Occupational Outlook Handbook

1974-75 Edition

U.S. DEPARTMENT OF LABOR
Bureau of Labor Statistics
1974

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Pointers on Using the Handbook

To learn the contents and arrangement of this Handbook, see How the *Handbook* is Organized, page 3.

To locate an occupation or industry in this book, see:
Table of Contents, page IX.
Alphabetical Index, page 803.
Dictionary of Occupational Titles Index, page 826.

For a general view of work and jobs in the United States, read the chapter on Tomorrow's Jobs, page 15.

Forecasts of the future are precarious! To interpret the standards on the outlook in each occupation, keep in mind the points made on page 15, as well as the method presented in the Technical Appendix, page 15.

The job picture is constantly changing. To find out how you can keep your information up to date, see the section on Sources of Additional Information, page 10.

You may need local information, too. The *Handbook* gives facts about each occupation for the United States as a whole. For suggestions on sources of additional information for your own locality, see page 12.

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

Today, young Americans must be aware of the effect sweeping changes in our society will have on their career futures. The 1974-75 edition of the *Occupational Outlook Handbook* is a key tool for helping young people make sensible career decisions.

Because changing demands cause shifts in skill and training requirements for occupations, students should begin the process of career exploration early in their lives. By acquiring a broad knowledge of occupations, each student can become aware of many career alternatives and be prepared to make suitable choices that coincide with his or her abilities and aspirations.

The main purpose of the *Handbook* is to provide occupational information that broadens the knowledge of choices available to young people and helps them make intelligent career plans. It is also a useful resource for persons entering or reentering the work force at different stages of their lives.

For hundreds of occupations, the *Handbook* answers such questions as: what does a person actually do on the job; what abilities and interests does the job call for; what kind of schooling and other training is required for the job; what are the working conditions like; and most importantly, what will be the job opportunities in coming years?

For more than a quarter of a century, the *Handbook* has been the standard reference for vocational guidance information. Our hope in the Department of Labor is that this publication will continue to be a valuable tool in guiding future workers into jobs which will be both satisfying and productive.

PETER J. BRENNAN, *Secretary of Labor*

Prefatory Note

Between 1972 and 1985 employment in the United States will likely increase by as much as 20 million jobs. Accompanying this increase, a significant shift from goods-producing industries—agriculture, mining, construction, and manufacturing—toward service-producing industries—transportation and utilities, trade, finance, services, and government—is expected. This expected shift is especially significant for educational and vocational planning. To assure that young people will have the necessary skills to meet future job requirements will require flexibility in our educational system and necessitate a continuing appraisal of career opportunities in the years ahead.

With respect to the latter, for the past 3 decades, the Bureau of Labor Statistics has been researching occupational and manpower trends. The major publication of this research is the *Occupational Outlook Handbook,* which provides encyclopedic information on work for over 800 occupations and 30 major industries. The *Handbook* information is based on BLS analysis of data received from business firms, trade associations, labor unions, professional societies, educational institutions, government agencies, and other groups. In addition to the *Handbook,* which is published every other year, other BLS vocational guidance materials include reprints of *Handbook* statements on individual occupations and the Occupational Outlook Quarterly, issued to supplement the *Handbook* with articles on current developments in the occupational outlook field.

With the current need to strengthen programs of career education, I feel that the *Occupational Outlook Handbook* will be more useful for students, counselors, and educators than ever before. To that end, the Bureau has done considerable revision work. This edition presents occupational materials in a new clustering system designed to organize occupations by related activities. The new *Handbook* also includes expanded earnings information, additional information on job characteristics as they relate to young people's interests and abilities, and finally an extensively revised guide on how to use the *Handbook* for career guidance.

JULIUS SHISKIN, *Commissioner, Bureau of Labor Statistics*

Letter of Endorsement

Work can be one of life's most rewarding experiences. A job can offer pride in achievement and an opportunity for individual growth, as well as the security of an adequate income. But satisfying employment seldom is achieved without informed career planning.

Up-to-date and accurate occupational information is a keystone to career planning. The wealth of information contained in this edition of the *Occupational Outlook Handbook* provides a major resource. For more than 800 occupations and 30 major industries, timely, accurate, and useful materials are provided. Counselors and counselees can find a ready source of comprehensive information in the *Handbook* covering what workers do in various occupations, training and educational requirements, advancement possibilities, occupational outlook, earnings and working conditions, and sources of additional information.

The new edition of the *Occupational Outlook Handbook* will continue to be an invaluable tool for counselors in various work settings who are responsible for helping clients make sound educational and vocational choices and plans that will lead to rewarding occupational endeavors in the Nation's job market.

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Contributors

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Government Sources

Federal. Department of Agriculture; Atomic Energy Commission; Department of Commerce—National Oceanic and Atmospheric Administration; General Accounting Office; General Services Administration—National Archives; Government Printing Office; Department of Health, Education, and Welfare—Food and Drug Administration, and National Institutes of Health; Department of Interior; Department of Justice—Federal Bureau of Investigation; National Aeronautics and Space Administration; Department of the Navy—Naval Oceanographic Office; Department of Transportation—Federal Aviation Administration; Treasury Department—Internal Revenue Service; U.S. Postal Service; and Veterans Administration.

State and Local. City of Houston; District of Columbia; Montgomery County; New York City—Fire Department; and Ohio—State Police.

Private Sources

Membership Groups. American Association of Colleges of Pharmacy; American Bankers Association; American Dietetic Association; American Home Economic Association; American Petroleum Institute; American Podiatry Association; American Society of Civil Engineers; B'nai Brith; British Information Services; Instrument Society of America; International Alliance of Theatrical Stage Employers and Moving Picture Machine Operators of the United States and Canada; International Association of Machinists and Aerospace Workers; International Ladies' Garment Workers' Union; Iron and Steel Institute; Lutheran Council in United States of America; Marble Institute of America; Motor Vehicle Manufacturers Association; Tile Contractors Association of America, Inc.; and Washington D.C. Board of Realtors, Inc.

Industry and Businesses. Aluminum Company of America; American Airlines; American Telephone and Telegraph; ARA Services, Inc.; Atchison, Topeka, and Santa Fe Railway Co.; Banning and Sons Motors, Inc.; Bausch and Lomb; Bethlehem Steel Corp.; Blake Construction Co.; Brunswick Corp.; The C&O/B&O Railroads; Chrysler Corp.; CIBA-Geigy Corp.; Collins Radio Co.; Congoleum, Inc.; Consolidated Edison Company of New York, Inc.; Continental Trailways Co.; Davis, Smith, and Palmer, Inc.; Del Monte Corp.; E.I. Du Pont De Nemours and Co.; Eastman Kodak Co.; Eli Lilly Co.; Exxon Corp.; Ford Motor Co.; Fraser Paper, Ltd.; Geico, Inc.; General Electric Co.; General Motors Corp.; Georgia-Pacific Co.; Girard Bank and Trust; Goodyear Tire and Rubber Co.; Great Atlantic and Pacific Tea Co., Inc.; Grumman Aerospace Corp.; Hamilton Watch Co., Inc.; Harry B. Gilpin Co.; Hecht Co.; Honeywell, Inc.; Hughes Aircraft Co.; Ingersoll-Rand Co.; Inland Steel Co.; International Business Machine Corp.; Jack Morton Productions; Kewanee Boiler Corp.; Link Belt Co.; Litton Industries; Manufacturers Hanover Trust Co.; Mayflower Transit Co., Inc.; Merkle Press; Minnesota Mining and Manufacturing Co.; Mutual of Omaha; The National Cash Register Co.; North American Aviation; Olin Industries (Winchester Division); Oster Corp. (Professional Products Division); Otis Elevator Co.; Parking Management Inc.; Phillips Petroleum Co.; Pittsburgh Plate Glass Industries; Prudential Insurance Company of America; RCA Service Co.; Reynolds Aluminum Co.; Schlage Lock Co.; Sears Roebuck and Co.; Sheraton Hotels and Motor Inns; Southern Railroad System; Suburban

Trust Co.; Texaco, Inc.; Transworld Airlines; Unilux, Inc.; Union Carbide Corp.; Westinghouse Electric Corp.; Weyerhaeuser Co.; Woodward and Lothrop; and Xerox Corp.

Publications. Bar Server Handbook; Minneapolis Tribune; Motel/Hotel Inn Journal; Signs of the Times magazine; *Washington Post;* and *Washington Star-News.*

Schools. California Technical Institute; George Washington University; Georgetown University; Montgomery Junior College; Stanislaus State College; and University of Maryland.

Others. Children's Memorial Hospital of Chicago; Kennedy Center; National Ballet; Don Ross, United Nations Information Center; Washington (D.C.) Hospital Center; and Washington (D.C.) Metropolitan Area Transit Authority.

Note

A great many trade associations, professional societies, unions, and industrial organizations are in a position to supply valuable information to counselors or young people seeking information about careers. For the convenience of *Handbook* users, the statements on separate occupations or industries list some of the organizations or other sources which may be able to provide further information. Although these references were assembled with care, the Bureau of Labor Statistics has no authority or facilities for investigating organizations. Also, since the Bureau has no way of knowing in advance what information or publications each organization may send in answer to a request, the Bureau cannot evaluate the accuracy of such information. *The listing of an organization, therefore, does not in any way constitute an endorsement or recommendation by the Bureau or the U.S. Department of Labor, either of the organization and its activities or of the information it may supply.* Such information as each organization may issue is, of course, sent out on its own responsibility.

The occupational statements in this Handbook are not intended, and should not be used, as standards for the determination of wages, hours, jurisdictional matters, appropriate bargaining units, or formal job evaluation systems. These descriptive statements are presented in a general, composite form and, therefore, cannot be expected to apply exactly to specific jobs in a particular industry, establishment, or locality.

Contents

The Outlook for Industries

GUIDE TO THE HANDBOOK

HOW THE HANDBOOK IS ORGANIZED

The *Handbook* begins with two introductory chapters designed to help counselors and students make effective use of the book and to give them a general view of the world of work.

This chapter describes the contents and organization of the book. It tells how the information was assembled, and discusses a number of points that need to be kept in mind in interpreting the statements. It also gives suggestions regarding supplementary sources of occupational information, and tells how readers can keep up to date on developments affecting the employment outlook in different occupations. The second introductory chapter describes some of the most important occupational and industrial employment trends, to provide a background for interpreting the reports on individual occupations.

Occupation and Industry Reports

The reports on different fields of work that make up the main body of the *Handbook* are grouped into two major divisions: Employment Outlook for Occupations and Employment Outlook for Industries. Within the occupational division there are 13 career cluster groups—Industrial Production and Related Occupations; Office Occupations; Service Occupations; Education and Related Occupations; Sales Occupations; Construction Occupations; Occupations in Transportation Activities; Scientific and Technical Occupations; Mechanics and Repairmen; Health Occupations; Social Science Occupations; Social Service Occupations; and Art, Design, and Communications occupations. These career clusters help relate the outlook materials to school curriculum and occupational training programs, career ladders and lattices, and fields of interest for young persons engaged in career exploration and planning. The clusters are based on a concept of related activities. Physicians, for example, are included in the same section of the *Handbook* as hospital attendants and all other health employees. Within each of these career clusters, occupations are further grouped into related sub-fields. Within the office-occupations cluster, the reader can find groups for clerical occupations, computer and related occupations, banking occupations, insurance occupations, and administrative and related occupations. The industry reports are grouped according to major industry divisions in the economy—agriculture; mining; construction; manufacturing; transportation; communications and public utilities; wholesale and retail trade; finance, insurance, and real estate; service and miscellaneous; and Government. An introductory statement for each major industry division provides information on occupational trends in the industry.

Indexes and Appendix

To help the readers locate information on the occupations in which they are interested, a detailed list of the occupational reports, by field of work, is provided in the table of contents at the front of the book. An alphabetical index is also provided at the back of the book. The occupations covered in the *Occupational Outlook Handbook* also are coded according to the occupational classification system developed by the U.S. Department of Labor and published in the *Dictionary of Occupational Titles*. This *Dictionary* provides a code number (D.O.T. number) for each occupation included in it; the code number can be used as a filing system for occupational information. The code numbers of the D.O.T. are listed in parentheses immediately below the main occupational group headings in the *Handbook*. An index listing occupations covered in the *Handbook* by D.O.T. number is also provided at the back of the book. Volumes I and II of the D.O.T. may be sought for further information; they also contain job classifications and definitions. A D.O.T. supplement lists individual physical demands, working conditions, and training-time data for each job defined in the *Dictionary*.

The technical appendix of this *Handbook* discusses the sources and methods used to analyze the occupational outlook in different fields of work. It is designed for readers wishing more information on this subject than is included in this chapter.

Sources of Information

Information, both on employment trends and outlook and on the many related topics discussed in the occupational reports, was drawn from a great variety of sources. Interviews with hundreds of experts

in industry, unions, trade associations, and public agencies provided a great deal of up-to-date information. The Bureau's other research programs were a second source: they supplied data on employment in different industries, productivity and technological developments, wages and working conditions, trade union agreements, industrial hazards, and a number of other topics. Additional data regarding the nature of the work in various occupations, training and licensing requirements, wages, and employment trends were provided by other agencies of the Federal Government—among them, the Bureau of Apprenticeship and Training and the U.S. Employment Service, Manpower Administration, Department of Labor; the Bureau of the Census, Department of Commerce; the Office of Education and the Vocational Rehabilitation Administration, Department of Health, Education, and Welfare; the Veterans Administration; the Civil Service Commission; the Interstate Commerce Commission; the Civil Aeronautics Board; the Federal Communications Commission; the Department of Transportation; and the National Science Foundation. Many other public and private organizations—educational institutions, business firms, professional societies, trade associations, and trade unions—also made available published data and supplied much helpful information through interviews.

Occupations Covered

The more than 850 occupations discussed in the 325 separate sections of the *Handbook* generally are those of greatest interest to young people. Most major occupations requiring long periods of education or training are discussed, as are a number of small but rapidly growing fields and other occupations of special interest. In total, the occupations covered account for about 97 percent of all workers in sales occupations; about 95 percent of all workers in professional and related occupations; about two-thirds of all workers in skilled, clerical, and service occupations, and two-fifths of those in operative occupations. Smaller proportions of managerial workers and laborers are discussed. The main types of farming occupations also are discussed.

After the information from these many sources was compiled and analyzed in conjunction with the Bureau's overall economic model, conclusions were reached as to prospective employment trends in the various occupations. (See the Technical Appendix for a discussion of the methodology used in employment outlook analysis.) In addition, estimates were made of the numbers of job openings that will be created by retirements and deaths and transfers out of each occupation. The supply of new workers likely to be available in a particular field also was analyzed, by studying statistics on high school and college enrollments and graduations, as well as data on the numbers of apprentices in skilled trades, re-entries into an occupation, and transfers into an occupation.

Preliminary drafts of the occupational reports were reviewed by officials of leading companies, trade associations, trade unions, and professional societies, and by other experts. The information and conclusions presented in each report thus reflect the knowledge and judgment not only of the Bureau of Labor Statistics staff, but also of leaders in the field discussed, although the Bureau, of course, takes full responsibility for all statements made.

Points to Bear in Mind in Using the Handbook

The information contained in the individual sections of each occupational statement follows a standard format under the headings: nature of work; places of employment; training, other qualifications and advancement; employment outlook; earnings and working conditions, and sources of additional information. In using the *Handbook* it is important to keep in mind the purposes for which the information was designed. Also, because of imperfect data sources, the limited length of each occupational statement, and many other factors, each of the sections has its own unique limitations. The following describes the information in each of the sections, including its purpose and its limitations.

The Nature of the Work section of each *Handbook* statement describes the major job duties performed by a worker in the occupation. It is intended to show young people what the worker does and how he does it.

Each job description is typical. However, job duties may vary by factors such as employer and size of the employing organization, geographic location of the job, and other variables.

In some occupations, individual workers specialize in certain tasks. In others they perform the entire range of work in the occupation. This can be illustrated by the field of medicine, where doctors usually specialize because of the amount of skill and knowledge required to function in each area.

Occupational skill requirements continually change along with changes in technology, industrial processes, and products. Analysts who prepare the *Handbook* attempt to include information on the latest changes but because of the rapidity of technological improvement and

innovation in some fields of work all developments are not covered in the *Handbook*.

The nature of the work section of each occupational statement is most valuable when used with other information in the statement. The descriptions of the nature of the work may lead one to other information that is important to job satisfaction. For example, the descriptions of some construction jobs indicate that the work is done outdoors. Information on other jobs indicates that the worker sits indoors at a desk most of the time. Many of these job characteristics are described further in the sections on working conditions.

The Places of Employment section provides information on the number of workers in an occupation and, when data are available, on the proportions of women and part-time workers. Industries that are major employers are discussed and the geographic concentration of employment is noted. When employment in a specific industry or area of the country does not significantly vary from the overall employment distribution, such information generally is not presented in the statement.

The places of employment section is designed to provide readers with information on the quantitative importance of the occupation in the economy, as well as to alert readers to potential incompatibilities between their career preferences and the occupation. For example, the data in the places of employment section can indicate that because of the geographic distribution of employment it may be difficult to live near family and friends or in a particular climate and at the same time have good employment prospects. However, data in the *Handbook* indicate that employment in most occupations is widespread enough that career choices usually need not be changed because of geographical considerations.

This section also highlights other factors affecting occupational choice that are generally explained in more detail in other sections of the statement. For example, when the employment size of two occupations is significantly different, the larger occupation usually will have more job openings each year because of the large number of workers who die or retire each year. The need to fill job openings that result from persons leaving the labor force accounts for more than half of all openings. In addition, occupations employing a high proportion of women generally have relatively higher numbers of annual job openings than occupations employing predominantly men because many women leave the workforce to have children and raise families.

The greater the diversity in the places of employment in an occupation, the more likely it is that less comprehensive data will be presented in other sections of the occupational statement. For example, educational and training qualifications needed to enter an occupation or to obtain professional licenses and certificates often differ among States, regions of the country, and industries in which the occupation is found. Specific job duties and working conditions often are slightly different in various industries and business establishments. And, the extent of trade union membership within an occupation may also vary by industry and area of the country.

The Training, Other Qualifications, and Advancement section is designed to inform the reader about the type of training needed for entering an occupation, and about the requirements for advancement to higher levels. It is important to be aware of the type of training required because it is often necessary early in high school to start planning courses toward that goal.

Variety in Training. Workers can qualify for jobs through a variety of methods, including college training leading to a bachelor's or advanced degree, junior or community college training leading to a certificate or associate degree, public and private post-secondary vocational schools, home study courses, government training programs, Armed Forces, apprenticeship and other formal training offered on-the-job or in the classroom by employers, and in high schools. The *Handbook* identifies which of these routes of entry can be taken in each of the occupations.

The *Handbook* generally presents the minimum level and type of education required for the various occupations and the preferred background for entry. In many cases, alternative ways of attaining required training are also listed in the individual *OOH* statements. Also provided is information on high school and post-high school courses that are of particular help in preparing for the occupations.

Although people with different educational backgrounds may be able to enter an occupation, the level of entry and the speed of advancement are often determined by the amount of training. For example, a high school graduate with clerical skills can enter the medical record field as a clerk and receive about a month of on-the-job training. A graduate of a two-year medical record technician course at a community college can begin his career at the technician level as a supervisor of several clerks. The graduate of a four-year medical record librarian course may enter the medical record profession as the head of the medical record department in a hospital. The chance that the person who starts as a clerk will, after years

of experience, be head of the department is very small, and as more trained people enter the labor force the chance to advance without academic training to the highest positions in any occupation becomes more remote.

In an effort to protect the public, there are State certifications or licensing requirements for some occupations to assure that the workers are qualified. The *Handbook* provides information to help young persons become aware of any special requirements that exist in a specific occupation. Physicians and nurses are examples of professionals who must pass State board exams for licensing. Elementary and secondary school teachers must successfully complete a specified list of courses among their college subjects, depending on the grade level and subject matter they plan to teach. Also, the courses required for a teacher's license differ from State to State. A person who is preparing for an occupation that requires State licensing should, therefore, become familiar with the information on licensing for the occupation that is presented in the *Handbook* and then obtain specific information on the requirements in the State or States in which he or she plans to work. This information will help in gearing courses so the requirements can be met.

When one decides on an occupation, the "continuing education" that will be required in order to reach the desired level in the occupation is as important a consideration as the initial education requirement. A person who sees himself as a college president and begins working as an assistant to the registrar after completing his bachelor's degree should be prepared to spend several years in graduate school. Once the requirements necessary to advance to the desired level of the chosen occupation are determined, the individual should decide whether he or she has the natural talents and personal qualities needed, and whether he or she is willing to put in the time and effort to meet those requirements. If formal education is involved, will the employer pay for it, and if not, can the employee afford the cost? Also, individuals must decide whether they have the academic ability to complete the education.

In addition to the education, training, and other requirements necessary both to enter the occupation and to reach the desired position, another essential factor in career choice is the correlation of specific personal characteristics with the characteristics of the job. To provide this information, the *Handbook* presents typical job characteristics for each occupation. This allows individuals to match their unique qualifications, "likes", and "dislikes" to the job. This is not an easy task, since it is often difficult for young persons to assess themselves. Tests which help individuals assess their personal characteristics can be very valuable.

The number of occupational characteristics that can be related to tangible personal characteristics are numerous. Listed below are some of the job characteristics described in the *Handbook* and the relevant personal characteristics.

Responsible decisions required— Individuals should be able to make important decisions and to exercise good judgment.

Motivates others— Individuals should be able to influence the behavior of others.

Directs the activity of others— Individuals should have supervisory skills.

Work is closely supervised— Individuals must feel comfortable in a situation where work performance is controlled closely by a supervisor.

Highly competitive— Individuals should be able to face the pressures of competing with others on the job for recognition and achievement.

Works with ideas— Individuals should be able to think in abstract terms to solve work related problems.

Works with people— Individuals should have pleasant personalities and the ability to get along with others in face-to-face relationships.

Works with objects— Individuals should have manual skills and some physical coordination.

Works independently— Individuals should have initiative, self-discipline, and organizational ability.

Works as part of a team— Individuals should have the ability to interact with fellow employees in performing duties.

Opportunity for self-expression— Individuals should have creative talents and the ability to utilize their own ideas in practical ways.

Opportunity to see physical results of work— Individuals should derive satisfaction from seeing their work produce a tangible product.

Works with detail— Individuals should enjoy working with technical data, numbers, or written materials on a continuing basis.

Generally is confined to a work area— Individuals should feel comfortable performing their work at one setting.

Work is repetitious— Individuals should be comfortable performing the same task on a continuing basis.

Exposed to weather conditions— Individuals should enjoy working outside, and should not be adverse to exposure to weather and temperature extremes.

Helps people— Individuals should enjoy assisting people in a helping relationship.

The Employment Outlook section informs students and counselors of prospective job opportunities and is, therefore, one of the major aids that

young people can use to evaluate the career potential of the occupations they find interesting. However, the prospect of relatively few job openings should not prevent someone from pursuing a particular career. A student who knows his own interests and has discussed his abilities and aptitudes with his counselor should not forego a potentially rewarding career only because the prospective outlook in that occupation is less favorable than in other occupations. Even in occupations with relatively poor prospects, jobs are available because of the need to replace workers who leave the occupation; on the average, job openings resulting from replacement of workers who leave the occupation account for more than half of all openings.

Outlook information can be very useful to someone who has great interest in a cluster of occupations requiring similar interests, abilities, and educational backgrounds. A student who has become interested in sales occupations, for example, can compare the job prospects for real estate, insurance, automobile, and manufacturer's salesmen and select the one or two offering the best opportunities.

Information about the future outlook in an occupation is very difficult to develop. No one can predict future labor market conditions with perfect accuracy. In every occupation and industry, the ratio between the number of job seekers and the number of job openings constantly changes. A rise or fall in the demand for a product or service affects the number of workers needed to produce it. New inventions and technological innovations create some jobs and eliminate others. Changes in the size or age distribution of the population, work attitudes, training opportunities, or retirement programs determine the number of workers available. As these forces interact in the labor market, some occupations experience a shortage, some a surplus, some a balance between applicants and openings. Methods used by economists to develop information on future occupational prospects differ, and judgments which go into any assessment of the future also differ. Therefore, it is important for users of the *Handbook* to understand what underlies each statement on outlook.

The keys to understanding the outlook statements are the economic assumptions used in developing projections of future needs. One of the assumptions that underlie the statements on employment outlook in this *Handbook* is that high employment levels will be maintained and that no cataclysmic events will occur, such as a war or a severe and prolonged economic depression. Such catastrophes would, of course, create an entirely different employment situation from that likely to develop under the assumed conditions. But young people would find it impossible to build their lifetime plans in expectation of such unpredictable catastrophes, although, on the basis of historical experience, they must be prepared to weather economic ups and downs during their working lives. The basic economic assumptions are discussed in detail in the introductory section of the Handbook titled Tomorrow's Jobs, and the Technical Appendix of the Handbook.

In making employment projections, all possible factors should be taken into account. Nevertheless, not all factors can be quantified or themselves projected. For this reason, outlook information in the *Handbook* is generally presented as a qualitative statement about growth in an occupation. Opportunities will usually be favorable if employment in occupations increases over time along with the growth of the economy; those occupations that are expected to remain constant or decline generally have less favorable prospects than does the average occupation. The adjectives used to describe changes in employment requirements correspond to the ranges of percent change, as shown in figure I.

For some occupations, it also is possible to make estimates of the future supply of workers. These are usually in professional occupations where the paths of entry are rather limited, and which therefore allow a statistical assessment based on trends in the number of young people pursuing specific types of education or training and entering the occupation related to the training. When supply estimates as well as demand estimates have been made, the *Handbook* chapters contain a qualitative statement of job opportunities corresponding to the demand-supply relationship. (See figure II.)

Figure I

Adjective	*Increase*	*Decline*
Very rapid	40.0 percent or more	−40.0 percent or more
Rapid	30.0 percent to 39.9	−30.0 percent to −39.9
Moderate	15.0 percent to 29.9	−15.0 percent to −29.9
Slow	5.0 percent to 14.9	− 5.0 percent to −14.9
Little or no change	0 percent to 4.9	− 0 percent to − 4.9

Figure II

Job opportunities	*Prospective demand-supply relationship*
Excellent	Demand much greater than supply
Very good	Demand greater than supply
Good or favorable	Rough balance between demand and supply
May face competition	Likelihood of more supply than demand
Keen competition	Supply greater than demand

The information in the *Handbook* discusses the outlook for the Nation as a whole. Job prospects in local areas, however, which are of great interest to many young people, may not correspond to those described in the *Handbook*. The *Handbook* cannot discuss the outlook in each locality because the analysis is too much for any centralized staff of researchers to handle. In using the national statements, therefore, young people should discuss with counselors the prospects in the particular areas in which they would like to live. Information is often available on the local outlook from local offices of State employment security agencies.

The Earnings section helps answer many questions young people ask when choosing a career. Will the income be high enough to maintain the desired standard of living? Is the pay high enough to justify the training costs? How much will a worker's earnings increase as he gains experience? In what localities are the best-paying jobs in the occupation?

What are Earnings? To most people, the word "earnings" means money—a paycheck in the mailbox or cash in the pocket. Money, however, is only one kind of financial reward for work. Paid vacations, clean uniforms, and free lunches are also part of the total earnings package. There are three basic kinds of earnings—cash, fringe benefits, and payment in kind.

Cash. In 1972 more than 90 percent of all American workers received cash for their work in the form of a *wage or salary*. A wage or salary is usually a "flat rate"—a certain amount of money for a specific period of time at work. A wage is usually an hourly or daily rate, and a salary is a weekly, monthly, or yearly rate. Most craftsmen, factory workers, and laborers are wage earners, and most professional, technical, and clerical workers are salary earners. Salary workers usually know how large their pay checks will be each week or month, which makes budgeting easier. Wage workers' earnings may be different each week, depending on how many hours they work.

Both wage and salary workers receive *overtime* pay, but this is more common for wage workers. Overtime rates and the standard workweek (the number of hours worked before overtime is paid) vary from job to job. Many employees are covered by the Fair Labor Standards Act, which requires overtime pay at 1-1/2 times the hourly rate for more than 40 hours' work a week. For many workers overtime pay is a relatively large part of their total earnings.

Workers assigned to night shifts or other irregular hours often receive extra pay per hour, called a *shift differential*.

Earnings take a variety of forms besides the familiar rate plus overtime. Waiters and waitresses get most of their earnings in *tips* from customers. Salesmen may receive a *commission*—a percent of the amount of their sales. Factory workers are sometimes paid a *piece rate*, a certain payment for each item they produce. Tips, commissions, piece rates, and other kinds of pay are often combined with flat rate wages and salaries.

Almost 10 percent of all workers in 1972 were in business for themselves and earned *self-employment income* instead of wages or salaries. Self-employment income takes an almost endless variety of forms. Farmers, shopkeepers, and other small businessmen receive money selling their products. Doctors and lawyers collect fees from their clients. Writers sell short stories to magazines or receive royalties from publishing their books.

Some occupations offer the chance to earn income in addition to regular wages and salaries. Seamstresses often take in sewing after shop hours, and college professors are paid for publishing independent research.

Fringe Benefits. In addition to cash, most American workers receive a variety of indirect payments, or *fringe benefits*, ranging from paid holidays to life insurance. The importance of fringe benefits has increased tremendously since World War II, and by 1970 accounted for nearly one-fifth of the total earnings package in private industries other than farming.

Several fringe benefits received by a majority of workers are required by Federal and State law. They include Social Security, Workmen's Compensation, and unemployment insurance. These benefits provide payments to workers who are not employed because of old age, work-related injury or disability, or lack of suitable jobs.

Among the most common fringe benefits are paid time off for vacations, holidays, and sick leave. Some workers also receive time off, usually without pay, for jury duty, military service, and maternity leave.

Some fringe benefits help protect the worker's income if he is injured, sick, unemployed, or retired. These include life, health, and accident insurance, retirement plans, supplemental unemployment benefits, and severance pay. The costs of insurance and retirement are often shared by the worker and employer.

Some employers also offer stock options and profit-sharing plans, saving plans, and bonuses.

Payments in kind. In addition to cash and fringe benefits, some workers receive part of their earnings as goods or services, also called "kind". For example, hired farm hands and private household workers often receive room and board. Other earn-

ings in kind include laundered uniforms, meals, company housing, business expense accounts, and free airline tickets. These items should be considered earnings because they are worth money and come with the job.

Which Jobs Pay the Most? Comparing the earnings in different occupations is not easy, mainly because good information is available only for one category of earnings—wages and salaries. For some occupations even this information is not available. Nevertheless, the *Handbook* provides some types of comparisons in many occupational statements. Generally, these are comparisons among the average earnings of all nonsupervisory wage and salary workers in private industry, except farming, which is the broadest average type of earnings data available in current statistics. Other comparisons are made between similar occupations. For example, a comparison of hourly earnings of different construction craftsmen such as bricklayers, carpenters, and plumbers.

Earning Variations. Within each occupation there are many levels of pay. Earnings vary with the worker's experience, location, industry, and type of work, and in the *Handbook* this information is, when possible, provided.

Experience. Beginning workers nearly always earn less than experienced workers. In most occupations, workers move up a "ladder" to higher pay and generally do more responsible work as they gain experience. Some ladders, especially those in unskilled jobs, have only one or two steps. In other occupations, the ladders have many steps, and many even offer a choice of several different kinds of work with different levels of pay.

The beginning draftsman faces a typical ladder. The average salary for draftsmen in 1970, for example, was $167 a week, but the beginner usually starts out as a tracer at $103. As he gains experience he will advance to be a junior draftsman at $126, senior draftsman at $158, and after many years a lead draftsman at $190. At each higher step in the ladder the draftsman is expected to do more complicated work with less supervision. If the opportunity comes along he might move to a higher paying position as a supervisor or designer.

Location. In most occupations a worker's earnings will vary with the location of his job. The average weekly earnings of lead draftsmen, for example, vary considerably from city to city. (See table 1.) The highest earnings, of the 10 cities listed, occurred in Detroit, where many draftsmen are concentrated in the automobile industry. The lowest earnings shown are in smaller cities in the South and West.

The variations in the earnings of draftsmen, however, do not tell much about such variations in other occupations. Although there are some general national patterns of earnings differentials, each occupation has its own geographical pattern, and each occupation must be studied for its own. Young people using the *Handbook* also should check with counselors and local employers to find out about specific earnings in local areas.

Industry and Type of Work. Workers in most occupations can find jobs in different industries, sometimes doing different types of work. Because the job market is not exactly the same in each situation, the worker can expect his pay to vary according to whom he works for and what he does on the job.

The earnings of senior accounting clerks, for example, vary considerably by industry. As shown in Table 2, accounting clerks averaged $141.50 a week in public utilities and $144.50 in manufacturing, but only $122.00 in retail trade and $123.50 in finance, insurance, and real estate. Those working in service industries and in wholesale trade earned $132.00 and $136.50 a week, respectively.

The salaries of Ph.D. chemists show how earnings may vary by type of work. (See table 3.) In 1972, chemists in management jobs earned $6,700 more than those in research and development. Chemists in marketing and production earned $400 less than research-and-development chemists, but $4,300 more than teachers.

Table 1. Average Weekly Earnings of Lead Draftsmen, 1970-71, by Selected City and Region

City	*Average weekly earnings*
Detroit, Michigan	$295.00
Dayton, Ohio	226.00
Chicago, Illinois	215.50
Houston, Texas	206.00
Seattle, Washington	193.00
Columbus, Ohio	189.50
Salt Lake City, Utah	175.00
Scranton, Pennsylvania	173.00
Raleigh, North Carolina	172.50
Little Rock, Arkansas	162.50
Region	
North Central	213.50
Northeast	202.00
West	199.00
South	192.00
United States	204.00

SOURCE: Bureau of Labor Statistics.

Table 2. Average weekly earnings of senior accounting clerks, by industry, 1971

Industry	*Weekly earnings*
Public utilities	$144.50
Manufacturing	141.50
Wholesale trade	136.50
Services	132.00
Finance, insurance, and real estate	123.50
Retail trade	122.00

SOURCE: Bureau of Labor Statistics.

Table 3. Average annual salaries of chemists, with Ph.D. degrees, by type of work, 1972

Type of work	*Annual salaries*
Management	$26,300
Research and Development	19,600
Marketing and Production	19,200
Teaching	14,900[1]
Other	18,300

[1] Salary for 9-month academic year.

SOURCE: American Chemical Society.

The Working Conditions section provides information that can be most important to an individual's job satisfaction because preferences for working conditions vary considerably among individuals. Some people, for example, have a preference for outdoor work while others prefer working in an office. Some people like the variety of shift work, and others want the steadiness of a 9-to-5-job. Proper consideration of working conditions can contribute greatly to job satisfaction and success.

The *Handbook* discusses many aspects of working conditions that are of concern to individuals who are looking into their prospective careers. The following are several types of working conditions, with their implications, that are discussed in the occupational statements when they apply.

Overtime work required— When overtime is required, employees must give up some of their free time and should therefore be flexible in their personal lives. Overtime, however, provides the opportunity to increase earning power.

Shift Work— Evening or night work is part of the regular work schedule in some jobs. Employees are, therefore, usually working while most other people are off. Shift work may be preferred by some individuals who want to pursue certain daytime hobbies such as hunting, fishing, gardening, etc.

Environment— Work settings vary from clean air-conditioned offices to places that are dirty, greasy, or poorly ventilated. With this knowledge, workers can avoid jobs that may submit them to unpleasant conditions.

Outdoor work— Those who work outdoors may be exposed to weather extremes. It may be preferred over indoor work, however, by those who consider outdoor work healthier.

Hazardous— In some jobs, employees are subject to possible burns, cuts, falls, etc., and must attend to proper safety precautions.

Physical demands— Some jobs require standing, stooping, kneeling, or working in cramped positions. Physical strength and stamina may be required, and those without such attributes should be careful in selecting such jobs.

Young people planning their careers should also consider how working conditions may change in an occupation as they progress up the career ladder. For example, an employee may find that promotion depends on adjusting to working conditions other than what he planned. For example, a young person may enter a particular occupation because outdoor work is appealing, and be disappointed to learn that the next levels of the career ladder are desk jobs.

Sources of Additional Information. People using the *Handbook* may want more detail on the occupations discussed in the individual reports, or information on fields of work that are not covered in this publication. Suggestions as to sources of additional information are given in most of the occupational reports. Several publications of the Bureau of Labor Statistics also provide further information on topics such as earnings, hours of work, and working conditions.

Bureau of Labor Statistics Publications. In addition to this *Handbook* the Bureau of Labor Statistics issues a periodical, the *Occupational Outlook Quarterly,* to keep readers up to date between editions of the *Handbook*, on developments affecting employment opportunities and on the findings of new occupational outlook research. In addition the Bureau issues, at irregular intervals, occupational outlook bulletins that give much more detailed information on various fields of work than can be included in either the *Handbook* or the *Quarterly.*

The Bureau has also developed a visual aid for counselors entitled *Jobs for the 70's.* It consists of a set of 40 color slides that show the changing occupational and industrial mix, and trends in manpower development, education, and training. The slides, which have an accompanying narrative, are available directly from Bureau of Labor Statistics Regional Offices.

The Bureau will be glad to place the name of any user of this *Hand-*

book on its mailing list to receive announcements of new publications and releases summarizing the results of new studies. Anyone wishing to receive such materials should send the request, with his address to the Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C. 20212.

Other Bureau of Labor Statistics publications that are useful to counselors can be purchased from the Government Printing Office in Washington, D.C., or from Bureau of Labor Statistics Regional Offices. A list of these publications, along with descriptions of their contents follows:

Employment and Earnings. Monthly reports featuring timely analysis of current developments in employment, unemployment, hours, and earnings for the Nation. Contains statistics on employment, earnings, hours of work, and labor turnover by industry for the Nation and by industry division for each State and for 202 metropolitan areas. Also, contains detailed statistics on the labor force, including characteristics of the employed and unemployed, such as age, marital status, color, industry, and occupational attachment.

Special Labor Force Reports. Reports based on special surveys of the labor force are issued several times a year. They include statistics and analysis of selected characteristics of the labor force, such as educational attainment, employment of school dropouts and recent high school graduates, work experience during the year, and marital and family status. Published in the *Monthly Labor Review,* which may be available in your school library.

Area Wage Surveys. These reports include figures on average earnings and employment in selected occupations and in major industries and labor market areas. Weekly working hours for some groups of workers and customary practices regarding pensions, vacations, holidays, and sick leave are also reported. A list of surveys is included in the *Directory of Area Wage Surveys,* which may be obtained free from the Bureau of Labor Statistics.

Union Wage Scales. Annual bulletins and releases on minimum wage scales and maximum hours of work at straight-time rates for cities of 100,000 or more population—69 cities in the printing industry, 68 cities in the construction and local trucking industries, and 67 cities in the local transit industry. Quarterly releases on surveys in seven major building trades, in 100 cities, cover averages and increases in wage scale by trade, and wage trends for the industry as a whole.

Monthly Labor Review. The Bureau of Labor Statistics issues the *Monthly Labor Review* which contains articles that can help counselors keep abreast of the changing social, economic, and demographic scene. In addition to providing a statistical section on labor force and employment, labor turnover, earnings and hours, consumer and wholesale prices, and work stoppages, the *Monthly Labor Review* publishes special articles by experts on subjects such as the impact of technological change on employment, occupational counseling, and manpower planning.

The procedure for ordering these reports can be found in the back of the *Handbook.*

Sources of Additional Assistance. The U.S. Office of Education publishes the *Directory of Post Secondary Schools With Occupational Programs, 1971, Public and Private.* This volume contains a program index and lists schools that offer specific occupational training and is a valuable tool for counselors, teachers and students. Other sources likely to be helpful in providing information and assistance are public libraries; schools; State employment services; private personnel agencies; business establishments; and trade unions, employers associations, and professional societies. A brief description of each follows.

Public Libraries. These libraries usually have many books, pamphlets, and magazine articles giving information about different occupations. They also may have several books and current indexes that list the great numbers of publications on occupations, and the librarians may be of assistance in finding the best ones on a particular field of work.

Schools. School libraries and guidance offices also often have extensive reading materials on occupations.In addition, school counselors and teachers usually know of any local occupational information that has been assembled through special surveys made by schools or other community agencies. Teachers of special subjects such as music, printing, and shorthand can often give information about occupations related to the subjects they teach.

Business Establishments. Employers and personnel officers usually can supply information about the nature of the work performed by employees in their own industries or businesses, and about the qualifications needed for various jobs, as well as other facts about employment conditions and opportunities. The names of local firms in a particular industry can be found in the classified sections of telephone directories or can be obtained from local chambers of commerce.

Trade Unions, Employers' Associations, and Professional Societies. Frequently, these organizations have local branches; their officials can supply information relating to the occupations with which they are concerned.

State Employment Services. Counselors in local public employment offices are in a particularly good position to supply information about job opportunities, hiring standards, and wages in their localities. The services available through the public employment offices are described in the following section of this chapter.

Services to jobseekers at public employment offices. Local offices of State Employment Services specialize in finding jobs for workers and workers for jobs. State Employment Services are affiliated with the U.S. Employment Service of the U.S. Department of Labor's Manpower Administration and constitute a Federal-State partnership. Employment and related services are available without charge in every State.

At each of the over 2,400 public Employment Service offices across the Nation, jobseekers are aided in obtaining employment, and employers are assisted in finding qualified workers.

Four basic services are provided to workers by the public Employment Service: (1) Job information; (2) employment counseling; (3) referral to job training; and (4) job placement.

Job Information. The personnel who staff the public Employment Service offices are familiar with their areas and thus know what kinds of workers are employed in local industry, what jobs are available, what hiring requirements and opportunities for advancement are, and the wages that are paid. Job Information Service (JIS) units in many local offices permit job seekers to select their own jobs from a computerized listing of job opportunities in the area. These job listings are updated daily and provide comprehensive information supplied by employers on specific job openings in the area. In addition, the JIS includes a library of general information on occupational trends, industrial developments, and State-Federal government job opportunities, as well as association and union promotional materials. The staff conduct manpower surveys to determine the area's available skills, training needs, and future occupational opportunities. Through the employment service network of offices, information is also available on job opportunities in other areas of the country.

Employment Counseling. Employment counseling assists young people who are starting their careers, as well as experienced workers who wish or need to change their occupation. The major purposes of employment counseling are to help people understand their actual and potential abilities, interests, and personal traits; to know the nature of occupations; and to make the best use of their capacities and preferences in the light of available job opportunities.

The employment counselor is specially trained and has access to a large store of occupational information.

Testing. Most local offices have testing services available which the counselor may use to assist him in appraising an individual's aptitudes, interests, and clerical and literacy skills.

USES aptitude tests are particularly helpful in relating an applicant's potential abilities to the aptitude requirements of 62 broad occupational groupings and hundreds of specific occupations. A Spanish Language and a nonreading edition for individuals with very limited education have also been developed.

Referral to Training. Many individuals seek work for which they lack some qualifications. Sometimes the job requires basic education or a specific skill. Besides referring a jobseeker to a job, the public Employment Service may suggest training for an applicant so that he can qualify for or secure a better job.

Jobs and job requirements change. In today's fast-paced world, important considerations when selecting a vocation are the training required to perform the work, and ways that training need can be met.

Job Placement. A primary objective of the public Employment Service is to place workers in jobs. Regular contact is maintained with local employers to learn about their job openings. Requests are received from employers for many different kinds of workers. As a result, registered applicants have access to a variety of job vacancies with many employers, just as the employer has access to many applicants. This dual function eliminates "hit-or-miss" job hunting.

Special Services to Veterans. Veterans are legally entitled to priority in all services, with preferential treatment for disabled veterans over other veterans. In addition, the Vietnam Era Veterans Readjustment Assistance Act requires that some specific form of assistance designed to enhance employment prospects be given to each veteran who applies to the Employment Service. Each local office has a veterans' employment representative who is assigned the responsibility to see that these priority services are provided by all local office staff.

Special Services for Youth. The Employment Service maintains a year-round program of services to youth, including counseling, job development, placement, training, and referral to other agencies. Special efforts include: (1) In the Summer Employment Program, the Employment Service enlists the cooperation of private and public sectors to help develop as many employment opportunities as possible for disadvantaged youth, to provide valuable summer experience and enable them to return to school in the fall; (2) The ES-School Cooperative Program provides placement-related services to graduating seniors, school dropouts, and potential dropouts who desire to enter the labor market.

Other Special Services. Disadvantaged job seekers who have special problems obtaining employment are provided employment services to help overcome barriers, and this may include referral for supportive services such as child care or health examinations to agencies which provide such services, or referral to training which will help develop the job seeker's employability.

Individuals with mental or physical disabilities which constitute vocational handicaps are given special consideration by the Employment Service. Middle-age and older workers are assisted in making realistic job choices and overcoming problems related to getting and holding jobs. Employers are encouraged to hire individuals on their ability to perform the work. Similar attention is given to the employment problems of minority group members and all others facing special difficulties in obtaining suitable employment.

Community Manpower Service. Jobseekers, employers, schools, civic groups, and public and private agencies concerned with manpower problems are invited to utilize the service of the public Employment Service office in their community, and to avail themselves of the job information in that office. Local offices are listed in the phone book as agencies of the State government.

Private Personnel Agencies. Private personnel agencies can provide a great deal of information and assistance to job seekers. These agencies employ counselors to assist clients with career planning and placement. Because they are located in cities and towns throughout the country, private personnel agencies are often an excellent source of information about occupational opportunities in local areas. The private personnel agencies can be found in local telephone directories and generally charge a fee for their services.

TOMORROW'S JOBS

Young people in an ever growing and changing society are faced with the difficult task of choosing sound career plans from among the thousands of alternatives. As the economy continues to expand, creating more and different kinds of jobs, this planning process becomes more difficult. Making career plans calls for an evaluation of an individual's interests and abilities, as well as for specific information on occupations. This *Handbook* provides students, counselors, teachers, and parents with occupational information.

Several questions are of major importance to young persons as they view the variety of occupational choices open to them. Among these questions are: What fields look especially promising for employment opportunities? What competition can be expected from other workers? What type and how much training and education are required in order to enter particular jobs? How do earnings in certain occupations compare with earnings in other occupations requiring similar training? What types of employers provide which kinds of jobs? What are the typical working conditions associated with particular occupations?

Of importance in evaluating information that answers these and related questions is knowledge of the dynamic changes that are continually occurring in our economy—the trends in the Nation's work force and in its business, industrial, and occupational development. New ways of making goods, new products, and changes in living standards are constantly changing the types of jobs that become available. To throw light on the changing characteristics of occupations and to provide background for understanding the outlook in specific occupations, this chapter focuses on overall patterns of change in the country's industrial and occupational composition. It also discusses the implications of these changes for education and training in relation to occupational choice.

No one can forecast the future. Nevertheless, by using the wealth of information available, extensive economic and statistical analyses, and the best judgment of informed experts, the work future can be described in broad terms. Of course, some aspects of the future can be predicted more accurately than others. For example, the number of 18-year-olds in 1985 can be estimated with a very high degree of accuracy because individuals 5 years old in 1972 are accounted for in our vital statistics, and the death rate of children between 5 and 18 is extremely low and stays about the same from year to year. On the other hand, forecasting employment requirements for automobile assemblers in 1985 is extremely difficult. Employment of these workers can be affected by the changing demand for American-made automobiles, shifts in buyers' preference (toward the compact car, for example), changes in the ways cars are made (more automation or the use of new types of engines), and unpredictable economic developments outside of the automobile industry.

To project the demand for all workers in the economy, specific assumptions have to be made about general economic movements and broad national policy. The picture of the future employment outlook reflected in the *Handbook* is based on the following fundamental assumptions:

1. Maintenance of high levels of employment and of utilization of available manpower in 1985;

2. that no major event such as long-duration or widespread energy shortages will alter substantially the rate of economic growth. (Although energy shortages were being experienced in the economy as this *Handbook* went to press, no conclusive assessments could be made at this time of the magnitude or duration of the shortages or their long-run effect on employment either as a factor stimulating or restricting employment opportunities in specific industries or occupations. Future editions of the *Handbook* will incorporate the significant findings of special studies and reports in this area.)

3. that economic, social, and educational trends will continue to change according to patterns of the recent past;

4. that scientific-technological advancement will continue at about the same rate as in recent years;

5. that the United States will not be at war, but that there will be no substantial reduction in the defense budget beyond that already in effect.

The *Handbook's* assessment of the 1985 industrial and occupational outlook assumes a projected total labor force of 107.7 million in 1985, all-volunteer Armed Forces of 2.0

million, and a resulting civilian labor force of 105.7 million.

Knowledge of specific industries is necessary because employers seek a wide variety of skills; for example, many different industries employ engineers, salesmen, and secretaries. Employment patterns have shifted considerably over the years and are expected to continue to do so. These changes greatly affect employment opportunities and occupational choices.

Industrial employment and occupational requirements change as a result of many factors. A new machine or a newly automated process may require different occupational skills or may even create an entirely new occupation; a change in product demand may affect the number of workers needed; an invention may all but eliminate an industry or create a new one.

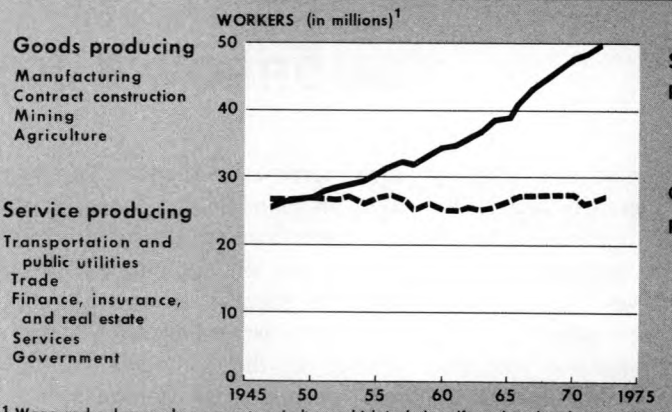
Industrial Profile

To help understand the Nation's industrial composition, industries may be viewed as either goods-producing or service-producing. They may further be grouped into nine major divisions according to product or service. (See chart 1.)

Most of the Nation's workers are in industries that produce services, in activities such as education, health care, trade, repair and maintenance, and in government, transportation, and banking and insurance service. The production of goods—raising food crops, building, extracting minerals, and manufacturing of goods—has required less than half of the country's work force since the late 1940's. (See chart 2.) In general, job growth through the 1970's is expected to continue to be faster in the service-producing industries than in the goods-producing industries. However, among industry divisions within both the goods-producing and service-producing sectors, the growth pattern will continue to vary. (See chart 3.)

Service-producing industries. In 1972, about 49.7 million workers were on the payrolls of service-producing industries—trade; Government; services and miscellaneous; transportation and other utilities; and finance, insurance, and real estate—about 15.9 million greater than the number employed in 1960. The major factors underlying the rapid growth of the 1960's have been (1) population growth; (2) increasing urbanization with its accompanying need for more city services; and (3) rising income and living standards accompanying demand for improved services, such as health, education, and security. These factors are expected to continue to result in rapid growth of service industries as a group, and they are expected to help employ (8.7 million by 1985, an increase of about 38 percent over the 1972 level.

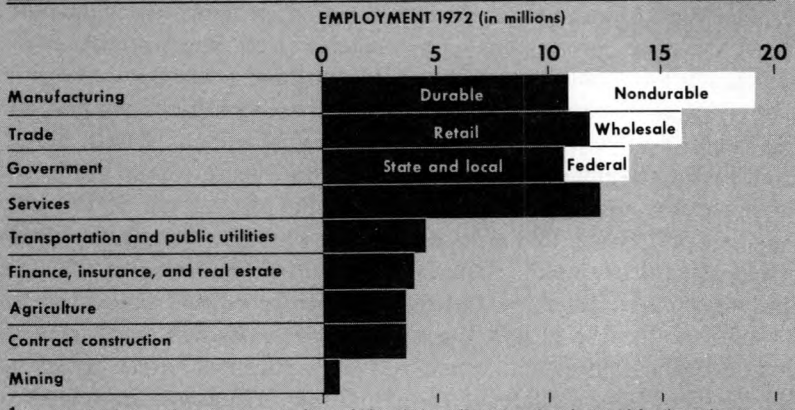
Industries Providing Services Offer More Jobs Than Those Providing Goods 2



[1] Wage and salary workers, except agriculture, which include self-employed and unpaid family workers.

Source: Bureau of Labor Statistics.

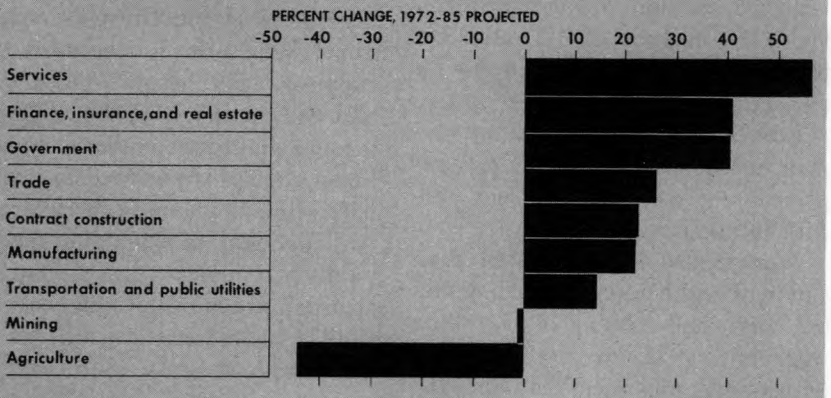
Where People Work[1] 1



[1] Wage and salary workers except agriculture which includes self-employed and unpaid family workers.

Source: Bureau of Labor Statistics.

Through the Mid-1980's Employment Growth Will Vary Widely, by Industry 3



Source: Bureau of Labor Statistics.

Trade, the largest division within the service-producing industries, has expanded sharply since 1960. Wholesale and retail outlets have multiplied in large and small cities to satisfy the need of an increasingly urban society. Employment in trade was about 15.7 million in 1972, about 38 percent above the 1960 level.

Employment in trade is expected to grow by about 26 percent between 1972 and 1985. Although an ever-increasing volume of merchandise will be distributed as a result of increases in population and consumer expenditures, the rate of increase in manpower needs will be slowed by laborsaving technology, such as the greater use of electronic data processing equipment and automated warehousing equipment, growth in the number of self-service stores, and the growing use of vending machines.

Government employment has grown faster than any other industry division, and has increased by almost three-fifths, from 8.4 million to 13.3 million, between 1960 and 1972. Growth has been mostly at the State and local levels, which together expanded by more than two-thirds. Employment growth has been greatest in agencies providing education, health, sanitation, welfare, and protective services. Federal Government employment increased about 21 percent between 1960 and 1972.

Government will continue to be a major source of new jobs through the mid-1980's. By the mid-1980's employment in Government may be as much as 42 percent higher than in 1972. Most of the growth will be in State and local governments, in which employment needs may rise by 1985 to 16.0 million, about 50 percent higher than the 10.6 million employed in 1972. Federal Government employment is expected to rise slowly to about 2.8 million in 1985, 150,000 or about 6 percent above the 1972 level of 2.7 million.

Service and miscellaneous industries employment has increased rapidly since World War II as a result of the growing need for maintenance and repair, advertising, domestic, and health care services. From 1960 to 1972, total employment in this industry division rose by about two-thirds, from 7.4 million to about 12.3 million.

Service and miscellaneous industries will continue to be among the fastest-growing industries through the mid-1980's. More than half again as many workers are expected to be employed in this industry division in 1985 as in 1972. Manpower requirements in health services are expected to grow rapidly due to population growth and the increasing ability of persons to pay for health care. Business services, including accounting, data processing, and maintenance, also are expected to grow very rapidly.

Transportation and public utility employment in 1972 at 4.5 million was only slightly more than one-tenth higher than in 1960. Different parts of this industry, however, have experienced different growth trends. For example, air travel employment increased rapidly but the railroad industry declined.

