degrees conferred in institutions of higher education by field of study, 1981-82**

HEGIS code	Major field of study	Bachelor's degrees requiring 4 or 5 years	Master's degrees	Doctor's degrees (Ph.D., Ed.D., etc.)
	All fields . . . . .	952,998	295,546	32,707
0100	<b>AGRICULTURE AND NATURAL RESOURCES . . . . .</b>	<b>21,029</b>	<b>4,163</b>	<b>1,079</b>
0101	Agriculture, general . . . . .	2,195	412	14
0102	Agronomy . . . . .	1,332	461	202
0103	Soils science . . . . .	457	165	83
0104	Animal science . . . . .	3,551	453	146
0105	Dairy science . . . . .	275	69	17
0106	Poultry science . . . . .	141	39	15
0107	Fish, game, and wildlife management . . . . .	1,140	326	64
0108	Horticulture . . . . .	1,417	254	88
0109	Ornamental horticulture . . . . .	569	15	9
0110	Agriculture and farm management . . . . .	303	12	1
0111	Agricultural economics . . . . .	1,909	535	160
0112	Agricultural business . . . . .	1,685	74	12
0113	Food science and technology . . . . .	724	347	99
0114	Forestry . . . . .	1,665	426	88
0115	Natural resources management . . . . .	1,788	264	30
0116	Agriculture and forestry technologies . . . . .	144	16	11
0117	Range management . . . . .	235	80	21
0199	Other . . . . .	1,499	215	19
0200	<b>AGRICULTURE AND ENVIRONMENTAL DESIGN . . . . .</b>	<b>9,728</b>	<b>3,327</b>	<b>80</b>
0201	Environmental design, general . . . . .	962	111	3
0202	Architecture . . . . .	5,796	1,610	22
0203	Interior design . . . . .	1,076	27	0
0204	Landscape architecture . . . . .	1,014	264	0
0205	Urban architecture . . . . .	6	118	4
0206	City, community, and regional planning . . . . .	505	1,095	38
0299	Other . . . . .	369	102	13
0300	<b>AREA STUDIES . . . . .</b>	<b>2,509</b>	<b>750</b>	<b>98</b>
0301	Asian studies, general . . . . .	177	82	3
0302	East Asian studies . . . . .	211	68	11
0303	South Asian (India, etc.) studies . . . . .	11	7	2
0304	Southeast Asian studies . . . . .	5	12	0
0305	African studies . . . . .	17	16	2
0307	Russian and Slavic studies . . . . .	77	27	1
0308	Latin American studies . . . . .	243	130	2
0309	Middle Eastern studies . . . . .	35	61	10
0310	European studies, general . . . . .	54	3	0
0311	Eastern European studies . . . . .	22	29	0
0312	West European studies . . . . .	58	14	0
0313	American studies . . . . .	1,251	208	56
0314	Pacific area studies . . . . .	2	9	0
0399	Other . . . . .	346	84	11
0400	<b>BIOLOGICAL SCIENCES . . . . .</b>	<b>41,639</b>	<b>5,874</b>	<b>3,743</b>
0401	Biology, general . . . . .	29,651	2,579	678
0402	Botany, general . . . . .	563	252	183
0403	Bacteriology . . . . .	162	40	12
0404	Plant pathology . . . . .	58	131	97
0406	Plant physiology . . . . .	97	17	23
0407	Zoology, general . . . . .	3,089	413	223
0408	Pathology, human and animal . . . . .	23	90	103
0409	Pharmacology, human and animal . . . . .	26	70	208
0410	Physiology, human and animal . . . . .	340	199	244
0411	Microbiology . . . . .	2,215	430	338
0412	Anatomy . . . . .	61	63	147
0413	Histology . . . . .	0	1	1
0414	Biochemistry . . . . .	1,865	273	462
0415	Biophysics . . . . .	48	26	73
0416	Molecular biology . . . . .	272	26	95
1417	Cell biology . . . . .	40	20	49
0418	Marine biology . . . . .	488	70	13
0419	Biometrics and biostatistics . . . . .	31	103	52
0420	Ecology . . . . .	792	236	76
0421	Entomology . . . . .	186	256	158
0422	Genetics . . . . .	106	107	123
0423	Radiobiology . . . . .	0	20	8
0424	Nutrition, scientific . . . . .	138	195	81

See footnotes at end of table.

**Table C-6. Continued—Bachelor's, master's, and doctor's degrees conferred in institutions of higher education by field of study, 1981-82**

HEGIS code	Major field of study	Bachelor's degrees requiring 4 or 5 years	Master's degrees	Doctor's degrees (Ph.D., Ed.D., etc.)
0425	Neurosciences . . . . .	76	12	51
0426	Toxicology . . . . .	49	57	2
0499	Other . . . . .	1,263	188	221
0500	<b>BUSINESS AND MANAGEMENT . . . . .</b>	<b>215,817</b>	<b>61,428</b>	<b>847</b>
0501	Business and commerce, general . . . . .	37,326	9,144	155
0502	Accounting . . . . .	45,542	3,246	61
0503	Business statistics . . . . .	357	96	11
0504	Banking and finance . . . . .	14,383	4,631	35
0505	Investments and securities . . . . .	236	111	0
0506	Business management and administration . . . . .	74,496	36,925	424
0507	Operations research . . . . .	627	536	40
0508	Hotel and restaurant management . . . . .	2,169	97	2
0509	Marketing and purchasing . . . . .	26,945	2,022	24
0510	Transportation and public utilities . . . . .	1,816	129	2
0511	Real estate . . . . .	774	103	2
0512	Insurance . . . . .	613	46	4
0513	International business . . . . .	571	1,429	5
0514	Secretarial studies . . . . .	1,527	4	0
0515	Personnel management . . . . .	2,430	473	4
0516	Labor and industrial relations . . . . .	1,629	1,009	17
0517	Business economics . . . . .	2,712	341	55
0599	Other . . . . .	1,664	1,086	16
0600	<b>COMMUNICATIONS . . . . .</b>	<b>34,222</b>	<b>3,327</b>	<b>200</b>
0601	Communications, general . . . . .	15,567	1,727	139
0602	Journalism . . . . .	8,841	901	27
0603	Radio-television . . . . .	5,366	256	11
0604	Advertising . . . . .	2,228	145	0
0605	Communication media . . . . .	1,794	223	18
0699	Other . . . . .	426	75	5
0700	<b>COMPUTER AND INFORMATION SCIENCES . . . . .</b>	<b>20,267</b>	<b>4,935</b>	<b>251</b>
0701	Computer and information sciences, general . . . . .	16,368	4,268	241
0702	Information sciences and systems . . . . .	2,433	541	10
0703	Data processing . . . . .	960	28	0
0704	Computer programming . . . . .	231	40	0
0705	Systems analysis . . . . .	217	52	0
0799	Other . . . . .	58	6	0
0800	<b>EDUCATION . . . . .</b>	<b>101,063</b>	<b>93,104</b>	<b>7,676</b>
0801	Education, general . . . . .	3,157	11,667	1,360
0802	Elementary education, general . . . . .	37,261	12,788	201
0803	Secondary education, general . . . . .	2,419	4,498	175
0804	Junior high school education . . . . .	301	249	12
0805	Higher education, general . . . . .	38	400	429
0806	Junior and community college education . . . . .	0	181	66
0807	Adult and continuing education . . . . .	70	956	143
0808	Special education, general . . . . .	8,217	9,157	253
0809	Administration of special education . . . . .	0	44	19
0810	Education of the mentally retarded . . . . .	1,394	403	9
0811	Education of the gifted . . . . .	25	166	4
0812	Education of the deaf . . . . .	344	398	3
0813	Education of the culturally disadvantaged . . . . .	9	60	0
0814	Education of the visually handicapped . . . . .	64	146	1
0815	Speech correction . . . . .	1,120	443	1
0816	Education of the emotionally disturbed . . . . .	425	353	6
0817	Remedial education . . . . .	52	82	0
0818	Special learning disabilities . . . . .	792	1,573	22
0819	Education of the physically handicapped . . . . .	122	78	4
0820	Education of the multiple handicapped . . . . .	54	142	0
0821	Social foundations . . . . .	42	336	187
0822	Educational psychology . . . . .	181	2,156	681
0823	Pre-elementary education . . . . .	4,183	1,383	54
0824	Educational statistics and research . . . . .	0	57	44
0825	Educational testing, evaluation, and measurement . . . . .	4	160	15
0826	Student personnel . . . . .	169	12,246	624
0827	Educational administration . . . . .	34	9,019	1,423
0828	Educational supervision . . . . .	57	1,674	51
0829	Curriculum and instruction . . . . .	247	3,701	742

See footnotes at end of table.