The number of jobs in transportation, and in public utilities as a whole, is expected to continue to increase slowly to 1985, and widely differing employment trends will continue to be experienced among individual industries within the division. Rapid increases in employment are expected in air transportation, and a decline is expected to continue in railroad employment, and little or no change is expected in water transportation. Overall employment in this industry division is expected to increase to almost 5.2 million in 1985, 15 percent above the 1972 level.

Finance, insurance, and real estate, the smallest of the service-producing industry divisions, has grown about 47 percent since 1960 to more than 3.9 million in 1972. Employment has grown especially rapidly in banks; in credit agencies; and among security and commodity brokers, dealers, exchanges, and services.

Job growth in finance, insurance, and real estate will keep in step with the overall employment increases of nonfarm employment through the

mid-1980's. Finance, insurance, and real estate employment is expected to expand to nearly 5.6 million by 1985, about 42 percent above 1972 levels.

Goods-Producing Industries. Employment in the goods-producing industries—agriculture, manufacturing, construction, and mining—more than 26.5 million in 1972—has increased slowly in recent years. Significant gains in productivity resulting from automation and other technological developments as well as the growing skills of the work force have permitted large increases in output without corresponding increases in employment. Employment in goods-producing industries is expected to increase to about 30 million in 1985, 13 percent above the 1972 level. However, widely different patterns of employment changes have occurred and will continue among the industry divisions in the goods-producing sector.

Agriculture (farming), which until the late 1800's employed more than half of all workers in the economy, employed only 4 percent, or 3.5 million workers, in 1972. Increases in the average size of farms, rapid mechanization, and improved fertilizers, feeds, and pesticides have created large increases in output at the same time that employment has fallen sharply.

Farming is facing a continuing decline in manpower needs. Factors resulting in past declines will continue, and the outlook is for a 1985 farm work force 45 percent lower than in 1972.

Mining employment, at about 607,000 workers in 1972, has declined by nearly 15 percent since 1960, primarily because of labor-saving technological changes. This trend is likely to continue, and mining is the only nonagricultural industry division that is not expected to increase between 1972 and 1985.

Contract construction employment, at more than 3.5 million in 1972, has increased more than one-fifth since 1960. The Nation's growing need for homes, offices, stores, highways, bridges, dams, and other physical facilities resulted in this increase in employment.

Between 1972 and 1985, employment in contract construction is expected to grow by more than one-fifth to about 4.3 million.

Manufacturing, the largest division within the goods-producing sector that had about 18.9 million workers in 1972, increased about 13 percent in employment between 1960 and 1972. New products for industrial and consumer markets and the rapid growth of the defense-space market have spearheaded the post World War II growth.

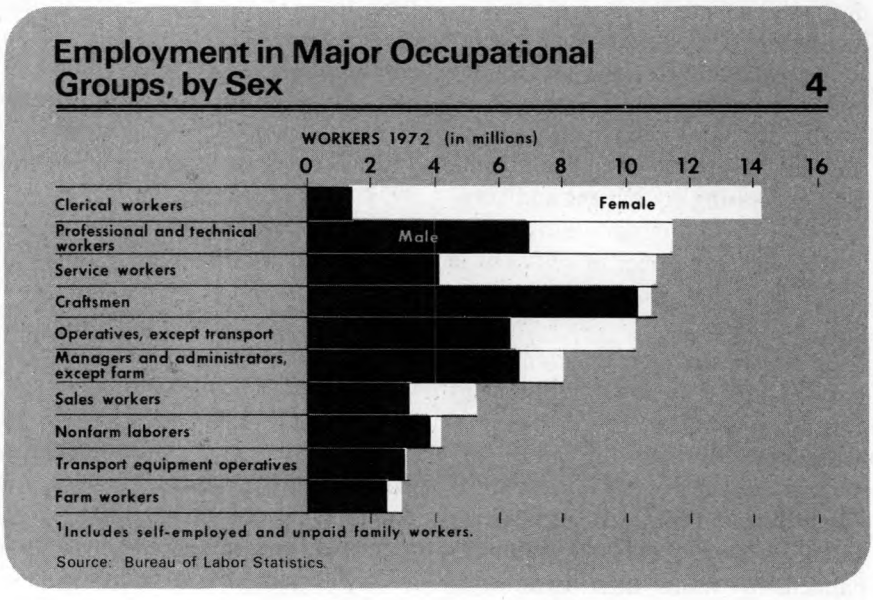
Manufacturing employment is expected to increase about 23 percent through the mid-1980's and to reach about 3.2 million in 1985. Employment in durable goods manufacturing is projected to increase slightly faster, and nondurable goods somewhat more slowly than the total. However, the rate of growth will vary among the individual manufacturing industries.

Occupational Profile

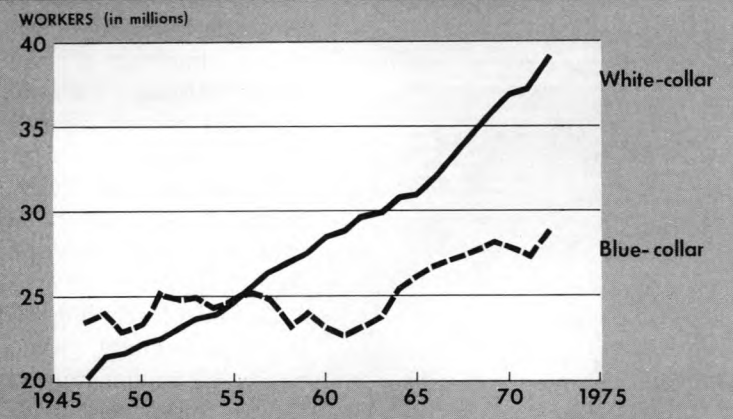
As American industries continue to grow larger, more complex, and more mechanized, basic changes will take place in the Nation's occupational structure. Furthermore, occupations will become more complex and specialized. Thus, an imposing and confusing number of occupational choices is provided to individuals who are planning their careers. An individual, in examining the vast number of choices, should first look at broad groupings of jobs that have similar characteristics such as entrance requirements. (See chart 4.)

Among the most significant changes in the Nation's occupational structure has been the shift toward white-collar jobs. In 1956, for the first time in the Nation's history, white-collar workers—professional, managerial, clerical, and sales—outnumbered blue-collar workers—craftsmen, operatives, and laborers. (See chart 5.)

Through the 1970's, we can expect a continuation of the rapid growth of white-collar occupations, a slower-than-average growth of blue-collar occupations, a faster-than-average growth among service workers, and a



Employment Has Shifted Toward White-Collar Occupations 5



Source: Bureau of Labor Statistics.

further decline of farm workers. Total employment is expected to increase about 24 percent between 1972 and 1985. In comparison, an increase of about 37 percent is expected for white-collar jobs, and only about 15 percent for blue-collar occupations. By 1985, white-collar jobs will account for more than one-half of all employed workers compared with about 48 percent in 1972. The rapid growth expected for white-collar workers and service workers reflects continuous expansion of the service-producing industries, which employ a relatively large proportion of these workers. The growing demand for workers to perform research and development, to provide education and health services, and to process the increasing amount of paperwork throughout all types of enterprises, also will be significant in the growth of white-collar jobs. The slower-than-average growth of blue-collar and farm workers reflects the expanding use of labor-saving equipment in our Nation's industries and the relatively slow growth of the goods-producing industries that employ large proportions of blue-collar workers. (See chart 6.)

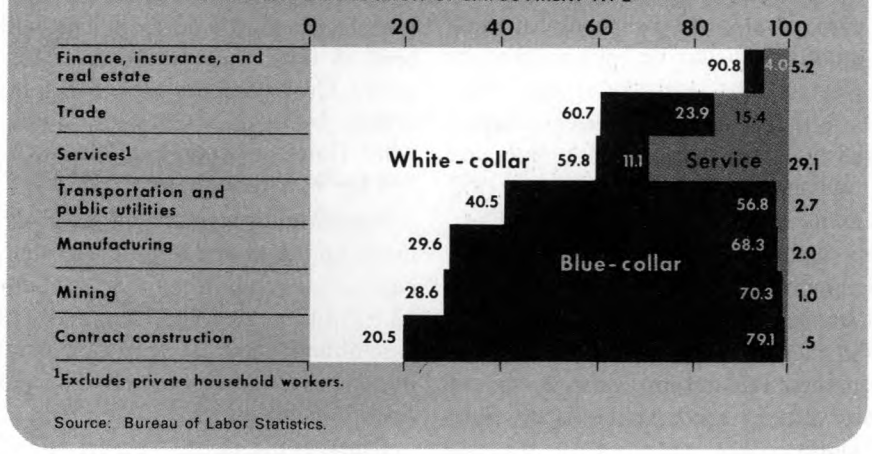
The following section describes in greater detail the changes that are expected to occur among the broad occupational groups through the mid-1980's.

Professional and technical workers, the third largest occupational group in 1972, number about 11.5 million, and include such highly trained personnel as teachers, engineers, dentists, accountants, and clergymen.

Professional occupations will be the fastest-growing occupations from 1972-85. (See chart 7.) Workers in this area will be in great demand as the Nation makes greater efforts toward the country's socio-economic progress, urban renewal, transportation, harnessing the ocean, and enhancing the beauty of the land. The quest for scientific and technical knowledge is bound to grow, and to raise the demand for workers in scientific and technical specialties. The late 1970's and early 1980's will see a continuing emphasis on the social sciences and medical services. By 1985, the requirements for professional, technical, and kindred workers may be almost one-half greater than 1972 employment.

Managers, officials and proprietors totaled about 8.0 million in 1972. As a group they will increase about 30 percent between 1972 and 1985. As in the past, requirements for salaried managers are likely to continue to increase rapidly because of the increasing dependence of business organizations and government agencies on management specialists. On the other hand, the number of self-employed managers is expected to continue to decline as larger businesses continue to restrict growth of the total number of firms,

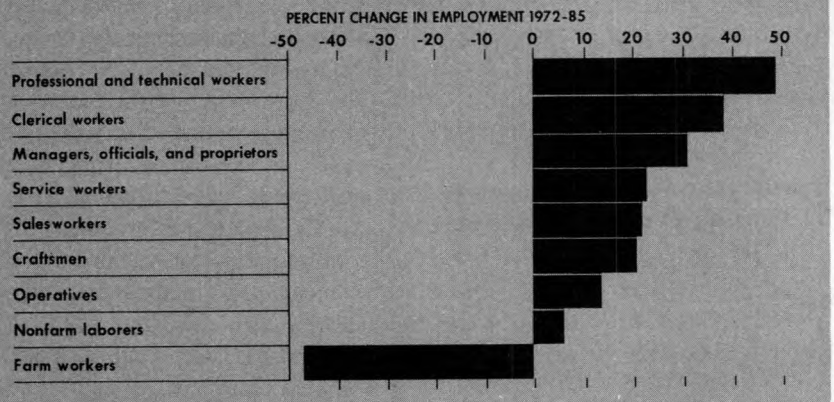
Industries Differ in the Kinds of Workers They Employ 6



[1]Excludes private household workers.

Source: Bureau of Labor Statistics.

Through the Mid-1980's Employment Growth Will Vary Widely among Occupations 7



Source: Bureau of Labor Statistics

and as supermarkets continue to replace small groceries and general stores.

Clerical workers, numbering 14.2 million in 1972, include workers who operate computers and office machines, keep records, take dictation, and type. Clerical workers made up the largest group of workers in 1972. Many new clerical positions are expected to open up as industries employing large numbers of clerical workers continue to expand. The trend in retail stores toward transferring to clerical workers functions that were performed by salespersons also will tend to increase employment needs of clerical workers. The demand also will be strong for those qualified to handle jobs created by electronic data processing operations. The need for clerical workers as a group is expected to increase by almost two-fifths between 1972 and 1985.

Sales workers, accounting for about 5.4 million workers in 1972, are found primarily in retail stores, wholesale firms, insurance companies, real estate agencies, as well as offering goods door-to-door. Sales workers are expected to increase more than one-fifth between 1972 and 1985.

Increasing sales of many new products resulting from rapid population growth, new product development, business expansion, and rising business levels will be the major reason for increasing employment of sales workers.

Craftsmen, numbering about 10.8 million in 1972, include carpenters, tool and die makers, instrument makers, all-round machinists, electricians, and typesetters. Industrial growth and increasing business activity are the major factors expected to spur the growth of craft occupations through the mid 1980's. However, technological developments will tend to limit the expansion of this group. Craftsmen are expected to increase by about one-fifth, somewhat slower growth than the average for all occupations.

Semiskilled workers (operatives) made up the second largest major occupational group in 1972 with about 13.5 million workers engaged in assembling goods in factories; driving trucks, buses and taxis; and operating machinery.

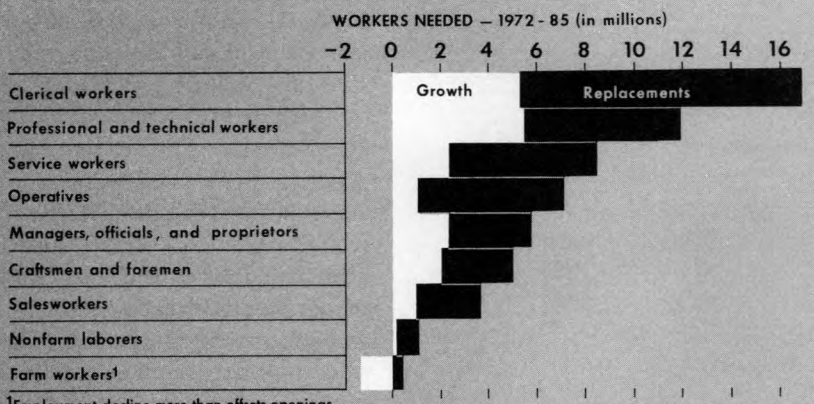
Employment of semiskilled workers is expected to increase about 13 percent above the 1972 level, despite continued technological advances that will reduce employment for some types of semiskilled occupations. Increases in production generated by rising population and rapid economic growth, as well as the increasing trend toward motor truck transportation of freight, are expected to be major factors contributing to the increasing employment.

Laborers (excluding those in farming and mining), who numbered nearly 4.2 million workers in 1972, for the most part move, lift, and carry materials and tools in the Nation's workplaces. Employment of laborers is expected to increase slightly between 1972 and 1985 in spite of the rises in manufacturing and construction, which employ most laborers. Increased demand is expected to be offset by rising productivity resulting from continued substitution of mechanical equipment for manual labor.

Service workers, including men and women who maintain law and order, assist professional nurses in hospitals, give haircuts and beauty treatments, serve food, and clean and care for our homes, totaled about 11.0 million in 1972. This diverse group will increase about 22 percent between 1972 and 1985. Some of the main factors that are expected to increase requirements for these occupations are the rising demand for hospital and other medical care; the greater need for protective services as urbanization continues and cities become more crowded; and the more frequent use of restaurants, beauty parlors, and other services as income levels rise and as an increasing number of housewives take jobs outside the home.

Farm workers—including farmers, farm managers, laborers, and foremen—numbered nearly 3.1

Training Needs Are Determined by Replacement Plus Growth 8



[1]Employment decline more than offsets openings created by deaths and retirements.

Source: Bureau of Labor Statistics

million in 1972. Employment requirements for farm workers are expected to decline to about 1.6 million in 1985. This decrease is anticipated, in part, because of continued improvement in farm technology.

Job Openings

In considering careers, young people should not eliminate occupations just because their preferences will not be among the most rapidly growing. Although growth is a key indicator of future job outlook, more jobs will be created between 1972-85 from deaths, retirements, and other labor force separations than from employment growth. (See chart 8.) Replacement needs will be particularly significant in occupations which have a large proportion of older workers and women. Furthermore, large occupations that have little growth may offer more openings than a fast-growing, small one. For example, among the major occupational groups, openings for operatives resulting from growth and replacement combined will be greater than for craftsmen, although the rate of growth in the employment of craftsmen will be considerably more rapid than the rate of growth for operatives.

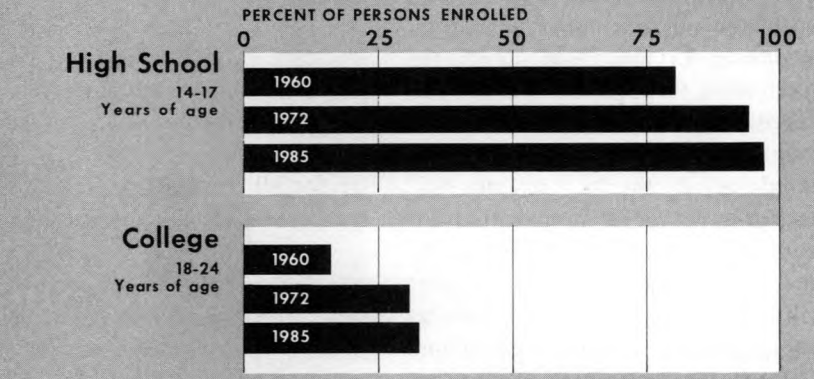
Outlook and Education

Numerous opportunities for employment will be available for jobseekers during the years ahead. Employers are seeking people who have higher levels of education because many jobs are more complex and require greater skill. Furthermore, employment growth generally will be fastest in those occupations requiring the most education and training. For example, professional occupations requiring the most education will show the fastest growth through the mid-1980's. (See chart 7.)

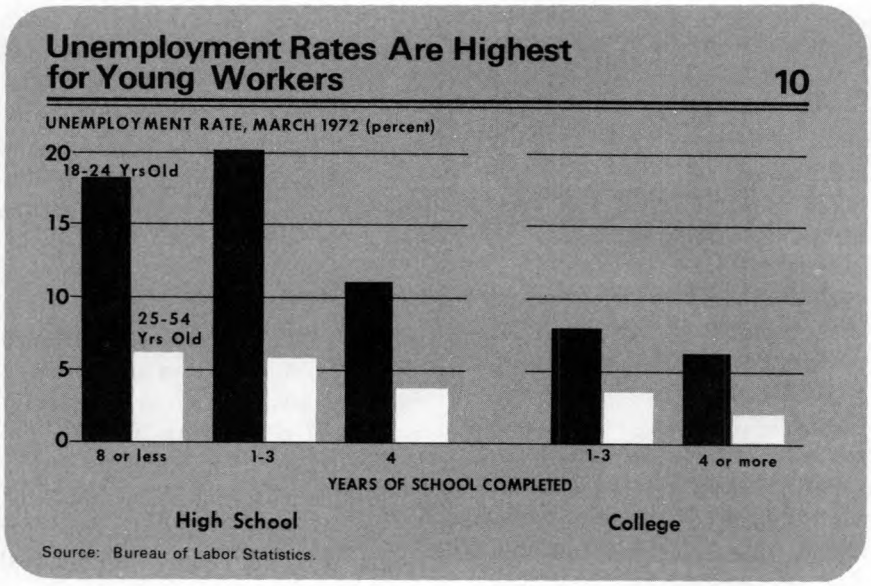
A high school education has become a standard for American workers. Thus, because of personnel practices in American industries, a high school graduate is in a better competitive position in the job market than a nongraduate.

Although training beyond high school has been the standard for some time for many professional occupations, many other areas of work require more than just a high school diploma. As new, automated equipment is introduced on a wider scale in offices, banks, insurance companies, and government operations, skill requirements are rising for clerical and other jobs. Employers increasingly are demanding better-trained workers to operate complicated machinery. In many areas of sales work, new developments in machine design, use of new materials, and the complexity of

School Enrollment Will Continue to Rise 9



Source: Bureau of the Census



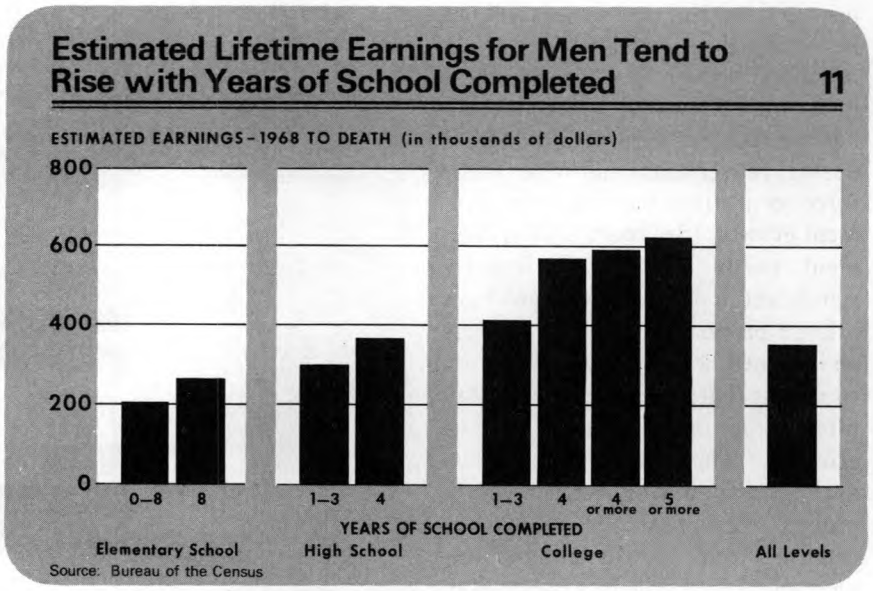
equipment are making greater technical knowledge a requirement for demonstrators; and repairmen must become familiar with even more complicated machines. Because many occupations are becoming increasingly complex and technical, specific occupational training such as that obtained through apprenticeship, junior and community colleges, and post-high school vocational education courses is becoming more and more important to young people preparing for successful careers.

As part of the demand for greater education, the proportion of youth in high school has increased, and an even larger proportion of high school graduates pursue higher education. (See chart 9.) This trend is expected to continue through the mid-1980's.

With so much competition from young people who have higher levels of education, the boy or girl who does not get good preparation for work will find the going more difficult in the years ahead. Employers will be more likely to hire workers who have at least a high school diploma. Furthermore, present experience shows that the less education and training a worker has, the less chance he has for a steady job, because unemployment falls most heavily on the worker who has the least education. (See chart 10.)

In addition to its importance in competing for jobs, education is highly valued in the determination of income. According to the most recently available data, men who had college degrees could expect to earn more than $600,000 in their lifetimes, or nearly three times the $214,000 likely to be earned by workers who had less than 8 years of schooling, nearly twice that earned by workers who had 1 to 3 years of high school, and nearly one and two-thirds as much as high school graduates. Clearly the completion of high school pays a dividend. A worker who had only 1 to 3 years of high school could expect to earn only about $31,000 more than workers who had an elementary school education, but a high school graduate could look forward to a $94,000 lifetime income advantage over an individual completing elementary school. (See chart 11.)

In summary, young people who have acquired skills or good basic education will have a better chance for interesting work, good wages, and steady employment. Getting as much education and training as one's abilities and circumstance permit should therefore be a top priority for today's youth.



THE OUTLOOK FOR OCCUPATIONS

INDUSTRIAL PRODUCTION AND RELATED OCCUPATIONS

Millions of people who work in industrial production help to ensure the continued growth of our economy and its smooth operation. These skilled and semiskilled blue-collar workers are involved in almost every production process.

Workers in this group are employed mostly in factories. Machinists and machine tool operators shape metal to precise sizes. Assemblers put together automobiles, television sets, and hundreds of other products. Inspectors examine and test products to assure quality. Printing craftsmen operate the various types of machinery used to print newspapers, books, and other publications. Some factory workers are not directly involved in the production process, but support it in some way. Stationary engineers, for example, operate boilers and other equipment. Millwrights move and install heavy industrial machinery. Power truck operators move materials about the plant.

Industrial workers also are employed outside of manufacturing in a variety of activities. Automobile painters, for example, restore the finish on old and damaged cars. Photographic laboratory workers develop film and make prints and slides.

Semiskilled workers, such as assemblers and power truck operators, ordinarily need only brief on-the-job training. Skilled workers, such as stationary engineers and machinists, require considerable training to qualify for their jobs. Many learn their trades on the job, but training authorities generally recommend completion of a 3- or 4-year apprenticeship program as the best way to learn a skilled trade.

Most jobs in industrial production do not require a high school diploma. However, many employers prefer high school or vocational school graduates who have taken courses such as blueprint reading and machine shop.

Growth rates for individual occupations in industrial production will differ greatly. Employment of welders, for example, is expected to rise rapidly as a result of growth in the metalworking industries and the wider use of welding. A moderate increase in the number of assemblers is expected, despite the continued automation of assembly processes. Employment in some printing crafts, on the other hand, is expected to decline slowly as a result of more efficient printing methods. Even in declining occupations, however, some job openings are expected as experienced workers retire, die, or transfer to other fields.

This chapter includes statements on 22 industrial production and related occupations. Many other workers who are involved in industrial production are described elsewhere in the *Handbook* because of their close association with particular occupational groups. For example, engineers are included in the chapter on Scientific and Technical Occupations.

FOUNDRY OCCUPATIONS

Foundry workers produce metal castings for numerous industrial and household products that range from machine tools to bathtubs. Casting is a method of forming metal into intricate shapes. Molten metal is poured into carefully prepared molds and allowed to solidify.

The *patternmaker*, the *coremaker*, and the *molder* each play an important part in the process. The *patternmaker* makes a wood or metal model of the casting. A *molder* places it in a box and packs sand around the model to form a mold. If the casting is to have a hollow section, a *coremaker* makes a core of packed and hardened sand that is positioned in the mold before the molten metal is poured in.

In 1972, about 19,000 patternmakers, 56,000 molders, and 23,000 coremakers worked in the foundry industry and foundry departments of other industries such as automobile and machinery manufacturers.

A high school education is the minimum requirement for an apprentice in patternmaking and for more skilled molding and coremaking jobs. An eighth grade education, however, may be enough for entry into many molding and coremaking jobs.

Employment in these trades is expected to show little or no change through the mid-1980's because of automation and other labor-saving improvements in production methods. Nevertheless, the need to replace experienced workers who die, retire, or transfer to other occupations will provide some openings.

Patternmakers, molders, and coremakers are discussed in detail in the following statements. (For a general description of many other jobs involved in metal casting, see the statement on foundries elsewhere in the *Handbook*.)

Sources of Additional Information

For details about training opportunities for patternmakers, coremakers, and molders, contact local foundries, the local office of the State employment service, the nearest office of the State apprenticeship agency, or the Bureau of Apprenticeship and Training, U.S. Department of Labor. Information also is available from the following organizations:

American Foundrymen's Society, Golf and Wolf Rds., Des Plaines, Ill. 60016.

Cast Metals Federation, Cast Metals Federation Building, 20611 Center Ridge Road, Rocky River, Ohio 44116.

International Molders' and Allied Workers' Union, 1225 East McMillan St., Cincinnati, Ohio 45206.

PATTERNMAKERS

Nature of the Work

Foundry patternmakers are highly skilled craftsmen who make the patterns used in making molds for metal castings. Most of the workers in the occupation are *metal patternmakers* (D.O.T. 600.280); a somewhat smaller number are *wood patternmakers* (D.O.T. 661.281). Some patternmakers work with both metal and wood as well as plaster and plastics.

Patternmakers work from blueprints prepared by engineers. They make a precise pattern for the product, carefully checking each dimension with instruments such as micrometers and calipers. Precision is important because any imperfections in the pattern will be reproduced in the castings made from it.

Wood patternmakers select the wood stock, lay out the pattern, and saw each piece of wood to size. They then shape the rough pieces into final form with various woodworking machines, such as lathes and sanders, as well as many small hand tools. Finally, they assemble the pattern segments by hand, using glue, screws, and nails.

Metal patternmakers prepare patterns from metal stock or from rough castings made from a wood pattern. To shape and finish the patterns, they use many metalworking machines, including lathes, drill presses, shapers, milling machines, power hacksaws, and grinders. They also use small hand tools.

Training, Other Qualifications, and Advancement

Apprenticeship is the best means of qualifying as a journeyman patternmaker. Because of the high degree of skill and the wide range of knowledge needed for patternmaking it is difficult to learn the trade on the job. In some instances, skilled machinists have been able to transfer to metal patternmaking with additional on-the-job training or experience. Trade school courses in

Patternmakers work from blueprints.

patternmaking provide useful preparation for the prospective apprentice, and may be credited toward completion of the apprenticeship.

The usual apprenticeship period for patternmaking is 5 years. Each year at least 144 hours of classroom instruction in related technical subjects normally are provided. Apprenticeship programs for wood and metal patternmaking are separate. Employers generally require apprentices to have at least a high school education.

Apprentice patternmakers begin by helping journeymen in routine duties. They make simple patterns under close supervision and, as they progress, the work becomes increasingly complex and the supervision more general. Patternmakers earn higher pay as their skill increases and some become foremen or supervisors.

Patternmaking, although not strenuous, requires considerable standing and moving about. Manual dexterity is especially important because of the precise nature of the work. The ability to visualize objects in three dimensions is also important.

Employment Outlook

Employment of foundry patternmakers is expected to show little or no change through the mid-1980's despite the anticipated increases in foundry production Some openings will arise each year because of the need to replace experienced patternmakers who retire, die or transfer to other occupations. Most of these openings will be for metal patternmakers.

The need for patternmakers will not keep pace with increases in the production of castings because of the greater use of metal patterns. These patterns can be used many times, reducing the number of individual patterns needed.

Because patternmakers learn either basic metalworking or woodworking they are prepared for jobs in related fields when patternmaking employment is not available. Wood patternmakers can qualify for woodworking jobs, such as cabinetmakers, and metal patternmakers can transfer their skills to metalworking jobs such as machinist.

Earnings and Working Conditions

Patternmakers generally have higher earnings than other production workers in manufacturing. In January 1972, average straight-time hourly earnings of wood patternmakers ranged from $4.35 in steel, gray iron and malleable iron foundries, to $4.85 in non-ferrous foundries, according to a wage survey made by the National Foundry Association. Metal patternmakers earnings were generally higher. In comparison, all production workers in manufacturing averaged $3.71 an hour.

Patternmakers work indoors in well-lighted, well-ventilated areas. The rooms in which they work are generally separated from the areas where the casting takes place, so they are not exposed to the heat and noise of the foundry floor.

For sources of additional information, see the introductory section of this chapter.

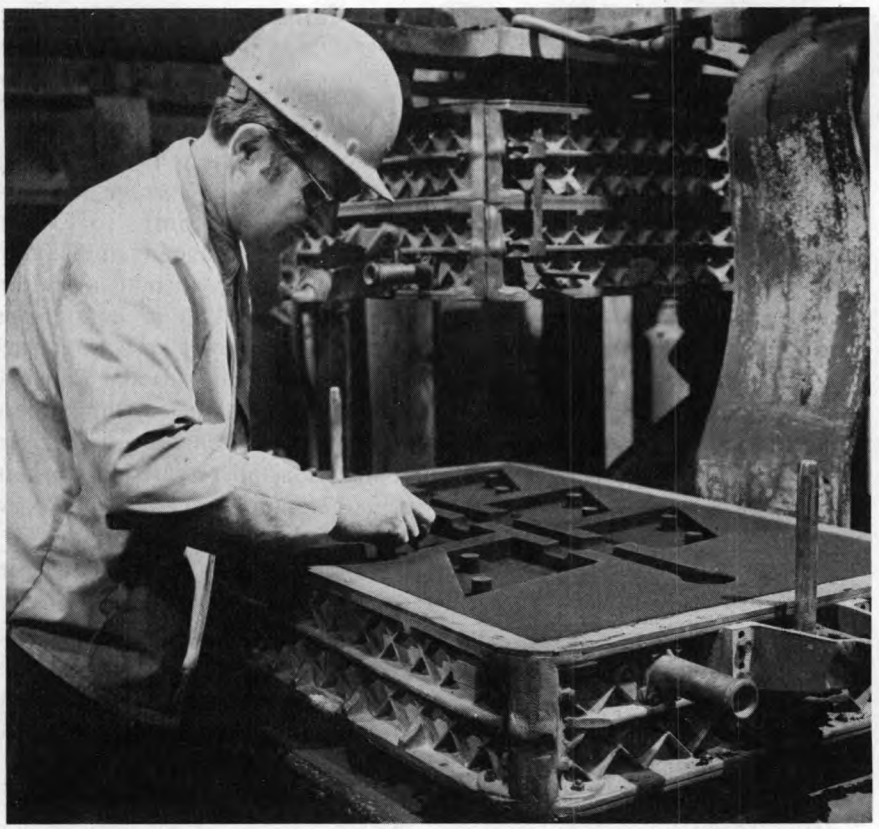
MOLDERS

Nature of the Work

The molder prepares a mold which contains a hollow space in the shape of the item to be made. The mold is made by packing and ramming specially prepared sand around a pattern—a model of the object to be duplicated—in a box called a flask. A flask is usually made in two parts which can be separated to remove the pattern without damaging the mold cavity. When molten metal is poured into the cavity, it soldifies and forms the casting. A molder uses pneumatic-powered rammers and handtools to pack and smooth the sand in the molds.

Most of the workers in this occupation are machine molders; the rest are hand molders. *Machine molders* (D.O.T. 518.782) operate machines that simplify and speed the making of large quantities of identical sand molds. Machine molders assemble the flask and pattern on the machine table, fill the flask with prepared sand, and operate the machine with levers and pedals. Many of these workers set up and adjust their own machines.

Hand molders use mainly manual methods to make the sand molds. Power tools, such as pneumatic rammers, and handtools, such as trowels and mallets, are used to smooth the sand. Molds for small castings are usually made on the workbench by *bench molders* (D.O.T. 518.381); those for large and bulky castings are made on the foundry floor by *floor molders* (D.O.T. 518.381). An all-round hand molder makes many different types of molds. A less skilled molder specializes in a few simple types.



Molder makes sand mold.

Training, Other Qualifications, and Advancement

Completion of a four-year apprentice program, or equivalent experience, is needed to become a journeyman hand molder. Workers with this training are also preferred for some kinds of machine molding but in general a shorter training period is required in order to become a qualified machine molder. Molders' helpers and less-skilled hand molders frequently learn molding skills informally on the job. However, this way of learning the trade takes longer and is less reliable than apprenticeship.

An eighth grade education usually is the minimum requirement for apprenticeship. Many employers, however, require additional education up to and including high school graduation for apprenticeship in skilled hand molding or machine molding jobs.

Apprentices, under close supervision by journeymen, begin with simple jobs such as shoveling sand. Gradually they take on more difficult and responsible work, such as ramming molds, withdrawing patterns, and setting cores. They also learn to operate the various types of molding machines. Beginning with simple shapes and advancing to more complex work, they make complete molds as training progresses. In addition, the apprentice may work in other foundry departments to develop all-round knowledge of foundry methods and practices. The apprentice usually receives at least 144 hours of classroom instruction each year in subjects such as shop arithmetic, metallurgy, and shop drawing.

Hand molders who do highly repetitive work usually learn their jobs during a brief training period. Trainees work with a molder to make a particular kind of mold. After 2 to 6 months, the trainee usually is capable of making a similar mold. Most machine molding jobs can be learned in 2 to 3 months on the job.

Physical standards for molding jobs are fairly high. Hand molders stand at their work, move about a great deal, and do frequent lifting. They need good vision and a high degree of manual dexterity. Since molding work is strenuous few women are employed. Molders may advance to a specialized molding job or eventually to a supervisory position.

Employment Outlook

Employment of molders is expected to show little or no change through the mid-1980's. The trend to more machine molding and the increasing use of permanent and shell molds will limit employment growth. Nevertheless, the need to replace experienced molders who retire, die, or transfer to other occupations will provide some openings.

Earnings and Working Conditions

In January 1972, floor molders averaged $3.85 an hour and bench molders averaged $3.55, according to a wage survey made by the National Foundry Association. By comparison, production workers in all manufacturing industries averaged $3.71 an hour.

Working conditions vary considerably from one foundry to another. Heat and fumes have been greatly reduced in many plants by the installation of improved ventilation systems and air-conditioning.

For sources of additional information, see the introductory section of this chapter.

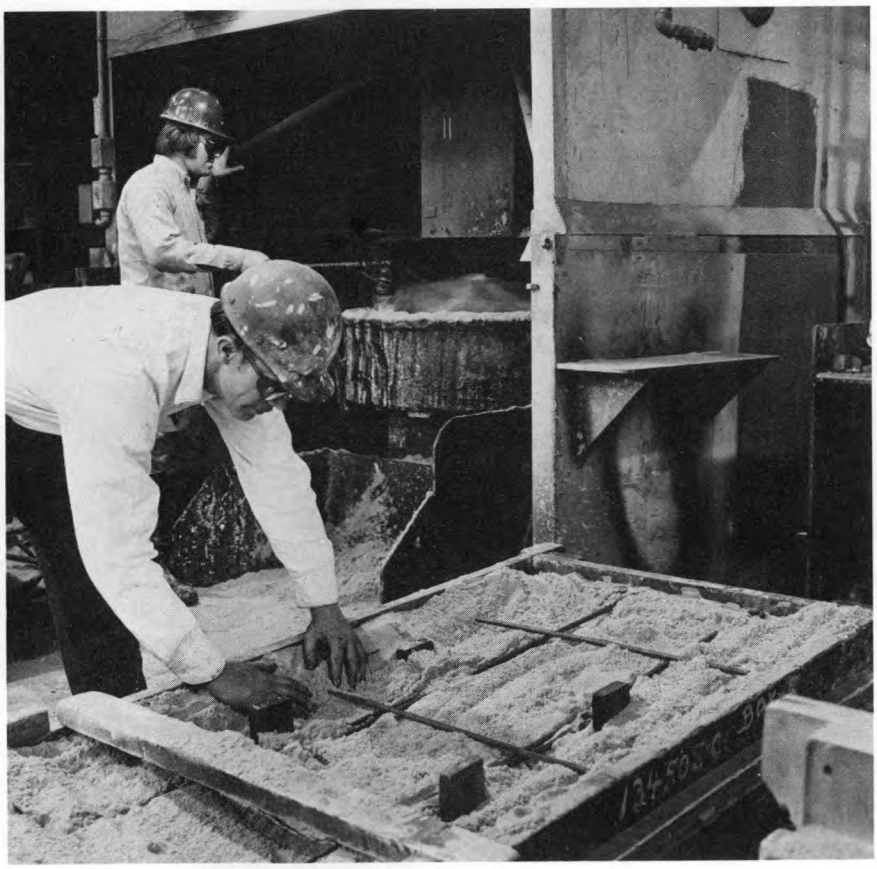
COREMAKERS

Nature of the Work

Coremakers prepare the "cores" that are placed in molds to form the hollow sections in metal castings. The poured metal solidifies around the core, so that when the core is removed the desired cavity or contour remains.

A core may be made either by hand or machine. In both instances, sand is packed into a block of wood or metal in which a space of the desired size and shape has been hollowed out. After the core is removed from this box it is hardened by baking or by another drying method. When hand methods are used the coremaker uses mallets and other handtools to pack sand into the core box. Small cores are made on the workbench by *bench coremakers* (D.O.T. 518.381) and large ones are made on the foundry floor by *floor coremakers* (D.O.T. 518.381).

Machine coremakers (D.O.T. 518.885) operate machines that make sand cores by forcing sand into a core box. Some machine coremakers are required to set up and adjust their machines and do finishing operations on the cores. Others are primarily machine tenders. They are closely supervised and their ma-



Coremakers build sand core for metal casting.

chines are adjusted for them. (To see how the coremaker's job is a basic step in the casting process, read the description of sand casting given in the statement on foundries elsewhere in the *Handbook*.)

Training, Other Qualifications, and Advancement

Completion of a 4-year apprentice training program or the equivalent experience is needed to become a skilled hand coremaker. Apprenticeships also are sometimes required for the more difficult machine coremaking jobs. Apprenticeship training in coremaking and molding are often combined.

Apprentices, working with journeymen coremakers, are assigned routine duties before they make simple cores and operate ovens. As their skill increases apprentices make more complex cores. Classroom instruction covering subjects such as arithmetic and the properties of metals generally supplement on-the-job training. Coremakers earn higher pay as their skill increases, and some become foremen or supervisors.

An eighth grade education usually is the minimum required for coremaking apprentices; some employers require graduation from high school. For less skilled coremaking jobs, inexperienced workers may be hired or other foundry workers upgraded. Some types of hand coremaking require a high degree of manual dexterity. Light coremaking is not strenuous and women frequently are employed.

Employment Outlook

Employment of coremakers is expected to show little or no change through the mid-1980's. Despite the anticipated increase in foundry production employment growth in this occupation will be limited as more cores are made by machine instead of by hand. Nevertheless, several hundred job openings will arise each year because of the need to replace experienced coremakers who retire, die, or transfer to other occupations.

Earnings and Working Conditions

In January 1972, the average hourly earnings of floor coremakers were $3.85; bench coremakers, $3.65; and machine coremakers, $3.25, according to a wage survey made by the National Foundry Association. By comparison, production workers in all manufacturing industries averaged $3.71 an hour.

Working conditions vary considerably from one foundry to another. Heat and fumes have been greatly reduced in many plants by the installation of improved ventilation systems and air-conditioning. Although the injury rate in foundries is higher than the average for manufacturing, coremaking is one of the least hazardous foundry jobs.

For sources of additional information, see the introductory section of this chapter.

MACHINING OCCUPATIONS

Nearly every product made by American Industry contains metal parts or is manufactured by machines made of metal parts. In 1972, about 1.1 million machinists, machine tool operators, tool and die makers, instrument makers, and setup men used a wide variety of machine and hand tools to shape these metal parts.

A machine tool is a stationary, power-driven device that holds and brings together the cutting instrument (tool) and the metal to be cut. Some of the most common machine tools are lathes and machines that drill, bore, mill, and grind. Metal also can be shaped by using chemicals, electricity, magnetism, sound, light, and liquids under controlled conditions.

Motors, farm machinery, and typewriters are among the wide variety of metal products with interchangable parts that are mass-produced and easily assembled from drawings and blueprints. Precision instruments are frequently used to check the accuracy of metal parts that may be machined to tolerances of 10 millionths of an inch.

All-round machinists can operate most types of machine tools, whereas machine tool operators generally work with only one kind. Tool and die makers make dies (metal forms) for presses and diecasting machines, devices to guide drills into metal, and special gages to determine whether the work meets specified tolerances. Instrument makers use machine tools to produce highly accurate instrument parts from metal and other materials. Setup men adjust tools for semiskilled machine tool operators to run. (Detailed discussions of work performed, training, and earnings of these occupations are presented in the chapters that follow.)

ALL-ROUND MACHINIST

(D.O.T. 600.280, .281, and .381)

Nature of the Work

The all-round machinist, who can set up and operate most types of machine tools, uses these tools to make metal parts. Because he plans and carries through all operations, he may switch from one product to another and give variety to his work. His knowledge of metals and machine tools enables him to turn a block of metal into an intricate part of precise specifications. He selects the tools and materials for each job and plans the cutting and finishing operations from a blueprint or written specifications. He makes standard shop computations relating to dimensions of work and machining specifications. He often uses precision-measuring instruments, such as micrometers, to measure the accuracy of his work to thousandths or even millionths of an inch. After completing machining operations, he may use hand files and scrapers before he assembles the finished parts with wrenches and screwdrivers.

Machinists who make and repair metal parts in maintenance departments must have a broad knowledge of the way machines work to adjust and test parts. In plants that produce large numbers of metal products, highly skilled machinists specialize in layout work and mark specifications on metal for machine tool operators who do the machining operations.

Places of Employment

An estimated 320,000 machinists were employed in 1972. Almost every factory using substantial amounts of machinery employed all-around machinists to maintain its mechanical equipment. Some all-round machinists made large quantities of identical parts in production departments of metalworking factories; others made limited numbers of varied products in machine shops. Most all-round machinists worked in the following industries: Machinery, including electrical; transportation equipment; fabricated metal products; and primary metals. Other industries employing substantial numbers of these workers were the railroad, chemical, food processing, and textile industries. The Federal Government also employed all-round machinists in Navy yards and other installations.

Machinists have great flexibility in their work because all types of machinery in nearly every locality require their skills.

Training, Other Qualifications, and Advancement

A 4-year apprenticeship is the usual way to learn the machinist trade, but some companies have training programs for single purpose machines that require less than 4 years. Many machinists, however, learn on the job.

A young person interested in becoming a machinist should be mechanically inclined and temperamentally suited to do highly accurate work that requires concen-

Machinist drills to close tolerance.

tration as well as physical effort. A prospective machinist should be able to work independently. Although the work is sometimes tedious and repetitious, the all-round machinist frequently has the satisfaction of seeing the final results of his work.

A high school or vocational school education, including mathematics, physics, or machine shop training, is desirable. Some companies require experienced machinists to take additional courses in mathematics and electronics, at company expense, so that they can service and operate numerically controlled machine tools. In addition, equipment builders generally provide training in the electrical, hydraulic, and mechanical aspects of machine-and-control systems.

A typical machinist apprentice program lasts 4 years and consists of approximately 8,000 hours of shop training and about 570 hours of related classroom instruction. In shop training, the apprentice learns chipping, filing, hand tapping, dowel fitting, riveting, and the operation of various machine tools. In the classroom, he studies blueprint reading, mechanical drawing, shop mathematics, and shop practices.

All-round machinists have numerous opportunities. Many advance to foreman or supervisory jobs. Some take additional training and become tool and die or instrument makers. A skilled machinist may open his own shop or advance into other technical jobs in machine programing and tooling.

Employment Outlook

The number of all-round machinists is expected to increase moderately through the mid-1980's as a result of the anticipated expansion of matalworking activities. Most job openings will arise from the need to replace experienced machinists who retire, die, or transfer to other fields of work.

The demand for machinists will be affected by two main factors. As population and income rise, so will the demand for machined goods, such as automobiles, household appliances, and industrial products. Partially offsetting this, however, will be worker-productivity increases resulting from technological developments.

Chief among these technological innovations is the expanding use of numerically-controlled machine tools. These machines, which translate numbers into a series of motions or processes, significantly reduce the time required to perform machining operations.

Much of the employment growth will occur in maintenance shops, as industries continue to use a greater volume of complex machinery and equipment. Skilled maintenance machinists are needed to prevent costly breakdowns in highly mechanized plants. In such plants, a breakdown of one machine may stop many other machines.

Earnings and Working Conditions

The earnings of machinists compare favorably with those of other skilled workers. Average hourly rates for machinists in 15 areas surveyed in 1972-73 are shown in the accompanying tabulation on the following page.

Machinists must follow strict safety regulations when working around

high-speed machine tools. Short-sleeve shirts, safety glasses, and other protective devices are required to reduce accidents. Most shops are clean and workplaces are well-lighted.

Area	*Hourly Rate*
Boston	$4.71
Buffalo	5.34
Chicago	5.60
Cleveland	5.09
Denver	4.96
Detroit	6.06
Greensville, S.C.	3.60
Houston	5.35
Huntsville, Ala.	5.27
Los Angeles—Long Beach	5.28
Louisville	5.64
Minneapolis—St. Paul	5.57
New York	5.52
Portland, Oreg.	5.92
San Francisco—Oakland	4.62

Companies employing machinists generally provide paid vacations and holidays. Other fringe benefits frequently included health and life insurance, accident insurance, supplemental unemployment benefits, and pensions.

Many machinists are members of unions including the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America; the International Union of Electrical, Radio and Machine Workers; the International Brotherhood of Electrical Workers; the United Steelworkers of America; and the Mechanics Educational Society of America.

Sources of Additional Information

The National Machine Tool Builders Association, 7901 Westpark Dr., McLean, Va. 22101—whose members build a large percentage of all machine tools used in this country—will supply, on request, information on career opportunities in the machine tool industry.

The National Tool, Die and Precision Machining Association, 9300 Livingston Rd., Oxon Hill, Md. 20022, offers information on apprenticeship training, including Recommended Apprenticeship Standards for Tool and Die Makers, certified by the U.S. Department of Labor's Bureau of Apprenticeship and Training.

The Tool and Die Institute, 777 Busse Highway, Park Ridge, Ill. 60068—a trade association—offers information on apprenticeship training in the Chicago area.

Many local offices of State employment services provide free aptitude testing to persons interested in becoming all-round machinists or tool and die makers. The State employment service also may be a source of information about training opportunities under the Manpower Development and Training Act. In addition, the State employment service refers applicants for apprentice programs to employers. In many communities, applications for apprenticeship also are received by labor-management apprenticeship committees.

Apprenticeship information also may be obtained from the following unions (which have local offices in many cities):

International Association of Machinists and Aerospace Workers, 1300 Connecticut Ave. NW., Washington, D.C. 20036.

International Union, United Automobile, Aerospace and Agricultural Implement Workers of America, Skilled Trades Department, 8000 East Jefferson Ave., Detroit, Mich. 48214.

International Union of Electrical Radio and Machine Workers, 1126 16th St. NW., Washington, D.C. 20036.

International Brotherhood of Electrical Workers, 1125 15th St. NW., Washington, D.C. 20005.

INSTRUMENT MAKERS (MECHANICAL)

(D.O.T. 600.280)

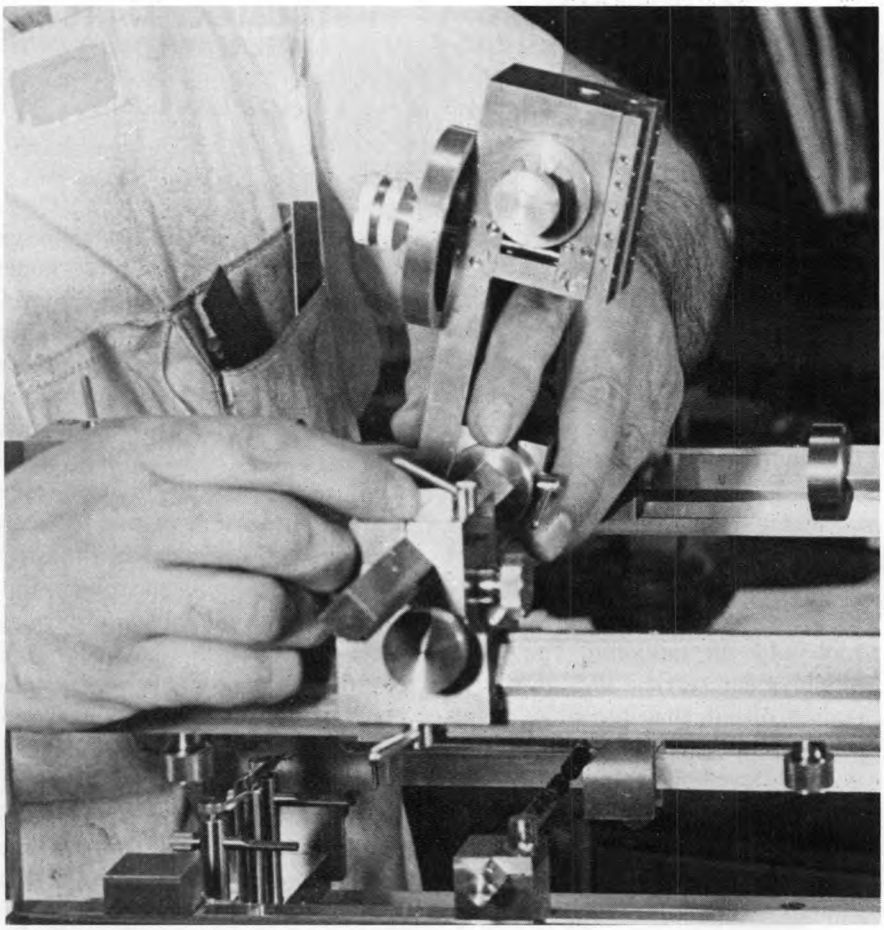
Nature of the Work

Instrument makers (also called experimental machinists and model-makers) work closely with engineers and scientists in translating designs and ideas into experimental models, special laboratory equipment, and custom instruments. Experimental devices constructed by these craftsmen are used, for example, to regulate heat, measure distance, record earthquakes, and control industrial processes. The parts and models may range from simple gears to intricate parts of navigation systems for guided missiles. Instrument makers also modify existing instruments for special purposes.

Instrument makers fabricate metal parts using machine tools (such as lathes and milling machines) and handtools (such as files and chisels). Because accuracy is important, they measure finished parts with a wide variety of precision-measuring equipment, including micrometers, verniers, calipers, and dial indicators, as well as standard optical measuring instruments.

Using considerable imagination and ingenuity, they work from rough sketches, verbal instructions, or ideas, as well as from detailed blueprints. Sometimes specifications must not vary more than ten millionths of an inch. To meet these standards, they commonly use special equipment or precision devices, such as the electronic height gauge, that other machining workers seldom use. They also work with a variety of materials, including plastics and rare metals such as titanium and rhodium.

An instrument maker may construct, assemble, and then test all



Instrument makers must work with detail.

parts of an instrument in small shops. When working with electrical and electronic components that are to be incorporated into an instrument, however, they frequently work with other instrument makers or electronic specialists.

Places of Employment

Many of the approximately 5,000 instrument makers employed in 1972 worked for firms that manufactured instruments. Others were in research and development laboratories that make special devices for scientific research. The Federal Government employed many instrument makers.

The main centers of instrument making are located in and around a few large cities, particularly New York, Chicago, Los Angeles, Boston, Philadelphia, Washington, Detroit, Buffalo, Cleveland, and Rochester.

Training, Other Qualifications, and Advancement

Some instrument makers advance from the ranks of machinists or skilled machine tool operators. These craftsmen, working at first under close supervision and doing the simpler jobs, usually need 1 to 2 years or more of instrument shop experience to qualify as instrument makers.

More frequently, instrument makers learn their trade through apprenticeships that generally last 4 years. A typical 4-year program includes 8,000 hours of shop training and 576 hours of related classroom instruction. Shop training emphasizes the use of machine tools, hand tools, and measuring instruments, and the working properties of various materials. Classroom instruction covers related technical subjects such as mathematics, physics, blueprint reading, chemistry, metallurgy, electronics, and fundamental instrument design. The apprentice must learn enough shop mathematics to plan his work and to use formulas. A basic knowledge of mechanical principles is needed in solving gear and linkage problems.

For apprenticeship programs, employers generally prefer high school graduates who have taken algebra, geometry, trigonometry, science, and machine shop work. Further technical schooling in electricity and electronics is often desirable, and may make possible future promotions to technician positions.

A person interested in becoming an instrument maker should have a strong interest in mechanical subjects and better-than-average ability to work with his hands. He must have initiative and resourcefulness because instrument makers often work alone under minimum or no supervision. Since the instrument maker often faces new problems, he must be able to develop original solutions. Frequently, he must visualize the relationship between individual parts and the complete instrument, and must understand the principles of the instrument's operation. Because of the nature of his job, the instrument maker has to be very conscientious and take considerable pride in creative work.

As the instrument maker's skills and knowledge improve, he may ad-

vance to more responsible positions. Up to 10 years' experience is required to rise to the top skill level. By gaining additional training beyond the high school level in subjects such as physics and machine design, some instrument makers may advance to technician jobs. In these jobs, they plan and estimate time and material requirements for the manufacture of instruments or provide specialized support to professional personnel. Others may become supervisors and train less skilled instrument makers.

Employment Outlook

Employment of instrument makers is expected to increase moderately through the mid-1980's as a result of an expected expansion of metalworking activities and the growing use of instruments in manufacturing processes and research and development work. However, since this occupation is relatively small, only a small number of openings will result in any one year.

Growing numbers of instrument makers will be needed to make models of new instruments for mass-production and also to make custom or special instruments, particularly in the expanding field of industrial automation. Also, more versatile and sensitive precision instruments can be expected to emerge from current research and development programs.

Earnings and Working Conditions

Earnings of instrument makers compare favorably with those of other highly skilled metalworkers. In 1972, instrument makers generally earned between $4 and $6 an hour for a standard workweek.

Instrument shops usually are clean and well-lighted, with temperatures strictly controlled. Instrument assembly rooms are sometimes known as "white rooms," for almost sterile conditions are maintained.

Serious work accidents are not common, but machine tools and flying particles may cause finger, hand, and eye injuries. Safety rules generally require the wearing of special glasses, aprons, tightly fitted clothes, and short-sleeve shirts; neckties are prohibited.

Most companies that employ instrument makers provide paid holidays and vacations. Other nonwage benefits frequently include health, accident, and life insurance, and a pension plan.