**Table C-6. Continued—Bachelor's, master's, and doctor's degrees conferred in institutions of higher education by field of study, 1981–82**

HEGIS code	Major field of study	Bachelor's degrees requiring 4 or 5 years	Master's degrees	Doctor's degrees (Ph.D., Ed.D., etc.)
0830	Reading education . . . . .	227	5,470	123
0831	Art education . . . . .	1,897	673	43
0832	Music education . . . . .	4,915	1,084	89
0833	Mathematics education . . . . .	629	347	32
0834	Science education . . . . .	558	406	59
0835	Physical education . . . . .	17,391	4,077	226
0836	Driver and safety education . . . . .	125	220	6
0837	Health education . . . . .	2,175	845	72
0838	Business, commerce, and distributive education . . . . .	3,167	1,067	57
0839	Industrial arts, vocational and technical education . . . . .	5,525	2,133	252
0899-1	Agricultural education . . . . .	835	257	28
0899-2	Education of exceptional children, not classified above . . . . .	186	152	3
0899-3	Home economics education . . . . .	1,442	356	14
0899-4	Nursing education . . . . .	108	9	0
0899	Other . . . . .	1,102	1,492	138
0900	<b>ENGINEERING . . . . .</b>	<b>80,005</b>	<b>17,939</b>	<b>2,636</b>
0901	Engineering, general . . . . .	4,318	1,497	316
0902	Aerospace, aeronautical, astronautical engineering . . . . .	2,120	521	96
0903	Agricultural engineering . . . . .	838	129	38
0904	Architectural engineering . . . . .	438	46	0
0905	Bioengineering and biomedical engineering . . . . .	508	236	50
0906	Chemical engineering . . . . .	6,740	1,285	311
0907	Petroleum engineering . . . . .	1,245	122	21
0908	Civil, construction, and transportation engineering . . . . .	10,524	2,995	329
0909	Electrical, electronics, communications engineering . . . . .	16,455	4,462	526
0910	Mechanical engineering . . . . .	13,922	2,399	333
0911	Geological engineering . . . . .	269	31	2
0912	Geophysical engineering . . . . .	73	4	0
0913	Industrial and management engineering . . . . .	3,992	1,656	116
0914	Metallurgical engineering . . . . .	592	262	59
0915	Materials engineering . . . . .	798	282	129
0916	Ceramic engineering . . . . .	258	65	12
0917	Textile engineering . . . . .	44	0	1
0918	Mining and mineral engineering . . . . .	662	88	10
0919	Engineering physics . . . . .	302	46	14
0920	Nuclear engineering . . . . .	394	325	124
0921	Engineering mechanics . . . . .	327	140	62
0922	Environmental and sanitary engineering . . . . .	272	412	39
0923	Naval architecture and marine engineering . . . . .	606	81	1
0924	Ocean engineering . . . . .	202	116	11
0925	Engineering technologies . . . . .	12,984	413	15
0999	Other . . . . .	1,122	326	21
1000	<b>FINE AND APPLIED ARTS . . . . .</b>	<b>40,422</b>	<b>8,746</b>	<b>670</b>
1001	Fine arts, general . . . . .	3,834	557	40
1002	Art . . . . .	11,515	1,873	12
1003	Art history and appreciation . . . . .	1,975	410	95
1004	Music (performing, composition, theory) . . . . .	5,138	2,596	298
1005	Music (liberal arts program) . . . . .	3,137	660	79
1006	Music history and appreciation . . . . .	143	105	29
1007	Dramatic arts . . . . .	5,286	1,258	93
1008	Dance . . . . .	795	269	4
1009	Applied design . . . . .	4,747	347	1
1010	Cinematography . . . . .	692	159	8
1011	Photography . . . . .	1,068	84	0
1099	Other . . . . .	2,092	428	11
1100	<b>FOREIGN LANGUAGES . . . . .</b>	<b>9,841</b>	<b>2,008</b>	<b>536</b>
1101	Foreign languages, general . . . . .	720	324	121
1102	French . . . . .	3,054	485	92
1103	German . . . . .	1,327	324	76
1104	Italian . . . . .	208	55	14
1105	Spanish . . . . .	3,633	568	140
1106	Russian . . . . .	324	49	7
1107	Chinese . . . . .	68	14	10
1108	Japanese . . . . .	100	16	3
1109	Latin . . . . .	86	10	2

See footnotes at end of table.

**Table C-6. Continued—Bachelor's, master's, and doctor's degrees conferred in institutions of higher education by field of study, 1981–82**

HEGIS code	Major field of study	Bachelor's degrees requiring 4 or 5 years	Master's degrees	Doctor's degrees (Ph.D., Ed.D., etc.)
1110	Greek, classical . . . . .	82	7	3
1111	Hebrew . . . . .	44	30	1
1112	Arabic . . . . .	15	4	4
1113	Indian (Asiatic) . . . . .	4	6	7
1114	Scandinavian languages . . . . .	31	8	2
1115	Slavic languages (other than Russian) . . . . .	48	30	18
1116	African languages (non-Semitic) . . . . .	1	4	7
1199	Other . . . . .	96	74	29
1200	<b>HEALTH PROFESSIONS . . . . .</b>	<b>63,653</b>	<b>16,503</b>	<b>925</b>
1201	Health professions, general . . . . .	4,862	868	75
1202	Hospital and health care administration . . . . .	1,978	1,640	20
1203	Nursing . . . . .	33,177	5,312	134
1205	Dental specialties . . . . .	0	359	9
1207	Medical specialties . . . . .	5	147	49
1208	Occupational therapy . . . . .	1,663	255	0
1209-2	Opometry . . . . .	396	9	2
1211-2	Pharmacy . . . . .	6,367	368	127
1212	Physical therapy . . . . .	2,736	317	0
1213	Dental hygiene . . . . .	1,167	21	0
1214	Public health . . . . .	705	2,312	207
1215	Medical record librarianship . . . . .	612	5	0
1216-2	Podiatry or podiatric medicine . . . . .	0	2	0
1217	Biomedical communication . . . . .	32	14	0
1219	Veterinary medicine specialties . . . . .	0	184	65
1220	Speech pathology and audiology . . . . .	3,414	3,104	114
1221-2	Chiropractic . . . . .	64	0	0
1222	Clinical social work . . . . .	268	561	15
1223	Medical laboratory technologies . . . . .	4,596	207	4
1224	Dental technologies . . . . .	5	13	0
1225	Radiologic technologies . . . . .	453	34	4
1299	Other . . . . .	1,153	771	100
1300	<b>HOME ECONOMICS . . . . .</b>	<b>17,872</b>	<b>2,355</b>	<b>247</b>
1301	Home economics, general . . . . .	5,535	753	83
1302	Home decoration and home equipment . . . . .	838	18	0
1303	Clothing and textiles . . . . .	3,270	98	18
1304	Consumer economics and home management . . . . .	647	73	6
1305	Family relations and child development . . . . .	3,005	515	86
1306	Foods and nutrition . . . . .	3,082	749	41
1307	Institutional management and cafeteria management . . . . .	607	30	0
1399	Other . . . . .	888	119	13
1400	<b>LAW . . . . .</b>	<b>846</b>	<b>1,893</b>	<b>22</b>
1401-2	Law, general . . . . .	592	1,468	22
1499	Other . . . . .	254	425	0
1500	<b>LETTERS . . . . .</b>	<b>40,693</b>	<b>8,226</b>	<b>1,681</b>
1501	English, general . . . . .	22,988	3,787	730
1502	Literature, English . . . . .	1,975	415	81
1503	Comparative literature . . . . .	341	179	115
1504	Classics . . . . .	381	133	48
1505	Linguistics . . . . .	534	516	164
1506	Speech, debate, and forensic science . . . . .	6,646	992	144
1507	Creative writing . . . . .	467	295	0
1508	Teaching of English as a foreign language . . . . .	50	653	4
1509	Philosophy . . . . .	3,391	445	247
1510	Religious studies . . . . .	2,918	707	117
1599	Other . . . . .	1,002	104	31
1600	<b>LIBRARY SCIENCE . . . . .</b>	<b>307</b>	<b>4,506</b>	<b>84</b>
1601	Library science, general . . . . .	282	4,385	82
1699	Other . . . . .	25	121	2
1700	<b>MATHEMATICS . . . . .</b>	<b>11,599</b>	<b>2,727</b>	<b>681</b>
1700	Mathematics, general . . . . .	10,450	1,927	512
1702	Statistics, mathematical and theoretical . . . . .	258	479	125
1703	Applied mathematics . . . . .	560	236	34
1799	Other . . . . .	331	85	10
1800	<b>MILITARY SCIENCES . . . . .</b>	<b>283</b>	<b>49</b>	<b>0</b>
1801	Military science (Army) . . . . .	6	49	0



**Table C-6. Continued—Bachelor's, master's, and doctor's degrees conferred in institutions of higher education by field of study, 1981–82**