Many instrument makers are union members. Among the union represented are the International Association of Machinists and Aerospace Workers; the International Brotherhood of Electrical Workers; the International Union of Electrical, Radio and Machine Workers; and the International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America.

Sources of Additional Information

See list under this same heading in the statement on all-round machinists.

MACHINE TOOL OPERATORS

(D.O.T. 602., 603., 604., 605., and 606.)

Nature of the Work

Many machine tool operators do simple, repetitive jobs that can be learned quickly on one or two types of machine tools. Other more skilled workers do complex and varied machining operations on several different machine tools.

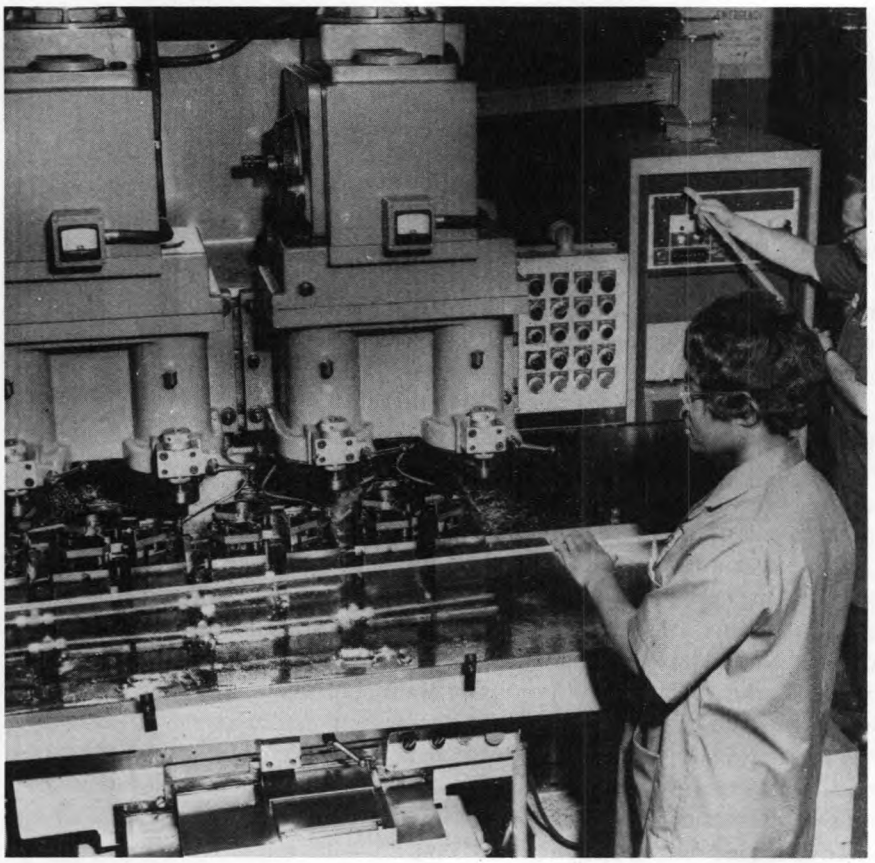
Typically, the semiskilled operator places rough metal stock in a machine tool on which the speeds and operation sequence already have been set. By using special, easy-to-use gages, he watches the machine and makes minor adjustments. However, he depends on skilled machining workers for major adjustments when the machine is not working properly.

A skilled machine tool operator usually works on a single type of machine and does little or no hand fitting and assembly work. He plans and sets up the correct sequence of machining operations according to blueprints, layouts, or other instructions. He adjusts speed, feed, and other controls, and selects the proper cutting instruments or tools for each operation. Using micrometers, gauges, and other precision-measuring instruments, he checks his completed work with the tolerance limits given in the specifications. He also may select cutting and lubricating oils to cool metal and tools during machining operations.

Operators use lathes; drill presses; and boring, grinding, milling, and automatic screw machines. Both skilled and semiskilled operators have job titles related to the kind of machine they operate, such as engine lathe operator, milling machine operator, and drill press operator.

Places of Employment

About 545,000 machine tool operators were employed in 1972, mainly in factories that produce fabricated metal products, transportation equipment, and machinery in large quantities. Skilled machine tool operators worked in production departments, maintenance departments, and toolrooms.



Machine tool operator oversees numerically controlled machining operation.

Machine tool operators worked in every State and in almost every city in the United States.

Training, Other Qualifications, and Advancement

Most machine tool operators learn their skills on the job. A beginner usually starts by observing a skilled operator at work. When the trainee first operates a machine, he is supervised closely by a more experienced worker. The beginner learns how to use measuring instruments and to make elementary computations needed in shop work. He gradually acquires experience and learns to operate a machine tool, read blueprints, and plan the sequence of machining work.

Individual ability and effort largely determine the time required to become a machine tool operator. Most semiskilled operators learn their jobs in a few months, but a skilled operator often requires 1-1/2 to 2 years. Some companies have formal training programs for new employees.

Although no special education is required for semiskilled jobs, young people seeking such work can improve their opportunities by completing courses in mathematics and blueprint reading. In hiring beginners, employers often look for people who have mechanical aptitude and some experience working with machinery. Physical stamina is important since much time will be spent standing. Applicants should be able to work independently within a relatively small work area. Although much of the work is tedious, many machine tool operators derive satisfaction from seeing the results of their work.

Skilled machine tool operators may become all-round machinists, tool and die makers, or advance to jobs in machine programing and maintenance.

Employment Outlook

The number of machine tool operators is expected to increase moderately through the mid-1980's, primarily as a result of the anticipated expansion of metalworking activities. In addition, many thousands of workers will be hired to replace experienced machine tool operators who retire, die, or transfer to other jobs.

Technological developments will continue to affect both the number and skill requirements of machine tool operators. The use of faster and more versatile automatic machine tools and numerically controlled machine tools will result in greater output per worker and tend to limit employment growth. Other factors that may slow the growth in this occupation are the increasingly important new processes in metal removal, such as electrical discharge and ultrasonic machining, and the use of powdered metals that reduce the machining necessary for a final product.

Workers who have thorough backgrounds in machining operations, mathematics, blueprint reading, and a good working knowledge of the properties of metals will be better able to adjust to the changing job requirements that will result from these technological advances.

Earnings and Working Conditions

Machine tool operators are paid according to hourly or incentive

rates, or on the basis of a combination of both methods. Average hourly rates for operators in 14 areas surveyed in 1972–73 are presented below:

Area	*Hourly rate*
Baltimore	$4.71
Boston	4.58
Chicago	5.46
Cincinnati	5.14
Denver	4.81
Detroit	6.06
Houston	4.32
Los Angeles–Long Beach	5.01
Minneapolis–St. Paul	4.85
Portland, Oreg.	4.87
San Francisco–Oakland	5.90
Tampa–St. Petersburg	3.75
Waterbury, Conn.	4.39
Worcester, Mass.	4.09

Machine tool operators must use protective glasses and may not wear loose-fitting garments when working around high-speed machine tools. Increasing emphasis upon safety regulations has reduced the accident rate for these workers. Most shops are clean and workplaces are well-lighted.

Companies employing machine tool operators usually provide paid holidays and vacations. Other employee benefits may include health and life insurance, accident insurance, supplemental unemployment benefits, and a pension plan.

Most machine tool operators belong to unions, including the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America; the International Union of Electrical, Radio and Machine Workers; the International Brotherhood of Electrical Workers; the United Steelworkers of America; and the Mechanics Educational Society of America.

Source of Additional Information

See the list under this same heading in the statement on all-round machinists.

SETUP MEN (MACHINE TOOLS)

(D.O.T. 600.380)

Nature of the Work

The setup man, often called a machine tool job setter, is a skilled specialist employed in plants and machine shops that do machining in large volume. His main job is to get machine tools ready for use (set up), and to explain to semiskilled workers the operations to be performed and ways to check the accuracy of their work. Usually a setup man is assigned a number of machine tools that often are of one type, such as turret lathes. However, he may set up several different kinds. Working from drawings, blueprints, written specifications, or job layouts, he determines the rate at which the material is to be fed into the machines, operating speeds, tooling, and operation sequence. He then selects and installs the proper cutting or other tools and adjusts guides, stops, and other controls. He may make trial runs and adjust the machine and tools until the parts produced conform to specifications. The machine is then turned over to a semiskilled operator.

Places of Employment

Most of the estimated 43,000 setup men in 1972 were employed in factories that manufactured fabricated metal products, transportation equipment, and machinery. These workers usually were employed by large companies that employed many semiskilled machine tool operators. They are not usually employed in maintenance shops or in small jobbing shops.

Training, Other Qualifications, and Advancement

A setup man must qualify as an all-round machinist. He must be able to operate one or more kinds of machine tools and select the sequence of operations so that metal parts will be made according to specifications. The ability to communicate clearly is important in explaining the machining operations to semiskilled workers. Setup men may be advanced within a shop or transferred into other jobs, such as parts programmer.

Employment Outlook

Employment of setup men is expected to increase rapidly through the mid-1980's as a result of the anti-

cipated expansion of metalworking activities due to heightened consumer and industrial demand for machined goods. Offsetting this somewhat will be increased productivity of setup men due to numerically-controlled machined tools. Job opportunities also will arise from the need to replace experienced setup men who retire, die, or transfer to other fields of work.

Earnings and Working Conditions

The earnings of setup men compare favorably with those of other skilled machining workers. In 1972, setup men generally earned between $4 and $6 an hour for a standard workweek.

Good safety habits are important since the setup man must handle sharp cutting tools. He also may be exposed to high-speed machine tools that have sharp cutting instruments when he makes the trial runs to test the accuracy of the setup.

Companies that employ setup men usually provide paid holidays and vacations. Many also provide paid accident, health and life insurance, and retirement.

Many setup men are members of unions, including the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America; and the United Steelworkers of America.

Sources of Additional Information

See list under this same heading in the statement on all-round machinists.

TOOL AND DIE MAKERS

(D.O.T. 601.280, .281, and .381)

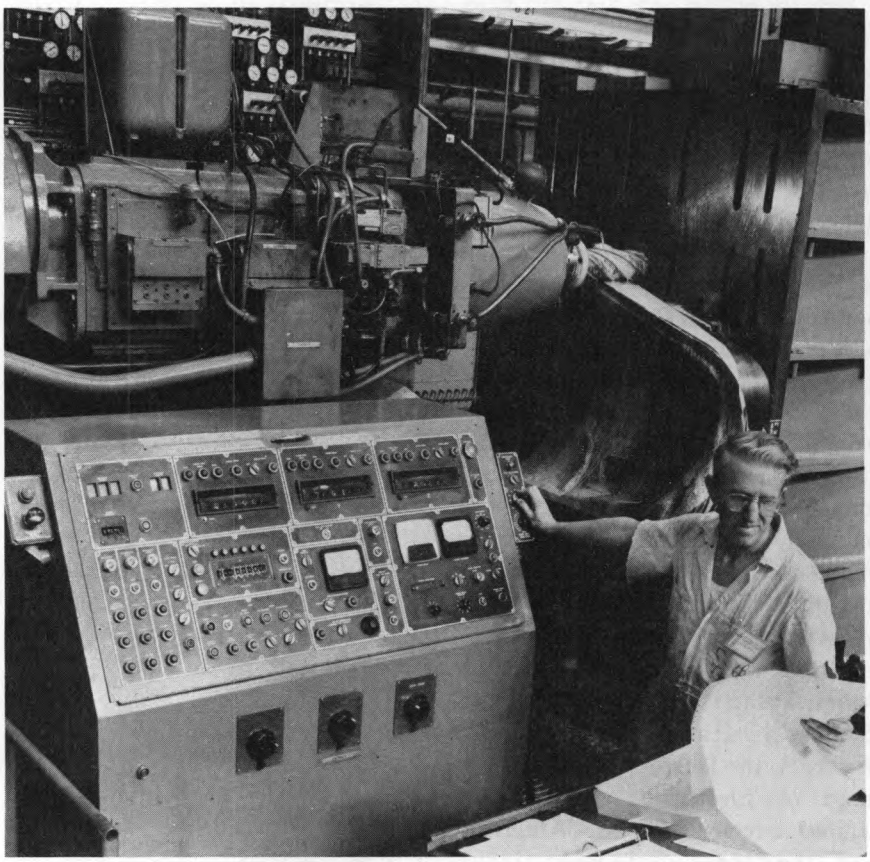
Nature of the Work

Tool and die makers are highly skilled, creative workers whose products—tools, dies, and special guiding and holding devices—are used to mass-produce metal parts. Toolmakers produce jigs and fixtures (devices that hold metal while it is shaved, stamped, or drilled). They also make gauges and other measuring devices for manufacturing precision metal parts. Diemakers construct metal forms (dies) to shape metal in stamping and forging operations. They also make metal molds for diecasting and for molding plastics. Tool and die makers repair worn or damaged dies, gauges, jigs, and fixtures, and design tools and dies.

Compared with most other machining workers, tool and die makers have a broad knowledge of machining operations, mathematics, and blueprint reading, and do precise handwork. Tool and die makers use almost every type of machine tool and precision-measuring instrument. They work and are familiar with the machining properties of metals and alloys commonly used in manufacturing.

Places of Employment

In 1972, about 170,000 tool and die makers were employed, primarily in plants that produce manufacturing, construction, and farm



Tool and Die maker uses computer run machine to make dies.

machinery. Others worked in automobile, aircraft, and other transportation equipment industries; small tool and die shops; and electrical machinery and fabricated metal industries.

Tool and die workers are found in every State. Large numbers were employed in California, Illinois, Michigan, New York, Ohio, and Pennsylvania.

Training, Other Qualifications, and Advancement

Tool and die making skills can be obtained through formal apprenticeship or equivalent on-the-job training. Applicants should have a good working knowledge of mathematics and physics, as well as considerable mechanical ability, finger dexterity, and an aptitude for precise work.

In selecting apprentices, most employers prefer young men who have a high school or trade school education. Some employers test apprentice applicants to determine their mechanical aptitudes and their abilities in mathematics. Young people entering the trade must be able to work to exacting standards in various types of tool and die work.

Most of the four years of a tool and die apprenticeship are spent in practical shop training. The apprentice learns to operate the drill press, milling machine, lathe, grinder, and other machine tools. He also learns, to use hand tools in fitting and assembling tools, gauges, and other mechanical equipment, and studies heat treating and other metalworking processes. Classroom training consists of shop mathematics, shop theory, mechanical drawing, tool designing, and blueprint reading. Several years' experience after apprenticeship is often necessary to qualify for more difficult tool and die work. Some companies have separate appenticeship programs for toolmaking and diemaking.

Some machining workers become tool and die makers without completing formal apprenticeships. After years of experience as skilled machine tool operators or machinists, plus additional classroom training, they develop into all-round workers who can skillfully perform tool and die making.

Tool and die makers can become tool designers or advance to supervisory positions. Some open their own tool and die shops.

Employment Outlook

Employment of tool and die makers is expected to increase slowly through the mid-1980's. Most job opportunities will become available as experienced tool and die makers retire, die, or transfer to other fields of work.

The anticipated long-range expansion in the machinery, electrical equipment, transportation equipment, and other metalworking industries will result in a continued need for tools and dies. The growth of this occupation may be limited, however, by the use of electrical-discharge machines and numerically-controlled machines that have significantly changed toolmaking processes. Numerically-controlled machining operations require fewer of the special tools and jigs and fixtures that are made by tool and die makers. Numerically-controlled machines also could replace many of the conventional machines now used in manufacturing tools, jigs, and fixtures, and could increase the output of each tool and die maker.

As a group, tool and die makers have a long working life, because their extensive skills and knowledge can be acquired only after many years of experience. Tool and die makers also have greater occupational mobility than other less skilled workers, and can transfer to jobs as machinists.

Earnings and Working Conditions

Tool and die makers are among the highest-paid machining workers. Average hourly rates for tool and die makers in 15 areas surveyed in 1972–73 are presented below:

Area	*Hourly rate*
Atlanta	$5.44
Baltimore	5.40
Buffalo	5.74
Chattanooga	4.13
Chicago	6.03
Cincinnati	5.39
Dallas	5.00
Denver	5.38
Detroit	6.15
Houston	4.85
Los Angeles–Long Beach	5.37
New York	5.16
Salt Lake City	4.51
San Francisco–Oakland	6.66
Worcester, Mass.	4.21

As with other machining workers, tool and die makers wear protective glasses when working around metal cutting machines. Tool and die shops are usually safer than similar operations in production plants.

Most companies that employ tool and die makers pay for holidays and vacations. Health, life, and accident insurance and pensions are among other benefits.

Many tool and die makers are members of unions, including the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America; and the United Steelworkers of America.

Sources of Additional Information

See list under this same heading in the statement on all-round machinists.

PRINTING OCCUPATIONS

In 1972, more than 400,000 printing craftsmen were employed to produce newspapers, magazines, business forms, and hundreds of other printed materials. Although most of these craftsmen worked for publishers and commercial printing shops, many had jobs in insurance companies, paper mills, government agencies, and many other organizations that do their own printing.

Printing craftsmen usually specialize in one area of printing operations: type composition, platemaking, presswork, or binding. The most common way to learn the skills needed in most of these fields is through apprenticeship, which generally lasts from 4 to 6 years. Apprenticeship applicants usually must be high school graduates who are 18 to 30 years of age, but requirements vary among employers. Most printing craftsmen who are covered by union contracts work fewer than 40 hours a week. Some contracts specify a standard workweek of less than 35 hours, but most fall within a 35 to 37-1/2 hour range.

Through the mid-1980's, opportunities to enter printing crafts will stem mainly from the need to replace experienced workers who retire, die, or leave the field for other reasons. Employment growth also will provide job openings in some crafts, but laborsaving technological developments will restrict growth in others.

The statements that follow deal with employment opportunities for the major groups of printing workers: composing room occupations, photoengravers, electrotypers and stereotypers, printing pressmen and assistants, lithographic occupations, and bookbinders.

BOOKBINDERS AND RELATED WORKERS

Nature of the Work

Many printed items, such as books and magazines must be folded, sewed, stapled, or bound after they leave the printing shops. Much of this work is done by skilled *bookbinders* (D.O.T. 977.781).

Edition-binding—making books in quantity from big, flat printed sheets of paper—is the most complicated kind of binding. Bookbinders first fold the printed sheets into one unit or more, known as a "signature," so that the pages will be in the right order. They then insert any illustrations that have been printed separately, gather and assemble signatures in proper order, and sew them together. They shape the book bodies with presses and trimming machines and reinforce them with glued fabric strips. Covers are glued or pasted onto the book bodies, and then the books undergo a variety of finishing operations and frequently are wrapped in paper jackets. Machines are used extensively throughout the process.

Skilled bookbinders seldom perform all the different binding tasks, but many have had training in all of them. In large shops, skilled bookbinders may be assigned to one or a few operations, most often to the operation of complicated machines, such as rounding and cutting machines.

Bookbinder finishes cover.

In many binding shops much of the work is done by bindery workers who are trained in only one operation or in a small number of relatively simple tasks. For example, bindery workers perform such tasks as fastening sheets or signatures together using a machine stapler and feeding signatures into various machines for stitching, folding, or gluing operations.

Places of Employment

About 33,000 bookbinders were employed in 1972. Many work in shops that specialize in bookbinding; others work in the bindery departments of book publishing firms, commercial printing plants, and large libraries. Some bookbinders work for the Federal government.

Training and Other Qualifications

A 4- or 5-year apprenticeship, which includes on-the-job training as well as related classroom instruction, 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. During the apprenticeship, trainees learn to assemble signatures; to renovate old, worn bindings; and to use various binding machines, such as puncher and folders.

Most unskilled bindery hands learn their tasks through informal on-the-job training which may last from several months to 2 years. A few learn through formal apprenticeship programs that include classroom instruction as well as on-the-job training.

Employment Outlook

Employment of bookbinders and bindery workers is expected to increase moderately through the mid-1980's. In addition to the jobs from employment growth, several hundred openings will arise each year as experienced workers retire or change occupations.

Despite the anticipated growth in the amount of bound printed materials, employment growth will be limited by the increasing mechanization of bindery operations. For example, the use of integral folders which automatically fold pages as they come off the press.

Earnings and Working Conditions

Wage rates for skilled bookbinders tend to be below the average for other printing crafts. A survey of union wage rates in 69 large cities showed that the minimum wage rates for bookbinders in publishing firms and bookbinding shops averaged $5.86 an hour in 1972. This rate was about half again above the average for nonsupervisory workers in all private industries, except farming. Among the individual cities surveyed, minimum hourly rates for bookbinders ranged from $3.06 in Syracuse, N.Y. to $7.88 in New York, N.Y.

The wage rates for bindery workers are considerably lower than the rates for bookbinders, and are among the lowest for printing industry workers. A survey of union wages in 69 large cities shows that in 1972 the average minimum hourly rate for bindery workers was $3.54. Among the individual cities surveyed, minimum hourly rates for bindery workers ranged from $3.06 in Syracuse, N.Y., to $4.25 in New York, N.Y.

Bookbinding shops tend to be noisy when machinery is operating. Bookbinders have some variety in their jobs, but the jobs of bindery workers tend to be monotonous.

Most bindery workers are members of the Graphic Arts Union.

Sources of Additional Information

Details about apprenticeship and other training opportunities may be obtained from local bookbinding shops, local offices of the Graphic Arts Union, or the local office of the State employment service.

General information on bookbinding occupations is available from the following organizations:

American Newspaper Association, 11600 Sunrise Valley Dr., Reston, Va. 20041.

The Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213.

The Graphic Arts Union, 1900 L St. NW., Washington, D.C. 20036.

Printing Industries of America, Inc., 1730 North Lynn St., Arlington, Va. 22201.

COMPOSING ROOM OCCUPATIONS

(D.O.T. 650.582, 654.782, and 973.381)

Nature of the Work

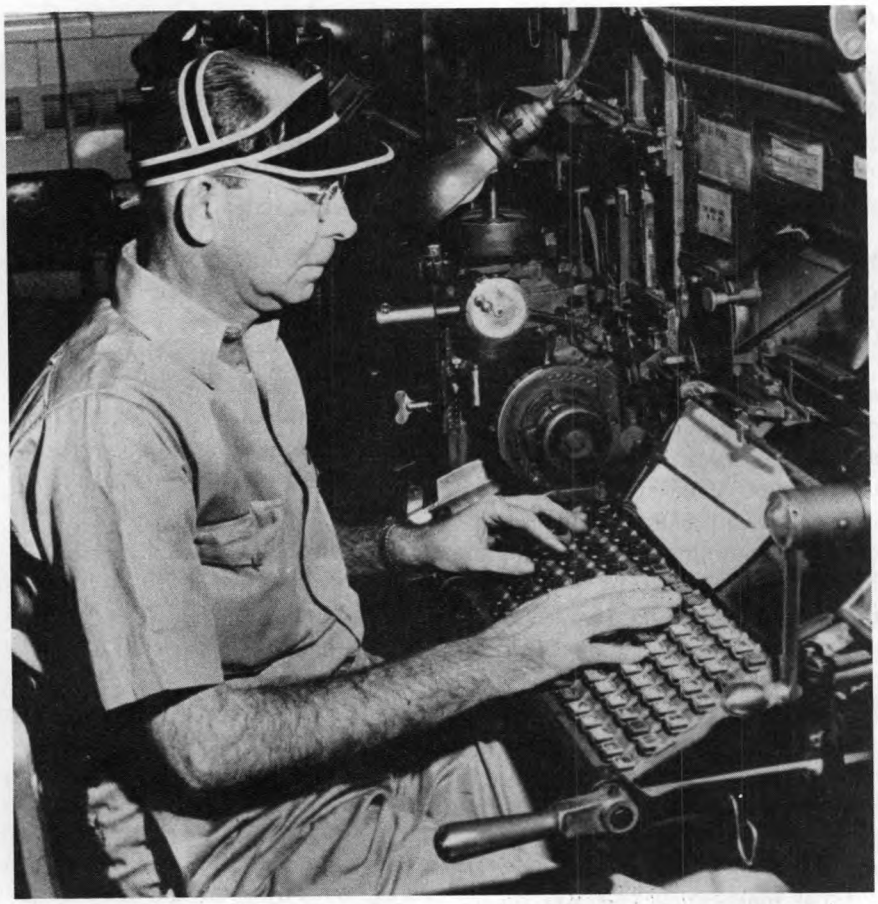
The printing process begins in a composing room when manuscript copy is set in type, proofed, and checked for errors. Machine and handset type and other materials such as photoengravings are assembled and prepared for the pressroom.

Hand compositors (typesetters) (D.O.T. 973.381) make up the oldest composing-room occupation. Today most type that is set by hand is for work that requires special composition (usually larger size type for advertising copy) and for small jobs in which the setting of type by machine would be impractical.

To set type, the compositor reads from the manuscript copy and sets each line of type in a "composing stick" (a device that holds type in place) letter by letter and line by line. When this stick is full, the compositor slides the completed lines onto a shallow metal tray called a "galley."

Typesetting machine operators are craftsmen who operate semiautomatic machines which set type much more rapidly than hand methods. Many of these workers specialize in operating linotype, keyboard, casting, or phototypesetting machines.

Linotype (or intertype) machine operators (D.O.T. 650.582), reading from the copy clipped to the machine's copy board, select letters and other characters by operating a keyboard which has 90 keys. As they press the keys, the letters, in forms of metal molds, are assembled into lines of words. As they complete each line, the operators touch a lever and the machine automatically casts the line of type into a solid metal strip called a "slug." The slugs are assembled



Linotype operator sets type.

into the type forms from which either the printing impressions or printing plates are made. Nearly all newspaper plants, large commercial shops, and typographic composition firms use these machines to set type. In small plants, operators also may maintain and repair typesetting machines.

Monotype keyboard operators (D.O.T. 650.582) operate keyboards which are similar to typewriters, but which have about four times as many keys. The keyboard machine produces a perforated paper tape that later is fed into the casting machine by *monotype caster operators* (D.O.T. 654.782). The machine reads the tape and automatically selects the metal molds for each letter. Molten metal is forced into molds to form the type. Caster operators insert the tape, adjust and tend the machine while it is operating, and do minor maintenance and repair work.

Phototypesetting machine operators (D.O.T. 650.582) operate high speed typesetting machines. In phototypesetting, a photographic process replaces the function of the hot metal, and the final product is a film or photographic print of the type rather than a metal slug. In a common kind of phototypesetting, perforated paper tape or a magnetic tape is fed into a machine which reads the tape and photographs the individual characters indicated on the tape.

In addition to machine operation, phototypesetters must be familiar with the fundamentals of photography, including darkroom procedures, to develop the film. They also make minor repairs on the phototypesetting machine. Since much of this equipment has electronic controls, operators need a basic knowledge of the principles of electronics.

Typesetting machine operators also use machines similar to typewriters to set "cold type" on paper. "Cold type" composition may be set directly on a paper or metal sheet from which the plate is to be made, or the cold type images may be cut from paper and pasted on layout sheets. The process of assembling and pasting this type on layout sheets is called paste makeup, and is somewhat similar to hand composition. The worker who assembles and pastes up all the materials for a page is called a *paste-makeup man.* Cold type composition frequently is used by newspapers for display advertising, and to set regular text copy.

Places of Employment

About 170,000 workers were employed in composing room occupations in 1972. About one-third work for newspaper plants. Many others work for commercial printing plants, book and magazine printers, and Federal, State, and local governments. Some work for banks, insurance companies, advertising agencies, manufacturers, and other firms that do their own printing.

Composing room workers can find jobs in almost every community throughout the country, but they are concentrated in large cities.

Training and Other Qualifications

Most compositors obtain their skills through apprenticeship training. Others learn while working as shop helpers for several years, or through a combination of trade

school and helper experience.

Generally, apprenticeship covers a 6-year period of progressively advanced training, supplemented by classroom instruction or correspondence courses. However, this period may be shortened by as much as 2 to 2-1/2 years for apprentices who have had previous experience or schooling or who show the ability to learn the trade more rapidly.

After basic training as a hand compositor, the apprentice receives intensive training in one specialized field or more, such as in the operation of typesetting machines, including phototypesetting and teletypesetting machines, as well as in specialized work in hand composition and photocomposition.

Applicants for apprenticeship generally must be high school graduates and in good physical condition. They sometimes are given aptitude tests. Important qualifications include training in English, especially spelling, and in mathematics. Printing and typing courses in vocational or high schools are good preparation for apprenticeship applicants, and a general interest in electronics and photography is becoming increasingly useful. Artistic ability is an asset for a compositor in layout work.

Tape-perforating machine operators must be expert typists. They generally learn to type in commercial courses in high school or in business school. These operators do not need to be trained as journeymen compositors but they must be familiar with printing terms and measurements. The training period for tape-perforating machine operators is about a year.

Employment Outlook

Employment in composing-room occupations is expected to decline slowly through the mid-1980's. Nevertheless, a few thousand job openings are expected each year as experienced workers retire, die, or change occupations.

In spite of the anticipated expansion in the volume of printing, employment in composing room occupations is expected to decline because of technological changes in typesetting equipment that will enable fewer operators to set type faster. For example, over the past decade automatically operated typesetting machines have been used increasingly. The use of computers, programmed to perforate the codes for spacing, length of line, and hyphenation, simplifies the work of the tape-perforating machine operator and increases the speed at which type can be set.

Technological changes also will affect the educational and skill requirements for composing room workers. For example, greater use of phototypesetting requires workers who have some photographic skills. Since much of the new typesetting equipment is operated by electronics systems, a knowledge of the principles of electronics is becoming increasingly important for composing room workers.

Earnings and Working Conditions

Union compositors on the day shift in newspaper plants had an average minimum rate of $5.94 an hour in 1972, according to a survey of 69 large cities. This rate was about one-half more than the average for nonsupervisory workers in all private industries, except farming. Minimum hourly rates for compositors among the surveyed cities ranged from $3.55 in Tampa, Fla., to $6.86 in Chicago, Ill. Compositors who worked nights received slightly higher pay.

Working conditions for compositors vary from plant to plant. Some heat and noise are made by typesetting machines. In general, the new plants are well-lighted and clean, and many are air-conditioned. Hand compositors have to stand for long periods and do some heavy lifting. People with some types of physical handicaps, such as deafness, have been able to work in the trade.

A substantial proportion of compositors are members of the International Typographical Union.

Sources of Additional Information

Details about apprenticeship and other training opportunities may be obtained from local employers, such as newspapers and printing shops, the local office of the International Typographical Union, or the local office of the State employment service.

General information on composing room occupations is available from the following organizations:

American Newspaper Publishers Association, 11600 Sunrise Valley Dr., Reston, Va. 20041.

Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213.

International Typographic Composition Association, Inc., 2233 Wisconsin Ave. NW., Washington, D.C. 20007.

International Typographical Union, P.O. Box 157, Colorado Springs, Colo. 80901.

Printing Industries of America, Inc., 1730 North Lynn St., Arlington, Va. 22201.

ELECTROTYPERS AND STEREOTYPERS

Nature of the Work

Electrotypers (D.O.T. 974.381) and *stereotypers* (D.O.T. 975.782)

make duplicate press plates of metal, rubber, and plastic for letterpress printing. These plates are made from the metal type forms prepared in the composing room. Electrotypes are used mainly in book and magazine work. Stereotypes, which are less durable, are used chiefly for newspapers. Electrotyping and stereotyping are necessary because most volume printing requires the use of duplicate plates. When a large edition of a magazine or newspaper is printed, several plates must be used to replace those which become too worn to make clear impressions. Furthermore, many big plants use rotary presses which require curved plates made by either electrotyping or stereotyping from flat type forms.

Electrotypers make a wax or plastic mold of the metal type form which is coated with chemical solutions before being placed in an electrolytic bath containing metal. This leaves a metallic shell on the coated mold. The shell is stripped from the mold, backed with metal or plastic, and carefully finished.

The stereotyping process is simpler, quicker, and less expensive than electrotyping, but it does not yield as durable or as fine a plate. Stereotypers make molds or mats of papermache instead of wax or plastic. The mat is placed on the type form and covered with a cork blanket and a sheet of fiberboard. The covered form is run under heavy steel rollers to impress the type and photoengravings on the mat. Then the mat is placed in a stereotype casting machine which casts a composition lead plate on the mold. In many of the larger plants, automatic machines cast stereotype plates.

Some electrotypers and stereotypers do only one phase of the work, such as casting, molding, or finishing. Others handle many tasks.

Places of Employment

About 4,000 electrotypers and stereotypers were employed in 1972. Many electrotypers work in large plants that print books and magazines. Most stereotypers work for newspaper plants, but some are employed in large commercial printing plants. Electrotypers and stereotypers also are employed in service shops which do this work for printing firms.

Jobs in these trades can be found throughout the country, but employment is concentrated in large cities.

Training and Other Qualifications

Nearly all electrotypers and stereotypers learn their trades through 5- to 6-year apprenticeships. Electrotyping and stereotyping are separate crafts and relatively few transfers take place between the two. The apprenticeship program of each trade covers all phases of the work and almost always includes classes in related technical subjects as well as training on the job.

Apprenticeship applicants must be at least 18 years of age and, in most instances, must have a high school education or its equivalent. If possible, this education should include courses in chemistry and machine shop. Physical examinations and aptitude tests often are given to prospective apprentices.

Employment Outlook

Employment of electrotypers and stereotypers is expected to decline slowly through the mid-1980's. Nevertheless, a small number of openings will arise as experienced workers retire, die, or change occupations.

Despite the anticipated increase in the total volume of printing, employment will decline because of labor-saving technological developments. For example, the increasing use of automatic plate-casting eliminates many steps in platemaking. Furthermore, the greater use of lithographic (offset) printing reduces the need for electrotype and stereotype plates, which are not needed in lithographic printing.

Earnings and Working Conditions

In 1972 union minimum wage rates in 69 large cities averaged $5.58 an hour for electrotypers and $5.83 an hour for stereotypers in book and commercial printing shops. Both averages were considerably higher than the average for nonsupervisory workers in all private industries, except farming.

Much of the work in these trades requires little physical effort since the preparation of duplicate printing plates is highly mechanized. However, some lifting of relatively heavy press plates is required.

Nearly all electrotypers and stereotypers are members of the International Stereotypers' and Electrotypers' Union of North America.

Sources of Additional Information

Details about apprenticeship and other training opportunities may be obtained from local employers, such as newspapers and printing shops, the local office of the International Stereotypers' and Electrotypers' Union, or the local office of the State employment service.

General information on electrotypers and stereotypers is available from the following organizations:

American Newspaper Publishers Association, 11600 Sunrise Valley Dr., Reston, Va. 20041.

Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213.

International Stereotypers' and Electrotypers' Union of North America, 10 South La Salle St., Chicago, Ill. 60603.

Printing Industries of America, 1730 North Lynn St., Arlington, Va. 22201.

LITHOGRAPHIC OCCUPATIONS

Nature of the Work

Lithography, also called offset printing, is one of the most rapidly growing methods of printing. It is a process of photographing the matter to be printed, making a printing plate from the photograph, and pressing the inked plate against a rubber plate which in turn presses it onto the paper.

Several operations are involved in lithography, and each is performed by a specialized group of workers. The main group of lithographic workers includes cameramen, artists, and letterers, strippers, platemakers, and pressmen.

Cameramen (D.O.T. 972.382) start the process of making a lithographic plate by photographing and developing negatives of the copy. They generally are classified as line cameramen, halftone cameramen, or color separation photographers. Negatives may need retouching to lighten or darken certain parts. *Lithographic artists* (D.O.T. 972.281) make these corrections by sharpening or reshaping images on the negatives. They do the work by hand, using chemicals, dyes, and special tools. Like cameramen, they are assigned to only one phase of the work, and may have job titles such as dot etchers, retouchers, or letterers.

Strippers (D.O.T. 971.281) arrange and paste film or prints of type and art work on the layout sheets from which photographic impressions are made for the press plates. *Platemakers* (D.O.T. 972.781) cover the surface of the plates with a coating of photosensitive chemicals, or the plate may come with the coating already applied. After exposing the sensitized plate to the negative, they chemically treat the plate to bring out the photographic image.

Lithographic pressmen (D.O.T. 651.782) tend lithographic (offset) printing presses. They install plates on the presses and adjust the pressure and water and ink rollers for correct operation. Basically, the duties of these workers are similar to those of letterpress and gravure pressmen.

Places of Employment

About 80,000 skilled lithographic workers were employed in 1972. Many work for commercial printing plants, newspapers, and book and magazine printers. Some work for the U.S. Government Printing Office.

Lithographic workers can find jobs throughout the country, but most jobs are in large cities.

Training and Other Qualifications

A 4- or 5-year apprenticeship program usually is required in order to become a well-rounded lithographic craftsman. These programs may emphasize a specific craft, such as platemaker or pressman, although an attempt is made to make the ap-

prentice familiar with all lithographic operations.

Usually, apprenticeship applicants must be in good physical condition, high school graduates, and at least 18 years of age. Aptitude tests are sometimes given to prospective apprentices. High school and vocational school training in photography, mathematics, chemistry, physics, and art are helpful in learning these crafts.

Employment Outlook

Employment of skilled lithographic workers is expected to increase very rapidly through the mid-1980's. In addition to the job openings resulting from employment growth, the need to replace workers who retire, die, or change occupations will provide some openings.

Employment of lithographic workers is expected to increase in response to the continued growth of offset printing. Commercial printing firms and newspaper publishers increasingly are using offset presses in place of letter presses. Employment growth also will be stimulated by the greater use of photographs and drawings in printed matter, and by the more widespread use of color in many printed products.

Earnings and Working Conditions

Average minimum union rates for cameramen, dot etchers or process artists, and letterers ranged from $4.00 an hour in Little Rock, Ark., to $7.46 an hour in Boston, Mass., according to a survey in 69 large cities in 1972. Rates of platemakers ranged from $4.00 an hour in Little Rock, Ark., to $7.15 an hour in Boston, Mass. The wide range of rates for lithographic pressmen—from $3.21 an hour for small multilith press operators in Little Rock, to $9.51 an hour for a pressman on a large web press in Chicago—is due largely to the many different types and sizes of presses.

Lithographic workers are on their feet much of the time, but the work is not strenuous. They are sometimes under pressure to meet publication deadlines.

Most lithographic workers are members of the Graphic Arts International Union. A large number of offset pressmen are members of the International Printing Pressmen and Assistants' Union of North America.

Sources of Additional Information

Details on apprenticeship and other training opportunities in lithographic occupations are available from local employers, such as newspapers and printing shops, local offices of the union previously mentioned, or the local office of the State employment service. General information on lithographic occupations may be obtained from:

American Newspaper Publishers Association, 11600 Sunrise Valley Dr., Reston, Va. 20041.

Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213.

The Graphic Arts International Union, 1900 L St. NW., Washington, D.C. 20036.

International Printing Pressmen and Assistants' Union of North America, 1730 Rhode Island Ave. NW., Washington, D.C. 20036.

National Association of Photo-Lithographers, 230 West 41st St., New York, N.Y. 10036.

Printing Industries of America, Inc., 1730 North Lynn St., Arlington, Va. 22201.

PHOTOENGRAVERS

(D.O.T. 971.281 and .382)

Nature of the Work

Photoengravers make metal printing plates of pictures and other copy that cannot be set up in type. In letterpress photoengraving, ink is rolled over the printed surface which stands higher than the rest of the plate. When paper is pressed against the raised surface, the print or image is picked up. Similarly, gravure photoengravers make gravure plates on which the image is etched below the plate's surface. Ink is placed in the etched or sunken areas, and when paper is pressed against the surface the ink is lifted out and appears on the paper.

In the making of a photoengraving plate for the letterpress process, the entire job may be done either by one worker or by several, each doing a particular operation, such as camera work, printing, and etching. In large shops, however, the work is divided almost always among a number of these specialists.

Photoengravers first photograph the material to be reproduced. After developing the negative, they print the image on a metal plate by coating the plate with a solution sensitive to light and then exposing it to the negative. When the plate is placed in an acid bath, the nonimage areas are etched away and the image areas stand out.

The number of photoengraving operations performed depends on the quality of the printing required. Photoengravings for very high quality books or periodicals, for example, require more careful finishing than those for newspapers. Photoengravers use handtools to inspect and touch up the plates. They cut away metal from the nonprinting part of the plate to prevent it from

touching the inking rollers during printing.

Gravure photoengraving is like letterpress photoengraving, except that in gravure photoengraving the image areas rather than the background are etched away.

Places of Employment

An estimated 16,000 journeymen photoengravers were employed in 1972. More than half work in commercial shops making photoengravings for other printing firms. Newspapers and rotogravure shops employ several thousand photoengravers. Book and magazine printers and the Federal government also employ these craftsmen. Many photoengravers have their own shops.

Photoengravers can find jobs throughout the country, but employment is concentrated in large printing centers, such as New York, Chicago, Philadelphia, and Los Angeles.

Training and Other Qualifications

Most photoengravers learn their trade through a 5-year apprenticeship program which includes at least 800 hours of classroom instruction. Apprenticeship applicants must be at least 18 years of age and generally must have a high school education or its equivalent, preferably with courses in chemistry and physics. Many employers require a physical examination for prospective photoengravers; the condition of the applicant's eyes is particularly important because of the close work and color discrimination involved.

Employment Outlook

Employment of photoengravers is expected to decline slowly through the mid-1980's. However, a few hundred job openings are expected each year as experienced workers retire, die, or change occupations.

Employment of these craftsmen is expected to decline despite the growing use of photographs and other illustrations in publications. Improved photographic equipment, and the increasing use of lithographic (offset) printing, which requires no photoengraving, will limit the number of photoengravers needed.

Earnings and Working Conditions

Union photoengravers on the day shift in newspaper plants had an average minimum rate of $6.46 an hour in 1972, according to a survey of 69 large cities. This average was about two-thirds more than the average for nonsupervisory workers in all private industries, except farming. Minimum hourly rates for photoengravers among the surveyed cities ranged from $4.31 in Jacksonville, Fla. to $8.01 in New York, N.Y.

Photoengravers stand up much of the time, but the work is not strenuous. Work areas usually are air-conditioned and well-lighted. Most photoengravers are members of the Graphic Arts International Union.

Sources of Additional Information

Details about apprenticeship and other training opportunities may be obtained from local employers, such as newspapers and printing shops, the local office of the Graphic Arts Union, or the local office of the State employment service.

General information on photoengravers is available from the following organizations:

American Newspaper Publishers Association, 11600 Sunrise Valley Dr., Reston, Va. 20041.

American Photoplatemakers Association, 166 West Van Buren St., Chicago, Ill. 60604.

Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213.

The Graphic Arts Union, 1900 L St. NW., Washington, D.C. 20036.

Printing Industries of America, Inc., 1730 North Lynn St., Arlington, Va. 22201.

PRINTING PRESSMEN AND ASSISTANTS

(D.O.T. 651.782, .885, and .886)

Nature of the Work

The actual printing operation is performed in the pressroom. Printing pressmen prepare type forms and press plates for final printing and tend the presses.

The object of preparation work is to insure printing impressions that are distinct and uniform. This operation may be performed by placing pieces of paper exactly the right thickness underneath low areas of the press plates to level them. Pressmen also adjust control margins and the flow of ink to the inking roller. In some shops, they oil and clean the presses and make minor repairs. Pressmen who work with large presses have assistants and helpers.

Pressmen's work may differ greatly from one shop to another, mainly because of differences in the kinds and sizes of presses. Small commercial shops generally have small and relatively simple manual presses. At the other extreme are the enormous presses used by the large newspaper, magazine, and book printers. These giant presses are fed paper in big rolls called "webs" up to 50 inches or more in width. They print the paper on both sides; cut, assemble, and fold the pages; and count the finished newspaper sections as they come off the press. Presses of this kind are operated by crews of journeymen and less skilled workers under the direction of a *pressman-in-charge.*

Places of Employment

About 140,000 pressmen and assistants were employed in 1972. More than half work for commercial printing shops and book and magazine publishers. Many others have jobs in newspapers plants. Some pressmen and assistants are employed by banks, insurance companies, manufacturers, and other organizations that do their own printing, such as Federal, State, and local governments.

Pressmen and assistants can find jobs throughout the country, but employment is concentrated in large cities.

Training and Other Qualifications

Most pressmen learn their trade through apprenticeship, but some workers learn while working as helpers or press assistant. Others obtain their skills through a combination of work experience and vocational or technical school training.

The length of apprenticeship and the content of training depend largely on the kind of press used in the plant. The apprenticeship period in commercial shops is 2 years for press assistants, and 4 to 5 years for pressmen. In addition to on-the-job instruction, the apprenticeship includes related classroom or correspondence school courses.

Individual companies generally choose apprentices from among press assistants and others already employed in the plant. Young people often may work for 2 or 3 years in the pressroom before they begin apprenticeship training. A high school education or its equivalent generally is required. Because of technical developments in the printing industry, courses in chemistry and physics are helpful. Mechanical aptitude is important in making press adjustments and repairs. An ability to visualize color is essential for work on color presses, which are being used increasingly. Physical strength and endurance are needed for work on some kinds of presses, where the pressmen lift heavy plates and stand for long periods.

Employment Outlook

Employment of pressmen is expected to increase slowly through the mid-1980's. In addition to the jobs from employment growth, a few thousand openings will arise each year as experienced workers retire, die, or change occupations.

More pressmen will be needed because of growth in the amount of printed materials. The use of faster and more efficient presses, many of which have automatic controls, will limit employment growth.

Earnings and Working Conditions

A survey of union wages in 69 large cities shows that in 1972 the average minimum hourly rate for newspaper pressmen-in-charge was $6.06; for newspaper pressmen, $5.80; for book and job cylinder pressmen, $5.92; and for book and job press assistants and feeders, $5.29. These rates were higher than the average for all nonsupervisory workers in private industries, except farming. Many pressmen work night shifts and receive extra pay.

Pressrooms are noisy, and workers in certain areas frequently wear ear protectors. Pressmen are subject to hazards when working near machinery, and often have to lift heavy type forms and press plates. At times, they work under pressure to meet deadlines.

Most pressroom workers are covered by union agreements. The principle union in this field is the International Printing Pressmen and Assistants' Union of North America.

Sources of Additional Information

Details about apprenticeship and other training opportunities may be obtained from local employers, such as newspapers and printing shops.

the local office of the International Printing Pressmen and Assistants' Union, or the local office of the State employment service.

General information about pressmen and assistants is available from the following organizations:

American Newspaper Publishers Association, 11600 Sunrise Valley Dr., Reston, Va. 20041.

Graphic Arts Technical Foundation, 4615 Forbes Ave., Pittsburgh, Pa. 15213.

International Printing Pressmen and Assistants' Union of North America, 1730 Rhode Island Ave. NW., Washington, D.C. 20036.

Printing Industries of America, Inc., 1730 North Lynn St., Arlington, Va. 22201.

OTHER INDUSTRIAL PRODUCTION AND RELATED OCCUPATIONS

ASSEMBLERS

Nature of the Work

Television sets, automobiles, and refrigerators are typical of the manufactured products that undergo many assembly operations. Assemblers, most of whom are semiskilled workers, put together the parts for these and thousands of other products.

Some assemblers, known as floor assemblers, put together large, heavy machinery or equipment on shop floors, often fastening parts with bolts, screws, or rivets. Others, known as bench assemblers, put together small parts to make subassemblies or small complete units. Many assemblers work on items that move automatically past their work stations on conveyors. These workers must complete their job within the time it takes the part or product to pass their work station.

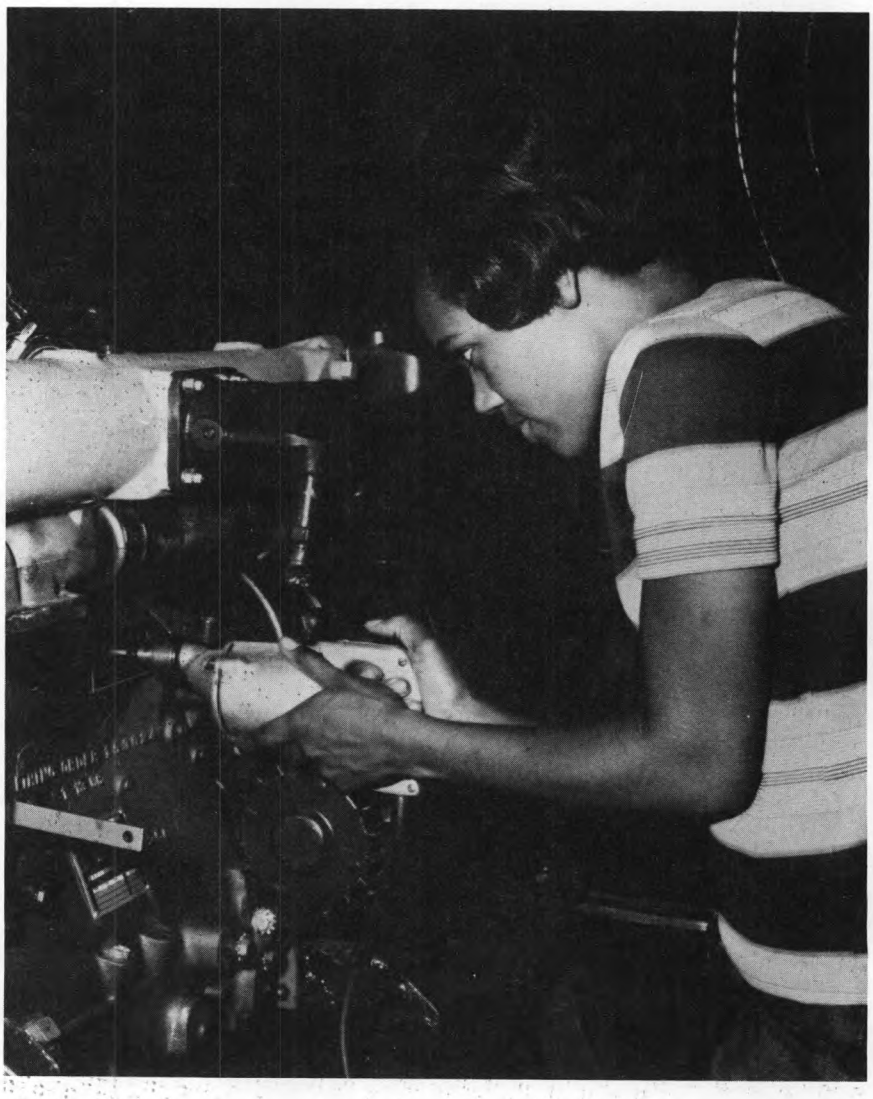
The duties of assemblers depend upon the product being manufactured and the process being used. In aircraft and missile production, these workers may assemble and install parts into subassemblies. In the automobile industry, one assembler may start nuts on bolts, and the next worker may tighten the nuts with power-driven tools. Assemblers in electronic plants may connect parts with electrical wire.

Assemblers use many different tools depending on the product and the work they are doing. Pliers, screwdrivers, soldering irons, power drills, and wrenches are among the common tools used by semiskilled assemblers.

Skilled assemblers work on the more complex parts of subassemblies with little or no supervision, and are responsible for the final assembly of complicated jobs. These workers must know how to read blueprints and other engineering specifications and use a variety of tools and precision measuring instruments. In relatively new fields such as electronics, instrumentation, and missiles, subassembly work may require a high degree of skill.

Places of Employment

In 1972, more than 1 million assemblers—half of them women—worked in manufacturing plants. Most were in plants that made fabricated metal products, machinery, and motor vehicles. More than half of all assemblers were



employed in the heavily industrialized States of California, New York, Michigan, Illinois, Ohio, New Jersey, and Pennsylvania.

Training, Other Qualifications, and Advancement

Inexperienced people can be trained to do assembly work in a few days or weeks. The new worker may have his job duties explained to him by the supervisor and then be placed under the direction of an experienced employee. When the new worker has developed sufficient speed and skill, he is placed "on his own" and is responsible for the work he does.

Employers seek applicants who are physically fit and dependable and who have some aptitude for mechanical work. High school graduates or workers who have taken vocational school courses, such as blueprint reading, are preferred by many employers, although a high school diploma is not usually required. Generally, for production-line jobs, employers look for applicants who can do routine work at a fast pace. For other types of assembly jobs, applicants may have to meet special requirements. For example, in plants that make electrical and electronic products, which may contain many different colored wires, applicants often are tested for color blindness.

A relatively small number of semiskilled assemblers advance to skilled assembly jobs. A few also may become inspectors or foremen.

Employment Outlook

Employment of assemblers is expected to increase slowly through the mid-1980's, with thousands of openings each year. Many more job openings will result as workers retire, die, or transfer to other occupations.

Manufacturing plants will need more assemblers to produce goods for the Nation's growing economy. Growth in population and personal income will increase the demand for consumer products such as automobiles and household appliances. Business expansion will increase the demand for industrial machinery and equipment. Employment of assemblers, however, is not expected to keep pace with manufacturing output because automation of assembly processes and other laborsaving innovations are expected to raise output per worker and limit employment growth.

Employment in plants that produce durable goods, such as automobiles and aircraft, is particularly sensitive to changes in business conditions and national defense needs. Therefore, assemblers in these plants may be subject to occasional layoffs.

Earnings and Working Conditions

Wage rates for assemblers ranged from about $3 to $5 an hour in 1972, according to information from a limited number of union contracts. Variation in wages depends on geographic area, industry, and type of assembly work.

The working conditions of assemblers differ, depending on the particular job performed. Assemblers of electronic equipment may put together small components at a bench in a room that is clean, well lighted, and free from dust. Floor assemblers of industrial machinery, on the other hand, may install and assemble heavy parts and may often be exposed to contact with oil and grease. Workers on assembly lines may be under pressure to keep up with the speed of the lines. Some assemblers are paid incentive or piece-work rates and are encouraged to work more rapidly by the prospect of higher earnings.

Many assemblers are members of labor unions. These include the International Association of Machinists and Aerospece Workers; the International Union of Electrical, Radio and Machine Workers; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; and the International Brotherhood of Electrical Workers. Most union contracts provide for fringe benefits such as holiday and vacation pay, health insurance, life insurance, and retirement pensions.

Source of Additional Information

Additional information about employment opportunities for assemblers may be available from local offices of the State employment service.

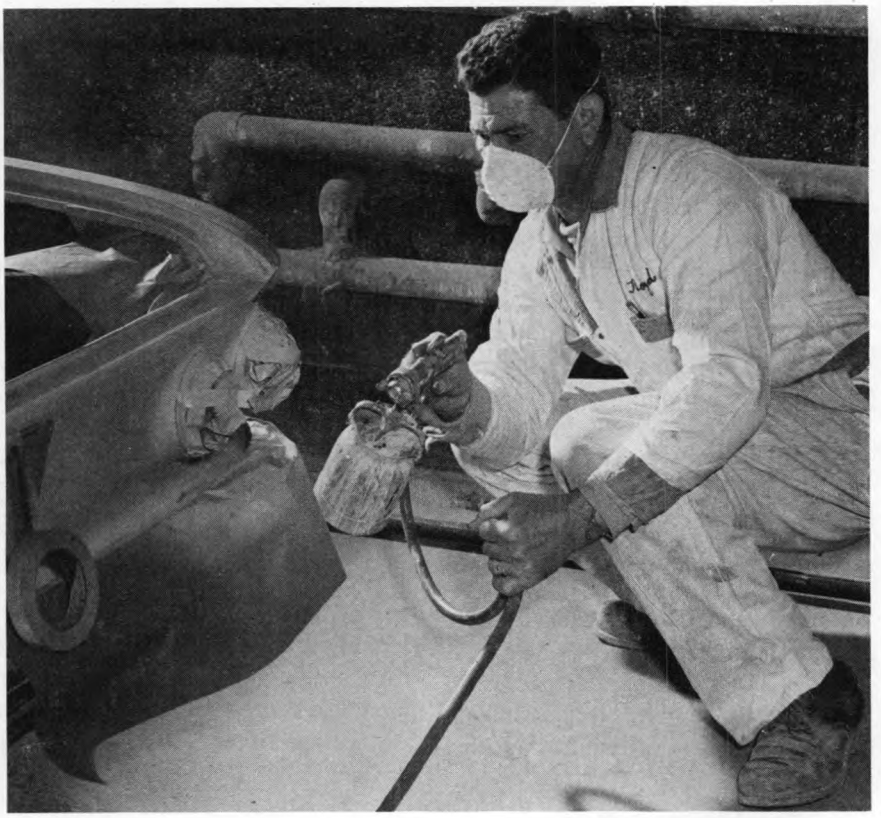
AUTOMOBILE PAINTERS

(D.O.T. 845.781)

Nature of the Work

Automobile painters make old and damaged motor vehicles "look like new." These skilled workers repaint vehicles that have lost the luster of their original paint, and the repaired portions of vehicles damaged in traffic accidents. (Production painters who work for motor vehicle manufacturers are discussed elsewhere in the *Handbook*.)