HEGIS code	Major field of study	Bachelor's degrees requiring 4 or 5 years	Master's degrees	Doctor's degrees (Ph.D., Ed.D., etc.)
1802	Naval science (Navy, Marines) . . . . .	3	0	0
1803	Aerospace science (Air Force) . . . . .	19	0	0
1899-2	Merchant marine . . . . .	228	0	0
1899	Other . . . . .	27	0	0
1900	<b>PHYSICAL SCIENCES</b> . . . . .	24,052	5,514	3,286
1901	Physical sciences, general . . . . .	765	131	24
1902	Physics, general . . . . .	3,472	1,282	863
1903	Molecular physics . . . . .	0	0	1
1904	Nuclear physics . . . . .	0	2	9
1905	Chemistry, general . . . . .	11,025	1,618	1,595
1906	Inorganic chemistry . . . . .	0	5	14
1907	Organic chemistry . . . . .	4	19	35
1908	Physical chemistry . . . . .	10	23	23
1909	Analytical chemistry . . . . .	16	18	15
1910	Pharmaceutical chemistry . . . . .	7	68	40
1911	Astronomy . . . . .	81	61	66
1912	Astrophysics . . . . .	32	19	10
1913	Atmospheric sciences and meteorology . . . . .	412	164	45
1914	Geology . . . . .	5,337	1,411	241
1915	Geochemistry . . . . .	8	13	4
1916	Geophysics and seismology . . . . .	193	116	37
1917	Earth sciences, general . . . . .	886	136	59
1918	Paleontology . . . . .	1	6	5
1919	Oceanography . . . . .	220	166	98
1920	Metallurgy . . . . .	48	23	24
1999-1	Other earth sciences . . . . .	263	100	29
1999-2	Other physical sciences . . . . .	1,272	133	49
2000	<b>PSYCHOLOGY</b> . . . . .	41,031	7,791	2,780
2001	Psychology, general . . . . .	39,251	4,448	1,845
2002	Experimental psychology . . . . .	237	98	69
2003	Clinical psychology . . . . .	81	663	555
2004	Psychology for counseling . . . . .	218	1,861	163
2005	Social psychology . . . . .	441	203	39
2006	Psychometrics . . . . .	0	29	5
2007	Statistics in psychology . . . . .	5	16	3
2008	Industrial psychology . . . . .	57	141	13
2009	Developmental psychology . . . . .	231	160	63
2010	Physiological psychology . . . . .	83	5	19
2099	Other . . . . .	427	167	6
2100	<b>PUBLIC AFFAIRS AND SERVICES</b> . . . . .	34,428	19,388	429
2101	Community services, general . . . . .	1,469	473	36
2102	Public administration . . . . .	2,122	6,503	134
2103	Parks and recreation management . . . . .	5,335	526	33
2104	Social work and helping services . . . . .	11,813	9,959	198
2105	Law enforcement and corrections . . . . .	12,438	1,336	24
2106	International public service . . . . .	160	110	0
2199	Other . . . . .	1,091	481	4
2200	<b>SOCIAL SCIENCES</b> . . . . .	99,898	11,951	3,065
2201	Social sciences, general . . . . .	7,954	1,107	66
2202	Anthropology . . . . .	3,069	826	334
2203	Archaeology . . . . .	72	23	11
2204	Economics . . . . .	19,876	1,964	677
2205	History . . . . .	17,146	2,210	636
2206	Geography . . . . .	3,445	553	123
2207	Political science and government . . . . .	25,658	1,954	513
2208	Sociology . . . . .	16,042	1,145	558
2209	Criminology . . . . .	2,051	289	11
2210	International relations . . . . .	2,336	1,075	56
2211	Afro-American (black culture) studies . . . . .	219	46	3
2212	American Indian cultural studies . . . . .	24	0	1
2213	Mexican-American cultural studies . . . . .	110	13	0
2214	Urban studies . . . . .	1,122	589	30
2215	Demography . . . . .	9	24	10
2299	Other . . . . .	765	133	36

See footnotes at end of table.

**Table C-6. Continued—Bachelor's, master's, and doctor's degrees conferred in institutions of higher education by field of study, 1981–82**

HEGIS code	Major field of study	Bachelor's degrees requiring 4 or 5 years	Master's degrees	Doctor's degrees (Ph.D., Ed.D., etc.)
2300	THEOLOGY . . . . .	5,998	4,064	1,288
2301-2	Theological professions, general . . . . .	3,464	2,266	1,160
2302	Religious music . . . . .	317	183	10
2303	Biblical languages . . . . .	78	56	6
2304	Religious education . . . . .	1,561	1,284	44
2399	Other . . . . .	578	275	68
4900	INTERDISCIPLINARY STUDIES . . . . .	35,796	4,978	393
4901	General liberal arts and sciences . . . . .	18,145	1,094	35
4902	Biological and physical sciences . . . . .	3,125	253	31
4903	Humanities and social sciences . . . . .	2,944	1,331	120
4904	Engineering and other disciplines . . . . .	379	1,060	31
4999	Other . . . . .	11,203	1,240	176

NOTE: Dash indicates data are not available.