To prepare an automobile for painting, painters or their helpers rough-sand it to remove original paint and rust. Painters then use a spray gun to apply primer coats to the automobile surface. After the primer dries, they sand the surface



until it is smooth. For rough-sanding, they usually use a pneumatic or electric sander and a coarse grade of sandpaper; final sanding may be done by hand, using a fine grade of sandpaper. Small nicks and scratches that cannot be removed by sanding are filled with automobile-body putty. Masking tape and paper are used to cover areas not to be painted.

Before painting repaired portions of an automobile, painters may mix paints to match the color of the car. Before applying paint, they adjust the nozzle of the spray gun according to the kind of lacquer or enamel being used and, if necessary, adjust the air-pressure regulator to get the needed amount of pressure. Painters must handle the spray gun skillfully so that the paint is applied evenly, rapidly, and thoroughly. To speed drying, they may place the freshly painted automobile under heat lamps or in a special infrared oven. Painters or their helpers may polish the newly painted surface.

Places of Employment

About 25,000 persons worked as automobile painters in 1972. Almost two-thirds worked in shops that specialize in automobile body repairs and painting, and in shops that make general automobile repairs. Most others worked for automobile and truck dealers. Some painters worked for organizations that maintained and repaired their own fleets of motor vehicles, such as trucking companies and bus lines.

Geographically, employment is distributed about the same as population, although automobile painters are employed in every section of the country.

Training, Other Qualifications, and Advancement

Most automobile painters start as helpers, and acquire their skills informally by working with experienced painters. Usually, beginners remove automobile trim, clean, and sand surfaces to be painted, and polish painted surfaces. As helpers gain experience, they progress to more complicated tasks, such as using spray guns to apply primer coats and paint small areas. Three to four years of informal on-the-job training are required in order to become fully qualified.

A small number of automobile painters learn through apprenticeship. Apprenticeship programs, which generally last 3 years, consist of on-the-job training supplemented by classroom instruction.

In 1972, training programs for unemployed and underemployed workers seeking entry jobs as automobile painters were in operation in several cities, under the Manpower Development and Training Act. Persons who complete these programs, which usually last up to a year, generally need additional on-the-job or apprenticeship training to qualify as skilled painters.

Young persons considering this work as a career should have good health, keen eyesight, a good color sense, and a steady hand. Courses in automobile-body repair offered by high schools and vocational schools provide helpful experience. Completion of high school is generally not a requirement but may be an advantage, because to many employers high school graduation indicates that a young person can complete a job.

An experienced automobile painter with supervisory ability may advance to shop foreman. Many experienced painters who acquire the necessary capital open their own shops.

Employment Outlook

Employment of automobile painters is expected to increase moderately through the mid-1980's. In addition to jobs created by growth, several hundred openings are expected each year because of the need to replace experienced painters who retire or die. Openings also will occur as some painters transfer to other occupations.

Employment of automobile painters is expected to increase primarily because more motor vehicles will be damaged in traffic accidents as the number of vehicles grows. Accident losses will grow, even though better highways, driver training courses, and improved bumpers and other safety features on new vehicles may slow the rate of growth. Despite the increasingly durable paint on new cars, the number of cars that need repainting also may increase.

Earnings and Working Conditions

Painters employed by automobile dealers in 34 large cities had estimated average hourly earnings of $6.66 in 1972, compared with $3.65, the average for all nonsupervisory workers in private industry, except farming. Skilled painters usually earn between two and three times as much as inexperienced helpers and trainees.

Many painters employed by automobile dealers and independent repair shops are paid a commission based on the labor cost charged to the customer. Under this method, earnings depend largely on the amount of work and how fast the painter completes it. Employers frequently guarantee their commissioned painters a minimum weekly salary. Helpers and trainees usually are paid an hourly rate until they are sufficiently skilled to work on a commission basis. Painters employed by trucking companies, buslines, and other organizations that repair their own vehicles usually receive an hourly rate. Most painters work 40 to 48 hours a week.

Many employers provide holiday and vacation pay, and additional benefits such as life and health insurance, and contribute to retirement plans. Some shops furnish laundered uniforms free of charge.

Automobile painters are exposed to fumes from paint and paint-mixing ingredients. However, in most shops, the painting is done in special ventilated booths that protect the painters. Masks covering the nose and mouth are used, as well. Painters must be agile because they often bend and stoop while working. Only average physical strength is needed.

Many automobile painters belong to unions, including the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.). Most painters who are union members work for the larger automobile dealers, trucking companies, and buslines.

Sources of Additional Information

For more details about work opportunities, contact local employers, such as automobile-body repair shops and automobile dealers; locals of the unions previously mentioned; or the local office of the State employment service. The State employment service also may be a source of information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about the work of automobile painters may be obtained from:

Automotive Service Industry Association, 230 North Michigan Ave., Chicago, Ill. 60601.

Automotive Service Councils of America, Inc., 4001 Warren Blvd., Hillside, Ill. 60162.

AUTOMOBILE TRIMMERS AND INSTALLATION MEN (AUTOMOBILE UPHOLSTERERS)

(D.O.T. 780.381 and .884)

Nature of the Work

Automobile trimmers, often assisted by installation men, replace and repair upholstery and other automobile fabrics. Trimmers and installation men together are called automobile upholsterers. (Workers who upholster automobiles in factories are not included in this statement.)

Automobile trimmers (D.O.T. 780.381) are skilled upholsterers who custom-make seat covers, door panels, convertible tops, and other items. To make these items, they first determine the dimensions of each peice of vinyl, leatherette, broadcloth, or other material to be used and mark the material for cutting. Although trimmers follow standard designs for most items, they may use their own creations or the original designs specified by customers. After cutting and fitting, they use heavy-duty sewing machines to stitch the pieces. Finished pieces are stretched and pulled to fit snugly; and then trimmed of excess material. In addition to upholstery and convertible tops, trimmers may make truck seat

cushions, tarpaulins, boat covers, and seats for buses, motorcycles, and small airplanes. They also may mend damaged upholstery, repair window and convertible top mechanisms, and cut and install automobile glass.

Automobile trimmers often are assisted by installation men, sometimes called *seat-cover installers* (D.O.T. 780.884), who remove worn seat covers and convertible tops and install new ones. In addition they may install sunroofs and vinyl tops.

Trimmers and installation men use many handtools including shears, knives, special pliers, and various types of wrenches and tack hammers. They also use heavy-duty sewing machines and power tools such as air-powered staplers and wrenches. Some shops have electric steaming machines which shrink fabrics, and special electronic welders which bind synthetic materials.

Places of Employment

Most of the 9,000 automobile trimmers and installation men employed in 1972 worked in shops that specialized in automobile upholstery and convertible tops. Others worked in automotive repair and accessories sections of department stores, and in automobile dealerships and body repair shops. Most automobile upholstery shops employ from one to five trimmers. In small shops, the number of installation men generally equals the number of trimmers. However, installation men outnumber trimmers in many of the larger shops, particularly those that specialize in installing factory-made seat covers and tops.

Although automobile upholsterers are employed throughout the country, most work in the larger cities.

Automobile upholsterer installs new seat covers.

Training, Other Qualifications, and Advancement

Most trimmers and installation men learn their skills on the job. Beginners, usually hired as trainees, first learn to remove seats and upholstery and install seat covers; they gradually advance to more difficult jobs, such as installing convertible tops. After qualifying as installation men, they make seat covers, tops, and other items. Although a capable beginner can become a fully qualified installation man in 3 to 6 months, 3 to 4 years usually are required to become a skilled trimmer.

A few automobile trimmers begin as apprentices. Apprenticeship programs, which usually last 3 to 4 years, consist of on-the-job training and classroom instruction.

Training programs for unemployed and underemployed workers for entry jobs as automobile trimmers were in operation in several cities in 1972 under the Manpower Development and Training Act. People who complete these programs, which usually last up to a year, may need additional on-the-job or apprenticeship training to qualify as skilled trimmers.

Applicants for entry jobs should be mechanically inclined and in good physical condition. Employers are interested in hiring those who enjoy working creatively with their hands. A high school education is desirable but not essential. High school and vocational school courses in furniture upholstering provide valuable training. Courses in mathematics are useful in laying out and planning upholstery work.

Experienced trimmers with supervisory ability may advance to foremen in large shops. Many automobile upholstery shops are owned by trimmers who acquired the necessary experience and funds to start their own businesses.

Employment Outlook

Employment of automobile trimmers and installation men is expected to increase slowly through the mid-1980's. Most job opportunities will result from the need to replace workers who retire, die, or transfer to other occupations.

Reasons for increased employment include a greater demand for truck cushions and tarpaulins and a greater demand for custom upholstery work in recreational vehicles such as motor homes, motorcycles, and boats. In addition, the growth of relatively new fields such as vinyl and sunroof installations is expected to increase employment.

Traditionally seat cover and convertible top installations have made up a large part of trim shop work. Recently, however, the number of new convertibles has declined sharply, and more durable fabrics are now used in automobile upholstery. As a result, the rate of increase for additonal trimmers and installation men will be less than the rate of growth in the number of motor vehicles.

Earnings and Working Conditions

According to information from a

limited number of automobile upholstery shops, beginners earned from $1.75 to $2.50 an hour in 1972. Experienced installation men earned $2.50 to $4.60 an hour, and skilled trimmers earned $4.00 to $7.75 an hour.

Most trimmers and installation men are paid a weekly salary or hourly wage and work from 44 to 48 hours a week. Many receive commissions or bonuses based on sales, in addition to their regular pay. Some trimmers are paid a straight commission.

Many employers provide paid holidays and vacations, and all, or part, of the cost of health and life insurance. Some also contribute to retirement plans.

Trimmers and installation men generally work in shops that are clean, well-lighted, and relatively quiet. They sometimes work in awkward or uncomfortable positions and are subject to minor cuts and bruises, but serious injuries are uncommon.

A small percentage of trimmers and installation men are members of the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.).

Sources of Additional Information

More details about work opportunities may be obtained from local automobile upholstery shops or the local office of the State employment service. The State employment service also may have information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about the work of automobile trimmers and installation men may be obtained from:

National Association of Auto Trim Shops, 129 Broadway, Lynbrook, L.I., N.Y. 11563.

BLACKSMITHS

(D.O.T. 356.381 and 610.381)

Nature of the Work

Years ago the village blacksmith was as vital as the country doctor. No one else could repair a broken wagon wheel, shoe a horse, or forge a tool to suit a farmer's needs. Power hammers and ready-made horse shoes have made work easier, but the blacksmith's job has remained basically the same.

To make or repair metal parts, blacksmiths first heat the metal in a forge to soften it. When it begins to glow, they pick up the metal with tongs, place it on the anvil, and shape it with presses and power hammers. Broken parts are rejoined by hammering them together. The blacksmith uses handtools such as hammers and chisels to finish the part; he often reheats it in the forge to keep it soft and workable.

To harden a finished part, blacksmiths heat it to a high temperature in the forge and then plunge it into a water or oil bath. To temper the part—make it less brittle—they heat the metal to a lower temperature for some time, and then allow it to cool at room temperature.

An ancient skill practiced by many blacksmiths is shoeing horses; blacksmiths who specialize in this activity often are called farriers. After removing the old shoe blacksmiths examine the horse's hoof for bruises and clean, trim, and shape the hoof. When the hoof is ready they position and nail a shoe on the hoof and trim the hoof flush to the new shoe. Today most blacksmiths use ready-

made horse shoes, but they may have to make or adjust shoes for a proper fit.

The jobs of industrial blacksmiths and forge shop workers are similar. (For a detailed discussion of jobs in forge shops, see the statement on forge shop occupations elsewhere in the *Handbook*.)

Places of Employment

About 10,000 blacksmiths were employed in 1972. Almost two-thirds of them worked in factories, railroads and mines. The remainder worked in small shops, and most of them were self-employed.

Blacksmiths work in all parts of the country—in rural communities as well as in large industrial centers—and horseshoers are found in all States, especially near horse farms and race tracks.

Training, and other Qualifications

Most beginners enter the occupation by working as helpers in blacksmith shops. Others enter through formal apprenticeship programs which generally last 3 or 4 years. Apprenticeship programs usually teach blueprint reading, proper use of tools and equipment, heat-treatment of metal, and forging methods. Most apprentices are found in large industrial firms rather than in small repair shops. Vocational school or high school courses in metalworking, blueprint reading, and mathematics are helpful to young people interested in becoming blacksmiths.

Blacksmiths must be in good physical condition. Pounding metal and handling heavy tools and parts require considerable strength and stamina.

Opportunities for advancement are limited, especially for blacksmiths who work in small repair shops. However, blacksmiths may advance to be foremen or inspectors in factories, or to open their own repair shops.

Employment Outlook

Employment of blacksmiths is expected to decline slowly through the mid-1980's. However, a few hundred job openings will arise each year to replace experienced workers who retire, die, or transfer to other occupations.

Employment is expected to decline because forge shops are producing many small metal articles formerly made by blacksmiths. Metalworking operations once performed only by blacksmiths are being done by other workers such as welders and forgeshop craftsmen. The skills of all-around blacksmiths, however, will continue to be required in the maintenance departments of large industrial firms and in many small metalworking and repair shops.

Earnings and Working Conditions

In union contracts covering a large number of blacksmiths in steel plants, railroad shops, and in the shipbuilding and petroleum industries, hourly pay ranged from $4.06 to $6.17 in 1972. Most contracts provide for 8 or 9 paid holidays a year and up to 5 weeks' vacation, depending on length of service. Other benefits include life insurance, hospitalization, and sickness and accident insurance, and pension plans.

Blacksmith shops tend to be hot and noisy, but conditions have improved in recent years because of large ventilating fans and less vibration from new machines. Blacksmiths are subject to burns from forges and heated metals and cuts and bruises from handling tools. Safety glasses, metal-tip shoes, face shields, and other protective devices have helped reduce injuries.

Many blacksmiths are members of the International Brotherhood of Boilermakers, Iron Shipbuilders, Blacksmiths, Forgers and Helpers. Other unions representing blacksmiths include the United Steelworkers of America, the Industrial Union of Marine and Shipbuilding Workers of America, and the International Union of Journeymen Horseshoers.

Sources of Additional Information

For details about training opportunities in this trade, contact local blacksmith shops and local offices of the State employment service.

BOILERMAKING OCCUPATIONS

Nature of the Work

Boilers, vats, and other large vessels that hold liquids and gasses are essential to many industries. Boilers, for example, supply the steam that drives the huge turbines in electric utility plants and ships. Tanks and vats are used to process and store chemicals, oil, and hundreds of other products. Layout men and fitup men help make the parts of these vessels, and boilermakers assemble them.

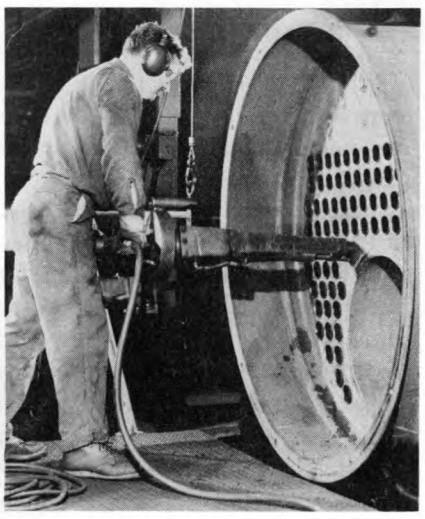
Layout men (D.O.T. 809.381 and .781) follow blueprints in marking off lines on metal plates and tubes. These lines serve as guides to other workers in the shop who cut and shape the metal. Layout men use compasses, scales, gages, and other devices to make measurements.

Their measurements must be precise because errors may be difficult or impossible to correct once the metal is cut.

Before the boiler parts are assembled, *fitup men* (D.O.T. 819.781) see that they fit together properly. These workers bolt or tack-weld the parts into place temporarily and alter those that do not line up according to blueprints. To make alterations, they use sledge hammers, drills, grinders, welding machines, cutting torches, and other tools.

Boilermakers (D.O.T. 805.281) assemble and erect large boilers in shops and at the construction sites where these vessels will be used. They lift heavy metal parts into place with rigging equipment such as hoists and jacks, and weld or rivet the parts together. After a boiler is completed, they test it for leaks and other defects.

Boilermakers also do repair jobs. After finding the cause of trouble, they may dismantle the boiler, patch weak spots with metal stock, replace detective sections with new parts, or strengthen joints. Installation and repair work often must meet State and local safety standards.



Places of Employment

About 33,000 boilermakers, layout men, and fitup men were employed in 1972. Several thousand boilermakers worked in the construction industry, mainly to assembly and erect boilers and other pressure vessels. Boilermakers also were employed in the maintenance and repair departments of iron and steel plants, petroleum refineries, railroads, and electric powerplants. Large numbers worked in Federal Government installations, principally in Navy shipyards and Federal powerplants. Layout men and fitup men worked mainly in plants that make fire-tube and water-tube boilers, heat exchangers, heavy tanks, and similar boiler-shop products.

Boilermakers work in every State, but employment is concentrated in States that are highly industrialized, such as Pennsylvania, California, Illinois, Ohio, New York, Texas, and New Jersey. Most layout men and fitup men also are employed in these States.

Training, Other Qualifications, and Advancement

Many workers have become boilermakers by working for several years as helpers to experienced boilermakers, but most training authorities agree that a 4-year apprenticeship is the best way to learn this trade. Apprenticeship programs usually consist of 4 years of on-the-job training, supplemented by about 150 hours of classroom instruction each year in subjects such as blueprint reading, shop mathematics, and welding.

Most layout men and fitup men are hired as helpers and learn the craft by working with experienced men. It generally takes at least 2 years to qualify as an experienced layout or fitup man.

When hiring apprentices or helpers, employers prefer high school graduates. Courses in mathematics, blueprint reading, and shopwork provide a useful background for all boilermaking jobs. Most firms require applicants to pass a physical examination because good health and the capacity to do heavy work are necessary in these jobs. Mechanical aptitude and manual dexterity also are important qualifications.

Layout men and fitup men may become boilermakers or shop foremen. Boilermakers may become foremen for boiler installation contractors; a few may go into business for themselves.

Employment Outlook

Employment in boilermaking occupations is expected to increase moderately through the mid-1980's. In addition to the job openings resulting from employment growth, several hundred openings will arise each year as experienced workers retire, die, or transfer to other fields of work.

Employment is expected to increase mainly because of the expansion of industries that use boiler products—particularly electric and gas utilities and the chemical, petroleum, steel, and shipbuilding industries. The development of atomic energy facilities may create a need for more boilermakers, layout men, and fitup men to manufacture and install boilers and related products. In shops that make boiler products, however, employment growth will be limited by more efficient production methods.

Earnings and Working Conditions

According to a national survey of

workers in the construction industry, union minimum wage rates for boilermakers in 54 large cities averaged $8.01 an hour in 1972, compared with $7.69 for all building trades journeymen. Average minimum hourly rates for boilermakers in 14 of these cities, selected to show how wages differ among various areas, appear in the accompanying tabulation.

City	*Rate per hour*
Atlanta	6.85
Baltimore	8.10
Boston	8.16
Chicago	8.35
Cleveland	8.71
Denver	7.80
Fresno	7.45
Houston	6.80
Kansas City	7.80
Los Angeles	7.20
New Orleans	6.80
Phoenix	7.20
Spokane	6.70
Syracuse	8.16

Comparable wage data were not available for boilermakers employed in industrial plants. However, wage rates were available from union contracts that cover many boilermakers, layout men, and fitup men employed in fabricated plate work and the petroleum and shipbuilding industries in 1972. Most of these contracts called for minimum hourly wage rates ranging from about $3.75 to $7.15. Generally, layout men received higher rates than boilermakers, and boilermakers received higher rates than fitup men.

Boilermakers, layout men, and fitup men in industrial plants usually work the same number of weekly hours as do other plant workers, generally 40 hours. Most union contracts covering these workers provide fringe benefits such as paid vacations, health and life insurance, and retirement pensions.

When assembling boilers or making repairs, boilermakers often work in cramped quarters or at great heights. Some work also must be done in damp, poorly ventilated places.

Boilermaking is more hazardous than many other metalworking occupations. Employers and unions attempt to eliminate injuries by promoting safety training and the use of protective equipment, such as safety glasses and metal helmets.

Most boilermaking workers belong to labor unions. The principal union is the International Brotherhood of Boilermakers, Iron Shipbuilders, Blacksmiths, Forgers and Helpers. Some boilermaking workers are members of [industrial unions, such as] the Industrial Union of Marine and Shipbuilding Workers of America; the Oil, Chemical and Atomic Workers International Union; and the United Steelworkers of America.

Sources of Additional Information

For further information regarding boilermaking apprenticeships or other training opportunities, inquiries should be directed to local construction companies and boiler manufacturers or the local office of the State employment service.

ELECTROPLATERS

(D.O.T. 500.380 and .782 through .886)

Nature of the Work

Electroplaters use plating solutions and electric current (electrolysis) to coat metal and plastic articles with chromium, nickel, silver, or other metal, to give the articles a protective surface or an attractive appearance. Products that are electroplated include items as widely different as automobile bumpers, silverware, costume jewelry, electronic components, and jet engine parts. Electroplaters also make items such as spray paint masks, turbine blades and pen caps, through a process known as electroforming.

Skill requirements and work performed vary by type of shop. All-round platers in small shops analyze solutions, do a great variety of plating, calculate the time and current needed for various types of plating, and perform other technical duties. They also may order chemicals and other supplies for their work. Platers in the larger shops usually carry out more specialized assignments that require less technical knowledge.

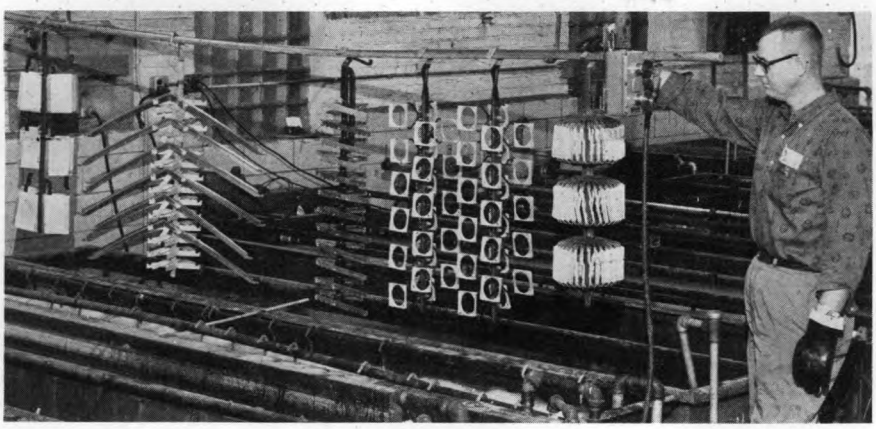
Before electroplaters coat an article, they first cover the parts not to be electroplated with lacquer, rubber, or tape. They then either scour the article or dip it into a cleaning bath, before putting it in the plating solution. They may remove the article from the solution from time to time to make sure that work is progressing satisfactorily.

Electroplaters must check many of the plated articles for defects. To determine the quality of the work, they use micrometers, calipers, and electronic devices.

Places of Employment

In 1972 there were about 17,000 electroplaters. About half of them worked in shops that specialized in metal plating and polishing for manufacturing firms and for other customers. The remaining platers were employed in plants that manufactured plumbing fixtures, cooking utensils, household appliances, electronic components, motor vehicles, and other metal products.

Electroplaters are employed in almost every part of the country, although most work in the North-



Electroplater prepares to immerse helicopter parts in nickel solution.

east and Midwest near the centers of the metalworking industry. Large numbers of electroplaters work in Los Angeles, San Francisco, Chicago, New York, Detroit, Cleveland, Providence, and Newark, N.J.

Training, Other Qualifications, and Advancement

Most electroplaters learn the trade on the job by helping experienced platers. It usually takes at least 3 years to become an all-round plater. Platers in large shops usually are not required to have an all-round knowledge of plating, and can learn their jobs in much less time.

A small percentage of electroplaters receive all-round preparation by working 3 or 4 years as an apprentice. Apprenticeship programs combine on-the-job training and related classroom instruction in the properties of metals, chemistry, and electricity as applied to plating. The apprentice does progressively more difficult work as his skill and knowledge increase. By the third or fourth year, he determines cleaning methods, does plating without supervision, makes solutions, examines plating results, and supervises helpers. Qualified platers may advance to be foremen.

A few people take a 1- or 2-year electroplating course in a junior college, technical institute, or vocational high school. In addition, many branches of the American Electroplaters Society give basic courses in electroplating. Young persons who wish to become electroplaters will find high school or vocational school courses in chemistry, electricity, physics, mathematics, and blueprint reading helpful.

Employment Outlook

Employment of electroplaters is expected to increase moderately through the mid-1980's. In addition, many openings will result from the need to replace experienced workers who retire, die, or transfer to other occupations.

Expansion of metalworking industries and the electroplating of a broadening group of metals and plastics are expected to increase the need for electroplaters. However, continuing mechanization, and the assignment of technical responsibilities to chemists and other personnel, will limit growth of this occupation.

Earnings and Working Conditions

Hourly wage rates for electroplaters ranged from $2.50 to $4.50 in 1972, according to the limited information available. During apprenticeship or on-the-job training, a worker's wage rate starts at about 60 to 70 percent of an experienced worker's rate and progresses to the full rate by the end of the training period.

Almost all plants pay shift premiums for night work. Many employers provide paid holidays and vacations and pay part or all of additional benefits such as life, health, and accident insurance.

Plating work involves some hazards because acid, alkaline, and poisonous solutions are used. Humidity and odor also are problems in electroplating plants. However, most plants have ventilation systems and other safety devices that have reduced occupational hazards. Protective clothing and boots provide additional protection. Generally, mechanical devices are used for lifting, but at times the worker must lift and carry objects weighing up to 100 pounds.

Some platers are members of the Metal Polishers, Buffers, Platers and Helpers International Union. Other platers have been organized by the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America, and the International Association of Machinists and Aerospace Workers.

Sources of Additional Information

For educational information concerning electroplating and other metal finishing methods, write to:

American Electroplaters Society, Inc., 56 Melmore Gardens, East Orange, N.J. 07017.

For information on job opportunities and training, write to:

National Association of Metal Finishers, 248 Lorraine Ave., Upper Montclair, N.J. 07043.

FOREMEN

Nature of the Work

Foremen play an important role in the national economy. They supervise skilled, semiskilled, and unskilled blue-collar workers, and are often responsible for seeing that millions of dollars of equipment and material are used efficiently. They may oversee workers assembling television sets, servicing automobiles, laying bricks, unloading ships, or any thousands of other activities. Foremen are known by different titles. For example, in the textile industry they are referred to as second hands; aboard ship they are called boatswains; and in construction they are known as overseers, strawbosses, or gang leaders.

Supervision is the most important part of the foremen's job. Many blue-collar workers never work for supervisors higher than foremen, and it is through their foremen that they get work orders, recognition, and discipline. Foremen interpret and communicate company policy to the workers. They also train newly hired workers and advise experienced workers on the proper way to handle jobs. In some cases, foremen also work at specific crafts. "Working foremen" are common in construction, where, for example, bricklayer foremen lay brick as well as supervise journeymen bricklayers and helpers.

Foremen must plan and schedule the work of their subordinates and keep production and employee records. They must use considerable judgment in their planning and allow for unforeseen problems such as absenteeism and machinery breakdown. Foremen participate in meetings and prepare reports on production, costs, personnel, and safety.

Foremen see that safety rules and regulations are followed and instruct employees in safety practices. In unionized plants, foremen may meet with union representatives to discuss work problems and grievances. They must know the rules of labor-management agreements and run their operation according to the agreements.

Places of Employment

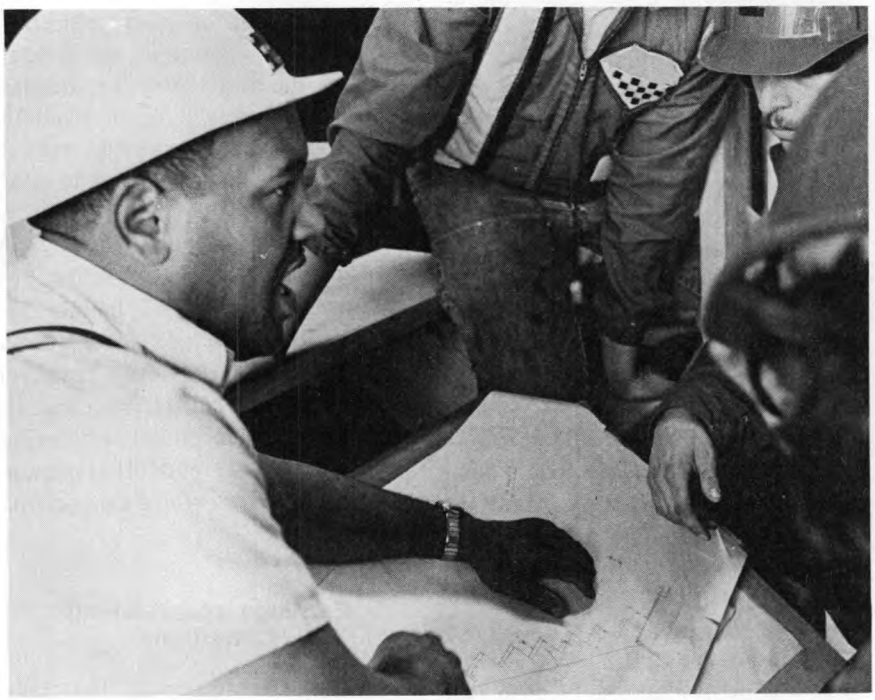
Foremen work for almost all businesses and government agencies that employ blue-collar workers. About 1.4 million were employed in 1972; about 93 percent were men.

Foremen work mainly in the highly industrialized sections of the Nation. About three-fifths work for the following manufacturing industries: machinery, metals, transportation equipment, food, chemicals, and paper products. Large numbers also are found in the construction, trade, and service industries. Many female foremen, or forewomen, work for the apparel, electrical machinery, leather products, and laundry and drycleaning industries.

Training, Other Qualifications, and Advancement

When choosing foremen, employers generally look for experience, skill, and leadership ability. Especially helpful are the abilities to motivate employees, to command respect, and to get along with people.

Most foremen rise through the ranks—that is, they are promoted from the machine, work bench, or a construction craft. By working at different jobs over a period of time, they develop many skills and gain a thorough knowledge of the jobs they supervise. During this time, they also learn much about their fellow workers, and about management policies and employee attitudes toward these policies. Very often, foremen are former union members who have served as elected representatives and learned about grievance procedures, collective bargaining, and labor-



management contracts.

The experience gained by rising through the ranks gives foremen the advantage of knowing how a job should be done and possible problems involved, and helps them know what to expect from the workers they supervise.

Although fewer than one-tenth of all foremen are college graduates, a growing number of employers are hiring foremen trainees with college backgrounds. This practice is most prevalent in industries that have highly technical production processes such as the chemical, oil, and electronics industries. Employers generally look for college graduates with backgrounds in business administration, industrial relations, mathematics, engineering, or science. Foremen trainees undergo on-the-job training until they are able to accept supervisory responsibilities.

Foremen with outstanding ability, particularly those with college education, may move up to higher management positions. In manufacturing, for example, they may advance to jobs such as department head, general foreman, and plant manager. In the construction industry, some foremen use the experience and skills they gain to go into business for themselves.

Employment Outlook

Employment of foremen is expected to increase moderately through the mid-1980's. In addition, many job openings will arise as experienced foremen retire, die, or transfer to other occupations.

Growth of business and government organizations will create a demand for more foremen. Demand also will be stimulated by the trend toward more complex production processes that require greater supervision.

Most foremen will continue to work in manufacturing. However, a large part of the increase in foremen jobs will be due to the rapid expansion of nonmanufacturing industries—construction, trade, service, and public utilities. The number of foremen in construction is expected to grow very rapidly.

Earnings and Working Conditions

In 1971, the average (median) earnings of foremen who worked full time was $10,410, compared with $7,965, in all occupations. Foremen usually are salaried and not paid for overtime. Their salary levels generally are keyed to the wage rates of the highest paid workers they supervise. Some companies keep wages of foremen about 10 percent to 30 percent higher than those of workers they supervise.

Working conditions of foremen vary widely from industry to industry. Since they are the first level of supervision, foremen must spend much time with workers on the plant floor or at the construction site. Plant foremen are apt to get dirty around machinery and materials and have to put up with noisy manufacturing operations. Construction foremen often work in unpleasant weather. Foremen generally work more than 40 hours a week and are expected to be on the job before the workers arrive, and after they leave.

Some foremen who have limited authority may feel isolated, neither a member of the work force nor an important part of management. On the other hand, foremen have more interesting and challenging jobs and more prestige than blue-collar workers.

Sources of Additional Information

More facts about foremen are available from:

American Management Association, 135 West 50th Street, New York, N.Y. 10020.

FORGE SHOP OCCUPATIONS

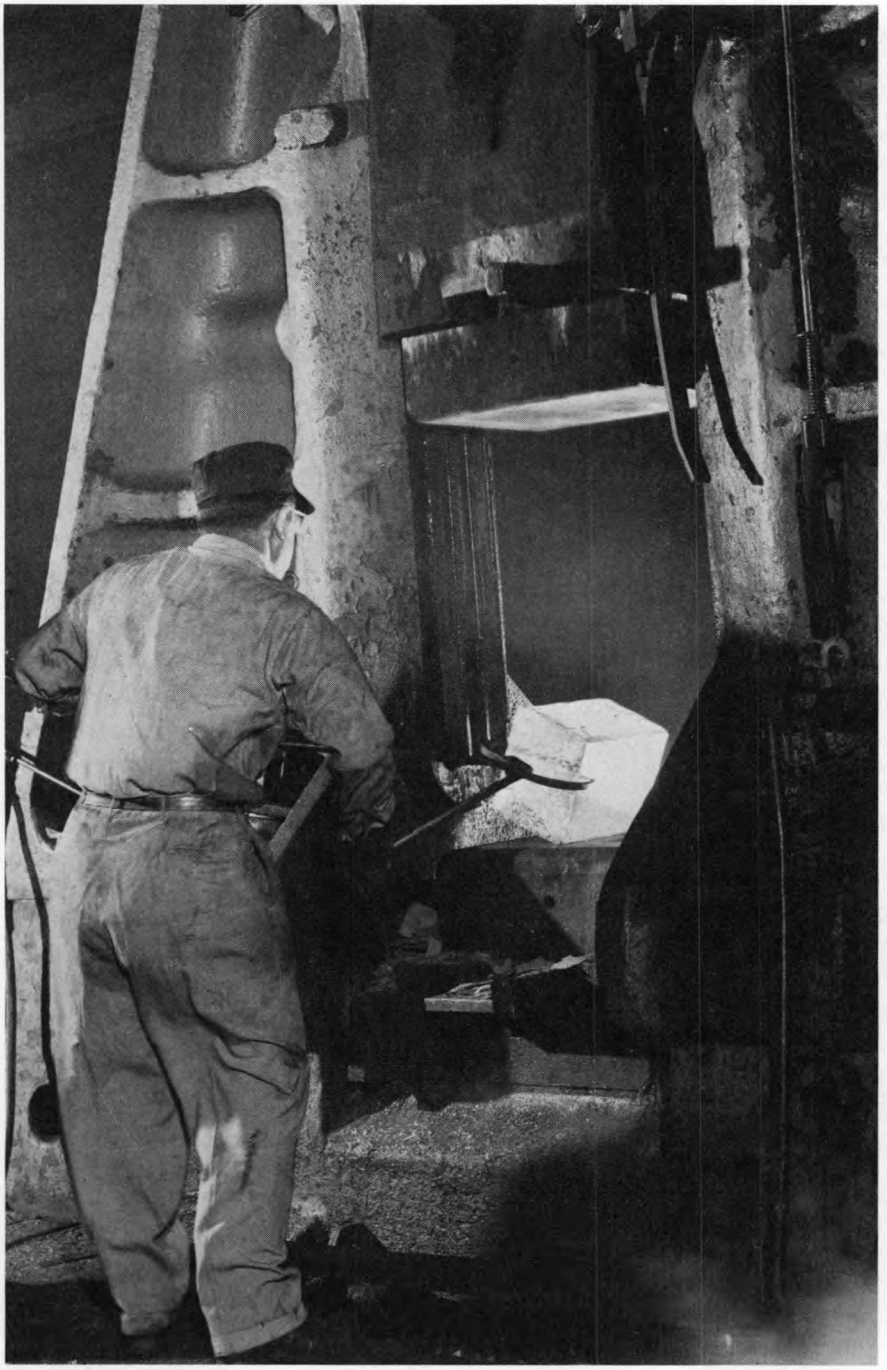
Forging is one of the oldest methods of working and shaping metals. The simplest way is the hand forging done by a blacksmith. Modern forge shops substitute heavy power equipment and dies (tools that shape metal) for the blacksmith's hammer and anvil. Five men operating a large forging machine can turn out more forgings in one hour than five blacksmiths can make in a year.

Forged metal is exceptionally strong and is used for many products that take heavy wear. Examples include automobile crankshafts, gears, wrenches, scissors, and many aerospace equipment parts. Most forgings are steel; but aluminum, copper, brass, bronze, and other metals are forged also. Forgings vary in weight from ounces to many tons.

Nature of the Work

Before metal can be shaped, it must be heated in intensely hot furnaces (forges). Then workers manipulate the glowing metal between two metal dies that are attached to power presses or hammers. With tremendous force, the hammers or presses pound or squeeze the metal into the desired shape. To finish the forging, other workers remove rough edges and excess metal and perform other finishing operations such as heat treating and polishing.

Two kinds of dies are used. The open die, which is flat and similar to the blacksmith's hammer, is used



when small numbers of forgings or large size forgings are needed. The impression or closed die, which has a cavity shaped to the form of the metal part, is used to produce large quantities of identical parts.

Basic forge-shop equipment consists of various types of power hammers, power presses, dies, and furnaces. Forge-shop workers also use hand tools, such as hammers and tongs, and measuring devices, such as rules, scales, and calipers. From two to ten men make up a hammer or press crew, depending on the size and type of equipment and the size and shape of the metal being formed. Descriptions of some major forge-shop production occupations follow.

Hammersmiths (D.O.T. 612.381) direct the operation of open die power hammers. They interpret blueprints, drawings, and sketches so that the part being forged will meet specifications. They decide the amount of hammer force, and if and when the metal needs additional heating. Hammersmiths determine how to work the metal under the hammer and which tools are needed to produce desired angles and curves.

Hammersmiths head crews of four or more workers. A hammer driver or hammer runner regulates the force of the forging blow. A craneman transfers the metal from the furnace to the hammer and manipulates it under the hammer. A heater controls the furnace that brings the metal to correct forging temperatures. One or more helpers assist the crew as needed.

The duties of *hammer operators* (D.O.T. 610.782), or hammermen, who operate impression die power hammers, are similar to those of hammersmiths at open die power hammers. Generally, the bigger the hammer and the larger or more intricate the shape to be formed, the greater the skill required of the operator. With the assistance of helpers and heaters, hammermen set and align dies in the hammers. They control the force of the forging blow, manipulate the metal under the hammer, and determine if and when the metal needs additional heating.

Press operators (D.O.T. 611.782 and .885) control huge presses equipped with either impression or open dies that press and squeeze hot metal rather than hammer or pound it. They regulate machine pressure and move the hot metal between the dies. They may control the metal heating operations. Some operators set up the dies in the presses. Their

skills are very similar to those of either hammersmiths or hammermen.

With the help of heaters and several helpers, *upsetters* (D.O.T. 611.782), or upsettermen, operate machines that shape hot metal by applying horizontal pressure. The heads of nails and bolts, for example, are made by upset forging.

Heaters (D.O.T. 619.782) control furnace temperatures. They determine when the correct temperature has been reached by observing the metal's color and the furnace's temperature gauge. Using tongs or mechanical equipment, they transfer the hot metal from the furnace to hammers or presses. Some heaters clean furnaces.

Inspectors (D.O.T. 612.281) examine forged pieces for accuracy, size, and workmanship. They use gauges, micrometers, and calipers to measure forgings. Machines that test strength and hardness and electronic testing devices also may be used.

Die sinkers (D.O.T. 601.280) make the impression dies for the forging hammers and presses. Working from a blueprint, drawing, or template, these skilled workers make an outline of the object to be forged on two matching steel blocks. They form the object's shape in the blocks by using milling machines and other machine tools such as EDM (electrical discharge machinery) and ECM (electrical chemical machinery). Using scrapers, grinders, and other handtools, die sinkers smooth and finish the die cavity. Finally, a sample is prepared from the finished cavity and is checked against specifications.

Many forge-shop workers clean and finish forgings. For example, *trimmers* (D.O.T. 617.885) remove excess metal with presses equipped with trimming dies. *Grinders* (D.O.T. 705.884) remove rough edges with power abrasive wheels. *Sandblasters* or *shotblasters* (D.O.T. 503.887) operate sandblasting or shotblasting equipment that cleans and smoothes forgings. *Picklers* (D.O.T. 503.885) dip forgings in an acid solution to remove surface scale and reveal any surface defects. *Heat treaters* (D.O.T. 504.782) heat and cool forgings to harden and temper the metal.

Places of Employment

In 1972, about 63,000 production workers were employed in forge shops. Nearly three-fourths of these worked in shops that make and sell forgings. The remainder worked in plants that use forgings in their final products, such as automobiles, farm equipment, and hand tools.

Although forge-shop workers are found in all States, they are concentrated near steel-producing centers that provide the steel for the forgings, and near metalworking plants that are the major users of forged products. Large numbers of forge-shop workers are employed in Pennsylvania, Ohio, Illinois, Michigan, Wisconsin, Massachusetts, California, and New York.

Training, Other Qualifications, and Advancement

Most forge-shop workers learn their skills on the job. They generally join hammer or press crews as helpers or heaters. As they become experienced, they progress to other jobs. Advancement to hammersmith, for example, requires several years of on-the-job training and experience.

Some forge shops offer apprentice training programs for skilled jobs such as die sinker, heat treater, hammer operator, hammersmith, and press operator. Apprenticeships usually last 4 years. These programs provide classroom training and practical experience in metal properties, power hammer and furnace operation, hand tool use, and blueprint reading.

Training requirements for inspectors vary. Only a few weeks of on-the-job training is necessary for those who make examinations visually or with simple gauges. Others who inspect forgings made to exact specifications may need some background in blueprint reading and mathematics, and may be given several months of training.

Employers usually require no more than a grammar school education for helpers and heaters, but high school graduates are preferred. Young people interested in more skilled forge-shop jobs should complete high school and take mathematics (especially geometry), drafting, and shopwork.

Although cranes are used to move very large objects, forge-shop workers must be strong enough to lift and move heavy forgings and dies. They need stamina and endurance to work in the heat and noise of a forge shop.

Employment Outlook

Employment of forge-shop production workers is expected to increase slowly through the mid-1980's. Most job openings will arise from the need to replace experienced workers who retire, die, or transfer to other fields of work.

Employment will grow because of expansion in industries that use forgings, particularly machinery and automobile industries. However, employment will increase much more slowly than forge shop production, because improved forging techniques and equipment will result in greater output per worker. Because forge-shop production is sensitive to changing business conditions, some forge-shop workers may be laid off periodically.

Earnings and Working Conditions

Average hourly earnings of forge-shop production workers are higher than the average for all manufacturing production workers. In 1972, production workers in iron- and steel-forging plants averaged $5.04 an hour, compared with $3.81 an hour for production workers in all manufacturing industries.

Most forge shops provide various fringe benefits such as paid holidays, vacations, and retirement pensions. Other important benefits include health and medical insurance and life insurance.

Many forge shops have heat deflectors and ventilating fans to reduce heat and smoke. Improvements in machinery and shop practices have reduced some noise and vibration. Further improvements, particularly in noise levels, will be made to meet the standards of the new Occupational Safety and Health Act. Labor and management cooperate to encourage good work practices through safety training and the required use of protective equipment such as face shields, ear plugs, safety glasses, metal-toe shoes, helmets, and machine safety guards.

Most forge shop workers are union members. Many are members of the International Brotherhood of Boilermakers, Iron Shipbuilders, Blacksmiths, Forgers and Helpers. Others are members of the United Steelworkers of America; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the International Association of Machinists and Aerospace Workers; and the International Die Sinkers' Conference (Ind.).

Sources of Additional Information

Further information on employment opportunities in forging can be obtained from local offices of the State employment service, personnel departments of forge shops, locals of the labor organizations listed above, or from:

The Forging Industry Association, 55 Public Square, Cleveland, Ohio 44113.

The Open Die Forging Institute, 120 East Ogden Ave., Hinsdale, Ill. 60521.

FURNITURE UPHOLSTERS

(D.O.T. 780.381)

Nature of the Work

Furniture upholsterers recondition sofas, chairs, and other upholstered furniture. These craftsmen repair or replace fabrics, springs, webbing, frames, and other parts that are worn or damaged. (Workers employed in the manufacture of upholstered furniture are not included in this statement.)

In order to work at a convenient level, upholsterers usually place the furniture on which they are working on padded wooden horses. Using tack pullers or chisels and mallets, they pull out the tacks holding the old fabric in place and remove the fabric. They may then remove the padding and burlap to uncover the springs. Broken or bent springs are removed. If the webbing that holds the springs in place is worn, the workers remove all the springs and the webbing. Upholsterers then repair the frame, as well, by regluing loose sections and refinishing exposed wooden parts.

In reupholstering furniture, they first tack strips of webbing to the frames. Next, they sew new springs to the webbing and tie each spring to the adjoining ones, securing the outside springs to the frame. They use burlap, filling, and padding to cover the springs, and sew the padding to the burlap. Finally, after covering the padding with muslin and new upholstery fabric, they attach these materials to the frame and make sure everything is smooth and tight. They complete the job by sewing or tacking on fringe, buttons, or other ornaments.

Upholsterers use a variety of handtools including tack and staple removers, pliers, hammers, and hand or power shears. They also use special tools such as webbing stretchers and upholstery needles. They may also use sewing machines.

Sometimes upholsterers pick up and deliver furniture. Those who own shops order supplies and equipment, keep business records, and perform other managerial tasks.

Places of Employment

About 35,000 people worked as furniture upholsterers in 1972. Over half worked in small upholstery shops, most of which had less than eight employees. Many upholsterers also worked for furniture stores. Also, businesses that maintain their own furniture, such as theaters and hotels, employed a few upholsterers.

Geographically, employment of upholsterers is distributed in about the same proportion as population.

Training, Other Qualifications, and Advancement

The most common way to enter this trade is to start as a helper in an upholstery shop and learn on the job. Newly hired helpers do simple jobs, such as removing old fabric, padding, and springs. As they gain experience, they do more complex tasks, such as installing webbing and springs, and sewing on fabric and trimming. A skilled upholsterer

Upholsterer tacks new material on chair.

needs about 3 years of on-the-job training.

Inexperienced persons can learn many skills of the trade by working in furniture factories and performing a variety of jobs closely related to furniture upholstering. They may get valuable training, also, in vocational or high school courses that include chair caning, furniture making, textile fabrics, and upholstery repair. However, additional training and experience in a shop is usually required before these workers can qualify as skilled upholsterers. A few people learn the trade through formal apprenticeship programs that last from 3 to 4 years and include classroom instruction as well as on-the-job training.

Young persons interested in becoming upholsterers should have good manual dexterity and be able to do occasional heavy lifting. An eye for detail, good color sense, and a flair for creative work are helpful.

Upholsterers usually buy their handtools, but employers provide power tools.

Many upholsterers open their own shops. Almost one out of every three upholsterers is self-employed—a much higher proportion than in most other trades.

Employment Outlook

Employment of upholsterers is expected to grow slowly through the mid-1980's. Most job openings will arise because of the need to replace experienced workers who retire, die, or transfer to other occupations.

The amount of upholstered furniture in houses and businesses will increase as population, personal income, and business expenditures grow. More durable fabrics and the trend to buying new furniture instead of having old pieces reupholstered, however, will limit the demand for upholsterers.

Earnings and Working Conditions

Earnings data for furniture upholsterers are not available on a national basis. However, information from union contracts covering many of these workers in 1972 indicated that hourly rates for helpers ranged from $2.20 to $4.50, and for experienced upholsterers from $3.25 to $4.95. Hourly rates in the South were generally lower than those in the North and West. A few upholsterers were paid on a piece-work basis.

Upholsterers generally work 40 hours a week, although overtime is common during the weeks before major holidays. Many upholsterers received paid vacations and sick leave, and some are covered by health insurance plans.

Many upholstery shops are spacious, adequately lighted, and well ventilated and heated. However, the workshop's air may contain dust from padding and stuffing. In addition, upholsterers stand while they work and also do a considerable amount of stooping and bending. The work generally is safe, although minor cuts from sharp tools and back strain from lifting heavy furniture are not uncommon.

Sources of Additional Information

For more details on work opportunities for upholsterers, contact local employers or the local office of the State employment service.

INSPECTORS (MANUFACTURING)

Nature of the Work

Most products—including the things we eat, drink, wear, and ride in—are checked by inspectors sometime during the manufacturing process to make sure they are of the desired quality. Inspectors also check the quality of the raw materials and parts that make up finished goods.

Inspectors use a variety of methods to make certain that products meet specifications. They may merely look for flaws, imperfections, or defects; or they may use gauges, micrometers, and other instruments to examine parts and materials. They may read work orders or blueprints and do calculations using decimals or common fractions when measuring. They may use handtools, such as screwdrivers, magnifying glasses, and tweezers.

Skilled inspectors work under general supervision, whereas semiskilled inspectors usually work under close supervision. Generally, skilled inspectors have greater discretion in accepting or rejecting products, and are responsible for inspecting the most important parts of mass-produced goods. Skilled inspectors also use a wider variety of testing instruments.

Many inspectors count the items rejected. When the number rises above a certain level, they notify their supervisors so that corrections can be made on the production line. Some inspectors make minor repairs and adjustments and grade products for quality.

Places of Employment

In 1972, most of the approximately 725,000 inspectors—two-fifths of them women—worked in plants that produced durable goods such as machinery, transportation equipment, electronics equipment, and furniture. Others were employed in plants that produced goods such as textiles, apparel, drugs, and leather products.

Inspectors worked in every part of the country. The largest numbers are found in heavily industrialized States such as Ohio, New York, Michigan, Illinois, Pennsylvania, California, and New Jersey.

Training, Other Qualifications, and Advancement

Inspectors generally are trained on the job for a brief period—from a few hours or days to several months, depending upon the skill required.

Employers look for applicants who have good health and eyesight, can follow directions, and can concentrate on details. Applicants should be able to get along with people since inspectors work occasionally as part of a team. A few large companies give preemployment tests to check such skills as the ability to work with numbers. Some employers may hire applicants who do not have a high school diploma but who have qualifying aptitudes or related experience. Other employers prefer experienced production workers for inspection jobs.

Some semiskilled inspectors—particularly in metalworking industries—who take courses, such as blueprint reading and shop mathematics, may advance to skilled inspectors or quality control technicians. After acquiring sufficient ex-

Inspector shows trainees how to check machined parts.

perience and knowledge, a few become foremen.

Employment Outlook

Employment of inspectors is expected to increase moderately through the mid-1980's, with thousands of openings each year. Additional openings will result as workers retire, die, or transfer to other occupations.

Most of the industries that employ these workers are expected to increase their employment in the long run. The growing complexity of manufactured products should also result in a need for more inspectors. However, increasing use of mechanized and automatic inspection equipment will limit employment growth.

Earnings and Working Conditions

According to limited information, average hourly rates for inspectors ranged from about $3 to $6 in 1972, depending on skill level, type of product inspected, geographic area, and industry.

Working conditions vary considerably for inspectors. For example, some have well lighted, air conditioned workplaces in an aircraft or missile plant; others, who work on the production floor of a machinery or metal fabricating plant, often are exposed to high temperatures, oil, grease, and noise.

Many inspectors are members of labor unions, including the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the International Association of Machinists and Aerospace Workers; the International Union of Electrical, Radio and Machine Workers; and the International Brotherhood of Electrical Workers. Most union contracts provide for fringe benefits such as paid holidays and vacations, health insurance, life insurance, and retirement pensions.

Sources of Additional Information

Information about employment opportunities in this field may be available from local offices of the State employment service.

The American Society for Quality Control certifies quality technicians. Information about the test required for certification may be obtained by writing to:

American Society for Quality Control,
161 West Wisconsin Ave.,
Milwaukee, Wisc. 53203.

MILLWRIGHTS

(D.O.T. 638.281)

Nature of the Work

Millwrights are skilled craftsmen who move and install heavy industrial machinery. They must know how to dismantle, reassemble, and align complex equipment. To assemble machinery, millwrights fit bearings, align gears and wheels, attach motors, and connect belts. They often construct concrete foundations and platforms and fabricate metal framework on which machinery is mounted. Millwrights must be able to read blueprints and work with wood, steel, concrete, and

Millwrights move machinery into place.

other building materials.

To move machinery, millwrights use hoists, jacks, wood blocking, and other rigging devices. To dismantle and assembly equipment they use wrenches and other handtools and portable power tools. They also use calipers, squares, plumb bobs, and other devices to align and level machinery.

Millwrights employed by contract installation and construction companies do a variety of installation work. Those employed in factories usually specialize in installing the particular types of machinery used by their employers. They also may maintain plant equipment such as conveyors and cranes.

Places of Employment

Most of the estimated 85,000 millwrights employed in 1972 worked for manufacturing companies; the majority were in metal, paper, lumber, and chemical products industries. Others worked for contractors in the construction industry. Machinery manufacturers employed a small number to install equipment in customers' plants.

Millwrights work in every State. However, about half of them are employed in the heavily industrialized State of Michigan, Ohio, Pennsylvania, Illinois, New York, and Indiana.

Training, Other Qualifications, and Advancement

Most millwrights start as helpers to skilled workers and learn the trade on the job. Others learn through formal apprenticeship programs. Apprenticeship programs generally last 4 years and include training in dismantling, moving, eracting, and repairing machinery. They also may work with concrete and receive instruction in related skills such as carpentry. Classroom instruction is given in shop mathematics, blueprint reading, hydraulics, electricity, and safety. Many companies require that applicants be high school graduates between the ages of 18 and 26.

High school courses in science, mathematics, mechanical drawing, and machine shop practice are useful. Because millwrights often put together and take apart complicated machinery, mechanical aptitude is important. Strength and agility also are important, because the work requires considerable lifting and climbing.

Employment Outlook

Employment of millwrights is expected to increase moderately through the mid-1980's as new plants are built, as plant layouts are changed, and as additional complex machinery is maintained. A few thousand openings will arise annually as millwrights retire, die, or transfer to other occupations.

Earnings and Working Conditions

In 1971-72, hourly wages for millwrights in all industries averaged about $5.00, which was considerably higher than the average wage for other production or nonsupervisory workers. Straight-time hourly earnings for millwrights in 12 cities that represent various regions of the country, appear in the accompanying tabulation:

City	*Rate per hour Industrial millwrights (all industries)*
Canton, Ohio	$4.78
Boston, Massachusetts	3.89
Buffalo, New York	4.61
Houston, Texas	5.24
Los Angeles-Long Beach and Anaheim-Santa Ana-Garden Grove, California	5.54
Louisville, Kentucky	5.29
Minneapolis-St. Paul, Minnesota	4.97
New Haven, Connecticut	4.12
New Orleans, Louisiana	4.50
St. Louis, Missouri	5.09
Trenton, New Jersey	4.81

Millwrights employed by construction companies usually have higher wage rates than those in manufacturing. The minimum average hourly rates for millwrights under union contracts in construction ranged from $5.45 to $9.07 in 1972, according to a national survey of building trades workers in 68 large cities.