SOURCE: U.S. Department of Education, National Center for Education Statistics.

**Table C-7. First professional degrees<sup>1</sup> conferred by institutions of higher education, 1981–82**

Field of study	First professional degrees
Total, all institutions . . . . .	72,032
Chiropractic (D.C. or D.C.M.) . . . . .	2,626
Dentistry (D.D.S. or D.M.D.) . . . . .	5,282
Medicine (M.D.) . . . . .	15,814
Optometry (O.D.) . . . . .	1,110
Osteopathic Medicine (D.O.) . . . . .	1,047
Pharmacy (D. Phar.) . . . . .	625
Podiatry (Pod. D. or D.P.) or Podiatric Medicine (D.P.M.) . . . . .	598
Veterinary Medicine (D.V.M.) . . . . .	2,038
Law (LL.B. or J.D.) . . . . .	35,991
Theology (B.D., M. Div., or Rabbi) . . . . .	6,901

<sup>1</sup> Includes degrees that require at least 6 years of college work for completion (including at least 2 years of preprofessional training).

SOURCE: U.S. Department of Education, National Center for Education Statistics.

# Appendix D.

## State Employment Security Agencies

State employment security agencies develop occupational projections and related employment statistics in cooperation

with the Bureau of Labor Statistics. The following list shows where to write or call for this information.

### Alabama

Chief, Research and Statistics, Department of Industrial Relations, Industrial Relations Bldg., Room 427, 649 Monroe St., Montgomery, Ala. 36130. Phone: (205) 832-5263.

### Alaska

Chief, Research and Analysis, Employment Security Division, Department of Labor, P.O. Box 1149, Juneau, Alaska 99811. Phone: (907) 465-4502.

### Arizona

Chief, Labor Market Information, Research and Analysis, Department of Economic Security, 733-A, P.O. Box 6123, Phoenix, Ariz. 85035. Phone: (602) 255-3616.

### Arkansas

Assistant Director, Research and Analysis, Employment Security Division, P.O. Box 2981, Little Rock, Ark. 72203. Phone: (501) 371-1541.

### California

Chief, Employment Data and Research Division, Employment Development Department, P.O. Box 1679, Sacramento, Calif. 95808. Phone: (916) 445-4434.

### Colorado

Chief, Research and Development, Division of Employment and Training, Department of Labor and Employment, 1278 Lincoln Street, Denver, Colo. 80203. Phone: (303) 839-5833, Ext. 43.

### Connecticut

Director, Research and Information, Employment Security Division, Department of Labor, 200 Folly Brook Blvd., Withersfield, Conn. 06109. Phone: (203) 641-4280.

### Delaware

Chief, Office of Planning, Research and Evaluation, Department of Labor, University Plaza Office Complex, Chapman Rd. - Route 273, Newark, Del. 19713. Phone: (302) 368-6921.

### District of Columbia

Chief, Division of Labor Market Information, Department of Employment Services, 500 C St. NW., Room 411, Washington, D.C. 20001. Phone: (202) 724-2414.

### Florida

Chief, Research and Analysis, Division of Labor and Employment Security, Caldwell Building, Tallahassee, Fla. 32301. Phone: (904) 488-1048.

### Georgia

Director, Labor Information Systems, Department of Labor, 254 Washington St., S.W., Atlanta, Ga. 30334. Phone: (404) 656-3177.

### Hawaii

Chief, Research and Statistics, Department of Labor and Industrial Relations, 830 Punchbowl St., Honolulu, Hawaii 96813. Phone: (808) 548-7639.

### Idaho

Chief, Research and Analysis, Department of Employment, P.O. Box 35, Boise, Idaho 83735. Phone: (208) 384-2755.

### Illinois

Director, Research and Analysis, Bureau of Employment Security, Department of Labor, 910 S. Michigan Ave., Chicago, Ill. 60605. Phone: (312) 793-2317.

### Indiana

Chief, Research and Statistics, Employment Security Division, 10 N. Senate Ave., Indianapolis, Ind. 46204. Phone: (317) 232-7701.

### Iowa

Chief, Audit and Analysis, Department of Job Service, 1000 E. Grand Ave., Des Moines, Iowa 50319. Phone: (515) 281-5802.

### Kansas

Chief, Research and Analysis, Department of Human Resources, Department of Labor, 401 Topeka Ave., Topeka, Kans. 66603. Phone: (913) 296-5058.