Apprentices generally start at 50 percent or more of the skilled worker's rate and receive periodic increases over that rate by the end of their training period.

Millwrights employed by factories ordinarily work year round. Those employed by construction companies and those companies that manufacture and install machinery may have periods of unemployment. Frequently they work away from home.

The work of millwrights involves some hazards. For example, there are dangers of being struck by falling objects or by machinery that is being moved. There also is the danger of falling from high work places. In addition, millwrights are subject to usual shop hazards such as cuts and bruises. Accidents have been reduced by the use of protective devices such as safety belts and hats.

Most millwrights belong to labor unions, among which are the International Association of Machinists and Aerospace Workers; United Brotherhood of Carpenters and Joiners of America (construction millwrights); United Steelworkers of America; International Union, United Automobile, Aerospace and Agricultural Implement Workers of

America; International Brotherhood of Pulp, Sulphite and Paper Mill Workers; and the International Union of Electrical, Radio and Machine Workers. Employer-union contracts usually provide for benefits such as paid holidays and vacations.

Sources of Additional Information

Further information on apprenticeship programs may be obtained from:

United Brotherhood of Carpenters and Joiners of America, 101 Constitution Ave. NW., Washington, D.C. 20001.

MOTION PICTURE PROJECTIONISTS

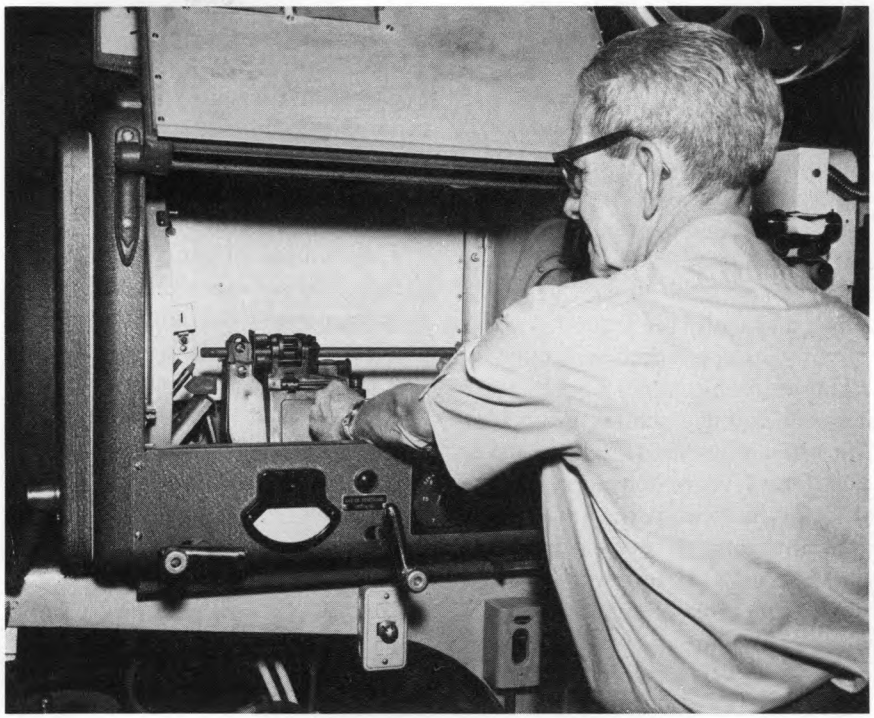
(D.O.T. 960.382)

Nature of the Work

Projectionists are key behind-the-scenes workers in motion picture theaters. From a room high in the back of the theater, the projectionist operates the movie projectors and sound equipment.

To show a feature-length movie, projectionists use two projectors, sound equipment, a film rewinding machine, and seven or more reels of film. Before the movie begins, they check the equipment to see that it works properly, and load the projectors with the first and second reels. Most projectors burn a carbon rod to provide light for the screen. After igniting and adjusting the rod, projectionists start the first reel. If the picture is out of focus or unsteady they adjust the projector lens.

A reel of film lasts about 20 minutes. When the reel is almost complete, cue marks (small circles in the upper right corner of the picture) signal that it is time to start the second projector. When a second series of cue marks appears, the projectionist simultaneously closes the shutter on the first projector and opens the second one. This changeover happens so quickly that the audience does not notice an interruption on the screen. Next, the projectionist removes the used reel and rewinds it on the rewinding machine. The entire process is repeated until all the reels have been shown. When film breaks, the projectionist must rapidly rethread it so that the show may continue.



Projectionist adjusts arc lamp in projector.

Some new theaters, especially multiscreen ones, have automatic equipment that reduces the projectionist's workload. Some machines, for example, automatically change reels.

Projectionists clean and lubricate equipment, check for defective parts and damaged film, and make minor repairs and adjustments. For example, they may replace a badly worn projector sprocket. Major repairs are made by servicemen who specialize in projection and sound equipment.

Places of Employment

An estimated 16,000 full-time motion picture projectionists—nearly all of them men—were employed in 1972. More than three-fourths worked for indoor theaters; most of the remainder worked for drive-ins. Some projectionists worked in large manufacturing companies, television studios, and in Federal, State, and local governments. Although many theaters employ one projectionist for each shift, the larger theaters have two. A few employ more than two projectionists.

Projectionists work in cities and towns of all sizes throughout the country. In theaters located in small towns, theater owners or members of their families may do projectionist work.

Training, Other Qualifications, and Advancement

Most theaters in urban areas are unionized and young people who want jobs as projectionists must complete a union apprenticeship program. In nonunion theaters, young people may start as an usher or helper and learn the trade by working with an experienced projectionist.

Unions require applicants to be 18 and prefer high school graduates. The apprenticeship training usually lasts 1 to 2 years depending on the policy of the local. After training, the apprentice must pass an exam for union membership. In some cases, a capable apprentice may be assigned to a full- or part-time job at journeyman's pay before becoming a union member. In a few cities and States, projectionists must be licensed.

Apprentices learn the trade by working with experienced projectionists. They first learn simple tasks, such as threading and rewinding film. With experience they progress to more difficult assignments, such as adjusting and repairing equipment. An apprentice may work in several theaters to become familiar with different types of equipment. Some apprentices are not paid during training.

Young people interested in becoming projectionists should have good eyesight, including normal color perception, and good hearing. They should be temperamentally suited to working along and in close quarters. Manual dexterity and mechanical aptitude are also important personal qualifications. Practical experience gained from operating small movie projectors at home, at school, or in the Armed Forces also is helpful. Advancement opportunities for projectionists are very limited. A few, however, become theater managers.

Employment Outlook

Employment of motion picture projectionists will gorw slowly through the mid-1980's. Most job openings will occur as experienced workers retire, die, or transfer to other fields of work.

The number of movie theaters is expected to grow as more are built in suburban areas but employment of projectionists will grow slowly this growth. In many new shopping centers, several theaters are being built side by side so that one projectionist can take care of more than one theater.

Earnings and Working Conditions

Average hourly earnings for projectionists in large metropolitan areas ranged from $4.10 to $9.19 in 1972, according to information from several union contracts. Generally, downtown multiscreen theaters pay higher hourly rates than suburban or drive-in theaters.

Most projectionists work evenings; generally 4 to 6 hours, 6 evenings a week. They may work more than 6 hours on Saturday and Sunday in theaters that feature matinees. Some projectionists work at several theaters. For example, a weekly schedule may call for two evenings in each of three theaters. Projectionists employed in drive-in theaters, particularly those in northern States, may be laid off for several months during the winter.

Many projectionists receive 2 or 3 weeks of paid vacation and premium pay for weekend or holiday work. Some are covered by hospitalization and pension plans.

Projection rooms usually have adequate lighting and ventilation, and many are air-conditioned. The work is not strenuous and is relatively hazard free, but there is some danger of electrical shocks and burns if proper safety precautions are not taken. Although projectionists must stand up a lot, they can sit for short periods while the equipment is operating. Most projectionists work without direct supervision and have infrequent contact with other theater employees.

Sources of Additional Information

Details about apprenticeship programs and employment opportunities may be obtained from any local of the International Alliance of Theatrical Stage Employees and Moving Picture Machine Operators of the United States and Canada.

PHOTOGRAPHIC LABORATORY OCCUPATIONS

(D.O.T. 970.281, 976.381, .687 through .887)

Nature of the Work

Amateur snapshots, home movies, professional portraits, and photographs to illustrate publications require the skills of thousands of photographic laboratory employees. These workers develop film, make prints and slides, and perform related tasks, such as enlarging and retouching photographs. (This chapter does not discuss employees of laboratories that specialize in processing professional motion picture film.)

All-round darkroom technicians (D.O.T. 976.381) can perform all tasks necessary to develop and print film. The technician varies the developing process according to the type of film—black-and-white negative, color negative, or color positive. For example, a developing process

for black-and-white negative film covers five steps: developer, stop bath, fixing bath, washing, and drying. The first three steps use chemical solutions and are performed in darkness. After unwinding a roll of film, the technician places it in the developer, a solution that brings out the image on exposed film. After the film has remained in the developer for a specified period, the technician transfers it to a stop bath to prevent over-development. Next, the film is placed in a fixing bath that makes it insensitive to light, thus preventing further exposure. Finally, the technician washes the film with water to remove the fixing solution and places the film in a drying cabinet. In many photographic labs, technicians regulate machines that automatically perform the steps described above.

Processes for developing color films are more complex than those used for black-and-white. Thus, some labs employ *color technicians* (D.O.T. 976.381)—highly skilled workers who specialize in processing color film.

The darkroom technician makes a photograph by transferring the image from a negative to photographic paper. Printing frequently is performed on a projection printer, which consists of a fixture for holding negatives and photographic paper, an electric lamp, and a magnifying lens. The technician places the negative between the lamp and lens, and the paper below the lens. When he turns on the lamp, light passes through the negative and lens and records a magnified image of the negative on the paper. During printing, the technician may vary the contrast of the image or remove unwanted background by using his hand or paper patterns to shade part of the photographic paper from the projected image. After removing the exposed photographic paper from the printer, he develops it in much the same way as the negative. If the customer desires, the technician mounts the finished print in a frame or on a paper or cardboard back.

Darkroom technician makes print.

In addition to working in the laboratory, darkroom technicians may set up lights and cameras or otherwise assist experienced photographers. Many technicians, particularly those in portrait studios, divide their time between taking and processing pictures. In some labs, helpers assist technicians. They also may be assisted by workers who specialize in a particular activity, such as *developers* (D.O.T. 976.381), *printers* (D.O.T. 976.381), and *retouchers* (D.O.T. 970.281).

In most large photo labs, darkroom technicians supervise semiskilled workers who perform specialized assignments that require only a limited knowledge of developing and printing. Included are *film numberers* (D.O.T. 976.887), who sort film according to the type of processing needed and number each roll for indentification; *film strippers,* who unwind rolls of film and place them in developing machines; *printer operators* (D.O.T. 976.782), who operate machines that expose rolls of photographic paper to negatives; *print developers, machine* (D.O.T. 976.885), who operate machines that develop these rolls of exposed photographic paper; *chemical mixers* (D.O.T. 976.884), who measure and combine the various chemicals that make up developing solutions; *slide mounters,* who operate machines that cut, insert, and seal film in cardboard mounts; and *photocheckers and assemblers* (D.O.T. 976.687), who inspect the finished slides and prints and package them for customers.

Places of Employment

In 1972, about 38,000 persons worked in photo lab occupations. More than half of them were in semiskilled photofinishing occupations; the remainder were darkroom technicians.

Most semiskilled workers are employed by large commercial labs that specialize in processing film for amateur photographers. A large proportion of darkroom technicians work in photo labs operated by portrait and commercial studios and by manufacturers, newspaper and magazine publishers, advertising agencies, and other organizations. Darkroom technicians also work in commercial labs that specialize in processing the work of professional photographers.

Photo lab jobs can be found throughout the country, but employment is concentrated in the more populous cities and States.

Training, Other Qualifications, and Advancement

Most darkroom technicians learn their skills through informal on-the-job training. Beginners start as helpers, and gradually learn to

develop and print film by assisting experienced technicians. It generally takes 3 to 4 years to become a fully qualified darkroom technician. Some helpers become specialists in a particular activity, such as printing or developing. Generally, the training time required in order to become a specialist is less than is needed to become an all-round darkroom technician.

When hiring darkroom technician helpers, employers prefer applicants who have high school educations. Courses in chemistry and mathematics are helpful to young people interested in this trade. Some high school and trade schools offer courses in photography that include training in film processing. The Armed Forces also offer training for darkroom technicians. Experience gained through processing film as a hobby is helpful.

Two-year curricula leading to an associate degree in photographic technology are offered by a few colleges. Completion of college level courses in this field is helpful to people who are interested in supervisory and managerial jobs in photo labs.

Many darkroom technicians eventually become professional photographers. (See Statement on photographers elsewhere in the *Handbook*.) Others advance to supervisory positions in laboratories.

Training requirements for workers in semiskilled photolab occupations range from a few weeks to several months of on-the-job training. For example, film numberers and slide mounters usually can learn their jobs in less than a month, but printer operators and chemical mixers need several months or longer. For many semiskilled jobs, manual dexterity, good vision including normal color perception, and good hand-eye coordination are important qualifications. However, some laboratories employ blind workers as film numberers and film strippers, since these jobs are performed in the dark to prevent damage to exposed film. Completion of high school generally is not required for semiskilled jobs, but frequently is needed for advancement to supervisory jobs.

Employment Outlook

Employment in photo lab occupations is expected to increase rapidly through the mid-1980's. In addition to jobs resulting from employment growth, many openings will result from the need to replace experienced workers who retire, die, or transfer to other fields of work.

The need for semiskilled workers is tied closely to the growth of amateur photography. Film purchases by amateur photographers are expected to increase very rapidly as a result of rising population and personal income, more leisure time, and increased travel. Improvements in still and movie cameras that make them easier to load and operate also should contribute to increases in the use of film. However, the use of mechanized film processing equipment will increase the efficiency of laboratory workers, and will keep employment from growing as fast as the amount of film processed.

The need for all-round darkroom technicians is expected to increase as a result of the growing demand for photography in business and government. A major factor contributing to this demand will be the increasing variety of printed matter that is illustrated with photographs. The growing use of photography in research and development activities also will contribute to the demand for darkroom technicians.

Earnings and Working Conditions

Earnings of photo lab workers vary greatly and depend on factors such as skill level, experience, and geographic location. Beginning pay for inexperienced darkroom technicians' helpers ranged from $2.25 to $3.50 an hour in 1972, according to the limited information available. Most of the experienced all-round darkroom technicians earned between $3.00 and $5.50 an hour.

Workers in semiskilled occupations earned from $2.25 to $3.75 an hour. Among these workers, printer operators and chemical mixers generally had the highest earnings.

Many photo labs provide paid holidays, vacations, and other benefits, such as health and life insurance. Workers in labs operated by business and government organizations receive the same fringe benefits as their fellow employees.

The majority of photo lab employees have a 40-hour workweek and get premium pay for overtime. In labs that specialize in processing film for amateur photographers, employees may work a considerable amount of overtime during the summer and for several weeks after Christmas. Many labs employ additional workers temporarily during these seasonal peaks.

Photo lab jobs are not physically strenuous. In many semiskilled occupations, workers perform their jobs while sitting, but the work is repetitious and the pace is rapid. Some workers (for example, printer operators and photocheckers and assemblers) are subject to eye fatigue. Photofinishing labs are generally clean, well-lighted, and air-conditioned.

Sources of Additional Information

Information about employment opportunities in photographic laboratories and schools that offer degrees in photographic technology

is available from:

Master Photo Dealers' and Finishers' Association, 603 Lansing Ave., Jackson, Mich. 49202.

Professional Photographers of America, Inc., 1090 Executive Way, Des Plaines, Ill. 60018.

POWER TRUCK OPERATORS

(D.O.T. 922.782 and .883)

Nature of the Work

In the past, manual workers usually did the hard physical labor of moving raw materials and products. Today, many heavy materials are moved by workers who operate various types of self-powered trucks. A typical truck has a hydraulic or electric lifting mechanism and special attachments for use on particular jobs. For example, a truck may have a fork lift to move piles of cartons, a scoop to lift coal, or a tow bar to pull small trailers.

Operators must use care and skill in driving trucks. For example, when loading or removing materials from stock, which may be stacked from floor to ceiling, they must be able to judge distance so that no damage occurs. They also must know how much the truck can lift and carry and the kinds of jobs it can do.

Operators may have to keep records of materials moved and do some manual loading and unloading. They also may be responsible for keeping their trucks in good working condition by cleaning, oiling, checking the water in batteries, and making simple adjustments.

Places of Employment

About 300,000 power truck operators were employed in 1972. Power truck operators worked in all types of manufacturing industries. Large numbers were employed in plants that made automobiles, machinery, fabricated metal products, and iron and steel. Many power truck operators also were employed in warehouses, depots, dock terminals, and mines.

Because power truck operators are employed in many different industries, they work in all parts of the country. Although some are employed in small towns, most work in heavily populated areas where large factories are located.

Training, Other Qualifications, and Advancement

Most workers can learn to operate a power truck in a few days. It takes several weeks, however, to learn the layout and operation of a plant and the most efficient way of handling materials.

Large companies generally require applicants to pass a physical examination. Many large companies have formal training programs to teach new employees to operate power trucks, make simple repairs, and handle materials. They also learn plant layout and operation and safe driving rules.

Young persons who are planning to become power truck operators should have manual dexterity, mechanical ability, and above-average eyesight, including good depth perception.

Opportunities for advancement are limited. A few operators may

become material-movement foremen or supervisors.

Employment Outlook

Employment of power truck operators is expected to increase moderately through the mid-1980's. In addition to jobs resulting from employment growth, many openings will result from the need to replace workers who retire, die, or transfer to other occupations.

More goods will be manufactured as population grows and our standard of living rises. Power truck operators will be needed to move these goods and the materials used to produce them. Employment growth will be limited, however, by the development of more efficient trucks and other mechanized material-handling equipment.

Earnings and Working Conditions

According to a survey of metropolitan areas in 1971-72, power truck operators in manufacturing earned an average of $3.50 an hour, about the same as the average for nonsupervisory workers in all private industries except farming. Earnings of operators varied by region, as shown below:

Area	*Hourly rate*
United States	$3.50
Northeast	3.37
South	3.00
North Central	3.73
West	3.67

Power truck operators are subject to hazards such as falling objects and collisions between vehicles. They may operate their trucks outdoors where they are exposed to all kinds of weather. Some operators may handle loose material that is dirty or dusty. Moving materials throughout a plant, however, is likely to be less routine and boring than many other production jobs.

Many power truck operators are members of labor unions. Most union contracts in manufacturing plants provide for fringe benefits such as paid holidays and vacations, health insurance, life insurance, and retirement pensions.

Sources of Additional Information

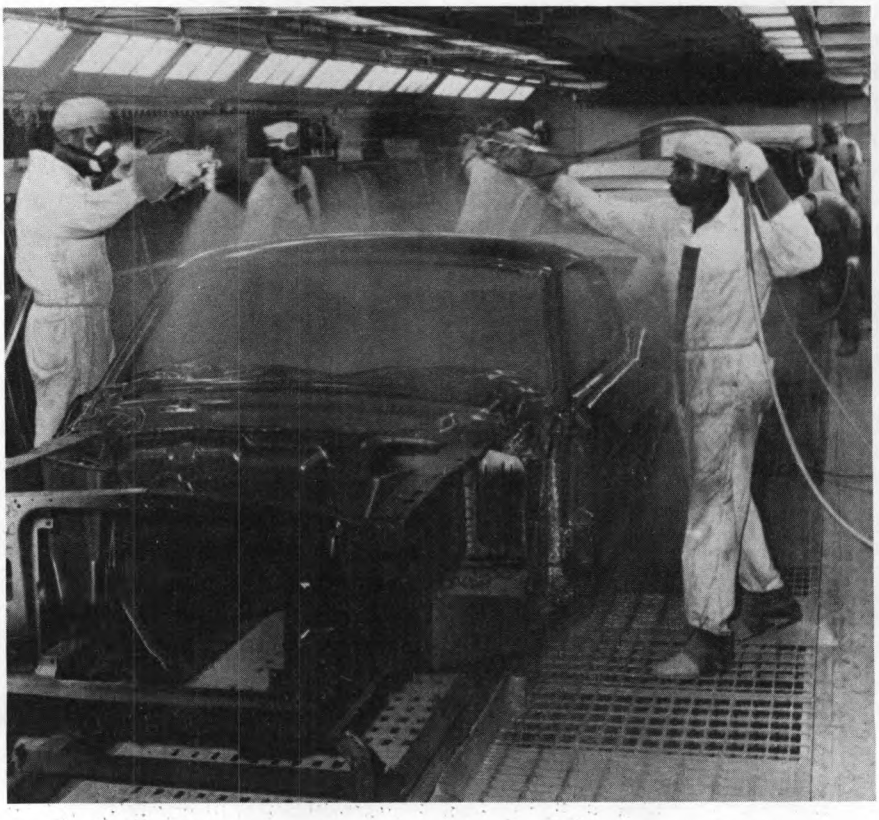
Information on work opportunities for power truck operators may be available from the local office of the State employment service.

PRODUCTION PAINTERS

Nature of the Work

Almost every metal or wood product manufactured gets a coating of paint or other protection. In mass-production, most painters use sprayguns to apply paint, lacquer, varnish, and other finishes; some use brushes; and others operate spraying machines, dipping tanks, or tumbling barrels. The work of production painters in factories is different from that of skilled painters in construction and maintenance work. (See statements on painters and automobile painters elsewhere in the *Handbook*.)

Production painters may have to clean items before painting them. On multicolored items they use masking tape to keep colors from overlapping. Spraygun operators adjust spraygun nozzles and other controls so the paint will be applied evenly. Some operate special sprayguns such as those used to apply powdered plastics. Painting machine operators may load items into the machine or



Production painters apply acrylic enamel to automobile body.

onto conveyors before applying paint.

Most production painters do simple, repetitive work; others have to decide finishes, paint thinning, and the adjustment of spray equipment. Mixing paints and figuring areas to be painted require simple arithmetic involving decimals and fractions.

Production painters may replace nozzles and clean sprayguns and other equipment. Besides the painting equipment, they use wrenches, mixing paddles, and gages which show the consistency of paint.

Places of Employment

About 180,000 production painters were employed in 1972; most of whom were men. More than four-fifths of the total worked in plants that manufactured furniture, automobiles, household appliances, industrial machinery, and other durable goods. Large numbers of production painters were employed in New York, Michigan, Ohio, California, Illinois, Pennsylvania, Texas, North Carolina, and New Jersey.

Training, Other Qualifications, and Advancement

The new worker usually learns by watching and helping experienced production painters. The length of training may vary from a few days to several months.

Production painters should have a steady hand, the ability to stand for long periods, and good eyesight to distinguish between colors and to apply paint evenly. High school graduation generally is not required.

Opportunities for advancement are limited. A small number of production painters become inspectors and foremen.

Employment Outlook

Employment of production painters is expected to increase slowly through the mid-1980's. Most job openings will result as experienced workers retire, die, or transfer to other occupations.

Most manufacturing industries which employ production painters are expected to increase their output in the years ahead. Demand for consumer products, such as automobiles and furniture, will increase as population and personal income grow. Business growth will create a need for more industrial machinery and equipment. Employment of painters, however, is not expected to keep pace with manufacturing output because the greater use of automatic sprayers and other labor-saving innovations, such as powder coating applied by electrostatic guns, should raise output per worker.

Earnings and Working Conditions

Hourly wage rates for production painters ranged from about $2.30 to $4.60 in 1972, based on information from a limited number of union contracts. Most contracts provided for holiday and vacation pay, health insurance, life insurance, and retirement pensions.

Painters are exposed to fumes from paint and paint-mixing ingredients. Some wear protective clothing and masks which cover the nose and mouth. When painting large objects, they sometimes work in awkward and cramped positions.

Among unions organizing production painters are the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the United Furniture Workers of America; and the United Steelworkers of America.

Sources of Additional Information

More facts about job opportunities in this field may be available from local offices of the State employment service.

STATIONARY ENGINEERS

(D.O.T. 950.782)

Nature of the Work

Stationary engineers operate and maintain boilers, diesel engines, turbines, generators, pumps, and compressors. The equipment is used to generate power and to control the temperature and humidity in factories and other buildings. Stationary engineers must operate and maintain the equipment according to State and local laws, since the safety of many people depends upon its proper functioning.

Stationary engineers detect and identify any trouble that develops by watching and listening to machinery, and by analyzing readings of meters, gages, and other instruments. They operate levers, throttles, switches, valves, and other devices to regulate the machinery, and also record such information as fuel consumption and boiler temperatures and pressure. Stationary engineers use handtools to repair equipment. Common repairs involve reseating valves and replacing gaskets, pumps, and bearings.

In a large plant, the stationary engineer may have charge of the boiler room, and direct the work of assistant stationary engineers, turbine operators, boiler operators, and air-conditioning and refrigeration mechanics. In a small plant, the stationary engineer may operate and maintain equipment by himself.

Places of Employment

In 1972, about 175,000 stationary

engineers were employed in a wide variety of places, including power stations, factories, sewage and water-treatment plants, office and apartment buildings, hotels, and hospitals. Federal, State, and local governments also employed large numbers of these workers. Most plants which operate on three shifts employ four to eight stationary engineers, but some have more. In many plants, only one engineer works on each shift.

Because stationary engineers work in so many different kinds of industries, they are employed in all parts of the country. Although some are employed in small towns and in rural areas, most work in the more heavily populated areas where large industrial and commercial businesses are located.

Training, Other Qualifications, and Advancement

Many stationary engineers start as helpers or craftsmen in other trades and acquire their skills through informal on-the-job experience. However, most training authorities recommend formal apprenticeship programs because of the increasing complexity of the machines and systems.

In selecting apprentices, most joint labor-management apprenticeship committees prefer high school or trade school graduates between 18 and 25 years of age who have received instruction in mathematics, mechanical drawing, machine-shop practice, physics, and chemistry. Mechanical aptitude, manual dexterity, and good physical condition also are important qualifications.

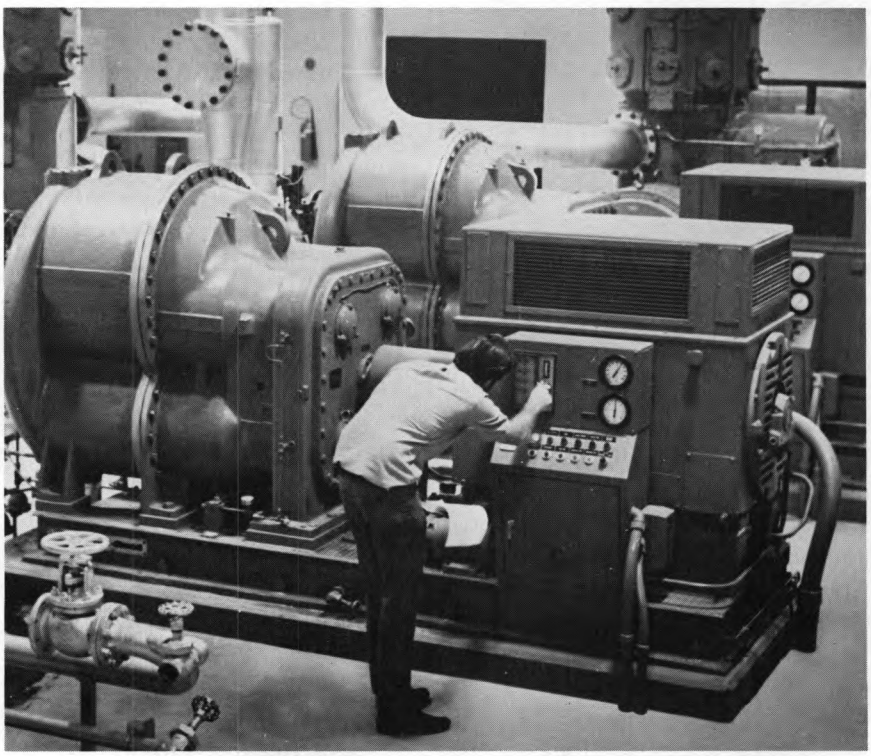
The apprenticeship usually lasts 3 to 4 years. In addition to on-the-job training, apprentices receive classroom instruction in practical chemistry, elementary physics, blueprint reading, applied electricity, and other technical subjects.

Becoming a stationary engineer without going through a formal apprenticeship program usually takes many years of experience as an assistant to licensed stationary engineers. This practical experience usually is supplemented by technical or other school training or home study.

Some States, the District of Columbia, and many large and medium-size cities have licensing requirements for stationary engineers. Although requirements for a license differ from place to place, the following are typical: applicants must be over 21 years of age; they must reside for a specified period in the State or locality in which the examination is given; and they must meet the experience requirements for the class of license requested and pass an examination which may be written, oral, or both.

Generally, there are several classes of stationary engineer licenses which specify the steam pressure or horsepower of the equipment the engineer can operate. The first-class license permits the stationary engineer to operate equipment of all types and capacities. The lower class licenses limit the capacity of the equipment the engineer may operate without the supervision of a higher rated engineer.

Stationary engineers advance to more responsible jobs by being placed in charge of larger, more powerful, or more varied equipment. Generally, engineers advance to these jobs as they obtain higher grade licenses. Advancement, however, is not automatic. For example, an engineer who has a first-class license may work for some time as an assistant to another first-class engineer before a vacancy occurs. Some stationary engineers eventual-



Stationary engineer operates compressor.

ly advance to jobs as plant engineers and as building and plant superintendents.

Employment Outlook

Employment of stationary engineers is expected to show little or no change through the mid-1980's. Nevertheless, several thousand job openings will arise annually because of the need to replace experienced workers who retire, die, or transfer to other occupations.

Industrial growth will result in an increased use of large boilers and auxiliary equipment in factories, powerplants, and other buildings. The need for additional stationary engineers, however, will be limited by the trend to more powerful and more centralized equipment with automatic controls. For example, large boilers make it possible to increase capacity without corresponding increases in the number of stationary engineers. In a growing number of plants, centralized control panels and closed circuit television monitoring systems will reduce the need for on-site observation of equipment. Automatic control systems which regulate throttles, valves, and other devices previously regulated by hand, also will increase the efficiency of stationary engineers.

Earnings and Working Conditions

Stationary engineers had average hourly earnings of $4.14 in 1971-72, according to a survey of metropolitan areas. This was higher than the average for all nonsupervisory workers in private industry, except farming. Averages for engineers in individual areas ranged from $4.29 in the south to $5.21 in the western United States.

Stationary engineers generally have steady year-round employment. They usually work a 5-day, 40-hour week. In plants that operate around the clock, they may be assigned to any one of three shifts—often on a rotating basis—and to Sunday and holiday work. Many employers provide finge benefits such as health insurance, life insurance, and retirement pensions.

Engine rooms, powerplants, or boiler rooms usually are clean and well-lighted. Even under the most favorable conditions, however, some stationary engineers are exposed to high temperatures, dust, dirt, contact with oil and grease, and fumes or smoke. They may have to crawl inside boilers and work in crouching or kneeling positions to inspect, clean or repair the interiors.

Because stationary engineers often work around boilers and electrical and mechanical equipment, they must be alert to avoid burns, electric shock, and injury from moving machinery.

Among the unions to which these workers belong are the International Union of Operating Engineers and the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America.

Sources of Additional Information

Information about training or work opportunities may be obtained from local offices of State employment services, locals of the International Union of Operating Engineers, and from State and local licensing agencies.

Specific questions about the occupation may be referred to:

International Union of Operating Engineers, 1125 17th St. NW., Washington, D.C. 20036.

National Association of Power Engineers, Inc. 176 West Adam St., Chicago, Ill. 60603.

STATIONARY FIREMEN (BOILER)

(D.O.T. 951.885)

Nature of the Work

Stationary firemen operate and maintain the steam boilers that power industrial machinery and heat factories, offices, and other buildings. Qualified firemen may be responsible for inspecting boiler equipment, lighting boilers, and maintaining steam pressure.

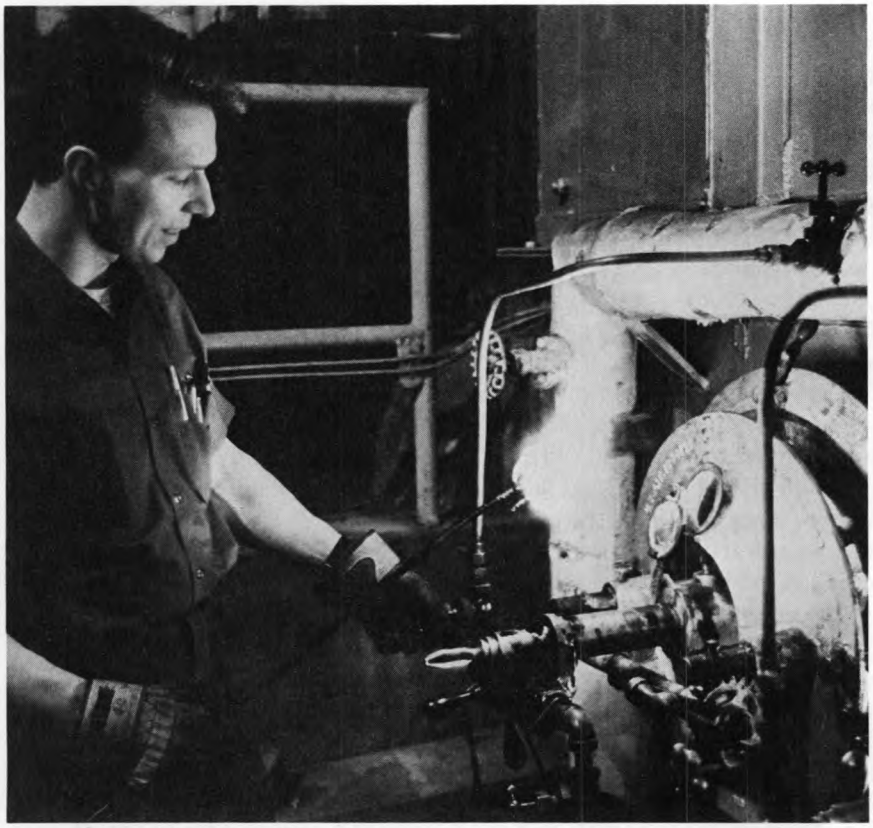
In most plants, stationary firemen operate mechanical devices that control the flow of air, gas, oil, or coal into fireboxes. They read meters and other instruments to make sure boilers are operating according to safety regulations. They sometimes make minor repairs, and test and treat boiler water with chemicals. They may also operate waste heat boilers.

Stationary firemen often are supervised by stationary engineers who operate and maintain a variety of equipment, including boilers, diesel and steam engines, and refrigeration and air-conditioning systems. (Additional information on stationary engineers appears elsewhere in the *Handbook*.)

Places of Employment

Most of the 93,000 stationary firemen employed in 1972 worked in manufacturing industries. Plants that manufacture lumber, iron and steel, paper, chemicals, and transportation equipment are among the leading employers of stationary firemen. Public utilities also employ many of these workers.

Although stationary firemen are employed in all parts of the country, most work in the more heavily populated areas where large manufacturing plants are located.



Stationary fireman lights boiler.

Training, Other Qualifications, and Advancement

Some large cities and a few States require stationary firemen to be licensed. An applicant can obtain the knowledge and experience to pass the license examination by first working as a helper in a boiler room.

License requirements differ from city to city and from State to State. However, applicants usually must meet experience requirements and pass an examination to obtain a license. For specific information about licensing, State and local authorities should be consulted.

There are two types of stationary firemen licenses—for low and high pressure boilers. Low pressure firemen operate boilers generally used for heating buildings. High pressure firemen operate the more powerful boilers and auxiliary boiler equipment used to power machinery as well as heat large buildings. Both high and low pressure firemen, however, may operate equipment of any pressure if a stationary engineer is on duty.

Stationary firemen should understand the operation of machinery, and must have normal vision and good hearing. Because of the mechanization of equipment, physical strength is no longer a major requirement for this type of work.

Stationary firemen may advance to stationary engineers. To help them advance, firemen sometimes supplement their on-the-job training by taking courses in chemistry, physics, blueprint reading; electricity, and air conditioning and refrigeration. Stationary firemen also may become maintenance mechanics.

Employment Outlook

Employment of stationary firemen is expected to decline slowly through the mid-1980's. Hundreds of job openings, however, will result each year from the need to replace experienced firemen who transfer to other occupations, retire, or die.

Although an increase in the use of boilers and auxiliary equipment is expected, the trend to automatic, more powerful, and more centralized equipment is expected to result in a decline in employment of stationary firemen. In large plants, however, where turbines and engines are housed under a separate roof, and where there is a need for constant surveillance of boilers, firemen will continue to be needed.

Earnings and Working Conditions

Stationary firemen had average hourly earnings of $3.74 according to a survey of metropolitan areas in 1971-72. This was the average for all nonsupervisory workers in private industry, except farming. Average for firemen in individual areas ranged from $2.25 in Greenville, S.C. to $5.44 in Detroit, Mich.

Many stationary firemen received paid holidays and vacations, and other benefits such as health insurance, life insurance, and retirement pensions.

Stationary firemen may have to work in awkward positions and be exposed to noise, heat, grease, fumes, and smoke. They are subject also to burns, falls, and injury from moving machinery. Defective boilers and auxiliary equipment may be dangerous to firemen and other persons. Modern equipment and safety procedures, however, have reduced accidents.

The principal unions organizing

stationary engineers are the International Brotherhood of Firemen and Oilers and the International Union of Operating Engineers.

Sources of Additional Information

Information about training or work opportunities in this trade may be obtained from local offices of State employment services, locals of the International Brotherhood of Firemen and Oilers, and from State and local licensing agencies.

Specific questions about the nature of the occupation, training, and employment opportunities may be referred to:

International Brotherhood of Firemen and Oilers, 200 Maryland Ave. NE., Washington, D.C. 20002.

WASTEWATER TREATMENT PLANT OPERATORS (Sewage-Plant Operator)

(D.O.T. 955.782)

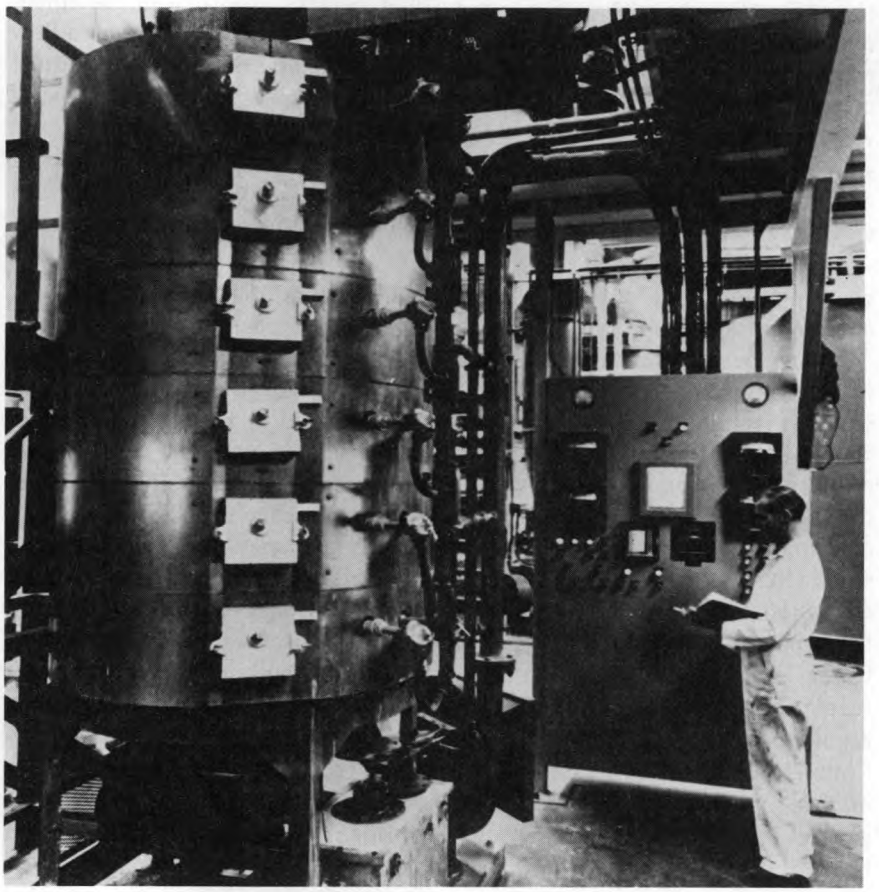
Nature of the Work

Clean water is essential for our health and recreation and for the existence of fish and wildlife. Wastewater treatment plant operators help keep America's water clean by removing harmful domestic and industrial waste.

Waste materials are carried by water through sewer pipes to treatment plants. Wastewater treatment plant operators control equipment to remove these materials or render them harmless. By operating and maintaining pumps, pipes, and valves that connect the collection system to the treatment facility, operators move the wastewater through the various treatment processes.

Operators read meters and gauges to make sure plant equipment is working properly. Other jobs include operating screening devices to remove solids from wastewater; taking samples of the water for laboratory analysis; and testing and adjusting the level of chlorine in the water. Operators also make minor repairs on valves, pumps, and other equipment. They use wrenches, pliers, and other common hand tools, as well as special tools. Occasionally operators must work under emergency conditions—for example, a heavy rainstorm may cause abnormal amounts of wastewater to flow into sewer pipes and threaten to exceed a plant's treatment capacity.

The duties of operators vary depending on the type and size of plant. The treatment process in an industrial plant, such as a food-processing company for example, may be simple since the wastewater is of a known content. Treatment plants which serve entire cities, on the other hand, must be equipped to treat a mixture of waste products that varies daily, thus making the operator's job more complicated. In smaller plants, one operator may be responsible for the entire system—making repairs, keeping plant records, handling complaints, and doing the maintenance work for the facility. In larger plants, the staff may include chemists, laboratory technicians, mechanics, helpers, foremen, and a superintendent.



Treatment plant operator records instrument reading.

Places of Employment

About 20,000 people worked full-time as wastewater treatment plant operators in 1972, of whom 14,500 worked in municipal plants, 4,500 in private industry, and 1,000 in Federal installations.

Wastewater treatment plant operators are employed throughout the country. Geographically, employment is distributed much like the Nation's population, with most jobs in larger towns and cities. Many operators in small towns are employed part-time.

Training, Other Qualifications, and Advancement

Trainees usually start as helpers and learn their skills on the job under the direction of an experienced operator. They learn by helping in routine tasks, such as recording meter readings; taking samples of wastewater and sludge; and doing simple maintenance and repair work on pumps, electric motors, and valves. They also are expected to perform housekeeping tasks such as cleaning and maintaining plant equipment and property.

Young people who are interested in entering the field should have some mechanical aptitude, and should be competent in basic mathematics. Employers generally prefer trainees who have a high school diploma or its equivalent, and in some States this is a minimum educational requirement. Some positions, particularly in larger cities and towns, are covered by civil service regulations, and applicants may be required to pass written examinations testing elementary mathematics, mechanical aptitude, and general intelligence. Operators must be agile, since they have to climb ladders and move easily around heavy machinery.

Some two-year programs leading to an associate degree in wastewater technology are available that provide a good general knowledge of the water pollution control field as well as basic preparation for becoming an operator. Since plants are becoming more complex, completion of such courses increase an applicant's chances for employment and promotion. Programs also are available under provisions of the Manpower Development and Training Act. Trainees who have completed such programs may bypass much of the basic on-the-job training and advance more rapidly.

Most State water pollution control agencies offer training courses to improve the skills of treatment plant operators. These courses cover principles of sludge digestion, odors and their control, chlorination, sedimentation, biological oxidation, and flow measurements. Some operators take correspondence courses on subjects related to wastewater treatment, and some municipalities will pay part of the tuition for courses leading to a college degree in science or engineering.

Operators may be promoted to supervisory positions such as foreman and superintendent. Superintendents of large and complex plants are expected to have an engineering or science degree. A high school diploma and increasingly responsible experience may be sufficient to qualify as superintendent of a small or medium-sized plant at present, but educational requirements are rising as more complex treatment plants are built to meet new water pollution control standards. A limited number of operators may become technicians employed by State water pollution control agencies to monitor and provide technical assistance to plants throughout the State. Some technical-vocational school or junior college training is generally preferred for technician jobs.

In 35 States, supervisors and certain operators must pass an examination to certify that they are capable of overseeing treatment plant operations. Voluntary certification programs are in effect in the remaining States, with the exception of Alaska and Mississippi.

Under a typical program, there are different classes of certification for different sizes of treatment plants. For example, to be certified a Class I operator (corresponding to a Class I plant serving a population of less than 2,000), an applicant may be required to be a high school graduate, demonstrate general knowledge of treatment operations by passing a written test, and have completed 1 year of employment at a treatment plant. Requirements for certification as a Class IV operator (corresponding to a Class IV plant, serving a population in excess of 40,000) may be completion of 2 or more years of college in science and engineering; 5 years of treatment plant experience at a Class III plant or higher, 2 years of which were in a position of major responsibility; and specific knowledge of the entire field of wastewater treatment as demonstrated through a written test.

Employment Outlook

Employment of wastewater treatment plant operators is expected to rise rapidly through the mid-1980's, mainly as a result of the construction of new treatment plants to process the increasing amount of domestic and industrial wastewater. Also, more highly trained operators will be needed as existing plants expand and modernize their facilities to cope more effectively with water pollution. In addition to the new jobs from employment growth, many job openings will occur as experienced

operators retire, die, or transfer to other occupations.

Earnings and Working Conditions

Earnings of operators ranged from about $5,000 to $14,000 a year in 1972, based on information from a survey covering a number of cities throughout the United States. Operators at the supervisory level could earn even more. Salaries for trainees were roughly 80 percent of operators' salaries in most cities.

Fringe benefits for operators usually are similar to those received by other local government employees. Typically, they receive paid vacations and holidays, overtime, shift differential pay, sick leave, paid hospitalization and life insurance, and retirement benefits.

Because pollution control is a never ending task, operators work different shifts and in an emergency may have to work overtime. Operators may be exposed to unpleasant odors, as well as noise from the operation of electrical motors and pumps. However, odor is kept to a minimum by the use of chlorine or other chemicals.

Sources of Additional Information

Young people interested in a career in wastewater treatment should contact their local or State water pollution control agencies. Additional information may be obtained from:

Water Pollution Control Federation, 3900 Wisconsin Ave. NW., Washington, D.C. 20016

Environmental Protection Agency, Office of Water Programs Operations Manpower Development Staff, 401 M St. SW., Washington, D.C. 20460.

WELDERS AND FLAME CUTTERS

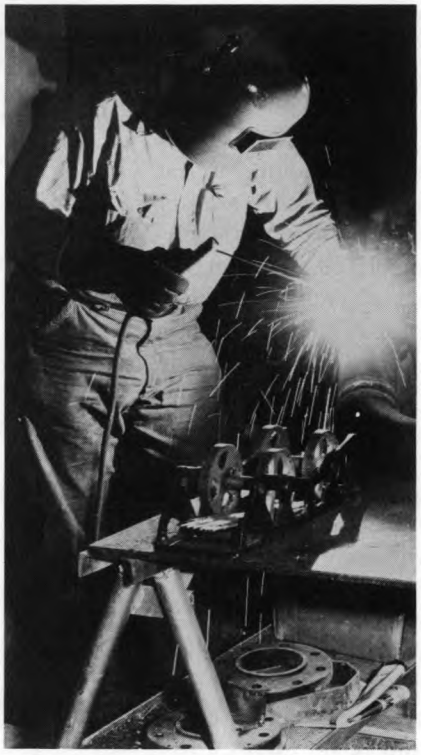
(D.O.T. 810. through 819.887)

Nature of the Work

Welding is one of the most common means of joining metal parts. Many of the parts in automobiles, spacecraft, airplanes, household appliances, and thousands of other products are joined by this process. Structural metal used for bridges and buildings is often welded. Most of the 40 or more different welding processes fall under three basic categories: arc, gas, and resistance welding. Arc and gas welding can be performed manually or by machine. Resistance welding is mainly a machine process.

Manual welders may do arc or gas welding, or both, and they may be either skilled or semiskilled. Skilled welders are able to plan and lay out work from drawings, blueprints, or other written specifications. They know the welding properties of steel, bronze, aluminum, and other metals and alloys. They also can weld all types of joints held in various positions (flat, vertical, horizontal, and overhead). Semiskilled manual welders usually do repetitive work; that is, production work which generally does not involve critical safety and strength requirements. They primarily weld surfaces in only one position.

Manual welders control the melting of metal edges by directing heat to the edges, either from an electric arc or from a gas-welding torch. In one of the most common arc welding processes, they first "strike" an arc (create an electric circuit) by touching the metal with the electrode. They guide the electrode at a suitable distance from the edges, and intense heat caused by the arc melts the edges and the electrode tip. The molten metal solidifies to form a solid connection.



Welders use special masks and heavy gloves to prevent injuries.

Gas welders apply an intensely hot flame to the metal edges. After the torch is lighted, valves are adjusted to obtain the proper flame for the particular job. Gas welders heat the metal with the torch and apply a welding rod to the molten metal to supply additional filler for the joint.

In production processes, especially where the work is repetitive and the items to be welded are relatively uniform, the welding may be done by semiskilled workers who operate machines. For example, *resistance welding operators* (D.O.T. 813.885) feed and aline the work and remove it after the welding operation is completed. Occasionally, they may adjust the controls of the machine for the desired electric current and pressure.

Closely related to manual welders are *oxygen cutters* (D.O.T. 816.782 and .884) and *arc cutters* (D.O.T. 816.884). These workers cut or trim

metals. Oxygen cutters melt the metal with a gas torch and cut it by releasing a stream of oxygen from the torch. Arc cutting differs from oxygen cutting because an electric arc is the source of heat. Oxygen and arc cutters also may operate a torch mounted on an electrically- or mechanically-controlled machine which automatically follows the proper guideline.

Places of Employment

About 555,000 welders and flame cutters were employed throughout the country in 1972. Very few were women. About three-fifths of the total were employed by firms that manufactured durable goods, such as transportation equipment, machinery, and primary metals. Most of the rest worked for construction firms and repair shops.

The widespread use of the welding and cutting processes enables these workers to find jobs in every State. Most of the jobs, however, are found in the major metalworking areas. In 1972, about half of all welders and cutters were employed in seven States—Pennsylvania, California, Ohio, Michigan, Illinois, Texas, and New York.

Training, Other Qualifications, and Advancement

Generally, it takes several years of training to become a skilled manual arc or gas welder, and somewhat longer to become a combination welder (both arc and gas welding). Some of the less skilled jobs, however, can be learned in a few months of on-the-job training.

Training requirements for resistance-welding machine operators depend upon the particular type of equipment used; most of them learn their work in a few weeks. Little skill is required for most oxygen and arc-cutting jobs; generally, they also can be learned in a few weeks.

Young persons planning careers as welders or cutters need manual dexterity, good eyesight, and good eye-hand coordination. They should be able to concentrate on detailed work for long periods, and must be free of any physical disabilities that would prevent them from bending, stooping, and working in awkward positions.

For entry into manual welding jobs most employers prefer applicants who have high school or vocational school training in welding. Courses in mathematics, mechanical drawing, and blueprint reading also are helpful.

Beginners often start in simple production jobs where the type and thickness of metal, as well as the position of the welding operation, rarely change. Occasionally, they are first given jobs as cutters and later move up to manual welding.

A few large companies offer welder apprenticeship programs that run as long as 8,000 hours. Also, the U.S. Department of the Navy, at several of its installations, conducts 4-year welder apprenticeship programs for its civilian employees.

Programs to train unemployed and underemployed workers for entry level welding jobs or to upgrade welding skills were operating in many cities in 1972 under the Manpower Development and Training Act and other legislation. The training, which may be in the classroom or on the job, lasts from several weeks up to 1 year. Additional work experience and on-the-job training may qualify graduates as skilled welders in a relatively short time.

Before being assigned to work on boilers or other jobs where the strength of the weld is highly critical, welders may be required to pass an examination given by an employer or government agency. New developments in some manufacturing industries are increasing the skills required of welders. This is particularly true in fields such as atomic energy or missile manufacture, which have high standards for the reliability of welds and require more precise work.

Welders may be promoted to jobs as welding inspectors, technicians, or foremen. A small number of experienced welders open their own welding and repair shops.

Employment Outlook

Employment of welders is expected to increase rapidly through the mid-1980's as a result of the generally favorable longrun outlook for metalworking industries and the wider use of the welding process. In addition to jobs created by employment growth, a few thousand openings will arise annually because of the need to replace experienced workers who retire or die. Openings will occur, also, as some welders transfer to other occupations.

Many more manual welders will be needed for maintenance and repair work in the growing metalworking industries. The number of manual welders in production work is expected to increase in plants that manufacture ships, boilers, storage tanks, and other structural-metal products. The construction industry will need an increasing number of welders as the use of welded steel building techniques expands.

Employment prospects for resistance welders are expected to continue to be favorable because of the increased use of machine resistance-welding in the manufacture of motor vehicles, aircraft and missiles, railroad cars, and other products.

The number of jobs for oxygen and arc cutters is expected to rise somewhat during the years ahead as the result of the general expansion of

metalworking activity. The increased use of oxygen and arc-cutting machines, however, will tend to restrict growth in these occupations.

Earnings and Working Conditions

National wage data on welders and cutters are not available. However, data from several union contracts in the shipbuilding and fabricated structural metal products industries indicate that welders hourly earnings ranged from $3.85 to $4.90 in 1972. Cutters generally earn less than welders.

The standard workweek for welders and cutters is 40 hours. Many employers provide paid vacations and holidays, and additional benefits, such as life and health insurance, and retirement pensions.

Welders and cutters use protective clothing, goggles, helmets with protective lenses, and other devices to prevent burns and eye injuries. Although lighting and ventilation are usually adequate, they occasionally work in the presence of toxic gases and fumes caused by the melting of some metals. They are often in contact with rust, grease, paint, and other elements on metal surfaces. Operators of resistance-welding machines are largely free from the hazards associated with hand welding. An eyeshield or goggles generally offer adequate protection to these workers.

Many welders and cutters are union members. Among the unions that organize these workers are the International Association of Machinists and Aerospace Workers; the International Brotherhood of Boilermakers, Iron Shipbuilders, Blacksmiths, Forgers and Helpers; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada; and the United Electrical, Radio and Machine Workers of America (Ind.). Only one labor organization—the International Union, United Welders (Ind.), is known to be composed entirely of welders, employed largely in the aircraft industry on the west coast.

Sources of Additional Information

For further information on training and work opportunities for welders and flame cutters, contact local employers. Local offices of the State employment service also may have information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities. General information about welders may be obtained from the State Supervisor of Trade and Industrial Education or the local Director of Vocational Education in the State or city in which a person wishes to receive training or by writing to:

The American Welding Society, 2501 NW. 7th St., Miami, Fla. 33125.

International Union, United Automobile, Aerospace and Agricultural Implement Workers of America, 8000 East Jefferson Ave., Detroit, Mich. 48214.

OFFICE OCCUPATIONS

Office workers perform a wide range of tasks that are needed to keep business and other organizations running on a day to day basis. Clerical workers, such as secretaries and typists, maintain files, type, and operate office machines. Professional and technical employees, on the other hand, give legal advice, prepare and analyze financial reports, design computer systems, and arrange bank loans.

Opportunities in office work exist for people with widely different educational backgrounds. Some jobs can be entered with only a high school education; many others, however, require at least a college degree.

Many clerical employees work with things and often do detailed, repetitive tasks. Most professional office workers, on the other hand, work with ideas; they apply their skills to solving problems and devising ways to provide better services to those who depend on them. Besides the technical skills required to do their jobs, office workers need judgment and the ability to communicate their ideas to others.

This chapter of the *Handbook* describes office work in Clerical Occupations, Computer and Related Occupations, Banking Occupations, Insurance Occupations, and Administrative and Related Occupations.

CLERICAL OCCUPATIONS

More than 14 million people worked in clerical jobs in 1972. Many keep records and do other office paperwork. Others handle communications, operate office machines, ship and receive merchandise, and ring sales on cash registers.

Workers in clerical jobs have a wide variety of skills and experience. They include highly skilled title searchers in real estate firms and executive secretaries in business offices as well as relatively unskilled messengers and file clerks.

More than one out of five clerical employees work as secretaries or stenographers. Bookkeepers and accounting clerks, representing a little more than one-tenth of the total, make up the next largest group. Chart 12—shows employment in these and other major clerical occupations discussed in the *Handbook.*

Training, Other Qualifications, and Advancement

Clerical workers need high school diplomas for all but the most routine jobs, and many employers prefer applicants who have had business courses. Some companies cooperate with local high schools and business schools in office education programs that enable students to work part time while attending school. This experience is helpful for beginners seeking jobs after graduation. The Federal Government also sponsors training for some clerical occupations under provisions of the Manpower Development and Training Act and other legislation.

Beginning clerical workers often receive on-the-job training. They learn how their employers keep records and the kinds of business forms used. They also may learn to operate adding and duplicating machines and other office equipment. They may attend school to learn how to operate tabulating machines and other specialized equipment. Secretaries and typists need special skills that must be learned in schools or formal training programs.

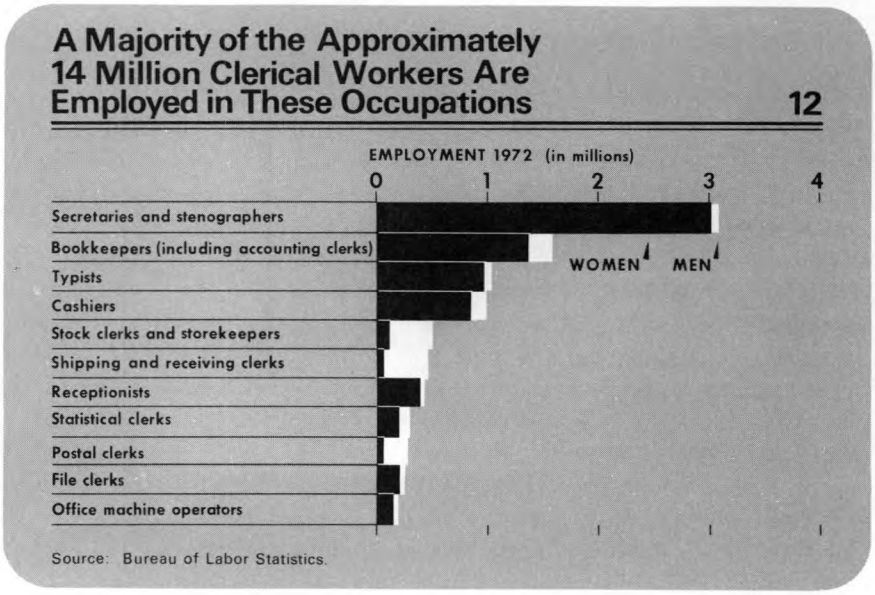
Many clerical jobs require reading comprehension, a knowledge of spelling and grammar, and arithmetic skills. Some employers test applicants for clerical aptitude.

Advancement opportunities for many clerical workers are good and organizations often provide courses so that employees can get the skills needed. As workers become skillful, they are assigned more difficult tasks. For example, a typist in a typing pool may be promoted to senior typist. Receptionists who learn typing and office procedures may become secretaries or typists. Promotion to supervisor or manager generally depends on leadership ability, work experience, and knowledge of the overall operations of the organization.

Employment Outlook

Employment of clerical workers is expected to increase rapidly through the mid-1980's. In addition to jobs created by growth, thousands of openings will occur as employees die, retire, or leave their jobs.

The growth in the number of clerical workers is expected to result primarily from the increasing paperwork that will accompany the expansion of large and complex organizations. Employment opportunities will be best for secretaries, typists, and other skilled workers whose jobs are not likely to be handled by machines. Demand for these workers will be particularly strong in banks, insurance companies, manufacturing firms, government of-



fices, and professional service organizations.

As more firms use computers and business machines, routine clerical jobs such as payroll, stock, bank, and file clerks may be reduced or eliminated. However, as work is shifted from clerks to machines, new jobs will be created for machine operators, particularly in large urban business firms.

Many clerical workers, including secretaries, receptionists, and others who deal with the public and who exercise initiative, will not be affected by automation.

Earnings and Working Conditions

Clerks in routine jobs earned as little as $83 a week and some experienced and highly skilled employees earned up to $162 a week, according to a 1972 Bureau of Labor Statistics survey. Salary variations within an occupation usually reflect differences in educational levels and work experience.

Salaries in different parts of the country also vary; earnings generally are lowest in southern cities and highest in northeastern and western urban areas. For example, secretaries averaged $141 a week in the Northeast, $142 in the West, and $126 in southern cities.

Office employees work a 40-hour week in most cities. In some, especially in the Northeast, the scheduled work week is 37½ hours.

Most office workers in large cities receive 7 or more paid holidays a year and 2 weeks vacation after working 1 year. Longer vacations, based on added years of service, may range to 4 weeks or more. Group life and health insurance plans, sick benefits, and retirement plans may be available.

Sources of Additional Information

Many State employment service offices can provide information about earnings, hours, and employment opportunities in clerical jobs.

Information concerning training for clerical occupations is available from:

State Supervisor of Office Occupations Education, State Department of Education, State Capitol.

Teachers should contact:

Division of Vocational and Technical Education, Bureau of Adult Vocational and Library Programs, U.S. Office of Education, Washington, D.C. 20202.

A directory of private business schools located in cities throughout the country may be obtained from:

United Business Schools Association, 1730 M St., NW., Washington, D.C. 20036.

Bookkeeper records business transactions.

BOOKKEEPING WORKERS

(D.O.T. 210.368 through .588, 216.388, and 219.388 and .488)

Nature of the Work

Every business needs systematic and up-to-date records of accounts and business transactions. Bookkeeping workers maintain these records in journals, ledgers, and on other accounting forms. They also prepare periodic financial statements showing all money received and paid out. The duties of bookkeeping workers vary with the size of the business in which they work.

In many small firms, a *general bookkeeper* (D.O.T. 210.388) is the only bookkeeping worker. He analyzes and records all financial transactions, such as orders and cash sales. He also does the other bookkeeping work involved in operating a business, which includes checking money taken in against that paid out to be sure accounts "balance" and calculating the firm's payroll. Although most of this work is done by hand, occasionally a bookkeeper uses simple office equipment such as an adding machine. A general bookkeeper also does other office work such as preparing and mailing customers' bills and answering the telephone.

Large businesses usually have many bookkeepers and accounting clerks under the direction of a head bookkeeper. Bookkeepers may specialize in certain types of work such as preparing statements on a company's income from sales or its daily operating expenses. They may use complex bookkeeping machines. *Accounting clerks* (D.O.T. 219.488), who sometimes are known as book-

keeping clerks, perform a variety of routine duties. They record details of business transactions, including deductions from payrolls and bills paid and due. They also may type vouchers, invoices, and other records.

Places of Employment

Bookkeeping workers numbered over 1.5 million persons in 1972. About 90 percent were women. Although jobs for bookkeeping workers are found in all kinds of firms, most work in retail stores, factories, banks, and insurance companies. Large numbers also work in wholesale firms, hospitals, and schools.

Training, Other Qualifications, and Advancement

High school graduates who have taken business arithmetic, bookkeeping, and accounting meet the minimum requirements for most bookkeeping jobs. Some employers, however, prefer applicants who have completed business courses at a junior college or business school.

Persons also may qualify for bookkeeping jobs through on-the-job training. In some areas, companies cooperate with business schools and high schools in work-study programs offering part-time experience that helps students get a job after graduation.

Bookkeeping workers need above average aptitude for working with numbers and the ability to concentrate on details. They should be able to type and operate various office machines. Because bookkeepers depend on other office workers for information, persons in these jobs should be able to work as part of a team.

Newly hired bookkeeping workers begin by recording routine transactions and advance to more responsible assignments, such as preparing income statements and operating complex bookkeeping machines. Some workers are promoted to supervisory jobs. Bookkeepers who complete courses in college accounting may become accountants. (The occupation of accountant is discussed elsewhere in the *Handbook*.)

Employment Outlook

Although the number of bookkeepers will increase slowly through the mid-1980's, thousands of workers will be needed each year. Most job openings will be due to deaths, retirements, and transfers.

Despite the expected increase in the volume of recordkeeping, employment growth in this occupation will be slowed by the use of electronic data processing and other bookkeeping machines. Many types of machines can process data more accurately, rapidly, and economically than workers doing it by hand. Nevertheless, the need for bookkeeping workers probably will outpace the impact of laborsaving office machines over the next decade.

Earnings and Working Conditions

Beginning accounting clerks in private firms averaged $489 a month in 1972, according to a Bureau of Labor Statistics survey of clerical occupations. Experienced clerks earned $628 a month, about the same as the average for all nonsupervisory workers in private industry, except farming. Relative earnings of bookkeeping workers have decreased slowly over the last ten years.

Accounting clerks working in cities for firms employing at least 2,500 people earned the highest salaries. Earnings also varied by industry; public utilities paid higher than average salaries, while workers in stores, banks, and insurance companies made less than the average.

Beginning bookkeeping workers in the Federal Government had monthly earnings which ranged from $430 to $485. Experienced workers were paid from $545 to $610 a month.

Working conditions for bookkeepers are similar to those of other office workers in the same firms. (See introductory section to this chapter for more information on Earnings and Working Conditions and for Sources of Additional Information.)

CASHIERS

(D.O.T. 211.138, .368, .468, .488, and 299.468)

Nature of the Work

Supermarkets, movie theaters, and restaurants are among the many businesses that employ cashiers to handle payments from customers. Most cashiers receive money, make change when necessary, fill out charge forms, and give receipts. Some also keep records of the amount of each transaction so that at the end of the day accounts can be balanced. Many cashiers prepare cash and checks for deposit at the bank and pay for company supplies and equipment. Some prepare pay envelopes or paychecks and make out sales tax reports. (The occupation of bank cashier, which is different from other cashier jobs, is discussed elsewhere in the *Handbook*.)

In addition to these duties, cashiers, depending on their employers, may do other jobs and have different job titles. Those who work in theaters, for example, (often called *box office cashiers or ticket*

sellers) operate ticket-dispensing machines and answer telephone inquiries. Restaurant cashiers, sometimes called *cashier checkers* or *hostess-cashiers,* handle reservations for meals and special parties, type menus, or sell items at the candy and cigarette counter. In supermarkets and other self-service stores, cashiers known as *check-out clerks, checkers,* or *grocery clerks* wrap or bag purchases and, during slack periods, may restock shelves and mark prices. In many offices, cashiers, known as *agency* or *front-office cashiers,* type, operate the switchboard, do bookkeeping, and act as receptionists.

Cashiers operate several types of machines. Most use cash registers which print the amount of the sale on a paper tape and release a money drawer. A growing number operate computerized registers that calculate the necessary taxes automatically and record inventory numbers. Others, especially those who work in hotels and hospitals, use machines that record the charges for telephone, medical, and other services and prepare itemized bills. Cashiers also may operate adding and change-dispensing machines.

Places of Employment

In 1972, about 1 million persons, over 85 percent of them women, were employed as cashiers. Although cashiers are found in businesses of all types and sizes, more than four-fifths work in grocery, drug, and other retail stores. Large numbers also are employed in restaurants and theaters. Most of the businesses employing cashiers are located in cities or suburban shopping centers; however, many also are found in small towns.

Training, Other Qualifications, and Advancement

Employers prefer that beginning cashiers have high school diplomas. Courses in business arithmetic, bookkeeping, typing, and other business subjects are good preparation. The Federal Government sponsors programs to train unemployed and underemployed workers for entry positions as cashiers under provisions of the Manpower Development and Training Act and other legislation. Cashier training also is offered as part of many public school vocational programs.

Many employers provide on-the-job training for cashiers. In a small firm this training may be informal as the beginning cashier works under supervision of an experienced employee. In large firms, training is more formal and may include classroom instruction in various phases of a cashier's job.

For some cashier jobs, employers seek persons who have special skills or business experience, such as typing or selling. Many cashier openings are filled by promoting clerk-typists in offices, baggers in supermarkets, and other qualified workers already employed by the firm.

Young persons planning to become cashiers should be able to do repetitious work accurately. They need finger dexterity, a high degree of eye-hand coordination, and an aptitude for working with figures. Because they meet the public, cashiers should be neat in appearance and able to deal tactfully and pleasantly with their customers.

Promotion opportunities for cashiers are likely to be limited, particularly in small firms. However, the cashier's job affords a good opportunity to learn an employer's business and so may serve as a steppingstone to a more responsible clerical job or managerial position. Cashiers working in chain stores and other large retail businesses, for example, may advance to department or store managers.

Employment Outlook

Employment in this large occupation is expected to increase rapidly through the mid-1980's due to continued expansion of business activity. In addition, the trend to self-service merchandising will spur the demand for cashiers to perform check-out duties formerly handled by salesworkers. Thousands of workers will be needed each year to fill new jobs and to replace those who leave the occupation.

Opportunities probably will continue to be best for cashiers having typing and bookkeeping skills. There also should be many chances for part-time work.

Earnings and Working Conditions

Beginning cashiers often earn the minimum wage required by law. In several States and in establishments covered by the Federal law, the minimum was $1.60 an hour in 1972; elsewhere, starting salaries were somewhat lower. Unionized cashiers and some in highly responsible jobs or those requiring specialized training often earn more than $3 an hour. Grocery checkers in supermarkets sometimes earn more than $4 an hour.

Cashiers often work during rush periods which are outside regular office hours. Holiday, weekend, late afternoon, and evening work may be required, especially in theaters, restaurants, and food stores. Many cashiers in these establishments work part time or on split shifts. Those employed full time in supermarkets and other large retail stores usually work a 5-day, 40-hour week; however, they generally work on Saturday and have another day off during the week.

Most cashiers work indoors, often in small booths or behind counters located near store entrances. In some cases, they are exposed to cold drafts in the winter and considerable heat during the summer. (See introductory section of this chapter for Sources of Additional Information.)

FILE CLERKS

(D.O.T. 132.388, 205.368, 206.388, 219.588, 920.887)

Nature of the Work

An orderly file system is often the key to an efficient office. In most offices, records are arranged to prevent time and money losses caused by inability to locate information quickly. This system creates job opportunities for file clerks, who keep records accurate, up to date, and properly placed.

File clerks handle office information by classifying, storing, updating, and retrieving it on request. To do this, they read incoming material and put it in order for future use by means of some system like number, letter of the alphabet, subject matter, or other. When these records are requested, file clerks locate them and turn them over to the borrower. They keep track of materials removed from the files and make sure that those given out are returned.

Some clerks operate mechanized files which rotate to bring the needed records to them. Others retrieve documents or spools of microfilm, and place them in an electronic transmitter which displays the information on video terminals located elsewhere in the organization. Records also must be up-to-date in order to be useful. File clerks make sure that new information is added to existing files shortly after it is received.

From time to time, file clerks have other duties, in addition to storing, updating, and retrieving data. For example, they may destroy outdated file materials or transfer them to inactive storage. They check files at regular intervals to insure that all items are correctly placed. Whenever data cannot be located, the file clerk searches for the missing records. As an organization's needs for information change, file clerks modify old filing systems or establish new ones.

In small offices, file clerks often type, sort mail, or operate duplicating machines. Those who work with automated filing systems may code and microfilm all incoming documents.

Places of Employment

About 270,000 persons—85 percent of them women—worked as file clerks in 1972. One out of every five worked part time. In addition, many other clerical workers have some filing tasks in connection with their work.

Although filing jobs are found in almost every kind of organization, nearly one-half of all file clerks work in either banks, insurance companies, or factories.

Training, Other Qualifications, and Advancement

Employers prefer high school graduates for beginning file clerks. Many seek applicants who can type, and who have some knowledge of office practices as well. High schools, colleges, and private business schools teach these and other skills that help a beginner to get a job. The Federal Government also sponsors programs to train unemployed and underemployed workers for entry positions as file clerks. This training is offered under provisions of the Manpower Development and Training Act and other legislation.

Some on-the-job training usually is necessary because each organization has its own filing system and office procedures. In organizations that have specialized filing procedures, clerks learn their jobs in a few weeks. Learning to operate mechanical filing systems usually takes more time. Where file clerks have a variety of related duties, training may take up to three months.

File clerks must read accurately and rapidly, spell well, and like detailed work. They should be neat, able to work as part of a team, and not easily bored by repeated tasks.

File clerks can advance to more difficult filing duties and to jobs supervising other file clerks. Those who improve their skills may be promoted to office machine operators, receptionists, and typists.

Employment Outlook

Employment of file clerks is expected to grow moderately through the mid-1980's as business expansion creates a need for more and better recordkeeping. Also, many file clerks will be needed each year to replace those who die, retire, or transfer to other jobs.

The increasing use of computers to arrange, store, and transmit information will cause the occupation to grow less rapidly than in recent years. However, the growing volume of paper work and continued expansion of those businesses that hire many file clerks should assure steady employment.

Earnings and Working Conditions

According to a Bureau of Labor Statistics survey, beginning file clerks in urban areas averaged $96 a week in 1972. Weekly salaries of those having some experience averaged $105; of those having a great deal of experience, $130. File clerks earn about three-fourths as much as the average for nonsupervisory workers in private industry, except farming.

In the Federal Government, beginning file clerks without high school diplomas started at about $92 a week in early 1973; high school graduates averaged $104 a week, and experienced clerks $118.

Working conditions for file clerks usually are similar to those for other office workers in the same organization. Although they do not do heavy lifting, they often must stoop, bend, and reach. (See the statement on Clerical Occupations for more information on Earnings and Working Conditions and for Sources of Additional Information.)

HOTEL FRONT OFFICE CLERKS

(D.O.T. 242.368)

Nature of the Work

Hotels and motels employ front office clerks to rent rooms, greet guests, issue keys, and handle mail. By working "up front," these clerks deal directly with the public and help build the hotel's reputation. In small hotels and in many motels, front office clerks (who are sometimes owners) also may work as bookkeepers, cashiers, or telephone operators. Large hotels usually employ several front office clerks for different jobs, such as handling mail or information, or as key clerk. In the largest hotels, floor supervisors or floor clerks handle distribution of mail, packages, and telegrams. Almost 50,000 persons—most of them men—worked as front office clerks in 1972.

Room or desk clerks rent available rooms. Usually, they are the first of the front office clerical staff to greet guests. In assigning rooms, they must consider reservations, guests' preferences, and, at the same time, try to maximize hotel revenues. These clerks give information about rates and services and see that registration forms are properly filled out. After check-in is completed hotel room clerks signal bellmen who escort guests to their rooms. *Reservation clerks* acknowledge written or wired requests for rooms, type out registration forms, and notify the room clerk when guests are due to arrive. *Rack clerks* keep room assignment records to advise housekeepers, telephone operators, and others concerned with room occupancies when rooms are occupied, vacant, or closed for repairs.

Training, Other Qualifications, and Advancement

High school graduates who have some clerical aptitude may be hired for beginning jobs as mail, information, or key clerks. A knowledge of bookkeeping may be helpful in smaller hotels or on nightshift work

Front office clerk keeps room occupancy information current.

where additional duties may be performed. Occasionally, employees in other related work—for example, bellmen or elevator operators—may be transferred to front office jobs. Although education beyond high school generally is not required for front office work, college training is an asset for advancement to managerial jobs. Neatness, a courteous and friendly manner, and ease in dealing with people are important traits for front office clerks.

Inexperienced workers learn about the front office routine mainly on the job. They usually have a brief training period which describes duties and gives information about the hotel such as room locations and services offered. Once on the job, they receive help from the assistant manager or an experienced front office worker.

Most hotels promote front office workers from within so that a key or rack clerk may be promoted to room clerk, then to assistant front office manager, and later to front office manager. Clerks may improve their opportunities for promotion by taking home study courses such as those sponsored by the Educational Institute of the American Hotel and Motel Association. (See statement on Hotel Managers and Assistants elsewhere in the *Handbook*.)

Employment Outlook

Employment is expected to increase very rapidly through the mid-1980's as hundreds of hotels, motels, and motor hotels open or expand. In addition to new front office jobs created by growth, many openings will result from the need to replace workers who are promoted, transfer to other occupations, or stop working. A front office clerk has a relatively stable job which is not usually affected by changes in general economic conditions.

See the Hotel statement elsewhere in the *Handbook* for information on Earnings and Working Conditions, Sources of Additional Information, and for additional information on Employment Outlook.

OFFICE MACHINE OPERATORS

(D.O.T. 207.782, .884, and .885; 208.782, 213.782, 214.448, 215.388, 216.488, 234.582, and .885)

Nature of the Work

To speed paper work, modern business offices use a variety of machines ranging from the simple letter opener to complicated equipment for involved computations. This statement presents information on the work of people who operate some of the more common types of office machines. Many, such as the bookkeeping and billing machine operators, have job titles related to the kind of equipment they use. (Excluded from this section but discussed in the *Handbook* are operators of transcribing machines, typewriters, and computers; clerical workers who occasionally use copying or adding machines; and statistical clerks who use calculators.)

Billing machine operators (D.O.T. 214.488) use machines that type and add in order to prepare customers' statements. The customer's name and address, items bought, and price are entered on each bill. The machine calculates and prints totals, discounts, and other items.

Bookkeeping machine operators (D.O.T. 215.388) use office ma-

Office machine operators need manual dexterity.

chines that record all financial transactions of a business on bookkeeping forms. Operators using bookkeeping machines also prepare trial balances, summary reports, and other statistical information.

Adding and calculating machine operators (D.O.T. 216.488) use electrically and manually-operated machines to compute payrolls and invoices and do other statistical work. Desired totals and results are automatically computed. *Adding machine operators* use machines to add and subtract and sometimes to multiply. *Calculating machine operators* and *Comptometer operators* use more complex machines to add, subtract, multiply, divide, and compute square roots and percentage distributions. Although many office workers operate adding machines and calculators in addition to other duties, these employees are full-time, trained calculator operators.

Mail preparing and mail handling machine operators (D.O.T. 234.582 and .885) run automatic equipment that handles incoming and outgoing mail. Some machines open the envelopes; others fold and insert enclosures or address, seal, and stamp envelopes. Addressing machines print addresses from stencils cut by typists or from plates prepared by *embossing machine operators* (D.O.T. 208.782) who use a special kind of typewriter.

Duplicating machines reproduce documents more quickly and inexpensively than they can be typed. Although any office employee can operate some of this equipment, machines which produce thousands of copies in a single "run" usually require full-time trained *duplicating machine operators* (D.O.T. 207.782, .884, and .885) who keep the equipment properly adjusted. In some machines, the paper is fed and removed manually; in other machines, these operations are automatic.

Operators of tabulating machines and related equipment (D.O.T. 213.782) run machines that sort and count quantities of accounting and statistical information. Cards are inserted into tabulating machines that count the various items on each card, multiply, and make other calculations. The results are printed on accounting records and other business forms.

Places of Employment

In 1972, about 200,000 people—three-fourths of them women—worked as office machine operators. (This total does not include over 450,000 computer operating personnel who are discussed under Computer and Related Occupations elsewhere in the *Handbook*.)

About one-third of all office machine operators work for manufacturing companies. Large numbers also work for banks and insurance companies, government agencies, and wholesale and retail stores. Others prepare monthly bills and mailing circulars in service centers for firms that do not have their own office machinery.

Training, Other Qualifications, and Advancement

Employers prefer high school or business school graduates for beginning office machine operators. Most newly hired workers also are expected to operate basic office equipment, such as adding machines and calculators. Courses in business arithmetic and typing are useful because many positions involve varied assignments.

The amount of instruction and on-the-job training beginners receive depends on the types of machines they operate. Although a few days may be enough to train operators of some duplicating machines, a few weeks may be needed to train key-driven calculating machine operators. These operators often are trained at

company expense in schools run by equipment manufacturers. The Federal Government also sponsors programs to train unemployed and underemployed workers for entry positions as office machine operators under provisions of the Manpower Development and Training Act, and other legislation.

Finger dexterity, eye and hand coordination, and good vision are important for most office machine operator jobs. Billing and calculating machine operators should understand mathematics so they can detect obvious errors in computations. Some mechanical ability is advantageous, especially for duplicating and tabulating machine operators.

Most employers promote from within and give strong consideration to seniority and job performance as shown by supervisors' ratings. Promotion may be from a routine machine job to a more complex one, or to a related clerical job. Employers often provide needed additional training. In firms having large clerical staffs, office machine operators may advance to jobs where they train beginners or to supervisory positions as section or department heads.

Employment Outlook

Employment of office machine operators will grow slowly through the mid-1980's as businesses introduce new types of recording and copying equipment. In addition to openings that will result from growth, many jobs will arise as operators die, retire, or transfer to other work.

Despite expected growth in the volume of billing, computing, and duplicating work, the occupation will expand only slowly as automated record-keeping systems spread. In addition, advances in computer technology and data transmission devices will enable large employers to centralize record keeping, and to reduce somewhat requirements for operators in branch offices.

Earnings and Working Conditions

A 1972 Bureau of Labor Statistics survey in urban areas provides figures on earnings for several office machine operator occupations. The lowest salaries were paid in the South and the highest in the North and West.

For some occupations averages are given separately for different skill groups. Operators in Class A were very experienced and performed comparatively difficult work. Those in Classes B and C had some or no experience, worked on more routine assignments, and used simpler equipment. The average weekly salaries reported by this survey are shown in the accompanying tabulation:

	Average Weekly Salaries, 1972
Billing machine Operators	$117.00
Bookeeping machine operators	
Class A	126.00
Class B	104.50
Comptometer operators	116.50
Tabulating machine operators	
Class A	165.50
Class B	137.50
Class C	115.00

Billing and bookkeeping machine operators earned slightly less than the average for all nonsupervisory workers in private industry, except farming.

Because of the noise of machines, groups of operators often work in areas which are apart from other company offices. In other respects, their working conditions usually are similar to those of other office workers in the same firms. (See the statement on Clerical Occupations for further information on Working Conditions and for Sources of Additional Information.)

POSTAL CLERKS

(D.O.T. 231.688, 232.138 and .368)

People are most familiar with the window clerk who sits behind the counter in post office lobbies selling stamps or accepting parcel post. However, the majority of postal clerks are distribution clerks who sort incoming and outgoing mail in workrooms. Only in a small post office does a clerk do both kinds of work.

When mail arrives at the post office it is dumped on long tables where distribution clerks and mail handlers separate it into groups of letters, parcel post, and magazines and newspapers. Clerks feed letters into stamp-canceling machines and cancel the rest by hand. The mail is then taken to other sections of the post office to be sorted by destination. Clerks first separate the mail into primary destination categories: mail for the local area, for each nearby State, for groups of distant States, and for some of the largest cities. This primary distribution is followed by one or more secondary distributions. For example, local mail is combined with mail coming in from other cities, and sorted according to street and number. In post offices with electronic mail-sorting machines, clerks simply push a button corresponding to the letter's destination, and the letter drops into the proper slot.

The clerks at post office windows provide a variety of services in addition to selling stamps and money orders. They weigh packages to

In many large post offices, postal clerks use electronic machines to sort mail.

determine postage and check to see if their size, shape, and condition are satisfactory for mailing. Clerks also register and insure mail and answer questions about postage rates, mailing restrictions, and other postal matters. Occasionally they may help a customer file a claim for a damaged package. In large post offices a window clerk may provide only one or two of these services and called a registry, stamp, or money order clerk.

Training, Other Qualifications, and Advancement

Postal clerks must be at least 18 and pass a four-part written examination. The first part tests reading accuracy by asking the applicant to compare pairs of addresses and indicate which are identical. The second part tests ability to follow oral instructions. The third measures general intelligence, including vocabulary, and the fourth tests ability to do simple arithmetic. Applicants who work with an electronic sorting machine must pass a special examination which includes a machine aptitude test. They must pass a physical examination and may be asked to show that they can lift and handle mail sacks weighing up to 70 pounds.

Applicants should apply at the post office where they wish to work because each post office keeps a separate list of those who have passed the examination. Applicants' names are listed in order of their scores. Five extra points are added to the score of an honorably discharged veteran, and 10 extra points to the score of a veteran wounded in combat or disabled. Disabled veterans who have a compensable, service-connected disability of 10 percent or more are placed at the top of the list. When a vacancy occurs, the appointing officer chooses one of the top three applicants; the rest of the names remain on the list for future appointments.

New clerks are trained on the job. Most clerks begin with simple tasks to learn regional groupings of States, cities, and ZIP codes. To help clerks learn these groups, many post offices offer classroom instruction.

A good memory, good coordination, and the ability to read rapidly and accurately are important.

Distribution clerks work closely with other clerks, frequently under the tension and strain of meeting mailing deadlines. Window clerks must be tactful when dealing with the public, especially when answering questions or receiving complaints.

Postal clerks are classified as casual, part-time flexible, part-time regular, or full-time. Casual workers are hired to help handle the large amounts of mail during the Christmas season. Part-time flexible employees do not have a regular work schedule, but replace absent workers or help with extra work loads as the need arises. Part-time regulars have a set work schedule—for example, 4 hours a day.

Most clerks begin as part-time flexible employees and become full-time workers as vacancies occur. As their seniority increases, they may bid for preferred assignments such as the day shift, a window job, or a higher level nonsupervisory position as stamp supply clerk or claims clerk. The supervisory examination may be taken after 4 to 5 years of service.

Employment Outlook

Employment of postal clerks —who numbered 286,000 in 1972— is expected to grow slowly through the mid-1980's. Most openings will result from the need to replace clerks who retire, die, or transfer to other occupations.

Although the amount of mail post offices handle is expected to grow as both population and the number of businesses grow, modernization of post offices and installation of new equipment will increase the amount of mail each clerk can handle. For

example, machines which semiautomatically mark destination codes on envelopes are now being tested. These codes can be read by computer-controlled letter sorter machines which automatically drop each letter into the proper slot for its destination. With this system, clerks read addresses only once, at the time they are coded, instead of several times, as they now do. Eventually this equipment will be installed in all large post offices.

Earnings and Working Conditions

Earnings of postal clerks are related to the size of the post office where they work. Earnings are higher in larger post offices because clerks in these jobs process more regular mail, and more mail requiring special handling, than do clerks in smaller post offices.

Most clerks are at the grade 5 level and in mid-1972 those working a part-time flexible schedule began at $4.02 and could reach $5.13 an hour after 7 years. Clerks working full-time earned $8,072 a year and could advance to $10,657 after 7 years. Clerks who worked in third- and fourth-class post offices were at the grade 3 level. All clerks who work night shifts receive 10 percent additional pay.

Working conditions of clerks differ according to the specific work assignments and the amount and kind of laborsaving machinery in the post office. In small post offices clerks must carry heavy mail sacks from one part of the building to another, and sort the mail by hand. In large post offices, chutes and conveyors move the mail and much of the sorting is done by machine. In either case, clerks are on their feet most of the time, reaching for sacks of mail, placing packages and bundles into sacks while sorting and walking around the workroom.

Distribution clerks may become bored with the routine of sorting mail unless they enjoy trying to improve their speed and accuracy. They also may have to work at night, because most large post offices process mail around the clock.

A window clerk, on the other hand, has a greater variety of duties, has frequent contact with the public, generally has a less strenuous job, and never has to work a night shift.

(For information on fringe benefits, see statement on postal service occupations elsewhere in the *Handbook*.)

Sources of Additional Information

Local post offices and State employment service offices can supply details about entrance examinations and empoyment opportunities for postal clerks.

RECEPTIONISTS

(D.O.T. 235.862, 237.368)

Nature of the Work

All organizations want to make a good first impression on the public. This is an important part of the job of the receptionist, who generally is the first person a caller sees.

Receptionists greet customers and other visitors, determine their needs, and refer callers to the officials who can help them. Receptionists in hospitals, after obtaining personal histories, direct patients to the proper waiting rooms; in beauty shops, they arrange appointments and show customers to the operator's booth; and in large plants, they provide callers with identification cards and arrange escorts to take them to the proper office.

Many receptionists keep business records of callers, the times at which they called, and the persons to whom they were referred. When they are not busy with callers, receptionists may type, file, or operate a switchboard. Some receptionists open and sort mail and collect and distribute messages. Still others prepare travel vouchers and do simple bookkeeping.

Places of Employment

About 435,000 persons—97 percent of them women—worked as receptionists in 1972. Nearly 1 out of 10 worked part time.

Although there are jobs for receptionists in almost every kind of organization, over half work for doctors, lawyers, or other professional people. Large numbers also work in hospitals, insurance companies, banks, factories, and businesses providing personal services.

Training, Other Qualifications, and Advancement

A high school diploma generally is required for work as a receptionist. Courses in English, spelling, typewriting, elementary bookkeeping, and business practices are helpful to the beginner.

Liking people and wanting to help them are assets to the receptionist. A neat appearance, pleasant voice, and even disposition also are important. Because receptionists do not work under close supervision, common sense and a thorough understanding of how the business is organized help them handle various situations that arise.

Promotion opportunities for receptionists are limited, especially in small offices. In large work places, however, a receptionist who has clerical skills may advance to a

Receptionist checks correspondence.

Receptionists usually are confined to specific work areas that are comfortably furnished. Although most have regular hours, receptionists in hospitals and beauty shops may work evenings and weekends. (See the statement on Clerical Occupations for Sources of Additional Information.)

better-paying job as a secretary or administrative assistant. Many companies have their own training programs so that the skills needed for advancement can be learned on the job. College or business school training also can be helpful in advancing to better-paying office jobs.

Employment Outlook

Employment of receptionists is expected to grow very rapidly during the next ten years. Thousands of openings will result each year as businesses providing personal and professional services expand and as those who die, retire, or transfer to other jobs are replaced. In addition, more firms are realizing the importance of the receptionist in promoting good public relations. Because the receptionist's work is of a person to person nature, it is unlikely to be affected by office automation.

Earnings and Working Conditions

According to a Bureau of Labor Statistics survey, full-time switchboard/receptionists working in urban areas averaged $108 a week in 1972. This was slightly under the average earnings for non supervisory workers in private industry, except farming. Receptionists working in the Western United States had average weekly earnings of $113. Those in Southern cities averaged $100 a week.

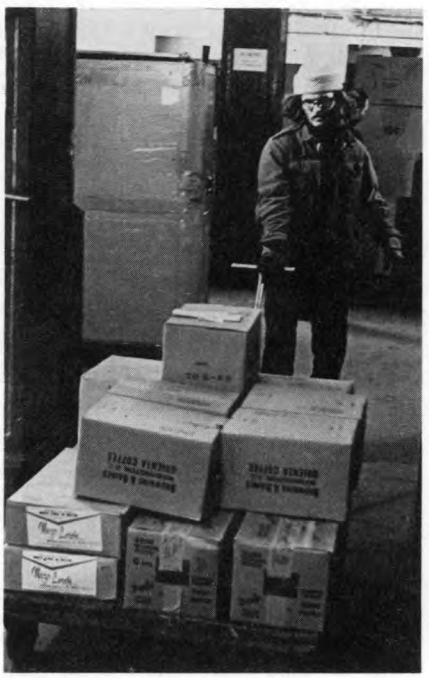
In the Federal Government, beginning information receptionists earned $104 a week in early 1973.

SHIPPING AND RECEIVING CLERKS

(D.O.T. 209.688, 219.388, 222.138 through .687, 223.387, 239.588, 910.368 and 920.887)

Nature of the Work

Shipping and receiving clerks keep track of goods transferred between firms and their customers and suppliers. In small companies, one clerk may keep records of all shipments sent out and sent out and received; in larger companies, many clerks take care of this recordkeeping.



Shipping clerks are responsible for all shipments leaving a business place. Before goods are sent to a customer, these clerks check to be sure the order has been filled correctly. They obtain merchandise from the stock room, and wrap it or pack it in shipping containers. Clerks also put addresses and other identifying information on packages, look up and compute either freight or postal rates, and record the weight and cost of each shipment. They may also be responsible for preparing invoices and furnishing information about shipments to other parts of the company, such as the accounting department. Once a shipment is checked and ready to go, shipping clerks may move it to the shipping dock and direct its loading on trucks according to different shipments' destinations. Shipping and receiving clerks working in small firms may combine the various duties of stock clerks in their jobs. (For more information about the additional duties of shipping clerks in small firms, see statement on Stock Clerks elsewhere in *Handbook*.)

When shipments arrive, receiving clerks perform tasks similar to shipping clerks. They determine whether their employer's orders have been correctly filled, by verifying incoming shipments against the original order and the accompanying bill of lading or invoice. They record the receipt and condition of incoming shipments. Clerks also make adjustments with shippers for lost and damaged merchandise. Routing or moving shipments to the proper department, warehouse section, or stockroom, and providing information that is needed to compute inventories, also may be part of their job.

Places of Employment

About 450,000 persons—85 percent of them men—worked as shipping and receiving clerks in 1972. More than half worked in factories; large numbers also were employed by wholesale houses or retail stores. Although jobs for shipping and receiving clerks are found in all localities, most clerks work in urban areas.

Training, Other Qualifications, and Advancement

High school graduates are preferred for beginning jobs in shipping and receiving departments. Business arithmetic, typing, and other high school business subjects are helpful for completing paperwork. The ability to write legibly is important. Dependability and an interest in learning about the firm's products and business activities also are qualities which employers seek. In addition, shipping and receiving clerks should be able to work under close supervision at repetitive tasks.

New employees usually are trained on-the-job by an experienced worker. As part of their training they often file, check addresses, attach labels, and check items included in shipments. As clerks gain experience, they may be assigned tasks requiring a good deal of independent judgment, such as handling problems of damaged merchandise, or supervising other workers in shipping or receiving rooms.

Work as a shipping or receiving clerk offers a good opportunity for an ambitious young person to learn about his company's products and business practices. Some clerks may be promoted to head shipping or receiving clerks or warehouse managers. Others may enter related fields such as industrial traffic management or purchasing. (Industrial traffic managers and purchasing agents are discussed elsewhere in the *Handbook*.)

Employment Outlook

Employment of shipping and receiving clerks is expected to rise slowly through the mid-1980's as population growth and business expansion increase the quantity of goods distributed. Several thousand jobs will become available each year as employment grows and as workers retire, die, or transfer to other occupations.

Although substantial growth is expected in the volume of goods distributed, employment of shipping and receiving clerks will increase at a somewhat slower rate as fewer clerks handle a greater volume of goods. This results from more firms using computers to keep track of shipping and receiving records, and moving belts to handle shipments once lifted by hand.

Earnings and Working Conditions

Shipping and receiving clerks in urban areas averaged $3.50 an hour in 1972, according to a Bureau of Labor Statistics survey. This is about as much as the average earnings for all nonsupervisory workers in private industry, except farming. Salaries of these workers varied by type and location of employer. For example, shipping and receiving clerks employed in the Western United States averaged $3.26 an hour, while those in the South earned $2.79 an hour.

Many shipping and receiving clerks receive time-and-a-half for work over 40 hours. Nightwork and overtime, including work on Saturdays, Sundays, and holidays, may be necessary when shipments have been unduly delayed or when materials are needed immediately on production lines. Although shipping and receiving clerks do much of their work in warehouses or in shipping and receiving rooms, they may do

some of it on outside loading platforms. Work places often are large, unpartitioned areas which may be drafty, cold, and littered with packing materials.

Some of the work that shipping and receiving clerks do takes physical stamina and strength. Most clerks must stand for long periods while they check merchandise. Locating numbers and descriptions on cartons often requires a great deal of bending, stooping, and stretching. Also, under the pressure of getting shipments moved on time, clerks may help load or unload materials in the warehouse. (See introductory section of this chapter for Sources of Additional Information.)

Statistical clerk checks policy records for insurance company.

STATISTICAL CLERKS

(D.O.T. 205.368, 206.588, 209.588, 219.388, .488, .588, 222.687, 223.588, 913.368, 953.168)

Nature of the Work

Administrators and managers in all types of organizations depend on numerical records to help make decisions. Statistical clerks prepare and insure the accuracy of these records. Jobs in this field can be grouped into four categories: recording, compiling and coding, computing and tabulating, and scheduling.

Recording. This work involves collecting, recording, and verifying the accuracy of information. *Shipping checkers* in manufacturing companies and in wholesale and retail businesses (D.O.T. 222.687) insure that merchandise is ready for shipment, is properly labeled, and contains the desired number of items. *Car checkers* for railroads (D.O.T. 209.588) record shipments as they arrive or leave a freight terminal. They check railroad car numbers, contents and weights of shipments to verify specifications on the invoice. *Talleymen* (D.O.T. 223.588), who may have a title referring to their work or items which they observe, record the number of materials received, transferred, or produced, and work in several industries. For example, lumber talliers or lumber checkers work in saw mills; pit recorders record production data in steel making.

Compiling and coding. In organizations of all types, information must be properly filed, verified, or analyzed by data processing equipment. *Posting clerks* (D.O.T. 219.588) do this work by making entries in registers and journals. They receive and sort records of shipments, production, and finance to provide company officials with current information on business activities. *Record keepers* (D.O.T. 206.588), also known as classification clerks, record data systematically for easy location. *Coding clerks* (D.O.T. 219.388) code information for transfer to computer cards. *Personnel clerks* (D.O.T. 205.368) gather and file information on the employees of a business; their work may include some typing and preparation of reports.

Computing and tabulating. Organizations frequently use numerical records for reports and research. Statistical clerks gather information from records to present in a chart or

table for analysis. *Actuary clerks* (D.O.T. 219.388) assist actuaries in insurance companies to determine the risk involved in providing insurance coverage. They also use calculators and prepare charts and tables for studies on general insurance practices. *Policy checkers* (D.O.T. 219.488) verify insurance company records. *Statistical assistants* (D.O.T. 219.388), also known as tabulating clerks, calculate and compute numerical data for government and business research projects. *Demurrage clerks* (D.O.T. 219.388), employed by railroads, compute charges for the use of railroad tracks and calculate the weight of shipments or distance railroad cars have traveled.

Scheduling. Many business activities involve the movement of people and things, and statistical clerks do much of the required scheduling. For example, *assignment clerks* (D.O.T. 913.368) work for bus companies and assign drivers to meet riders' transportation needs. Drivers are selected on the basis of experience, length of service, and nature of the assignment. *Crew schedulers* (D.O.T. 219.388) do similar work for airlines; they assign pilots to scheduled flights and log the mileage each pilot has flown. *Gas dispatchers* (D.O.T. 953.168) determine the proper pressure of a natural gas line to meet customers' requirements after considering information such as the weather, time of day, and other factors that affect the use of gas.

Places of Employment

About 300,000 persons worked as statistical clerks in 1972. More than two-thirds were women, but some jobs were held predominately by men. For example, shipping checkers who may lift and move heavy items and assignment clerks who often are experienced bus drivers, usually are men.

Although statistical clerks are employed in nearly every industry, over half worked in finance, insurance, and real estate companies; manufacturing firms; and Federal, state, and local government.

Because businesses of almost every size require numerical records, statistical clerks work throughout the United States. Jobs are concentrated, however, in heavily populated cities that are centers of industry and government activities.

Training, Other Qualifications, and Advancement

Most employers prefer statistical clerks who are high school graduates. They also seek applicants who have logical minds, an aptitude for working with numbers, and the ability to do detailed work. Clerks should be tactful and even tempered. Courses in business arithmetic, bookkeeping, and typing are good preparation for this work.

In many companies, general clerks who have become familiar with their employers' record systems and office procedures are promoted to statistical clerk positions. On-the-job training that equips the employee to specialize in numerical work may include the use of calculators, tabulating machines, and typewriters.

Statistical clerks who observe and record data must be familiar with the items or information which they observe. For example, lumber checkers must know the various types and qualities of wood products. Statistical clerks, in compiling and coding jobs, must locate and assemble information from records in an orderly manner. In preparing data for computers, coding clerks must be careful to avoid errors.

Most employers follow a promotion-from-within policy that allows experienced workers to qualify for more responsible jobs as they become available. Qualified statistical clerks may perform more difficult assignments or advance to supervisory positions. With additional training in mathematics and extensive experience, statistical assistants may become statisticians. Many compiling-coding jobs and computing-tabulating jobs can lead the exceptional employee with specialized training to a career in computer programing and related work.

Employment Outlook

Employment of statistical clerks is expected to grow moderately through the mid-1980's. In addition to openings from growth, several thousand clerks will be needed each year to replace workers who die, retire, or transfer to other jobs.

Among the factors that will contribute to the demand for these workers is the expected increase in business and government research projects, requiring the collection and processing of large amounts of numerical data. In addition, administrators will rely increasingly on numerical records to analyze and control all aspects of their organization's work.

Although the growing use of computers to process routine information will eliminate some statistical clerk positions, most jobs involve duties that cannot be computerized. Also, the increasing use of data processing will stimulate the demand for those clerks who prepare data for computer use.

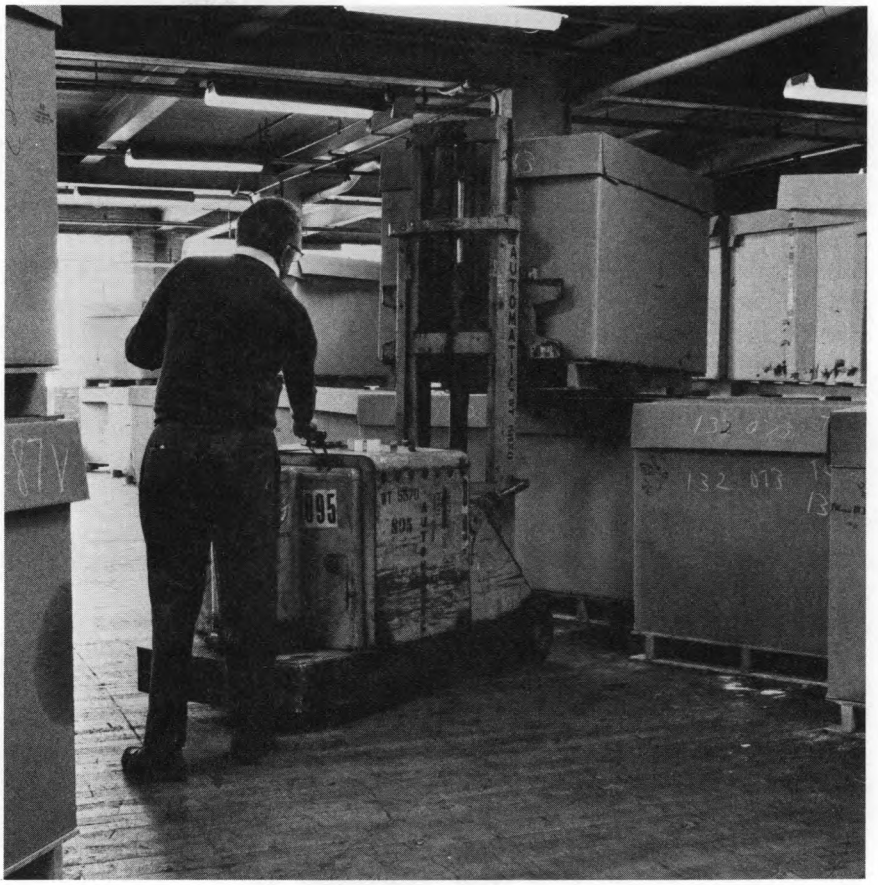
Earnings and Working Conditions

Limited information indicates that beginning statistical clerks earn about as much as workers in other entry level clerical jobs such as gen-

eral clerks or file clerks; salaries for these workers ranged between $90 and $100 a week in 1972. The entrance salary for beginning statistical clerks employed by the Federal Government was $118 a week in early 1973.

According to a recent survey, experienced workers doing statistically related clerical work, including the operation of tabulating machines or calculators, earned between $115 and $140 a week. Top level clerks and supervisors earned $165 a week and more. Earnings usually are highest in the manufacturing, transportation, and utilities industries; and lower in retail trade; finance, insurance and real estate; and service industries.

Nearly every employer of statistical clerks offers some form of health plan, insurance coverage, and retirement benefits. Most statistical clerks work in clean, well-lighted, and well-ventilated offices.



Stock clerk stores new shipment.

STOCK CLERKS

(D.O.T. 223.138, .368, .387, .388, .588, .687, 623.381, 910.388, 969.387)

Nature of the Work

Most employers recognize the importance of keeping well-balanced inventories to prevent sales losses or slowdowns in production.

Stock clerks (D.O.T. 223.387) help protect against such losses by controlling the flow of goods received, stored, and issued. They usually receive and unpack incoming merchandise or material. They may check the items against outgoing orders for quality and quantity and sometimes make minor repairs or adjustments. They also report damaged or spoiled goods and process papers necessary for obtaining replacements or credit.

Materials are stored in bins, on the floor, or on shelves according to the plan of the stockroom. Stock clerks organize and mark items with identifying codes or prices so that inventories can be located quickly and easily. They keep records of items entering or leaving the stockroom. Sometimes they label, pack, crate, or address goods for delivery.

Stock clerks working in small firms may combine the varied duties of shipping and receiving clerks. (For more information about the additional duties of stock clerks in small firms, see the statement on Shipping and Receiving Clerks elsewhere in the *Handbook*.) In large firms with specialized jobs, *inventory clerks* (D.O.T. 223.388) take periodic counts of items on hand and make reports showing stock balances. *Procurement clerks* (D.O.T. 223.368) work in factories and prepare orders for the purchase of new equipment.

The duties of stock clerks also depend on the items they handle. For example, stock clerks who work with foods and drugs must maintain proper temperature and humidity conditions; those who handle large construction items do much walking and climbing to note the condition and quantity of that stock.

Places of Employment

About 500,000 people — 80 percent of them men — worked as stock

clerks in 1972. Nearly three-fourths of the total worked in factories, wholesale firms, and retail stores. Many others were employed in mail-order houses, airlines, government agencies, hospitals, and other organizations that keep large quantities of goods on hand. Although jobs for stock clerks are found in all parts of the country, most work in urban areas where factories, warehouses, and stores are concentrated.

Training, Other Qualifications, and Advancement

Although there are no specific educational requirements for stock clerks, employers prefer high school graduates. Many look for reading and writing skills, a basic knowledge of mathematics, and typing and filing abilities. Good health, especially good eyesight, is important. Generally, those who handle jewelry, liquor, or drugs must be bonded.

Stock clerks usually receive on-the-job training. New workers begin with simple tasks such as counting and marking stock. Basic responsibilities of the job usually are learned within several weeks. As they progress, stock clerks learn to keep records of incoming and outgoing materials, take inventories, and order supplies.

This is a job where many young people start their careers. In a small firm, the stock clerk may advance to a sales position or become an assistant buyer or purchasing agent. In large firms, stock clerks can advance to more responsible stock handling jobs such as invoice clerk, stock control clerk, or procurement clerk. A few may be promoted to the stockroom supervisor's job, but additional education often is required.

Employment Outlook

Employment of stock clerks is expected to rise very rapidly through the mid-1980's as business expansion increases the quantity of goods that firms keep on hand. Many thousands of jobs will open each year as employment grows and as workers die, retire, or transfer to other occupations.

Although substantial growth is expected in the quantity of goods stocked by firms, employment will increase at a slightly slower rate as computers are used increasingly for inventory control. Because entrance into this occupation is relatively easy and many young people seek this work as a first job, some competition for openings is likely.

Earnings and Working Conditions

Stock clerks working in large cities earned average weekly salaries of $145 in 1972, according to the limited data available. This was slightly above the average for nonsupervisory workers in private industry, except farming.

In the Federal Government, inexperienced stock clerks averaged $92 a week in early 1973, experienced clerks $132.

Stock clerks usually work a 40-hour week and receive the same fringe benefits as do office employees. Those working in urban areas usually have at least seven paid holidays a year and 2 weeks of vacation after 1 year on the job. Life and health insurance and sick benefits also are generally available, as are retirement pension plans that supplement benefits paid under the Federal Social Security program.

Although stock clerks usually work in relatively clean, heated, and well-lighted areas, some stockrooms may be damp and drafty. Clerks handling refrigerated goods may spend some time in cold storage rooms. Stock clerks are on their feet much of the working day, often on a concrete floor. The job also involves considerable bending, lifting, and climbing. (See the statement on Clerical Occupations for additional information on working conditions.)

Sources of Additional Information

Information about the work and earnings of stock clerks in wholesale establishments is available from:

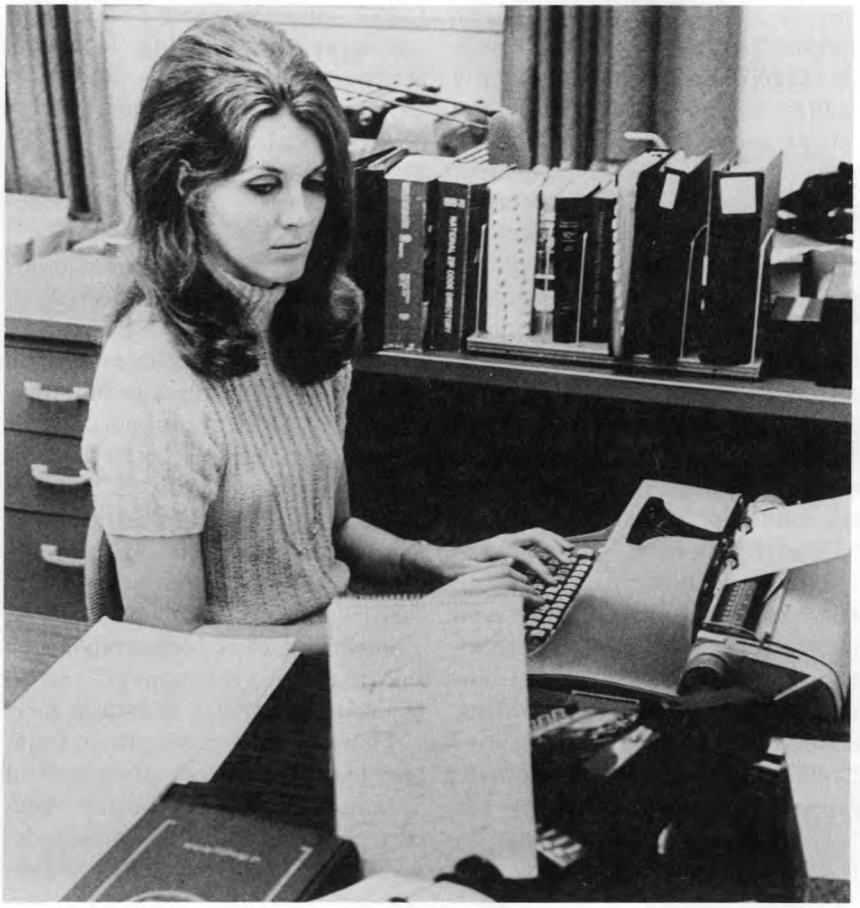
National Association of Wholesaler-Distributors, 1725 K St. NW., Washington, D.C. 20006.

STENOGRAPHERS AND SECRETARIES

(D.O.T. 201.268 and .368, 202.388, and 209.138)

The efficiency of any organization depends upon *stenographers* and *secretaries* who are at the center of communications within their firm. They transmit information among their employer's staff and to persons in many other organizations.

Stenographers (D.O.T. 202.388) take dictation and then transcribe their notes on a typewriter. They may either take shorthand or use a stenotype machine which prints symbols as certain keys are pressed. *General stenographers,* including most beginners, take routine dictation and do other office tasks such as typing, filing, answering telephones, and operating office machines. Experienced and highly skilled stenographers take difficult dictation and do more responsible clerical work. They may sit in on staff meetings and give a summary report or a word for word record of the proceedings. They also supervise other stenographers, typists, and clerical workers.