## **Kentucky**

Manager, Labor Market Research and Analysis, Department for Manpower Services, Cabinet for Human Resources, 275 E. Main St., Frankfort, Ky. 40621. Phone: (502) 564-7976.

## **Louisiana**

Director, Research and Statistics, Department of Labor, P.O. Box 44094, Capital Station, Baton Rouge, La. 70804. Phone: (504) 342-3141.

## **Maine**

Director, Research and Analysis, Bureau of Employment Security, 20 Union St., Augusta, Maine 04330. Phone: (207) 289-2271.

## **Maryland**

Director, Research and Analysis, Department of Human Resources, Employment Security Administration, 1100 N. Eutaw St., Baltimore, Md. 21201. Phone: (301) 383-5000.

## **Massachusetts**

Director, Job Market Research, Division of Employment Security, Hurley Bldg., Government Center, Boston, Mass. 02114. Phone: (617) 727-6556.

## **Michigan**

Director, Research and Statistics, Employment Security Commission, 7310 Woodward Ave., Room 516, Detroit, Mich. 48202. Phone: (313) 876-5445.

## **Minnesota**

Director, Research and Statistical Services, Department of Economic Security, 390 N. Robert St., St. Paul, Minn. 55101. Phone: (612) 296-6545.

## **Mississippi**

Chief, Research and Statistics, Employment Security Commission, P.O. Box 1699, Jackson, Miss. 39205. Phone: (601) 961-7424.

## **Missouri**

Chief, Research and Analysis, Division of Employment Security, P.O. Box 59, Jefferson City, Mo. 65104. Phone: (314) 751-3215.

## **Montana**

Chief, Research and Analysis, Employment Security Division, Department of Labor and Industry, P.O. Box 1728, Helena, Mont. 59601. Phone: (406) 449-2430.

## **Nebraska**

Chief, Research and Statistics, Division of Employment, Department of Labor, P.O. Box 94600, State House Station, Lincoln, Nebr. 68509. Phone: (402) 475-8451.

## **Nevada**

Chief, Employment Security Research, Employment Security Department, 500 E. Third St., Carson City, Nev. 89713. Phone: (702) 885-4550.

## **New Hampshire**

Director, Economic Analysis and Reports, Department of Employment Security, 32 S. Main St., Concord, N.H. 03301. Phone: (603) 224-3311, Ext. 251.

## **New Jersey**

Director, Division of Planning and Research, Department of Labor, P.O. Box 2765, Trenton, N.J. 08625. Phone: (609) 292-2643.

## **New Mexico**

Chief, Research and Statistics, Employment Services Division, Department of Human Services, P.O. Box 1928, Albuquerque, N. Mex. 87103. Phone: (505) 841-8645.

## **New York**

Director, Research and Statistics, Department of Labor, State Campus, Bldg. 12, Albany, N.Y. 12240. Phone: (518) 457-6181.

## **North Carolina**

Director, Labor Market Information, Employment Security Commission, P.O. Box 25903, Raleigh, N.C. 27611. Phone: (919) 733-2936.

## **North Dakota**

Chief, Research and Statistics, Employment Security Bureau, P.O. Box 1537, Bismarck, N. Dak. 58505. Phone: (701) 224-2868.

## **Ohio**

Director, Research and Statistics, Bureau of Employment Services, 145 South Front St., Columbus, Ohio 43216. Phone: (614) 466-3240.

## **Oklahoma**

Chief, Research and Planning, Employment Security Commission, 310 Will Rogers Memorial Office Bldg., Oklahoma City, Okla. 73105. Phone: (405) 521-3735.

## **Oregon**

Assistant Administrator, Research and Statistics, Employment Division, Department of Human Resources, 875 Union St., N.E., Salem, Oreg. 97311. Phone: (503) 378-3220.

## **Pennsylvania**

Chief, Research and Statistics, Department of Labor and Industry, 7th and Foster Sts., Harrisburg, Pa. 17121. Phone: (717) 787-3265.

**Puerto Rico**

Chief, Department of Labor and Human Resources, Bureau of Employment Security, 505 Munoz Rivera Avenue-15th Floor, Hato Rey, P.R. 00918. Phone: (809) 751-3737.

**Rhode Island**

Supervisor, Employment Security Research, Department of Employment Security, 24 Mason St., Providence R.I. 02903. Phone: (401) 277-3704.

**South Carolina**

Director, Manpower Research and Analysis, Employment Security Commission, P.O. Box 995, Columbia, S.C. 29202. Phone: (803) 758-8983.

**South Dakota**

Chief, Research and Statistics, Office of Administrative Services, Department of Labor, P.O. Box 1730, Aberdeen, S. Dak. 57401. Phone: (605) 622-2314.

**Tennessee**

Chief, Research and Statistics, Department of Employment Security, 519 Cordell Hull Office Bldg., 436 Sixth Avenue, North, Nashville, Tenn. 37219. Phone: (615) 741-2284.

**Texas**

Chief, Economic Research and Analysis, Texas Employment Commission, 15th and Congress Ave., Austin, Texas 78778. Phone: (512) 397-4540.

**Utah**

Chief, Research and Analysis, Department of Employment Security, P.O. Box 11249, Salt Lake City, Utah 84147. Phone: (801) 533-2014.

**Vermont**

Chief, Research and Statistics, Department of Employment and Training, P.O. Box 488, Montpelier, Vt. 05602. Phone: (802) 229-0311.

**Virginia**

Chief, Research and Analysis, Virginia Employment Commission, P.O. Box 1358, Richmond, Va. 23211. Phone: (804) 786-7496.

**Virgin Islands**

Chief, Research and Statistics, Bureau of Labor Statistics, 35 Norre Gade, P.O. Box 818, St. Thomas, Virgin Islands 00801.

**Washington**

Chief, Research and Statistics, Employment Security Department, 212 Maple Park, Olympia, Wash. 98504. Phone: (206) 753-5224.

**West Virginia**

Chief, Labor and Economic Security, Department of Employment Security, 112 California Ave., Charleston, W. Va. 25305. Phone: (304) 348-2660.

**Wisconsin**

Chief, Labor Market Information, Department of Industry, Labor, and Human Relations, P.O. Box 7944, Madison, Wis. 53707. Phone: (608) 266-5843.

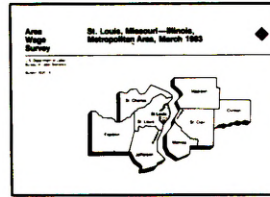
**Wyoming**

Chief, Research and Analysis, Employment Security Commission, P.O. Box 2760, Casper, Wyo. 82602. Phone: (307) 237-3701.

# BLS Occupational Earnings Data

## Area Wage Surveys

These publications provide earnings data annually for a variety of white-collar, skilled maintenance, and other nonproduction occupations in about 70 metropolitan areas throughout the Nation. In addition to these annual publications, summaries for approximately 90 other areas are released periodically.

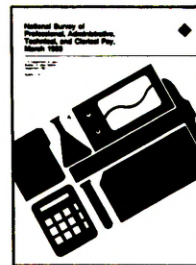


## Industry Wage Surveys

These publications provide national, regional, and local earnings data for many of the most common occupations in 25 manufacturing and 15 nonmanufacturing industries. Information also is included on weekly work schedules; shift operations and differentials; paid holiday and vacation practices; and health, insurance, and pension plans, as well as other items applicable to a particular industry.

## National Survey of Professional, Administrative, Technical, and Clerical Pay

This annual publication contains average salaries for about 25 professional, administrative, technical, and clerical jobs in the private sector of the economy.



## Current Population Survey

Data on usual weekly earnings of full-time wage and salary workers are available from the Current Population Survey for several hundred occupations. Data for major occupational groups are published quarterly in the periodical *Employment and Earnings*. More detail is available from the Division of Employment and Unemployment Analysis.

Information on how to order publications may be obtained from the BLS Regional Offices listed below.

## BLS Regional Offices

Suite 1603  
John F. Kennedy Federal Building  
Government Center  
Boston, Mass. 02203  
Phone: (617) 223-6761

Suite 3400  
1515 Broadway  
New York, N.Y. 10036  
Phone: (212) 944-3121

3535 Market Street  
P.O. Box 13309  
Philadelphia, Pa. 19101  
Phone: (215) 596-1154

1371 Peachtree St., N.E.  
Atlanta, Ga. 30367  
Phone: (404) 881-4418

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Chicago, Ill. 60604  
Phone: (312) 353-1880

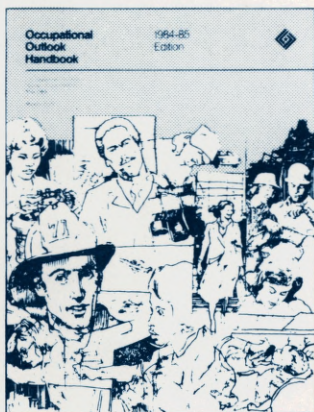
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555 Griffin Square Bldg.  
Dallas, Tex. 75202  
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