Stenographer transcribes her shorthand notes.

Technical stenographers must know the terms used in a particular profession. They include medical, legal, and engineering or scientific stenographers. Some experienced stenographers take dictation in foreign languages; others work as public stenographers serving traveling business people and others who require them.

Shorthand reporters are specialized stenographers who record all statements made in proceedings. About half of all shorthand reporters work as *court reporters* attached to courts of law at different levels of government. They take down all statements made at legal proceedings and present their record as the official transcript. Other shorthand reporters record the proceedings in the Congress of the United States, in State legislatures, and in both State and Federal agencies. Still others work as free-lance reporters who record out-of-court testimony, meetings and conventions, and other private activities.

Most shorthand reporters take their notes on a stenotype machine and transcribe them on a typewriter. Sometimes the reporter dictates notes on magnetic tapes that a typist can transcribe later. Because the reporter's transcript is the official record of a proceeding, accuracy is extremely important.

Secretaries (D.O.T. 201.368) relieve their employers of routine duties so that they can work on more important matters. Although most secretaries type, take shorthand, and deal with callers, the time spent on these duties varies with the type of organization where they work.

In offices where dictation and typing are handled in specialized centers, administrative secretaries handle all other secretarial duties. They often work in clusters of three or four so that they can readily help each other. Because they are released from dictation and typing, they can serve as many as 6 to 12 of the professional staff. Their duties range from filing, routing mail, and answering telephones to more responsible jobs such as answering letters, doing statistical research, and writing reports.

Some secretaries are trained in specific skills needed in certain types of work. *Medical secretaries* prepare case histories and medical reports; *legal secretaries* do legal research and help prepare briefs; and *technical secretaries* assist engineers or scientists in drafting complex reports and research proposals. Another specialized secretary is the *social secretary* (201.268), who arranges social functions, answers personal correspondence, and keeps the employer informed about all social activities.

Places of Employment

About 3 million persons—95 percent of them women—worked in occupations requiring secretarial or stenographic skills in 1972. Of this number, about 95 percent were secretaries.

More than half of all secretaries and stenographers work in banks, insurance companies, real estate firms, and government organizations. Many specialized stenographers and secretaries work for doctors, lawyers, and other professional people. Although many shorthand

reporters are court reporters, some work in firms that furnish reporting services on a contract basis.

Training, Other Qualifications, and Advancement

Generally, graduation from high school is required for a job as a stenographer or secretary. Many employers prefer applicants having additional secretarial training at a college or private business school. Courses vary from a few months' instruction in basic shorthand and typing to longer programs teaching specialized skills such as shorthand reporting or legal or medical secretarial work.

An increasing number of private firms and government agencies have their own training facilities where employees can upgrade their skills and broaden their knowledge of the organization. The Federal Government sponsors programs to train unemployed and low-skilled workers for entry jobs as stenographers and secretaries under provisions of the Manpower Development and Training Act and other legislation.

Many courts of law require their court reporter to be a Certified Shorthand Reporter (CSR). Others hire reporters with the understanding that they will be certified within one year. The National Shorthand Reporters Association gives tests for speed and accuracy to certify reporters.

Although there are many different shorthand methods, employers usually have no preferences. The most important factor in hiring and promotion is speed and accuracy. To qualify for jobs in the Federal Service—and for employment in many private firms—stenographers must be able to take dictation at 80 words per minute and type 40 words per minute. Some private firms ask beginning secretaries to take dictation at 100 words per minute and type 50 words per minute. Many shorthand reporting jobs require more than 200 words of dictation per minute; shorthand reporters in the Federal Government must take 175 words a minute.

Stenographers and secretaries should have good hearing; a knowledge of spelling, punctuation, grammar, and vocabulary is essential. The ability to concentrate amid distractions is vital for shorthand reporters. Employers look for persons who are poised and alert, and who have pleasant personalities. Discretion, judgment, and initiative are important for the more responsible secretarial positions.

Many stenographers who improve their skills advance to secretarial jobs; others, who acquire the necessary speed through additional training, can become shorthand reporters. An increasing number of executive secretaries are promoted into management positions where they use their experience and knowledge of the employing organization.

Employment Outlook

Employment of secretaries is expected to increase very rapidly through the mid-1980's as the continued expansion of business creates a growing volume of paper work. Thousands of jobs will become available each year due to growth and the need to replace those who die, retire, or stop working for other reasons.

Although the use of automatic office equipment is not expected to have a significant impact on employment of secretaries, opportunities for stenographers will be limited as more firms install dictating machines.

Earnings and Working Conditions

According to a recent Bureau of Labor Statistics survey, general stenographers working in urban areas averaged $515 a month in 1972; experienced workers who were highly skilled averaged $589. Shorthand reporters generally earn higher salaries than other stenographic workers.

According to the same survey, secretaries to supervisors of small offices earned monthly salaries of $581. Secretaries to officers in small companies had average monthly salaries of $653; those working for middle management in large companies averaged $703. Secretaries having greater responsibilities, such as executive secretaries to corporate officers, earned average monthly salaries of $758.

Beginning clerk/stenographers in the Federal Government earned from $450 to $640 a month in early 1973, depending on education, training and experience. Earnings of beginning shorthand reporters ranged from $710 to $970 a month depending on speed, education, and experience. Starting salaries for secretaries in the Federal Government ranged from $640 to $790 a month. In 1972, earnings of stenographers were slightly less, and those of secretaries somewhat more than average earnings for all nonsupervisory workers in private industry, except farming.

Working conditions for secretaries and stenographers generally are similar to those of other office workers in the same organization. Shorthand reporters, however, often sit for long periods of time while recording an event. (See the statement on Clerical Occupations for more information on Earnings and Working Conditions.

Sources of Additional Information

For information on careers in secretarial work write:

National Secretaries Association, 616 East 63rd St., Kansas City, Mo. 64110.

Additional information on careers in secretarial work and a directory of business schools is available from:

United Business Schools Association, 1730 M St. NW., Washington, D.C. D.C. 20036.

For information about shorthand reporting contact:

National Shorthand Reporters Association, 25 West Main St., Madison, Wisc. 53703.

TYPISTS

(D.O.T. 203.138 through .588; 208.588; and 209.382 through .588)

Nature of the Work

A rapid flow of written communication is essential to the modern office. The typist helps to maintain this flow by making copies of printed, handwritten, and recorded words.

Beginning or *junior typists* usually type headings on form letters, copy directly from handwritten drafts, and address envelopes. Often, they do other office tasks, including answering telephones, filing, and operating office machines such as copiers, and calculators.

More experienced typists do work that requires a high degree of accuracy and independent judgment. *Senior typists* work from rough drafts which are difficult to read or which contain technical material. They may plan and type complicated statistical tables, combine and rearrange materials from different sources, or prepare master copies to be reproduced on copying machines.

Clerk typists (D.O.T. 209.388) combine typing with filing, sorting mail, answering telephones, and other general office work. *Varitypists* (203.582) produce master copies, such as stencils, on machines similar to typewriters.

Transcribing machine operators (D.O.T. 208.588) type letters and reports as they listen to dictation recorded on magnetic tape. Other typists who have special duties include *policy writers* (D.O.T. 203.588) in insurance companies, *waybill clerks* (D.O.T. 209.588) in railroad offices, and *mortgage clerks* (D.O.T. 203.588) who work in banks.

In some offices, many typists are grouped in a pool that handles all the transcription and typing for several departments. Some of these typists handle strictly confidential documents, while others operate composing equipment that produces documents in different type sizes and styles.

Places of Employment

About 1 million persons—95 percent of them women—worked as typists in 1972. Nearly 1 out of 6 worked part time. Many other clerical workers use some typing skills in the performance of their jobs.

Although typists are employed in all kinds of organizations, about half work in factories, banks, insurance companies, and government agencies.

Training, Other Qualifications, and Advancement

Typists generally need high school diplomas. Good spelling, punctuation, and grammar are essential. Ability to operate office equipment, such as copying and adding

A growing number of businesses use automatic typewriters.

machines, and also a knowledge of office procedures, are assets.

An increasing number of companies and government organizations have their own typist training programs. These give employees a chance to learn or upgrade skills so that they can advance to more responsible positions within the organization. The Federal Government sponsors programs to train unemployed and low-skilled workers for entry positions as typists, under provisions of the Manpower Development and Training Act and other legislation.

Many employers require applicants for typing jobs to take a test that shows their speed and accuracy. For most jobs, 40 to 50 words per minute is required. All typists who transcribe recorded dictation need sharp hearing and must be especially good in spelling. Successful typists are neat, accurate, and are able to concentrate amid distractions.

As beginners increase their skills, they often advance to higher level typing jobs. Typists who learn shorthand can be promoted to secretaries or stenographers.

Employment Outlook

The number of typists is expected to grow rapidly through the mid-1980's as business expansion increases the volume of paper work. There will be several thousand job openings each year due to growth of the occupation and the need to replace those who stop working or transfer to other jobs.

Continued growth in the volume of paper work will assure excellent opportunities for typists in the years ahead. Demand should be particularly strong for highly skilled workers and those who can handle other office jobs as well as typing. Some employers will prefer typists who are familiar with new kinds of typing equipment such as high speed machines equipped with a magnetic keyboard.

Earnings and Working Conditions

According to a recent Bureau of Labor Statistics survey, beginning typists averaged $109 a week in 1972. Those having experience earned $127 a week, slightly less than the average earnings for nonsupervisory workers in private industry, except farming.

In the Federal Government, the entrance salary for typists without experience was $104 a week in early 1973, compared with $132 a week for those with experience.

Working conditions for typists usually are similar to those of other office employees where they work. Typists sit for long periods and often must contend with high noise levels caused by machines located in the same area. (See the statement on Clerical Occupations for more information on working conditions and also for sources of additional information.)

COMPUTER AND RELATED OCCUPATIONS

Data processing needs have increased very rapidly over the past decade as population has grown, as business organizations have become more complex, and as scientific and technical knowledge has expanded. The computer has enabled us to keep pace with the increasing need for more and better information. Workers in computer and related occupations prepare data in the form necessary for machine processing, operate computer consoles and various related equipment, and analyze and interpret the machine's output.

Most computer careers require specialized training that varies widely in content and length depending upon the occupation. While there are no universal educational requirements for systems analysts and programmers, a college degree is increasingly important—especially for work in scientifically and technically oriented systems. Computer operators usually need at least a high school education; however, training and experience in operating the machine is more important than formal education.

All computer jobs, including those that generally require a college education, stress the importance of learning on the job. While this is the primary source of training for operating personnel, college graduates in computer science also may spend a year or more working on a system to learn how it functions.

In addition to technical knowledge and skills, computer personnel need good powers of concentration and should enjoy working with details. Those who operate equipment, for example, keypunchers or console operators, must have manual dexterity and some mechanical aptitude. Although programmers and systems analysts seldom run computer equipment, they also need mechanical ability to trace the source of data processing errors.

This chapter describes 3 computer occupations: Computer Operating Personnel, Programmers, and Systems Analysts.

ELECTRONIC COMPUTER OPERATING PERSONNEL

(D.O.T. 213.138, .382, .582, .588, and .885, and 223.387)

Nature of the Work

Computers require specialized workers to code "input," operate the console, and translate "output" into words and numbers. Although large systems require several workers, small ones need only one or two employees.

"Input" is data to be processed plus a programmer's step-by-step instructions to the computer. (Information about the occupation of Programer is given elsewhere in the *Handbook*.) In many systems, *keypunch operators* (D.O.T. 213.582) or *data typists* (D.O.T. 213.588) prepare input. Keypunch operators use machines similar to typewriters that punch holes in cards to represent specific items of information. Data typists use special typewriters to prepare input data which the machine converts to holes on cards or magnetic impulses on tapes.

Some computer systems get their input from "direct access" devices that use magnetic surfaces for recording data. These systems use machines called converters to transfer data from punched cards or paper tapes to the magnetic surface. *Card-to-tape converter operators* (D.O.T. 213.382) wire plugboards and interpret signals from a panel of lights on the machine. They also must understand the whole system to recognize errors in input or other situations that prevent proper operation.

Once facts and figures have been coded, data are ready to be processed. A *console operator* (D.O.T. 213.382) examines the programmer's instructions and makes sure the computer is loaded with tape, cards, or other input. The operator then starts the computer. During the processing, he manipulates switches and observes lights. If the computer stops or lights signal an error, the operator must locate the problem. Some operators who work with automatic systems do not start the computer each time a different problem is run. They must, however, watch the equipment carefully in order to respond to various machine signals.

Output is translated from machine language to words and numbers. In some systems, machines directly connected to the computer do this. In others, converters and high-speed printers run by auxiliary equipment operators—*tape-to-card converter operators* (D.O.T. 213.382) and *high-speed printer operators* (D.O.T. 213.382)—do this work. With the increasing use of telephone lines to transmit data, many auxiliary equipment operators run communications as well as computing equipment.

Places of employment

About 480,000 persons worked as

console, auxiliary equipment, and keypunch operators in 1972. Nearly three-fifths of all console and auxiliary equipment operators were men; women held 9 out of 10 keypunching jobs.

Jobs for operating personnel are found in all kinds of organizations, but they are most numerous in government agencies, insurance and public utility companies, banks, and factories. Large numbers also work for wholesale and retail stores, and for independent service organizations that process data for other firms.

Computer operator positions tape.

Training, Other Qualifications, and Advancement

Employers often transfer operators of tabulating and bookkeeping machines to newly installed electronic computers. Other operators are recruited from the outside.

In hiring outsiders, private employers usually require a high school education. For console operators, some college training may be preferred. The Federal Government requires console and auxiliary equipment operators to be high school graduates unless they have specialized training or experience. Many employers give applicants special tests to determine their aptitude for computer work, especially the ability to reason logically.

Beginners usually receive training after they are hired. While auxiliary equipment operators train for a few weeks, console operators need a longer period of instruction. They attend classes to learn to mount tapes and operate the console. This classroom training is supplemented by instruction on the job, where operators become sufficiently familiar with the equipment to trace mechanical failures.

As they gain experience, operators work on more complex equipment. Eventually, they may be promoted to supervisors, or to jobs that combine supervision and console operation. Through on-the-job experience and additional study, some console operators qualify as programmers.

Most employers prefer high school graduates for jobs as keypunchers. Although some organizations will train good typists in the operation of keypunching equipment, most seek workers who already have basic skills as keypunchers. Instruction in operating a keypunch machine is available in many high schools, public and private vocational schools, private computer schools, and numerous business schools and colleges. The Federal Government also sponsors programs to train unemployed and low-skilled workers for entry jobs as keypunch operators under provisions of the Manpower Development and Training Act and other legislation.

Although advancement opportunities for keypunch operators are limited, some are promoted to supervisory positions after several years on the job. With additional training, often including college study, a few keypunch operators advance to jobs as console operators.

Keypunch and auxiliary equipment operators should be able to work under close supervision and as part of a team. Operating personnel also must be skillful in working with things and not easily bored by repetitious tasks. Console operators frequently must exercise independent judgment, especially when working without supervision on second or third shifts.

Employment Outlook

Changes in technology will have different effects on the employment growth of occupations included in the group computer operating personnel.

Console and auxiliary equipment operators will grow rapidly over the period as new computers are installed and existing systems increase their capabilities. The demand for keypunch operators is not expected to keep pace with the growth in computer installations, however, because faster and more efficient methods of data entry will increasingly replace card punch equipment.

Earnings and Working Conditions

Beginning console operators averaged $127 a week in 1972, according to a recent Bureau of Labor Statistics survey in urban areas. Experienced console operators averaged $177 a week and experienced keypunch operators $125. Salaries of beginning operating personnel in the Federal Government are roughly comparable to those in private industry; in early 1973, they started at $132 a week. Console operators earned slightly more and keypunch operators slightly less than all nonsupervisory workers in private industry, except farming.

Some console and auxiliary equipment operators work evenings or nights because many computers run for two or three shifts. Tape librarians usually work on day shifts.

Because electronic computers are housed in carefully controlled temperatures, operators work in air-conditioned rooms. However, one disadvantage is the high level of noise generated by some auxiliary equipment. (See introduction to this chapter for additional information on Working Conditions.)

Sources of Additional Information

Further information on data processing careers is available from:

Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068.

For a list of reading materials giving information about computer operating personnel contact:

Association for Computing Machinery, 1133 Avenue of the Americas, New York, N.Y. 10036.

PROGRAMMERS

(D.O.T. 020.188)

Nature of the Work

An electronic computer can process masses of information with great speed and accuracy, but the machine cannot think for itself. The programmer's job is to prepare step-by-step instructions for the computer to follow.

Before a computer can process a problem, exact and logical steps for its solution must be worked out. An experienced programmer or systems analyst does this preliminary work. (See the statement on Systems Analysts elsewhere in the *Handbook*.) Some programmers, whose work involves a considerable amount of this preliminary analysis, are known as programmer-analysts.

When this preliminary job is finished, the programmer prepares detailed instructions that tell the machine how to process the data. The way a "program" is written depends on the nature of the problem and the type of equipment to be used. The mathematical calculations involved in billing a firm's customers, for example, are different from those required in most scientific work. A business programmer works on instructions that tell the computer how to bill customers or make up a payroll. First the programmer decides what company records contain the information needed to prepare the documents. Next he makes a flow chart or diagram showing the computer what order to follow in doing each step. From the flow chart, the programmer writes detailed instructions telling the machine exactly what to do with each piece of information. He also prepares an instruction sheet for a computer operator to follow when the program is run. (The work of computer operators is described in the *Handbook* statement on Computer Operating Personnel.)

The final step in programming is a check to be sure that the programmer's instructions are correct and will produce the desired information. This check is called "debugging." The programmer uses a sample of the data to be processed to review what will happen as the computer follows instructions. He changes the instructions to take care of any errors that appear and has the computer make a trial run.

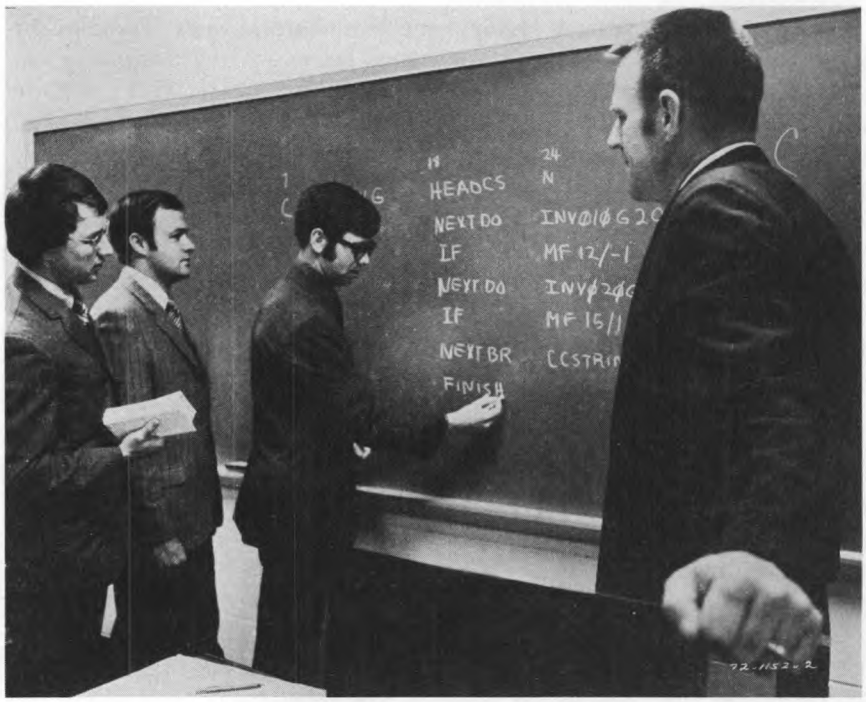
Because of differences in their work, many programmers specialize in either business or scientific applications. Some, known as systems or software programmers, write instructions that tell the computer how

to schedule jobs and when to switch from one to another. Although a simple program can be written in a few days, one designed to produce many different kinds of information may require a year or more. Often several programmers at different levels of responsibility work together under an experienced programmer's supervision.

Places of Employment

About 186,000 persons—about three-fourths of them men—worked as programmers in 1972. In addition, some professional workers such as engineers, economists, and accountants spend part of their time programming.

Most programmers work in large business organizations and government agencies. Large numbers also work for computer and other manufacturers and independent service organizations that furnish computer services for a fee.



Programmer explains instructions for processing data.

Training, Other Qualifications, and Advancement

There are no universal training requirements for programmers. Some are college graduates; others take special courses in computer work to supplement experience in a field such as accounting or inventory control.

Organizations that use computers for science and engineering prefer college graduates with degrees in the physical sciences, math, engineering, or computer science. Graduate degrees are required for some jobs. Very few scientific employers are interested in an applicant with no college training.

Many employers who use computers to process business records don't require college degrees, although college courses in data processing, accounting, and business administration are helpful. Some workers with no college training but experience in machine tabulation or payroll are promoted to programming jobs. They usually need additional courses in data processing before they are fully qualified programmers.

Interested persons can learn some of the necessary programming skills at a growing number of technical schools, colleges, and universities. Instruction ranges from introductory home study courses to advanced computer technology at the graduate level. High schools in many parts of the country also offer courses in computer programming.

In hiring programmers, employers look for people who have an aptitude for logical thinking and exacting analysis. The job also calls for patience, persistence, and the ability to work with extreme accuracy. Ingenuity and imagination are particularly important when programmers have to solve problems in new ways.

Beginning programmers usually attend training classes for a few weeks. Then they work on simple assignments while continuing with further specialized training. A programmer generally needs a year or more of experience before he can handle all aspects of his job without close supervision. Once he becomes skilled, his prospects for further advancement are good. In large organizations, workers may be promoted to lead programmers or systems analysts with supervisory responsibilities.

Employment Outlook

The employment of programmers will grow rapidly over the next decade as the number of computer installations increases. Thousands of job openings will become available each year due to growth and the need

to replace workers who leave the occupation. Because many programmers are young, relatively few job openings will be due to death or retirement.

The number of programmers will increase as business continues to automate processes once done by hand. For example, many stores will computerize credit information and their ordering and inventory of merchandise. Employment growth also will be sharp in computer service bureaus (organizations that furnish computer services for a fee). Substantial growth will continue in firms that were among the first to use computers on a large scale, including banks, insurance companies, and factories.

Although employment growth will be significant, programmers are not expected to multiply as rapidly as they have in the past for several reasons. Improved programming languages should make it easier for nonprogrammers to use machines, and preprogrammed mini-computers will be used for many applications. In addition, new techniques will enable the programmers to handle a greater volume of work. The best opportunities will be for experienced persons qualified in both programming and systems analysis who have kept up with the latest equipment and techniques.

Earnings and Working Conditions

Beginning business programmers averaged $8,500 a year in 1972, according to a Bureau of Labor Statistics survey in urban areas. Those in the North and West earned slightly more than the average while workers in the South earned a little less. Also programmers who worked for manufacturers and public utilities had higher earnings than those employed by banks and insurance companies.

Experienced business programmers averaged $11,000 a year, nearly twice as much as average earnings for all nonsupervisory workers in private industry, except farming. Lead programmers averaged $14,400 and managers of programming, $16,700 a year.

Federal government salaries are close to those in private industry. In early 1973, beginners started at $7,700 or $9,500; most experienced programmers earned from $11,600 to $18,900 a year.

Programmers work about 40 hours a week, but their hours are not always from 9 to 5. Once or twice a week a programmer may report early or work late to use the computer when it is available. Occasionally, they work on weekends or are telephoned to advise computer operators working a second or third shift.

Sources of Additional Information

Additional details about the occupation of programmer are available from:

Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068.

American Federation of Information Processing Societies, 210 Summit Ave., Montvale, N.J. 07645.

For a list of reading materials on career opportunities in programming contact:

Association for Computing Machinery, 1133 Avenue of the Americas, New York, N.Y. 10036.

SYSTEMS ANALYSTS

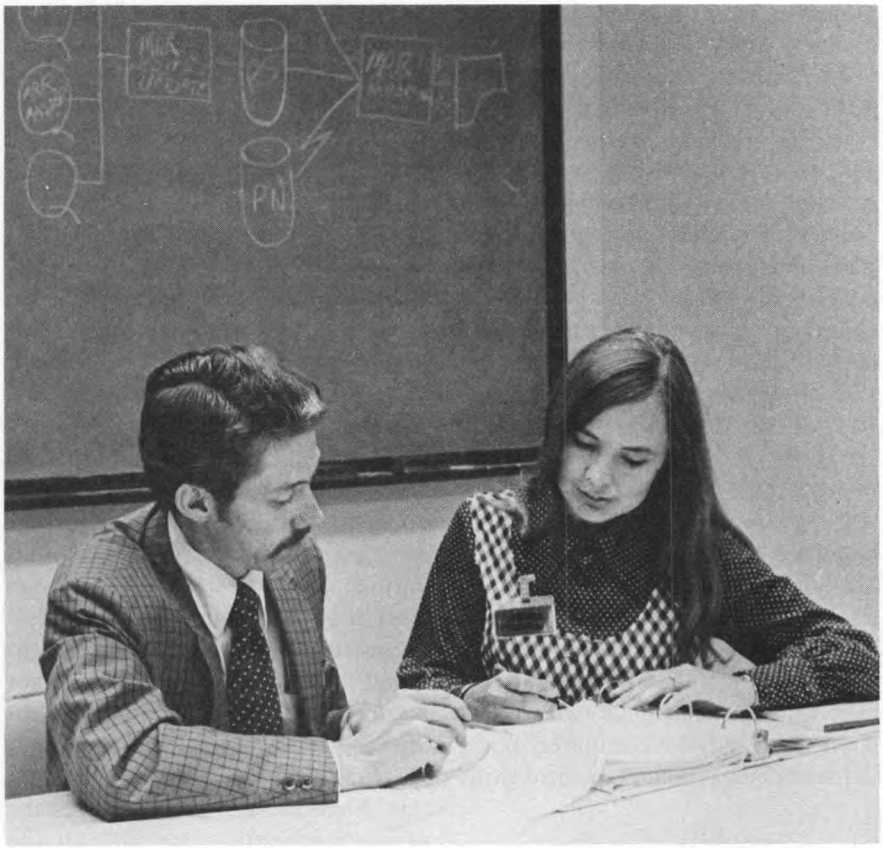
(D.O.T. 003.187, 012.168, 020.081 and 020.088)

Nature of the Work

Many essential business functions and scientific procedures rely on the work of systems analysts. Their job is to plan the activities needed for processing data to solve business, scientific, or engineering problems. Although a system can be developed to process data by hand, with office machines, or by computers, most analysts develop methods to use computers. This statement applies only to analysts who work on systems that use computers.

Systems analysts begin an assignment by determining the exact nature of the data processing problem. Often managers or subject matter specialists help them to do this. Then the analyst structures the problem logically, identifies all the data needed, and specifies how they are to be processed. Systems analysts may use various techniques in their work such as cost accounting, sampling, and mathematical model building. After analyzing the problem and devising a data processing system, they prepare charts and diagrams that describe how the system operates.

Analysts usually recommend which data processing equipment is to be used, and prepare instructions for programmers. (See the statement on Programmers in this chapter.) They also translate final results into terms that managers or customers can understand. Data processing problems are so varied and complex that many systems analysts specialize in one area. For example, analysts who work for scientific or engineering organizations may develop systems to determine the flight path of a space vehicle.



Systems analyst confers with programmer.

Others develop business systems for functions such as accounting, forecasting sales, or marketing research.

Some analysts improve systems already in use. They may develop better procedures or adapt the system to handle additional or different types of data. Others do research, described as advanced systems design, to devise new methods of systems analysis. These analysts usually have mathematical or engineering backgrounds.

Places of Employment

More than 100,000 persons—about 90 percent of them men—worked as systems analysts in 1972. Most analysts worked in urban areas for manufacturing concerns, insurance companies, banks, and wholesale and retail businesses. A growing number also are employed by universities and independent organizations that furnish computer services for a fee.

Training, Other Qualifications, and Advancement

There is no universally acceptable way of preparing for work in systems analysis. Some employers prefer applicants who have a bachelor's degree and experience in mathematics, science, engineering, accounting, or business. Others stress a graduate degree.

Educational preparation and experience often determine the kind of job opportunities available. For example, employers usually want an analyst who has a background in business administration for work in finance or one having an engineering background for a scientifically oriented system. Applicants also may qualify on the basis of professional experience in scientific, technical, or managerial occupations, or practical experience in data processing jobs such as programmer or computer operator. (See the statement on Computer Operators in this chapter.)

Most employers prefer people who have had some experience in computer programming. A beginner can learn to use electronic data-processing equipment on the job, or can take special courses offered by his employer, computer manufacturers, or colleges. In the Federal Government, for example, systems analysts usually begin their careers as programmers. After gaining some experience, they may be promoted to systems analyst trainees, and thus later qualify as systems analysts.

Systems analysts need an aptitude for logical thinking and should like working with ideas. Although they sometimes work as part of a team, much of their work is done independently. They should be able to concentrate and pay close attention to details.

In large data-processing departments, a person who begins as a junior systems analyst and gains experience may be promoted to senior or lead systems analyst. Systems analysts who show leadership ability also can advance to jobs as managers of systems analysis or data-processing departments.

Employment Outlook

Employment of systems analysts is expected to grow very rapidly through the mid-1980's as data processing systems in business and Government expand. In addition to opportunities that result from

growth, some openings will occur as systems analysts advance to more responsible positions or leave their jobs to enter other employment. Because many of these workers are young, relatively few positions will result from retirement or death.

Among the factors expected to contribute to a growing demand for systems analysts are the extension of computer technology to small businesses and the growth of computer centers to serve individual clients for a fee. Employment also will be stimulated by efforts to develop systems that will retrieve information more efficiently, and to monitor industrial processes.

Earnings and Working Conditions

Beginning systems analysts averaged $11,800 a year in 1972, according to a private survey which covered more than 85,000 workers in business and government data-processing installations in all parts of the country. Earnings of experienced systems analysts averaged $15,700 annually; in some cases they were paid $25,000 or more a year. Systems analysts earn over twice as much as the average for all nonsupervisory workers in private industry, except farming.

Systems analysts usually work about 40 hours a week—the same as other professional and office workers. Unlike many computer operators who work evening or night shifts, systems analysts generally work only during the day. Occasionally, evening or weekend work may be necessary to complete emergency projects.

Sources of Additional Information

Additional information about the occupation of systems analyst is available from:

American Federation of Information Processing Societies, 210 Summit Avenue, Montvale, N.J. 07645.

Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068.

For a list of reading materials on career opportunities in the data processing field write:

Association for Computing Machinery, 1133 Avenue of the Americas, New York, N.Y. 10036.

BANKING OCCUPATIONS

Modern banks offer a variety of services to meet the needs of their customers. They provide checking and savings accounts, loans, trust fund management, and financial counseling.

Bank work is highly specialized, and most employees gain experience and skill through on-the-job training. Although banks usually seek college graduates for officer trainee jobs, many opportunities exist for high school graduates as well. Banks also give many workers opportunities to qualify for better positions if they enroll in programs offered by the American Institute of Banking, or if they take finance and business courses in colleges and universities.

Bank employees should enjoy working with numbers and be able to perform detailed work. Personal qualifications such as honesty and the ability to meet and communicate with customers are important.

This section discusses 3 office occupations unique to banking: Clerks, Tellers, and Officers.

BANK CLERKS

(D.O.T. 209.388, 210.388, 215.388, 217.388, 219.388 and .488)

Nature of the Work

All complex organizations require the processing of large amounts of paperwork. Because of the specialized nature of banking, some of the duties of bank clerks differ from those of clerks in other businesses. (Secretaries, office machine operators, receptionists, and other clerical workers whose jobs are much the same in banks as in other businesses are discussed elsewhere in the *Handbook*.)

In a small bank, one clerk may do several jobs such as sort checks, total debit and credit slips, and prepare monthly statements for depositors. In a large bank, however, each clerk usually specializes and frequently has a special job title.

Bank clerks known as *sorters* (D.O.T. 219.388) separate documents—checks, deposit slips, and other items—into different groups and tabulate each "batch" so they may be charged to the proper accounts; often they use canceling and adding machines in their work. Many banks also employ *proof machine operators* (D.O.T. 217.388), who use equipment that sorts items and adds and records the amount of money involved.

The bookkeeping workers who keep records of depositors' accounts, and of bank transactions such as loans or the purchase and sale of securities, are the largest single group of bank clerks. *Bookkeeping machine operators* (D.O.T. 215.388) may use conventional bookkeeping machines or electronic posting machines to record financial trans-

Bank clerks record financial transactions.

actions. In banks, these workers are sometimes known as account clerks, posting machine operators, or recording clerks. *Bookkeepers* (D.O.T. 210.388) job titles relate to the kinds of records they keep—for example, Christmas club bookkeeper, discount bookkeeper, interest-accrual bookkeeper, trust bookkeeper, and commodity loan clerk. Thousands of *bookkeeping and accounting clerks* (D.O.T. 219.488) also do routine typing, calculating, and posting. Included in this group are reconcilement clerks, who process statements from other banks to aid the auditing of accounts; and trust investment clerks, who post the daily investment transactions of bank customers.

Other clerical employees whose duties and job titles are unique to banking include *country collection clerks* (D.O.T. 219.388), who sort thousands of pieces of mail daily and determine which items must be held at the main office and which should be routed to branch banks for collection. Also employed are *transit clerks* (D.O.T. 217.388), who sort checks and drafts on other banks, list and total the amounts involved, and prepare documents to be mailed for collection; *exchange clerks* (D.O.T. 219.388), who service foreign deposit accounts and determine charges for cashing or handling checks drawn against such accounts; *interest clerks* (D.O.T. 219.388), who keep records on interest-bearing items that are due to or from the bank; and *mortgage clerks* (D.O.T. 209.388), who type legal papers dealing with real estate upon which money has been loaned, and maintain records relating to taxes and insurance on these properties.

Electronic data-processing has created several new clerical occupations which are unique to banking. These include the electronic reader-sorter operator who runs electronic check sorting equipment; the check inscriber or encoder who operates machines that print information on checks and other documents in magnetic ink to prepare them for machine reading; and the control clerk who keeps track of the large volume of documents flowing in and out of the computer division. Other occupations include card-type converter operator, coding clerk, console operator, data typist, data converting machine operator, data examination clerk, high speed printer operator, tape librarian, teletype operator, and verifier operator.

Most of the 475,000 clerical employees in banks in 1972 were women.

Training, Other Qualifications, and Advancement

High school graduation is adequate preparation for most beginning clerical jobs in banks. Courses in bookkeeping, typing, business arithmetic, and office machine operation also are desirable. Applicants may be given brief tests to determine their ability to work rapidly and accurately, and to communicate effectively with others. They should be able to work as part of a team and under close supervision.

Beginners may be hired as file clerks, keypunch operators, transit clerks, clerk-typists, or for related work. Some are trained by the bank to operate various office machines. A few start as inside messengers.

A clerk in a routine job may be promoted to a minor supervisory position to teller or credit analyst, and eventually to senior supervisor. Opportunities for advancement to bank officer positions also exist for outstanding clerks who have had college training or have taken specialized courses in banking.

Additional education obtained during one's employment—particularly the courses offered by the American Institute of Banking—may help workers advance. (See statement on the Banking Industry for further information on the Institute's educational program.)

Employment Outlook

Employment of bank clerks is expected to increase rapidly through the mid-1980's. New jobs created by growth, as well as replacements for those who retire, die, or stop working for other reasons, probably will result in thousands of openings each year. Replacement needs are relatively high in banks, as in other industries which employ many women in clerical positions.

Jobs for clerks will arise as established banks expand their services and new banks are opened. In banks that install electronic equipment, however, fewer opportunities can be expected for check sorters and bookkeeping machine operators. Most workers affected by the shift to computer processing will be retrained and reassigned, either to new jobs created by the change in equipment and methods, or to other duties related to new banking services. Overall, the volume of work is expected to be so great that the total number of clerks will continue to rise for some years to come. Occupations related to electronic data processing will have the most rapid growth.

Earnings

According to a Bureau of Labor Statistics survey, clerical workers in financial institutions, including banks, usually earned between $87 and $150 a week in 1972.

Experienced tabulating machine operators and secretaries received the highest weekly salaries: about $150. The earnings of beginning file clerks and messengers were generally the lowest: $87 and $89 a week.

Bank clerks are covered under the Fair Labor Standards Act, a Federal law which provides for a minimum wage. In 1972, the minimum was $1.60 an hour; thus, any clerk who worked a 40-hour week earned at least $64.

See statement on the Banking Industry for information on Places of Employment and Sources of Additional Information; and for additional information on Training, Employment Outlook, and Earnings and Working Conditions.

Branch bank manager helps new customers open checking account.

BANK OFFICERS

(D.O.T. 186.118, .138, .168, and .288; 161.118, 189.118 and .168)

Nature of the Work

Practically every bank has a president who directs operations; one or more vice presidents who act as general managers or have charge of bank departments such as trust, or credit; and a comptroller or cashier who, unlike cashiers in stores and other businesses, is an executive officer generally responsible for all bank property. Large banks also may have treasurers and other senior officers, as well as junior officers, to supervise the various sections within different departments. Banks employed almost 220,000 officers in 1972; women were about one-sixth of the total.

A bank officer makes decisions within a framework of policy set by the board of directors and existing laws and regulations. An officer must have a broad knowledge of business activities to relate to the operations of his department. For example, loan officers evaluate the credit and collateral of individuals and businesses applying for a loan. Similarly, trust officers must understand each account before they invest funds to support families, send young people to college, or pay retirement pensions. Besides supervising financial services, officers advise individuals and businessmen and participate in community projects.

Because banks offer many services, a wide choice of careers is available to those who specialize.

Loan officers must be familiar with economics, production, distribution, merchandising, and commercial law. They also need to know business operations and be able to analyze financial statements. Officers may handle installment, commercial, real estate, or agricultural loans.

Trust management requires knowledge of financial planning and investment for investment research and estate and trust administration.

Operations officers plan, coordinate, and control the work flow; update systems; and strive for bank efficiency. They also train and supervise a large number of people. Careers in bank operations include electronic data processing and internal and customer services.

A correspondent bank officer is responsible for relations with other banks; branch bank manager, for all functions of a branch office; and an international officer, for advising customers with financial dealings abroad. A working knowledge of a foreign country's language, geography, politics, history, and economic growth can help those interested in international banking.

Other career fields for bank officers are auditing, economics, personnel administration, public relations, and operations research.

Training, Other Qualifications, and Advancement

Bank officer positions are filled by management trainees or by promoting outstanding bank clerks. College graduation usually is required for management trainees. A business administration major in finance or a liberal arts curriculum including accounting, economics, commercial law, political science, and statistics serve as excellent preparation for officer trainee positions. Valuable experience may be gained through summer employment programs.

Many banks have well-organized officer-training programs usually ranging from 6 months to 1 year. Trainees may start as credit or investment analysts or rotate among bank departments to get the "feel" of banking; bank officials then can determine the position for which each employee is best suited.

Although persons planning to become bank officers should like to work independently and analyze detailed information, they need tact and good judgment in order to counsel customers.

Advancement to officer may come slowly in small banks where the number of positions is limited. In large banks that have special training programs, promotions may come more quickly. For a senior officer position, however, an employee usually needs many years of experience.

Although experience, ability, and leadership are emphasized for promotion, advancement also may be accelerated by special study. Courses in every phase of banking are offered by the American Institute of Banking, a long-established, industry-sponsored school. (See the statement on the Banking Industry elsewhere in the *Handbook* for more information on the Institute's program and other training programs sponsored by universities and local bankers' associations.)

Employment Outlook

Through the mid-1980's, employment of bank officers is expected to increase rapidly. Computers will be used to expand banking activities; additional officers will be required for sound management and control and to replace those who retire or leave their jobs for other reasons.

Although college graduates who meet the standards for executive trainees should find good opportunities for entry positions, many senior officer positions will be filled by promoting people already experienced in banking. Competition for these promotions, particularly in large banks, is likely to be keen.

Earnings

According to a private survey conducted in 1972, large banks, insurance companies, and other financial institutions paid salaries ranging from $550 to $780 a month to new executive trainees who were college graduates.

The salaries of senior bank officers may be several times as great as these starting salaries. For officers, as well as for other bank employees, earnings are likely to be lower in small towns than in big cities.

See the statement on the Banking Industry elsewhere in the *Handbook* for Places of Employment and Sources of Additional Information, and for general information on banking occupations.

TELLERS

(D.O.T. 212.368)

Every bank, no matter how small, has at least one teller who receives and pays out money and records these transactions. In a very small bank, one *all-round teller* may handle all transactions; in larger banks different kinds of transactions usually are assigned to different tellers. For example, a *Christmas Club* teller accepts and records deposits made to Christmas Club savings accounts and a *note teller* handles certain transactions for clients who have made loans. Other tellers who have special job titles include *commercial* (or *paying and receiving*), *savings, foreign exchange, payroll, discount,* and *securities tellers.*

Bank tellers should possess a pleasant personality.

Commercial tellers, the most common, cash customer's checks and handle deposits and withdrawals from checking and savings accounts. Before cashing a check, the teller must verify the identity of the person to whom payment is made, and must be certain that the payee's account has sufficient funds to cover the payment. When accepting a deposit, the teller checks the accuracy of the deposit slip and enters the total in a passbook or on a deposit receipt. Tellers may use machines for making change and for totaling deposits. Those who handle savings accounts may use a "window" posting machine to print a receipt, record the transaction in the customer's passbook, and simultaneously post the transaction to the bank's ledger.

After banking hours, tellers count cash on hand, list the currency-received tickets on a settlement sheet, and balance the day's accounts. They also sort checks and deposit slips. Paying and receiving tellers may supervise one or more clerks.

About 250,000 tellers were employed in 1972. A large number worked part time; about 9 out of 10 were women.

Training, Other Qualifications, and Advancement

In hiring tellers, banks prefer high school graduates experienced in clerical work. Maturity, neatness, tact, and courtesy are important, because customers deal with tellers far more frequently than with other bank employees. Since tellers handle large sums of money and are bonded, they must meet the standards established by bonding companies. Although tellers work independently, their recordkeeping is closely supervised. They work with detail and are confined to a small work area.

New tellers usually observe experienced workers for a few days before doing the work themselves. Training may last from a few days to 3 weeks or longer. Beginners usually start as commercial tellers; in large banks which have a separate savings teller's "cage," they may start as savings tellers.

After gaining experience, a competent teller in a large bank may advance to head teller; those who have had some college or specialized training offered by the banking industry may be promoted to officers. (See the statement on the Banking Industry for information about the educational programs of the American Institute of Banking.)

Employment Outlook

The number of bank tellers is expected to increase rapidly through the mid-1980's as banks expand their services. An increasing proportion of tellers, however, will work part-time during peak hours to accommodate customers who transact business during the noon hour and evenings. Thousands of openings will occur each year as a result of employment growth and the need to replace tellers who retire, die, or stop working for other reasons. Replacement needs are relatively high for the many thousands of women tellers.

Although increased use of mechanical and electronic equipment may eliminate some routine duties and speed other work, total employment is unlikely to be adversely affected.

Earnings

According to a Bureau of Labor Statistics survey, all nonsupervisory workers in banking, including tellers, averaged $112 a week in 1972. The range between the lowest and highest salaries depends on experience, the worker's specific duties, and location and size of the bank.

Bank tellers are covered under the Fair Labor Standards Act, a Federal law which provides for minimum wages. In 1972, the minimum was $1.60 an hour; thus, tellers who worked a 40-hour week earned at least $64.

See the statement on the Banking Industry elsewhere in the *Handbook* for Places of Employment and Sources of Additional Information, and for general information on banking occupations.

INSURANCE OCCUPATIONS

Insurance protection has become an integral part of the American way of life. It frees policyholders and their beneficiaries from worry and financial burdens that may result from death, illness, or other losses beyond their control. Businesses could not operate, nor could most people buy homes or other major items, without the assurance of protection from sudden disaster. Insurance workers adapt policies to meet changing needs, decide which applications can be accepted and establish premium rates on the policies, and investigate and settle claims.

A college degree is increasingly important for professional, technical, and managerial jobs in insurance, although some positions are open to high school graduates who have appropriate experience. Insurance workers in clerical positions need a high school diploma. Regardless of their previous training, insurance workers must continually learn while on the job to develop their potential. Many professional associations sponsor courses in all phases of insurance work; employees are encouraged to participate to prepare themselves for more responsible jobs.

This section describes 4 insurance occupations: Actuaries, Claim Adjusters, Claim Examiners, and Underwriters. (Statements on the Insurance Industry and Insurance Agents and Brokers are included elsewhere in the *Handbook*.)

ACTUARIES

(D.O.T. 020.188)

Nature of the Work

Why do young persons pay more for automobile insurance than older persons? How much should an insurance policy cost? Answers to these and similar questions are provided by actuaries who design insurance and pension plans that can be maintained on a sound financial basis. They assemble and analyze statistics to calculate probabilities of death, sickness, injury, disability, unemployment, retirement, and property loss from accident, theft, fire, and other potential hazards. Actuaries use this information to determine the expected insured loss. For example, they may calculate how many persons who are 21 years old today will live to age 65—the possibility that an insured person might die during this period is a risk to the company. They then calculate a price for assuming this risk that will be profitable to the company yet be competitive with other insurance companies. Finally, they must make sure that the price charged for the insurance will enable the company to pay all claims and expenses as they occur. In the same manner, the actuary calculates premium rates and policy contract provisions for each type of insurance offered. Most actuaries specialize in either life and health insurance or in property and liability (casualty) insurance.

To perform their duties effectively, actuaries must keep informed about general economic and social trends, and legislative, health, and other developments that may affect insurance practices. Because of their broad knowledge of insurance, actuaries may work on problems arising in investment, underwriting, group insurance, and pension sales and service departments. Actuaries in executive positions help determine general company policy. In that role, they explain complex technical matters to a variety of laymen, company executives, and government officials. They also may testify before public agencies on proposed legislation affecting the insurance business, or justify intended changes in premium rates or contract provisions.

Actuaries who work for the Federal Government usually deal with a particular insurance or pension program, such as social security or life insurance for veterans and members of the Armed Forces. Actuaries in State government positions regulate insurance companies, supervise the operations of State retirement or pension systems, and work on problems connected with unemployment insurance or workmen's compensation. Consulting actuaries set up pension and welfare plans and make periodic evaluations of these plans for private companies, unions, and government agencies.

Places of Employment

Approximately 5,500 persons worked as actuaries in 1972. About one-half of all actuaries worked in the three states that are the major centers of the insurance industry — New York, Connecticut, and Illinois.

Over two-thirds of all actuaries worked for private insurance companies. Most worked for life insurance companies; the rest worked for property and liability (casualty) companies. The number of actuaries

employed by an insurance company depends on the volume of its business and the number and types of insurance policies it offers. Large companies may employ over 100 actuaries; small firms may have only a few actuaries on their staffs or rely instead on rating bureaus or consulting firms.

Consulting firms and rating bureaus (associations that supply actuarial data to member companies) employed about one-fifth of all actuaries. Other actuaries work for private organizations administering independent pension and welfare plans or for Federal and State government agencies. A few teach in colleges and universities.

Training, Other Qualifications, and Advancement

The minimum requirement for beginning jobs in actuarial work is a bachelor's degree with a major in mathematics, statistics, economics, or business administration and a thorough foundation in calculus, probability, and statistics. Other desirable courses are insurance law, economics, and accounting. Although only 17 colleges and universities offer training specifically designed for actuarial careers, several hundred schools offer some of the necessary courses.

It usually takes from 5 to 10 years after beginning an actuarial career to complete the entire series of examinations required for full professional status. These examinations cover general mathematics, specialized actuarial mathematics, and all phases of the insurance business. Those considering an actuarial career should take at least the beginning examination covering general mathematics while still in college. Success in passing the first two examinations helps beginners to evaluate their potential as actuaries.

Actuaries receive on-the-job training.

Those who pass these examinations usually have better opportunities for employment and receive a higher starting salary. Advanced examinations, usually taken by those in junior actuarial positions, require extensive home study and experience in insurance work.

The Society of Actuaries gives 10 actuarial examinations for the life insurance and pension field; and the Casualty Actuarial Society gives 9 for the property and liability (casualty) field. Since the first parts of the examination series of either Society are the same, students may defer the selection of their insurance specialty until they become more familiar with the field. Persons who complete five examinations in either field are awarded "associate" membership in the society. Those who have passed an entire series receive the title "fellow".

Beginning actuaries often rotate among different jobs to learn various actuarial operations and to become familiar with different phases of insurance work. At first, their work may be rather routine, such as preparing calculations or tabulation for actuarial tables or reports. As they gain experience, they may supervise actuarial clerks, prepare

correspondence and reports, and do research.

Advancement to more responsible work as assistant, associate, and chief actuary depends largely on job performance and the number of actuarial examinations passed. Many actuaries, because of their broad knowledge of insurance and related fields, are selected for administrative positions in other company activities, particularly in underwriting, accounting, or data processing departments. Some actuaries advance to top executive positions.

Employment Outlook

Employment of actuaries is expected to rise very rapidly through the mid-1980's. In addition to job openings resulting from this growth, several hundred actuaries will be needed each year to replace those who retire, die, or transfer to other occupations. Job opportunities should be favorable for new college graduates who have passed one or two of the actuarial examinations while still in school and have a strong mathematical and statistical background. However, because of the large number of persons expected to receive degrees in mathematics, and the increasing number of students taking actuarial examinations, competition for beginning jobs could intensify.

A more affluent and insurance-conscious population and business community will demand a rising number and variety of insurance policies. There will be a need for actuaries to solve the growing number of problems arising from continuously rising, and increasingly complex insurance and pension coverage. The growing number of group health and life insurance plans and of pension and other benefit plans will require actuarial services. Government regulatory agencies will need additional actuaries. The wide-spread use of electronic computers has also made more actuarial studies possible, and there will be a need for actuaries capable of working with electronic computers.

New State and Federal legislation, such as no-fault automobile insurance, competitive rating, and pension reform may be passed, and make more actuarial studies necessary.

Earnings and Working Conditions

In 1972, actuaries had average salaries over three times as high as the average for non-supervisory workers in private industry, except farming. Depending on their college grades and experience, new college graduates entering the field as trainees earned from about $8,000 to $10,000 a year. Most insurance companies paid $300 to $800 a year more to trainees who had completed their first actuarial examination, and another $300 to $800 when they completed the second examination.

In the Federal government, new graduates with the bachelor's degree could start at $7,694 or $9,520 a year in early 1973, depending on their college grades. Those with the master's degree could start at $9,520 or $11,614.

Beginning actuaries can look forward to a marked increase in earnings as they gain professional experience and successfully complete either society's series of examinations. Insurance companies give merit increases to those who pass one or a group of examinations. Fellows of either the Society of Actuaries or the Casualty Actuarial Society earn over $18,000 a year and many actuaries earn more than $25,000 a year. Those in executive positions in large companies may earn over $35,000.

Sources of Additional Information

For facts about acuarial opportunities and qualifications contact:

Casualty Actuarial Society, 200 East 42nd St., New York, N.Y. 10017

Society of Actuaries, 208 South LaSalle St., Chicago, Ill. 60604.

CLAIM ADJUSTERS

(D.O.T. 191.268, 241.168)

Claim adjusters investigate, negotiate, and settle claims made against an insurance company by policyholders who have suffered loss. Most adjusters work for companies that sell property and liability insurance, although some handle claims arising under accident or health insurance policies. (See the statement on Claim Examiners for a discussion of claim settlement in life insurance.)

When an insurance company receives a claim, the adjuster determines the amount of the loss and whether the policy covers it. Adjusters use reports, physical evidence, and testimony of witnesses in investigating a claim. When their company is liable, they negotiate with the claimant and settle the case.

Adjusters make sure that settlements are in line with the real extent of the loss. They must protect their company from false or inflated claims but, at the same time, settle valid claims fairly and promptly. Some adjusters are allowed to issue checks on company funds; others submit their findings to the insurance company which then pays the claimant.

Some adjusters work with all lines of insurance. Others specialize in claims from property damage by

fire, marine losses, automobile damage, workmen's compensation losses, or bodily injury. Some States have no-fault insurance plans that relieve the adjuster from determining responsibility for a loss. Adjusters who work in these States, however, still must decide the true amount of a loss. For some minor property damage cases, the insured parties submit estimates of repair costs. For other claims, adjusters personally inspect the damage and make a brief investigation.

Adjusters work mostly away from the office. They may be called to the site of an accident or to the location of a fire or burglary. Adjusters make their own schedules of the activities needed to dispose of a claim properly. They also keep written or taped records of information obtained from witnesses and other sources, and prepare reports of their findings.

Claim adjuster discusses automobile damage with a policyholder.

Places of Employment

About 128,000 persons—most of them men—were claim adjusters in 1972. Adjusters work for insurance companies, adjustment bureaus (organizations formed by several insurance companies to settle claims), and independent adjusting firms. Some contract their services privately for a fee.

A few public adjusters represent the insured rather than the insurance company. These adjusters usually are retained by banks, financial organizations, and other business firms to handle fire and other losses to property. They negotiate claims against insurance companies and deal with adjusters for such companies.

Adjusters can look forward to working in almost any area of the United States, since claims must be settled locally in all parts of the country. Occasionally, the adjuster may travel to the scene of a disaster, such as a hurricane or a riot, to work with local personnel. Some cases result in travel outside the United States.

Training, Other Qualifications, and Advancement

Although a growing number of firms require claim adjusters to have a college degree, many hire those without college training, particularly if they have specialized experience. For example, a person experienced in automobile repair work may qualify as an auto adjuster. However, an adjuster who lacks college training probably will be slower in advancing to senior or supervisory positions.

No specific field of college study is recommended; many successful adjusters have liberal arts backgrounds. An adjuster who has a business or accounting background might specialize in loss from business interruption or damage to merchandise. Those with college training in engineering or law will find their education helpful in adjusting bodily injury claims. Legal training is desirable, although few employers demand that beginning adjusters have a law degree.

Nearly three-fourths of the States and Puerto Rico require adjusters to be licensed. Despite wide variation among State licensing requirements, applicants usually must comply with one or more of the following: pass a written examination covering the fundamentals of adjusting; furnish character references; be 20 or 21 years of age and fulfill State residency qualifications; offer proof that they have completed an approved course in insurance or loss adjusting; and file a surety bond.

Many insurance companies and adjustment firms offer on-the-job training and home study courses for beginning adjusters. The Insurance Institute of America offers a six-semester study program leading to a diploma in insurance loss and claim adjusting upon successful completion of six examinations. Adjusters can prepare for these examinations by independent home study, through company or public classes, or by college courses in insurance. A professional Certificate in Insurance

Adjusting also is available from the College of Insurance in New York City.

Because they work closely with claimants, witnesses, and policyholders, adjusters must be able to adapt to many different persons and situations. They should be able to gain the respect and cooperation of people from different backgrounds. When an adjuster's evaluation of a claim differs from that of the person who has suffered the loss, he should be able to explain his conclusions tactfully. Successful adjusters must be observant and pay careful attention to details.

Most adjuster trainees are assigned to field offices or urban training centers operated by some insurance companies for an orientation course in general insurance principles. Beginners work on small claims under the supervision of an experienced adjuster. As they learn more about claim investigation and settlement, they are assigned claims that are higher in loss value and more difficult.

Adjusters may be promoted to senior or chief adjuster when they demonstrate competence in handling assignments and progress in available study courses. The adjuster who shows administrative skills may advance to claim supervisor in a field office; senior adjusters who are able to organize workflow and make decisions may be promoted to managerial positions in the field or home office. Adjusters with legal backgrounds can advance to trial attorney or home office legal manager.

Employment Outlook

Employment of claim adjusters is expected to grow moderately through the mid-1980's as the number of insurance claims continues to increase. In addition to jobs created by growth of the occupation, many others will result from the need to replace workers who die, retire, or transfer to other jobs.

Several factors point to a growing volume of insurance and a resulting need for claim adjusters. Higher personal incomes should stimulate property and liability sales as families insure homes, additional automobiles, and other consumer durables. Expanding businesses will need protection for new plants and equipment and for insurance covering workmen's compensation and product liability. As more people live and work in densely populated areas, the increased risk of automobile accident, fire, or theft should result in a greater number of claims.

Growth of this occupation may be slower than in recent years as no-fault plans enable adjusters to handle more cases. Independent adjusters who specialize in automobile damage claims may suffer some loss of business. Prospects are best for adjusters who specialize in other types of claims or those who can move into other lines of adjusting.

Earnings and Working Conditions

According to an American Insurance Association/American Mutual Insurance Alliance survey of companies that sell property and liability insurance, all-lines adjusters averaged $10,000 a year in 1972.

Adjusters with supervisory responsibilities averaged $13,000; some earned over $20,000 a year. Most public adjusters are paid a percentage of the amount of the loss adjustment—generally 10 percent. Adjusters may be furnished company cars or reimbursed for use of their own vehicles during business hours. Salaries of claim adjusters are above the average earnings for nonsupervisory workers in private industry, except farming.

Claim adjusting is not a desk job. It requires that a person be physically fit because much of the day may be spent in driving from one place to another, walking about outdoors, and climbing stairs. Adjusters may have to work evenings or weekends in order to interview witnesses and claimants when they are available. Since most companies provide 24-hour claim service to their policyholders, some adjusters always must be on call. (See the statement on the Insurance Industry for additional information on working conditions and employee benefits.)

Sources of Additional Information

Information about licensing requirements for claim adjusters may be obtained from the department of insurance in each State. General information about a career as a claim adjuster is available from the home offices of many property and liability insurance companies. Information about career opportunities as a claim adjuster also may be obtained from:

Insurance Information Institute, 110 William St., New York, N.Y. 10038.

Information about public insurance adjusting is available from:

National Association of public Adjusters, 1613 Munsey Building Baltimore, MD. 21202.

CLAIM EXAMINERS

(D.O.T. 168.288 and 249.268)

Nature of the Work

Although policyholders expect their insurance claims to be paid promptly, important questions often must be answered first. These

questions may arise when large settlements are made by property/liability company adjusters, when a false claim is suspected, or as regular procedure when a claim exceeds a specified amount. Claim examiners, also called claim representatives or claim reviewers, investigate details of the claim to provide answers for these questions.

Life insurance claim examiners may check claim applications for completeness and accuracy, interview medical specialists, consult policy files to verify information on a claim, or calculate benefit payments. They are authorized to investigate and approve payment on all claims up to a certain limit; larger claims are referred to a senior examiner.

In property/liability companies, the claim examiner reviews claims to be sure that the adjusters, who do most of the investigative work, have followed proper procedures. (See the statement on Claim Adjusters elsewhere in the *Handbook*.) Some property/liability firms employ workers to examine and settle small claims only, such as those arising over minor automobile damage. These claim workers, called "inside adjusters," contact claimants by telephone or mail and have the policyholder send repair costs, medical bills, and other statements to the company.

In both life and property/liability companies, some home office examiners process only unusual or questionable claims referred from regional or field offices.

Claim examiners need a thorough knowledge of their company's settlement procedures and basic policy provisions. Although they can consult company claim manuals, efficient examiners must be familiar with procedures so that frequent checking is unnecessary. Besides verifying claims and approving payment, claim examiners maintain records and prepare reports to be submitted to their company's data processing department.

Examiner discusses insurance claims with policyholder.

Examiners checking incorrect or questionable claims may correspond with investigating companies, field managers, agents, and policyholders. Claim examiners occasionally travel to obtain information by a personal interview, or contact State insurance departments and other insurance companies. Experienced examiners serve on committees, conduct surveys of claim practices within their company, and help devise more efficient ways to process claims. They also may appear in court to testify on contested claims.

Places of Employment

About 29,000 persons—half of them women—worked as claim examiners in 1972. Most worked for life insurance companies in large cities such as New York, Hartford, Chicago, San Francisco, and Dallas, where home or regional offices are located. Some were employed in field offices in smaller cities and towns where their companies sell and service insurance policies.

Training, Other Qualifications, and Advancement

Although many employers prefer college graduates for claim examiner positions, some firms accept applicants with good high school records if they have experience in clerical work or some college training. The employee who has only a high school education may begin as a claim processor in a group life or health insurance department. College graduates, or those having 2 years or more of college training, usually begin work as junior claim ex-

aminers. Although courses in insurance, economics, or other business subjects are helpful, a major in almost any college field is adequate preparation.

The beginning claim examiner is given on-the-job training under the direction of an experienced claim manager. Trainees who are college graduates also may receive instruction in insurance fundamentals or personnel management designed to prepare them for more responsible jobs. The Life Office Management Association (LOMA) cooperates with the International Claim Association in offering a claims education program for life and health insurance claim examiners. The program is part of the LOMA Institute Insurance Education Program leading to the professional designation of FLMI (Fellow, Life Management Institute) upon successful completion of eight written examinations. Most insurance companies encourage study by making educational materials available to employees enrolled in the LOMA Institute Program. Many firms offer classroom intruction in preparation for the annual examinations.

Because they have frequent contact with agents and brokers, field managers, and policyholders, claim examiners must be able to communicate effectively in many different situations. In addition, they need to be familiar with medical and legal terms and practices and Federal and State insurance laws and regulations. Because the claim examiner may have to check premium payments, policy values, and other numerical items in processing a claim, some skill in performing mathematical calculations is an asset. They also should have a good memory and enjoy working with details.

College trained workers usually can be promoted to claim examiner or senior claim representative after one year; workers who lack formal academic training generally advance more slowly. Examiners who show unusual competence in claim work sometimes are promoted to claim approver or another supervisory job within the claim department. Qualified examiners also can advance to jobs in underwriting, data processing, or administration.

Employment Outlook

Employment of claim examiners is not expected to increase through the mid-1980's. Some job openings will occur, however, as examiners die, retire, or transfer to other work. Competition for the few supervisory openings is expected to be keen.

Although the volume of insurance should continue to expand, computers will enable each examiner to process more claims, especially routine ones and those that arise under group life and health policies. In addition, as smaller branch offices are consolidated, companies will be able to handle the rapidly expanding volume of claims with a relatively stable work force.

Earnings and Working Conditions

College graduates hired by life insurance companies as claim examiner trainees averaged $8,000 a year in 1972, according to a Life Office Management Association survey. Supervisors of claims earned $11,500 to $17,300 a year. In most cases, examiners in large companies earned higher salaries.

An American Insurance Association/American Mutual Insurance Alliance survey of property/liability insurance companies showed that in 1972 "inside adjusters" averaged $7,500. Claim supervisors averaged $13,000; some earned over $20,000 a year. Salaries of claim examiners who are not supervisors are slightly above the average for all nonsupervisory workers in private industry, except farming.

Claim examiners have desk jobs that require no unusual physical activity. Although the average work week for examiners is 35 to 40 hours, they may work longer at times of peak claim load or when quarterly and annual statements are prepared. They also may need to travel occasionally. (See the statement on the Insurance Industry for additional information on working conditions and employee benefits.)

Sources of Additional Information

General information about a career as a claim examiner is available from the home office of many life insurance and property/liability insurance companies and also from:

Institute of Life Insurance, 277 Park Ave., New York, N.Y. 10017.

Insurance Information Institute 110 William St., New York, N.Y. 10038.

UNDERWRITERS

(D.O.T. 169.188)

Nature of the Work

Insurance companies assume millions of dollars in risks each year, by transferring chance of loss from their policyholders to themselves. Underwriters appraise and select the risks their company will insure. (The term underwriter sometimes is used in referring to insurance salespeople; see the statement on Insurance Agents and Brokers elsewhere in the

Handbook for a discussion of that occupation.)

An underwriter decides if his company will select a risk after analyzing information in insurance applications, reports of safety engineers, and actuarial studies (reports that describe the probability of insured loss). Some routine applications that require very little independent judgment are handled by computers. Generally, however, underwriters use considerable personal judgment in making decisions. Because these decisions are seldom reviewed at a higher level, the underwriter has great responsibility. His company may lose business to competitors if he appraises risks too conservatively or have to pay many future claims if his underwriting actions are too liberal.

When deciding that a policy is an acceptable risk, an underwriter may outline the terms of the contract, including the amount of the premium. Underwriters frequently correspond with policyholders, agents, and management about policy cancellations or information requests. In addition, they sometimes accompany salespeople on appointments with prospective customers. Some underwriters in small companies issue policies or supervise the sales force.

Most underwriters specialize in one of three major categories of insurance: life, property and liability, or health. Life underwriters may further specialize in one or more types of life insurance, such as group or individual policies. The property and liability underwriter specializes by type of risk insured, such as fire, automobile, marine, or workmen's compensation. Some underwriters, called commercial account underwriters, handle business insurance exclusively. They must evaluate a firm's entire operation in appraising its insurance application.

Underwriter discusses information on an insurance application.

A group insurance policy insures all persons in a specified group through a single contract. The group underwriter analyzes the overall composition of the group to be sure that total risk is not excessive. The duties of some group underwriters are similar to those of insurance salespeople, and include meeting with union or employer representatives to discuss the types of policies available to their groups.

Places of Employment

About 60,000 persons—most of them men—worked as insurance underwriters in 1972. Nearly three-fourths were property and liability underwriters working in field or home offices throughout the United States; most life insurance underwriters are in home offices in a few large cities, such as Hartford, New York City, Chicago, Dallas, and San Francisco.

Training, Other Qualifications, and Advancement

For beginning underwriting jobs, most insurance companies seek college graduates who have degrees in liberal arts or business administration, but a major in almost any field provides a good general background. Some high school graduates who begin as underwriting clerks may be trained as underwriters after they demonstrate an aptitude for the work.

College graduates usually start as trainees or junior underwriters. They study claim files to learn the factors associated with certain types of losses and carry out their work assignments under an experienced risk appraiser. Many supplement on-the-job training with courses and instruction at home office schools or local colleges and universities. Many firms pay tuition and the cost of books for those who satisfactorily complete underwriting courses. Some companies offer salary increases as an incentive. Several independent study programs are available through associations such as the American Institute for Property and Liability Underwriters, the American College for Life Underwriters, the Home Office Life Underwriters

Association and the Institute of Home Office Underwriters, and the Life Office Management Association.

Underwriting can be a satisfying career for a young man or woman who likes working with details and enjoys relating and evaluating facts. In addition to analyzing problems, underwriters must make prompt decisions and be able to communicate their ideas to others. They also must be imaginative and aggressive, especially when they have to get additional information from outside sources.

Experienced underwriters who complete study courses may advance to chief underwriter or underwriting manager. Some underwriting managers are promoted to senior managerial jobs after several years.

Employment Outlook

The employment of underwriters is expected to grow moderately through the mid-1980's as insurance sales continue to expand. Each year many jobs will become available as the occupation grows and as those who die, retire, or transfer to other work are replaced.

Several factors underlie the expected growth in the volume of insurance and the resulting need for underwriters. Higher personal incomes should stimulate purchases of life insurance, especially policies which provide retirement income and money for children's education. Property and liability insurance sales should expand as purchases of automobiles, pleasure boats, and other consumer durables increase. Both spending for new home construction and the American public's growing security consciousness should contribute to demand for more extensive insurance protection. Expanding businesses will need protection for new plants and equipment and insurance for workmen's compensation and product liability. Heightened competition among insurance companies and changes in regulations affecting investment profits also are expected to increase the insurance industry's need for competent underwriters.

Earnings and Working Conditions

College graduates hired as underwriter trainees averaged $8,140 a year in 1972, according to a Life Office Management Association (LOMA) survey of 55 U.S. companies. Senior underwriters (those with 5 years' experience) earned $10,000 to $15,000 in 1972; supervisors of underwriting in life insurance companies averaged $13,000 to $20,000. In most cases, underwriters in larger companies earned higher salaries. Salary ranges also were higher in the Eastern and Central states, slightly lower in the West, and substantially lower in the South.

An American Insurance Association/American Mutual Insurance Alliance survey of companies that sell property and liability insurance showed that experienced underwriters averaged $10,000 a year in 1972. Earnings varied by underwriting specialty; ocean marine underwriters earned the highest and personal line underwriters the lowest annual salaries. Experienced underwriters earn nearly twice the average earnings of nonsupervisory workers in private industry, except farming. Underwriting supervisors in property and liability companies averaged $13,400 a year in 1972; many earned over $16,000.

Most underwriters have desk jobs that require no unusual physical activity. Although the average week is 35 to 40 hours, underwriters sometimes work overtime. Most insurance companies have liberal vacation policies and other employee benefits. (See the statement on the Insurance Industry for additional information on working conditions and employee benefits.)

Sources of Additional Information

General information about a career as an insurance underwriter is available from the home offices of many life insurance and property and liability insurance companies. Information about career opportunities as an underwriter also may be obtained from:

Institute of Life Insurance, 277 Park Ave., New York, N.Y. 10017.

Insurance Information Institute, 110 William St., New York, N.Y. 10038.

American Mutual Insurance Alliance, 20 North Wacker Dr., Chicago, Ill. 60606.

ADMINISTRATIVE AND RELATED OCCUPATIONS

Most administrative workers are professional office employees who run, or help run, business and other organizations. Some are managers, who supervise, plan operations, and make company policy. Others provide assistance to management, such as personnel workers who recruit and hire staff members and handle employee problems. The success or failure of an organization depends heavily on the way administrative workers do their jobs.

Nearly all administrative jobs require a college degree, although employers vary in the specific area of study they prefer. Some seek business administration or liberal arts graduates; others want a background in a technical area such as engineering or science.

Many administrative workers solve problems and make decisions, using numbers and technical data. In addition, these workers must be tactful and able to get along with others. They must be able to handle the uneven flow of work in offices.

This section describes several administrative occupations including **city managers, Accountants, Credit Officials, and Personnel workers.**

ACCOUNTANTS

(D.O.T. 160.188)

Nature of the Work

Managers must have up-to-date financial information to make important decisions. Accountants prepare and analyze financial reports that furnish this kind of information.

Three major accounting fields are public, management, and government accounting. Public accountants are independent practitioners or employees of accounting firms. Management accountants, often called industrial or private accountants, handle the financial records of their firms. Government accountants examine the records of government agencies and audit private businesses and individuals whose dealings are subject to government regulations.

Accountants often specialize in areas such as auditing, taxes, or budgeting and control. Many public accountants specialize in auditing (reviewing a client's financial records and reports to judge their reliability). Others advise clients on tax matters and other financial and accounting problems. Management accountants provide the financial information that executives need to make intelligent business decisions. They may specialize in taxes, budgeting, investments, or internal auditing (examining and appraising their firms' financial systems and management control procedures). Many accountants in the Federal Government work as Internal Revenue agents, investigators, and bank examiners; other government accountants have regular accounting positions.

Places of Employment

More than 700,000 people worked as accountants in 1972; about 20 percent were Certified Public Accountants (CPA's). About 3 percent of the CPA's and 22 percent of all accountants are women.

More than 60 percent of all accountants do management accounting work. An additional 20 percent

Accountant discusses client's financial records.

are engaged in public accounting as proprietors, partners, or employees of independent accounting firms. Other accountants work for Federal, State and local government agencies, and a small number teach in colleges and universities.

Accountants are found wherever business, industrial, or government organizations are located. Most, however, work in large urban areas where many public accounting firms and central offices of large businesses are concentrated.

Training, Other Qualifications, and Advancement

Training in accounting is available at colleges and universities, accounting and business schools, and correspondence schools. Although many graduates of business and correspondence schools are successful in small accounting firms, most large public accounting and business firms require applicants to have at least a bachelor's degree in accounting or a closely related field. Many employers prefer those with the master's degree in accounting. For beginning accounting positions, the Federal Government requires 4 years of college training (including 24 semester hours in accounting or related subjects) or an equivalent combination of education and experience. For teaching positions, most colleges and universities require the master's degree or the doctorate with the Certified Public Accountancy Certificate.

Previous work experience in accounting can help an applicant get a job. Many colleges offer students an opportunity to gain experience through internship programs conducted by public accounting or business firms.

Anyone working as a "certified public accountant" must hold a certificate issued by the State board of accountancy. All states use the CPA examination, administered by the American Institute of Certified Public Accountants, to establish certification. Although only half the States require CPA candidates to be college graduates, most successful candidates have college degrees. Nearly all States require applicants to have at least 2 years of public accounting experience for a CPA certificate.

Requirements vary, but more than half the States restrict the title "public accountant" to those who are licensed or registered. Information on requirements may be obtained directly from individual State boards of accountancy or from the National Society of Public Accountants.

People planning a career in accounting should have an aptitude for mathematics. Neatness and accuracy also are necessary. Employers seek applicants who handle responsibility and work with little supervision.

Accountants who want to get to the top in their profession usually must continue their study of accounting even though they already have college degrees or CPA certificates. They may take part in seminars sponsored by various professional associations or take courses offered by their employers. An increasing number of accountants study computer operation and programming to adapt accounting procedures to new data processing methods. Although capable accountants may advance rapidly, those having inadequate academic preparation are likely to be assigned routine jobs and may find promotions difficult to obtain.

Junior public accountants usually start by assisting with auditing work for several clients. They may advance to intermediate positions with more responsibility in 1 or 2 years and to senior positions within another few years. In larger firms, those who deal successfully with top industry executives often become supervisors, managers, or partners, or transfer to executive positions in private firms. Some open their own public accounting offices.

Beginning management accountants often start as ledger accountants, junior internal auditors, or as trainees for technical accounting positions. They may advance to jobs such as chief plant accountant, chief cost accountant, budget director, senior internal auditor, or manager of internal auditing. Some become controllers, treasurers, financial vice-presidents, or corporation presidents. In the Federal Government, beginners are hired as trainees and usually promoted in a year or so. In college and university teaching, those having minimum training and experience may receive the rank of instructor without tenure; advancement and permanent faculty status depend upon further education and teaching experience.

Employment Outlook

Employment of accountants is expected to increase rapidly through the mid-1980's as businesses and government agencies continue to expand in size and complexity. Thousands of additional openings will occur as employees die, retire, or leave their jobs to seek other work.

Greater use of accounting information in business management, changing tax systems, and growth of large corporations that must provide financial reports to stockholders, all point to excellent opportunities for accountants. Because of the growing complexity of business accounting requirements, accountants with college degrees will be in stronger demand than those who lack this training. In addition, the trend toward specialization will

create opportunities for people trained in a specific phase of accounting.

As data processing systems continue to replace manual preparation of accounting records and statements, the need for some lower level accountants may be reduced or eliminated. On the other hand, many highly-trained accountants will be required to prepare, administer, and analyze the information made available by these systems.

Earnings and Working Conditions

Starting salaries of beginning accountants in private industry were $9,100 a year in 1972, according to a Bureau of Labor Statistics survey in urban areas. Earnings of experienced accountants ranged between $11,900 and $17,400, depending on their level of responsibility and the complexity of the accounting system. In general, experienced accountants earn about twice as much as average earnings of all nonsupervisory workers in private industry, except farming. Chief accountants who direct the accounting program of a company or one of its establishments earned between $15,300 and $26,500, depending upon the scope of their authority and size of professional staff.

According to the same survey, beginning auditors averaged $9,600 a year, while experienced auditors' earnings ranged between $12,900 and $15,900.

Salaries generally are somewhat higher for accountants holding a graduate degree or a CPA certificate. Earnings also are higher for those who are required to travel a great deal.

In the Federal Civil Service the entrance salary for junior accountants and auditors was about $7,700 in early 1973. Candidates who had superior academic records received a starting salary of about $9,500. Some auditors began at about $10,300. Experienced accountants in the Federal Government averaged about $20,000 a year. Those with administrative responsibilities earned more.

Accountants often work very long hours under heavy pressure during the tax season and some travel extensively. The majority, however, remain in one office and work between 35 and 40 hours a week, under the same general conditions as fellow office workers.

Sources of Additional Information

Information about CPA's and aptitude tests given in many high schools, colleges, and public accounting firms may be obtained from:

American Institute of Certified Public Accountants, 666 Fifth Ave., New York, N.Y. 10019.

Further information on specialized fields of accounting is available from:

National Association of Accountants, 919 Third Ave., New York, N.Y. 10022.

National Society of Public Accountants, 1717 Pennsylvania Ave., NW., Washington, D.C. 20006.

ADVERTISING WORKERS

(D.O.T. 050.088, 132.088, 141.081 and .168, 162.158, and 164.068 through .168)

Nature of the Work

Through advertisements, businesses try to reach potential customers and persuade them to buy their products or services. Advertising workers are employed in many industries to plan and prepare ads. To get advertisements before the public, copywriters write texts; artists prepare illustrations; administrative and technical workers reproduce "ads"; and salesmen sell advertising space and time for publications, radio, and television. In some small advertising organizations, one person handles all these tasks; large organizations, however, may employ research, copywriting, and other specialists. The following specialties commonly are found in advertising work.

Advertising managers direct a firm's advertising program. They decide policy questions such as the type of advertising, the advertising budget, and the agency to employ. The advertising manager and agency work together to plan the program and carry it through. They also may supervise the preparation of special sales brochures, display cards, and other promotional materials. Advertising managers of newspapers, radio stations, or other advertising media are responsible for selling advertising time or space. Their work is similar to that of sales managers in other businesses.

Account executives work in advertising agencies to handle relations between the agency and its clients. An account executive studies the client's sales and advertising problems, develops a plan to meet the client's needs, and seeks his approval of the proposed program. Account executives must be able to sell ideas and maintain good relations with clients. They must also know how to write copy and use artwork, even though copywriters and artists usually carry out their ideas and suggestions. Some advertising agencies have account supervisors who oversee the work of the account executives. In others, account executives are responsible directly to agency heads.

Research directors and their assistants assemble and analyze information for advertising programs. They study possible uses of a product, its advantages and disadvantages compared to competing products, and ways of reaching potential buyers. These workers may survey buying habits and motives of customers, or try out sample advertisements to find the best selling theme or media. (See the statement on Marketing Research Workers for more information on this occupation.)

Advertising copywriters create the headlines, slogans, and text that attract buyers. They collect information about products and potential customers. Copywriters use a knowledge of psychology and writing to prepare copy especially suited for the particular readers or listeners sought as buyers and for the advertising medium used. They may specialize in a type of copy that appeals to certain groups—housewives, businessmen, scientists, engineers—or that deals with a class of items such as packaged goods or industrial products. In advertising agencies, copywriters work closely with account executives, although they may also be under the supervision of a copy chief.

Artists and layout workers plan and create visual effects in advertisements. (See the statements on Commercial Artists and Photographers elsewhere in the *Handbook* for more information on these occupations.)

Advertisers and advertising agencies employ *media directors* (or *space buyers* and *time buyers*) to negotiate contracts for advertising space or time. They determine where and when advertising should be carried to reach the largest group of prospective buyers at the least cost. They must know the advertising costs in different media and the characteristics of the audience reached in various parts of the country by specific publications, broadcasting stations, and other media.

Production managers and their assistants arrange to have the copy and art work converted into print. They deal with printing, engraving, filming, recording, and other firms involved in the reproduction of advertisements. The production manager needs a thorough knowledge of printing, photography, paper and inks, and related technical materials and processes.

Places of Employment

In 1972, about 150,000 people worked in jobs that require considerable knowledge of advertising. More than one-third were employed in advertising agencies, largely concentrated in New York City and Chicago.

These workers also are employed by organizations having products or services to sell, like manufacturing companies and stores; by advertising media, such as newspapers and magazines; and by firms providing services to advertisers, including printers, engravers, art studios, and product and package designers.

Training, Other Qualifications, and Advancement

Most employers prefer college graduates having liberal arts training or majors in advertising, marketing, journalism, or business administration. However, no typical educational background is equated with success in advertising. Experience in copywriting, work on school publications, or summer jobs with marketing research services are helpful.

Some large advertising organizations recruit outstanding college graduates and train them through programs that cover all aspects of advertising work. Some beginners start as assistants in research or production work or as space or time buyers. A few begin as junior copywriters.

Most advertising jobs require a flair for language, both spoken and written. Because every assignment requires specialized handling, an ability for problem-solving also is important. Advertising workers should be interested in people and things; they also need tact to help them sell their ideas to superiors, advertisers, and the public. They must also be able to accept criticism and work as part of a team.

Copywriters and account executives may advance to managerial jobs or more responsible work in their own specialties, if they demonstrate ability in dealing with clients. Some top-flight copywriters and account executives establish their own agencies.

Employment Outlook

Employment of advertising workers is expected to increase moderately through the mid-1980's, as the volume of consumer goods and

competition among manufacturers increase. Although opportunities should be favorable for highly qualified applicants, those seeking entry jobs will face stiff competition. Most openings will result from the need to replace those who retire, die, or leave the occupation for other reasons.

Earnings and Working Conditions

According to the limited information available, annual starting salaries for beginning advertising workers with bachelor's degrees ranged from $6,500 to $10,000 in 1972 and from $11,000 to $13,000 for those with master's degrees. The higher starting salaries usually were paid by very large firms to outstanding college graduates.

Salaries of experienced advertising workers employed by advertising agencies varied by size of firm and type of job. For example, account executives' salaries averaged $18,000 to $22,000 a year; media directors, $10,000 to $16,000, according to limited information.

Advertising workers frequently work under great pressure. Working hours sometimes are irregular because of deadlines and last minute changes. People in creative jobs often work evenings and weekends to finish important assignments.

Advertising may be a satisfying career for those who enjoy variety, excitement, creative challenges, and competition. Advertising workers experience the satisfaction of having their work in print, on television, or on radio, even though they remain unknown to the public at large.

Sources of Additional Information

Information on advertising agencies and the careers they offer may be obtained from:

American Association of Advertising Agencies, 200 Park Ave., New York, N.Y. 10017.

Association of Industrial Advertisers, 41 East 42nd Street, New York, N.Y. 10017.

A list of schools providing training in advertising may be obtained from:

American Advertising Federation, 1225 Connecticut Ave., NW., Washington, D.C. 20036.

CITY MANAGERS

(D.O.T. 188.118)

Nature of the Work

Population growth and industrial expansion place increasing pressure on housing, transportation, and other facilities of cities. Problems associated with growing modern communities, such as air and water pollution and rising crime rates, also demand attention. To cope effectively with these problems, sophisticated management techniques are required. Consequently, many communities hire a specialist who has these skills—the city manager.

A city manager is responsible to the community's elected officials who appoint him. Although duties vary by city size, city managers generally coordinate and administer activities of operating departments, such as tax collection and disbursement, law enforcement, and public works; hire department heads and their staffs; and prepare the annual budget to be approved by elected officials. They also study current problems, such as unionization of government employees or urban renewal, and report their findings to the elected council.

City managers must plan for future growth and development of cities and surrounding areas. To provide for an expansion of public ser-

City manager discusses urban renewal project with staff.

vices, they frequently appear at civic meetings to advocate certain programs or to inform citizens of current government operations.

City managers work closely with planning departments to coordinate new and existing programs. In smaller cities that have no permanent planning staff, coordination may be assumed entirely by the manager.

Many cities employ assistant city managers, department head assistants, and administrative assistants to aid city managers. Under his direction, they administer programs, prepare reports, receive visitors, answer correspondence, and generally help to keep the city functioning smoothly. Assistant city managers organize and coordinate city programs, supervise city employees, and act for the city manager when he is absent. They also may assume responsibility for some projects, such as the development of a preliminary annual budget. Department head assistants generally are responsible for one activity, such as personnel, finance, or law, but also may assist in other areas. Administrative assistants, also called executive assistants or assistants to the city manager, usually do administrative and staff work in all departments under the city manager. For instance, they may compile operating statistics, or review and analyze work procedures.

Places of Employment

About 2,500 city managers, nearly all of them men, were employed in 1972. In addition, several thousand persons worked as administrative assistants, department head assistants, and assistant city managers. About nine out of ten city managers worked for cities and counties having a council-manager form of government. Most of the remainder worked in municipalities having other forms of government, such as mayor-council government in which the mayor appoints the city manager as his "administrative assistant" or "chief administrative officer." A few city managers also worked for metropolitan or regional planning organizations and councils of governments.

Although four-fifths of all city managers work for small cities with populations less than 25,000, most larger cities also employ a city manager. About half of the cities with populations between 10,000 and 500,000 have city managers. City managers work in all States except Hawaii and Indiana, but one-half are concentrated in Eastern United States.

Training, Other Qualifications, and Advancement

A bachelor's degree, preferably with a major in political science or public administration, is the minimum educational background needed to become a city manager. However, a master's degree in public or municipal administration is preferred.

In 1972, about 90 colleges and universities offered graduate degree programs in public or municipal administration. Degree requirements in some schools include successful completion of an internship program in a city manager's office. During this internship period, which may last from 6 months to a year, the degree candidate observes local government operations and does research under the direct supervision of the city manager.

Most new graduates work as administrative assistants to city managers for several years and gain experience in solving urban problems, coordinating public services, and management techniques. Others work in an area of government operations such as finance, public works, or public planning. They may acquire supervisory skills and additional experience by working as assistant city manager or department head assistant in operations. City managers first are employed in small cities, but during their careers, they usually work in several cities of increasing size to gain experience.

Young persons who plan a career in city management should like to work with detail and as part of a team. They must have sound judgment, self-confidence, and be able to perform well under stress. To handle emergency situations, city managers must quickly isolate problems, identify their causes, and provide alternate solutions. City managers should be tactful and able to communicate with and work well with people.

City managers also must be dedicated to public service since they often put in long hard hours in times of crises.

Employment Outlook

This small occupation is expected to grow very rapidly as problems of our growing cities become complex. Examples of this complexity are computerized data collection of police information, advances in technology of traffic control, and the application of systems analysis to urban problems. The demand for city managers also will increase as cities convert to the council-manager form of government, currently the fastest growing form of city government. Furthermore, city managers will be needed in places having other forms of government to help elected officials cope with day-to-day operations of government.

Persons who seek beginning city management jobs as administrative assistants, department head assistants, or assistant city managers may

face competition through the mid-1980's, especially if they do not have a graduate degree in public administration or related management experience. Competition should be keen among the growing number of administrative assistants, department head assistants, and assistant city managers for the relatively few city manager positions.

Earnings and Working Conditions

Salaries of city managers and their assistants vary according to their education and experience as well as job responsibility and size of city. Generally, city manager's earnings are very high relative to the average earnings for nonsupervisory workers in private industry, except farming. In 1972, annual salaries of city managers ranged from about $12,000 in cities of 5,000 to more than $35,000 in cities of more than 250,000, according to the International City Management Association. In cities of 10,000 or more, seven out of ten city managers were paid at least $20,000. City managers in cities not having council-manager governments received slightly less.

Salaries of assistant city managers and department head assistants ranged from about $10,000 in small cities to more than $25,000 in large ones. They were generally paid about three-fourths the salaries paid city managers. Administrative assistant salaries typically ranged from $8,500 to $10,000, annually.

City managers often work more than 40 hours a week. Emergency problems may require evening and weekend work and meetings with individuals and citizen's groups consume additional time.

Fringe benefits usually include health and life insurance programs, pension plans, sick leave, vacation time, and often a car for official business. Managers generally are reimbursed for expenses incurred while attending professional meetings and seminars.

Sources of Additional Information

International City Management Association, 1140 Connecticut Ave. NW., Washington, D.C. 20036.

COLLEGE STUDENT PERSONNEL WORKERS

(D.O.T. 045.108, 090.118, 090.168, 129.108 and 166.168)

Nature of the Work

A student's choice of a particular institution of higher education for further study is influenced by many factors. Availability of a specific educational program, quality of the school, and cost, as well as proximity to home, may all play important roles.

For many students, an equally important standard is the institution's ability to provide for their housing, social, cultural, and recreational needs. Development and administration of the latter services, and of similar programs serving students' well-being in addition to their educational needs, provide a wide variety of jobs for college student personnel workers. The admissions officer, registrar, the dean of students, and the career planning and placement counselor are probably the best known among these. Some other types of workers that may make up this broad occupational field are student activities and college union personnel, student housing officers, counselors in the college counseling center, financial aid officers and foreign student advisors.

Titles of student personnel workers vary from institution to in-

stitution and from program to program within a single school. Titles also vary with the level of responsibility within a certain student personnel program. The more common titles include dean, director, officer, associate dean, assistant director, and counselor,

The *dean of students*, or the vice president for student affairs, heads the student personnel program at a school. Among his duties, he evaluates the changing needs of the students and helps the president of the college develop institutional policies. The dean of students generally coordinates a staff of associate or assistant deans; these are in charge of the specific programs that deal directly with the students.

At some schools, the admissions office and the records office are separate. *Admissions Counselors* interview and evaluate prospective students and process their applications. They may travel extensively to recruit high school, junior college and older students and to acquaint them with opportunities available at their College. They work closely with faculty, administrators, financial aid personnel and public relations staff to determine policies for recruiting and admitting students. Personnel in the office of the *registrar* maintain the academic records of students, and provide current enrollment statistics for communication both within the college and between the college and the community.

Student financial aid personnel assist students in obtaining financial support to pay for their education. Workers in this field must keep well informed about sources of financial aid, funding, and about management of all forms of financial aid—scholarships, grants, loans, student employment, fellowships, teaching and research assistantships. They work closely with administrators, the admissions, counseling, business, and academic office staffs.

Career planning and placement counselors, sometimes called college placement officers, assist students in making long-range career selections and may also help students get part-time and summer jobs. On many campuses, they arrange for prospective employers to visit the school to discuss their firm's personnel needs and to interview applicants. (For further information on this field, see statement on College Career Planning and Placement Counselors).

The student personnel staff in charge of *student activities* work with members of proposed and established student organizations, especially with student government. They help the student groups to plan, implement, and evaluate their activities. Often, the student activities staff will assist in the orientation of new students.

College union staff members work with students to provide intellectual, cultural, and recreational programs. Many college union staff members are responsible for directing the operation of the physical facilities and services of the building, such as food and recreational services, building maintenance, fiscal planning, conference facilities, and employee supervision.

Student housing officers sometimes live in the dormitories and, in general, help the students to live together in harmony. They may serve as counselors to individual students with personal problems. Housing officers also may be involved in managing the fiscal, food service, and housekeeping operation of student residences.

Counselors help students with personal, educational, and vocational problems. Students may come to the counselors on their own or be referred by a faculty member, a residence hall counselor, or a friend. Topics of discussions may include lack of self-confidence or motivation on the part of the student, failure in academic work, desire to leave college or transfer to another college, inability to get along with others, loneliness, drug abuse, or marriage problems. In addition, there is a growing trend for counselors to try to reach more students by establishing group sensitivity sessions and telephone "hotlines". Counselors often administer tests that indicate aptitudes and interests to students having trouble understanding themselves. Some also teach in the college or assist with admissions, orientation and training of residence hall staff. (For further information on this field, see statement on Psychologists.)

Foreign student advisers administer and coordinate many of the services which are crucial in insuring a successful academic and social experience for students from other countries. They usually assist with foreign student admissions, orientation, financial aid, housing, English as a foreign language, academic and personal advising, student-community relationships, placement, and alumni relations. In addition they may be an adviser for international associations and nationality groups and for United States students interested in study, educational travel, work, or service projects abroad.

Places of Employment

An estimated 35,000 to 40,000 college student personnel workers, roughly one-third of them women, were employed in 1972. Every college and university, whether a two-year or a four-year school, has a staff performing student personnel functions. They are not always organized as a unified program. Large colleges and universities generally

have specialized staffs for each personnel function. However, in many small colleges the entire student personnel program may be carried out by just a few persons.

Training, Other Qualifications, and Advancement

Because of the diversity in duties, the education and backgrounds of college student personnel workers vary considerably. A bachelor's degree is the minimum requirement; however, for some student personnel programs it is necessary to have a master's degree, and others in the field have doctoral degrees.

In 1972, more than 100 colleges and universities offered graduate programs in student personnel work. However, many employers prefer instead a graduate degree in a specific academic field added to some courses in student personnel work. A master's degree in clinical or counseling psychology is usually required for work as a college counselor. This degree also is helpful in other student personnel fields such as career planning and placement. Business administration also is helpful, especially for those who wish to go into the admissions, records, college union, financial aid, or student housing fields. Familiarity with data processing is an asset especially for work in admissions, records, or financial aid. Social science and recreation degrees also are useful, as is work experience in business, government, or educational associations. The majority, however, have degrees in education or the social sciences.

College student personnel workers must be interested in, and able to work with, people of all backgrounds and ages. They must have the patience to cope with conflicting viewpoints of students, faculty, and parents. People in this field often deal with the unexpected and the unusual, therefore emotional stability and the ability to function while under pressure are necessities.

Entry-level positions are usually those of student activities advisors, admissions counselors, financial aid counselors, residence hall directors, and assistants to deans. Persons without graduate degrees may find advancement opportunities limited. A doctorate is usually necessary for the top student personnel positions.

Employment Outlook

Employment of college student personnel workers is likely to remain relatively stable through the mid-1970's. Tightening budgets, in both public and private colleges and universities, is the chief factor underlying this expected stability in employment. Student personnel positions least likely to be affected if some reduction in number becomes necessary are those most closely tied to the academic function of the school—admissions, financial aid, records, and counseling. The number of graduate programs in student personnel is continuing to grow as is the number of graduates, a situation which the National Association of Student Personnel Administrators feels could result in competition for jobs in this field. Over the short run, until colleges and universities resolve their financial difficulties, most openings each year will result from the need to replace personnel who transfer to other positions, retire, or leave the field for other reasons.

After the mid-1970's, however, employment of student personnel workers is expected to increase as colleges provide more services for students, especially the growing number from low-income and minority families who often require special counseling and assistance. The increasing number of college students, particularly in junior and community colleges, is a factor which also could contribute to some growth in the student personnel occupations, especially if financial problems should ease. Two-year public colleges, for the most part, have less serious financial problems because, unlike most four-year colleges, their enrollments are growing and their operating costs are moderate.

Earnings and Working Conditions

Median salaries of *chief student affairs officers* ranged from $11,900 in small non-public colleges to $26,000 in large public universities in 1972, according to a National Education Association survey of public and private colleges and universities. Median salaries of *deans of admissions* ranged from $11,062 to $19,400; for *registrars,* from $8,130 to $17,725. *Directors of student testing and counseling* had median salaries of $9,900 to $19,800. The median salaries of the other student personnel workers were somewhat lower.

College student personnel workers frequently work more than a 40-hour week; often irregular hours and overtime work are necessary. Employment in these occupations is usually on a 12-month basis. In many schools, they are entitled to retirement, group medical and life insurance, sabbatical and other benefits.

Sources of Additional Information

A pamphlet, *Careers in Higher Education*, is available from:

The American Personnel and Guidance Association, 1607 New Hampshire Ave. NW., Washington, D.C. 20009.

CREDIT OFFICIALS

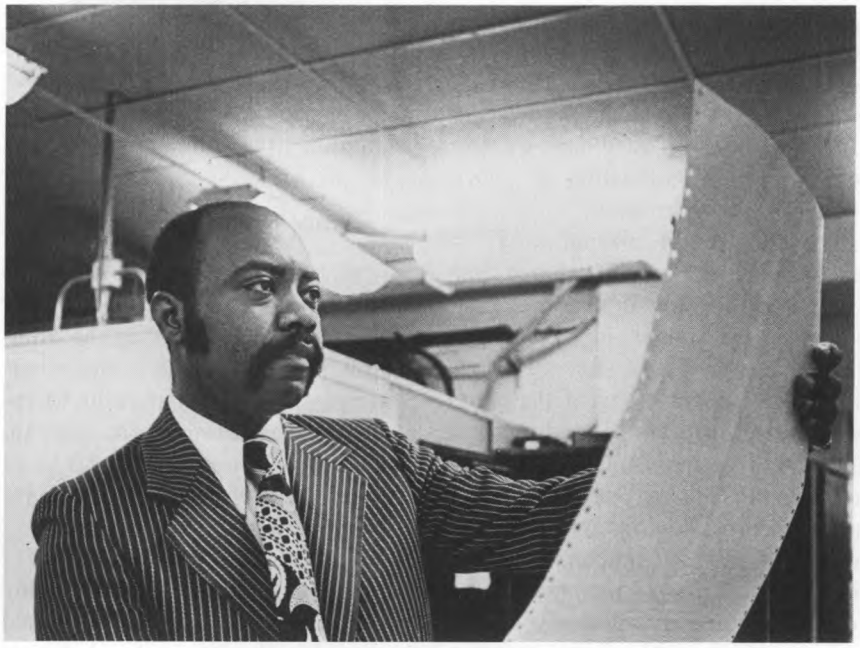
(D.O.T. 168.168 and 186.288)

Nature of the Work

Many daily activities of businesses and individuals depend upon receiving goods and services on credit or obtaining cash loans. In most forms of credit granting, a credit official makes the decision to accept or reject the application. These workers include *credit managers,* who authorize customer purchases when payment is promised at a later date, and *loan officers,* who approve cash loans by financial institutions.

In extending credit to a business (commercial credit), the credit official analyzes detailed financial reports submitted by the applicant, interviews a company representative about its management, and reviews credit agency reports to determine the firm's reputation for repaying debts. He also checks at banks where the company has deposits or previously was granted credit. In extending credit to individuals (consumer credit), detailed financial reports usually are not available. The credit official must rely more on personal interviews, credit bureaus, and banks to provide information about the person applying for credit.

Loan officers in many large banks make decisions based on their analysis of reports submitted by credit analysts. Officers may specialize in handling certain types of credit, such as installment loans, commercial loans, real estate mortgages, and agricultural loans. In smaller financial institutions, such as branch banks and consumer finance companies, the loan officer (who sometimes is the manager of the firm) may do all the work of granting loans himself. He may interview applicants, analyze the information gained in the interview, and make the final lending decision.



Credit manager reviews previous credit transactions from computer printout.

Credit managers in retail and wholesale trade usually cooperate with the sales department in developing credit policies liberal enough to allow the company's sales to increase and yet strict enough to deny credit to customers whose ability to pay their debts is questionable.

A credit manager frequently must contact a customer who is unable or refuses to repay his debt. He does this though writing, telephoning, or personal contact. If these attempts at collection fail, the credit manager may refer the account to a collection agency or assign an attorney to take legal action. Some credit managers supervise workers who gather information, analyze facts, and perform general office duties in a credit department; they include *investigation clerks, application clerks, credit authorizers, information clerks, credit collectors, adjustment clerks, bookkeepers,* and *secretaries.*

Places of Employment

More than 110,000 credit officials were employed in 1972; most were men. About 75,000 were credit managers working in wholesale and retail stores, in manufacturing firms, and for services that process a company's credit operations. Loan officers working in banks and other financial institutions numbered about 40,000. In addition, some other bank officers, general managers, and office managers spend part of their time supervising the granting of credit within their companies.

Although goods and services are sold on credit, and cash loans granted, throughout the United States, most credit officials work in urban areas where many financial and business establishments are located.

Training, Other Qualifications, and Advancement

A college degree is becoming increasingly important for entry level jobs as credit officials. Employers usually seek persons who have majored in business administration,

economics, or accounting, but may instead hire graduates holding liberal arts degrees. Some employers promote high school graduates to credit official positions if they have experience in credit collection or processing credit information.

The new credit official may be hired as a management trainee and work under the guidance of more experienced personnel in the credit department. Here he gains a thorough understanding of the company's credit procedures and policies and learns various sources of credit information. He may analyze previous credit transactions to learn how to recognize which applicants should prove to be good customers. The trainee also learns to deal with credit bureaus, banks, and other businesses that can provide information on the past credit dealings of their customers.

Many formal training programs are available through the educational branches of the associations that serve the credit and finance field. This training includes home study, college and university programs, and special instruction to improve beginners' skills and keep experienced credit officials aware of new developments in their field. Many banks will pay tuition for loan officers who take courses in credit and finance at colleges and universities.

A person interested in a career as a credit official should be able to analyze detailed information and draw valid conclusions based on this analysis. Because it is necessary to maintain good customer relationships, a pleasant personality and the ability to speak and write effectively also are characteristics of the successful credit official.

The work performed by credit officials allows them to become familiar with almost every phase of their respective businesses. Highly qualified and experienced officials can advance to top-level executive positions. However, in small and medium-sized companies, such opportunities are limited.

Employment Outlook

Employment of credit officials is expected to increase rapidly through the mid-1980's as the number of individual credit transactions continues to grow. In addition to opportunities resulting from growth, many jobs will open each year from the need to replace those who leave the occupation.

Although the increasing use of computers for storing and retrieving information will allow individual credit officials to serve more customers, this should not slow the growth of the occupation. As companies handle greater numbers of credit transactions, the credit official will spend more time managing and supervising the credit handling process in his firm. Moreover, many duties of credit officials, such as customer counseling and interviewing applicants, demand the tact and good judgment only personal contact can provide.

In addition, attractive credit terms are a major tool for increasing the sales volume of almost any business. As firms strive to maximize their sales, in the face of competition, there will be a greater demand for skilled credit officials who can establish credit policies strict enough to minimize bad debt losses.

Earnings and Working Conditions

In 1972, beginning credit officials earned annual salaries that ranged from about $7,500 to just over $10,000, depending on the type of credit granting performed and the geographic location of the job. Bank officers hired as trainees earned annual starting salaries of about $8,500. The Nation's largest banks and major business firms, however, may offer slightly higher salaries to entry level credit officials.

As credit officials gain experience and reach middle management positions, their earnings usually range from $10,000 to $20,000 a year; with the largest employers, earnings may be as high as $25,000 or more. Some individuals in top-level positions earned salaries well over $40,000 a year.

According to a Bank Administration Institute survey conducted in May of 1971, salaries of loan officers were generally highest in the Northeast and Middle Atlantic regions and lower in the South.

Credit officials normally work the standard workweek of their company—35-40 hours. Some work longer hours, particularly in retail trade where a seasonal increase in credit sales can produce a greater work volume.

Sources of Additional Information

General information about the field of consumer credit, including career opportunities, is available from:

The National Consumer Finance Association, 1000 16th St. NW., Washington, D.C. 20036.

Specific information about training programs available in consumer credit may be obtained from:

Society of Certified Consumer Credit Executives, 7405 University Dr., St. Louis, Mo. 63130.

For information about training programs available in commercial credit write:

Credit Research Foundation, 3000 Marcus Ave., Lake Success, N.Y. 11040.

HOTEL MANAGERS AND ASSISTANTS

(D.O.T. 163.118 and 187.118 and .168)

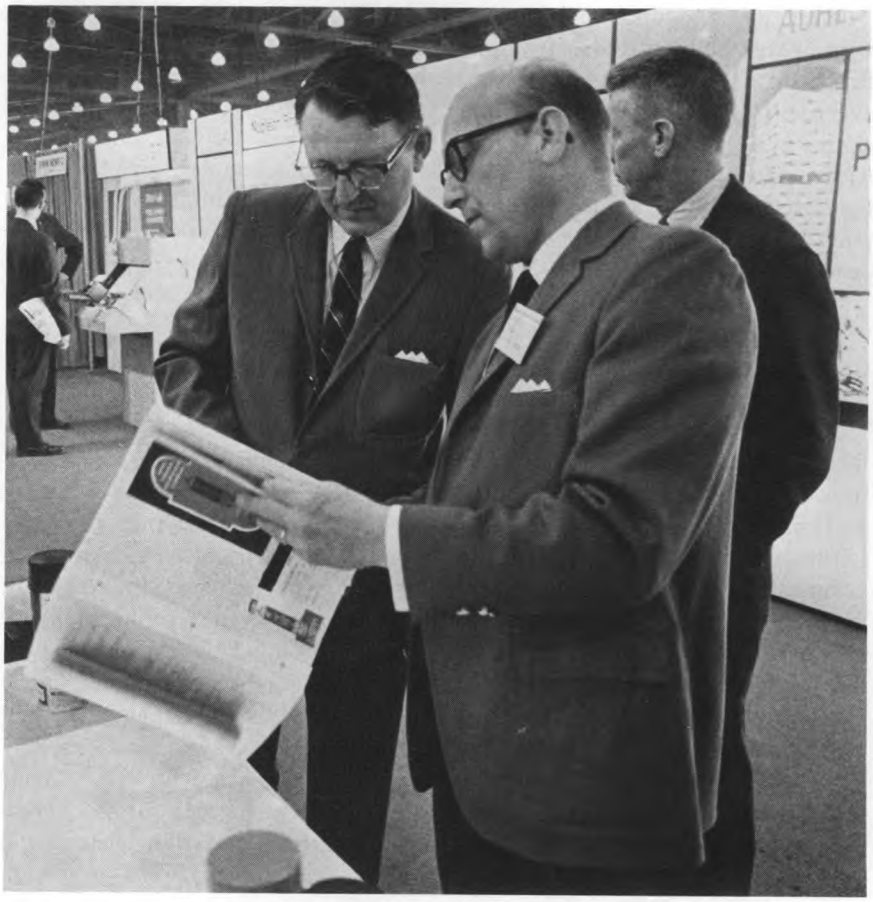
Nature of the Work

Hotel managers are responsible for profitably operating their establishments and providing maximum comfort for their guests. More than 110,000 managers worked in hotels and motels in 1972; 40,000 of these were self-employed. Managers direct and coordinate the activities of the front office, kitchen, and dining rooms; and various hotel departments including housekeeping, accounting, personnel, and maintenance. They determine room rates, establish credit policy, and have final responsibility for solving the many problems that arise in operating their hotels. Like other business managers, they may confer with business and social groups and participate in community affairs.

In small hotels, the manager also may do much of the front office clerical work. In the smallest hotels and in many motels, the owners—sometimes a family team—completely run the business.

The general manager of a large hotel may have several assistants who manage departments and assume general administrative responsibilities when he is absent. Because preparing and serving food is important in the operation of most large hotels, a special manager usually is in charge of this department. Managers of large hotels usually employ a sales manager to advertise hotel facilities for meetings, banquets, and conventions.

Since large hotel chains often centralize activities such as purchasing and planning employee training programs, managers in these hotels may have a smaller range of duties than those in independently owned establishments. Hotel chains may assign managers to organize either a newly acquired hotel, or to establish hotels in different cities or in foreign countries.



Hotel manager makes final arrangements for a convention.

Training, Other Qualifications, and Advancement

Although experience is generally the most important consideration in selecting managers, employers are increasingly emphasizing college education. Many believe a 4-year college curriculum in hotel and restaurant administration is the best educational preparation. Courses in hotel work, available in a few junior colleges and through the American Hotel and Motel Association, also are helpful.

College level courses in hotel management include hotel administration, accounting, economics, food service management and catering, and hotel maintenance engineering. Students are encouraged to work in hotels or restaurants during summer vacations. The experience gained and the contacts made with employers may help them to get better hotel jobs after graduation.

Managers should have initiative, self-discipline, and the ability to organize work and run a department or hotel. They must be able to concentrate on details and solve problems.

Some large hotels have special on-the-job management trainee programs in which trainees rotate among various departments. Outstanding employees may receive financial assistance for college study.

Most hotels promote employees with proven ability, usually front office clerks, to assistant manager and eventually to general manager. Hotel chains may offer better opportunities for advancement than independent hotels, since vacancies may arise anywhere in the chain or central office.

Employment Outlook

Hotel manager employment is expected to increase very rapidly through the mid-1980's. New positions will arise as additional hotels and motels are built. Many openings for management personnel also will occur as workers die, retire, or transfer to other jobs. Applicants having college degrees in hotel administration will have an advantage in seeking entry positions and later advancement.

See the Hotel statement elsewhere in the *Handbook* for information on Earnings and Working Conditions, Sources of Additional Information, and additional information on Employment Outlook.

INDUSTRIAL TRAFFIC MANAGERS

(D.O.T. 184.168)

Nature of the Work

Industrial firms want to receive raw materials and deliver customers' goods promptly, safely, and with minimum cost. Arranging the transportation of materials and finished products is the job of an industrial traffic manager. Industrial traffic managers analyze various transportation possibilities and choose the most efficient type for their companies' needs—rail, air, road, water, pipeline, or some combination. Then they select the route and the particular carrier. To make their decisions, managers consider factors such as freight classifications and regulations, time schedules, size of shipments, and loss and damage rates. (This statement does not cover traffic managers who sell transportation services for railroads, airlines, trucking firms, and other freight carriers.)

Activities of industrial traffic managers range from checking freight bills to deciding whether the company should buy its own fleet of trucks rather than contract for services. They route and trace shipments, arrange with carriers for transportation services, prepare bills of lading and other shipping documents, and handle claims for lost or damaged goods. Traffic managers keep records of shipments, freight rates, commodity classifications, and applicable government regulations. They also must stay informed about changing transportation technology, such as containerization (the use of containers packed with many individual items). Some traffic managers (called physical distribution managers) are responsible for packaging shipments and maintaining warehouse facilities and transportation equipment.

Traffic managers often consult with other company officials about the firm's transportation needs. They may, for example, work with production department personnel to plan shipping schedules, or with members of the purchasing department to determine what quantities of goods can be transported most economically.

Since many aspects of transportation are subject to Federal, State, and local government regulations, traffic managers must know about these and any other legal matters that apply to their companies' shipping operations. High level traffic managers represent their companies before ratemaking and regulatory bodies such as the Interstate Commerce Commission, State commissions, and local traffic bureaus.

Places of Employment

More than 20,000 persons were industrial traffic managers in 1972. Although most jobs are found in manufacturing firms, some traffic managers work for large stores. A few are self-employed consultants, or work for firms that handle transportation problems for clients. Most traffic managers are men.

Training, Other Qualifications, and Advancement

Although high school graduates with experience in traffic departments sometimes are hired as traffic managers, a college education is becoming increasingly important in this field. For some kinds of work, college training is required. For example, in order to argue cases before the Interstate Commerce Commission, a traffic manager must meet standards that include at least 2 years of college. Although some employers prefer graduates who have a degree in traffic management, others seek liberal arts majors who have had courses in transportation, management, economics, statistics, marketing, or commercial law.

Industrial traffic training is available through colleges and universities, traffic management schools, and seminars sponsored by private organizations. More than 100 colleges, universities, and junior colleges offer a degree in traffic management.

Industrial traffic managers should be able to analyze numerical and technical data such as freight rates and classifications to solve transportation problems. These jobs also require the ability to work independ-

Industrial traffic manager checking freight bills.

ently and to present facts and figures in a convincing manner.

Newly hired traffic managers often complete shipping forms and calculate freight charges. After gaining experience, they do more technical work such as analyzing transportation statistics. A competent worker may advance to a supervisory job such as supervisor of rates and routes; a few are promoted to assistant general traffic managers and eventually to general traffic managers. Industrial traffic managers can sometimes help their chances for advancement by participating in company-sponsored training programs or taking other courses in traffic management.

Employment Outlook

Employment of industrial traffic managers is expected to increase slowly through the mid-1980's as more businesses centralize their shipping and receiving activities in separate departments. A few openings will become available each year as new jobs are created, and as traffic managers die, retire, or leave the field for other reasons.

Growth in this occupation will stem from an increasing emphasis on efficient management of traffic activities and from the trends toward procuring materials over greater distances and distributing products in wider markets. There will be a strong demand for specialists who can obtain the lowest possible freight rates.

Earnings and Working Conditions

Industrial traffic managers, salaries started at about $9,000 a year in 1972, according to the limited information available. Although the earnings of experienced traffic managers vary by the company's transportation costs, they are much higher than the average for all nonsupervisory workers in private industry, except farming. Industrial traffic managers working for companies whose transportation requirements were small earned about $16,000 a year. Those in companies whose transportation needs were large received from $25,000 to $30,000 a year. Some traffic executives earned $40,000 or more a year.

Although industrial traffic managers usually have a standard work week, those in particularly responsible jobs may have to spend some time outside regular working hours preparing reports, attending meetings, and traveling to hearings before State and Federal regulatory agencies.

Sources of Additional Information

Information on education and technical training is available from:

American Society of Traffic and Transportation, Inc., 547 West Jackson Boulevard, Chicago, Ill. 60606.

LAWYERS

(D.O.T. 110.108, .118, and 119.168)

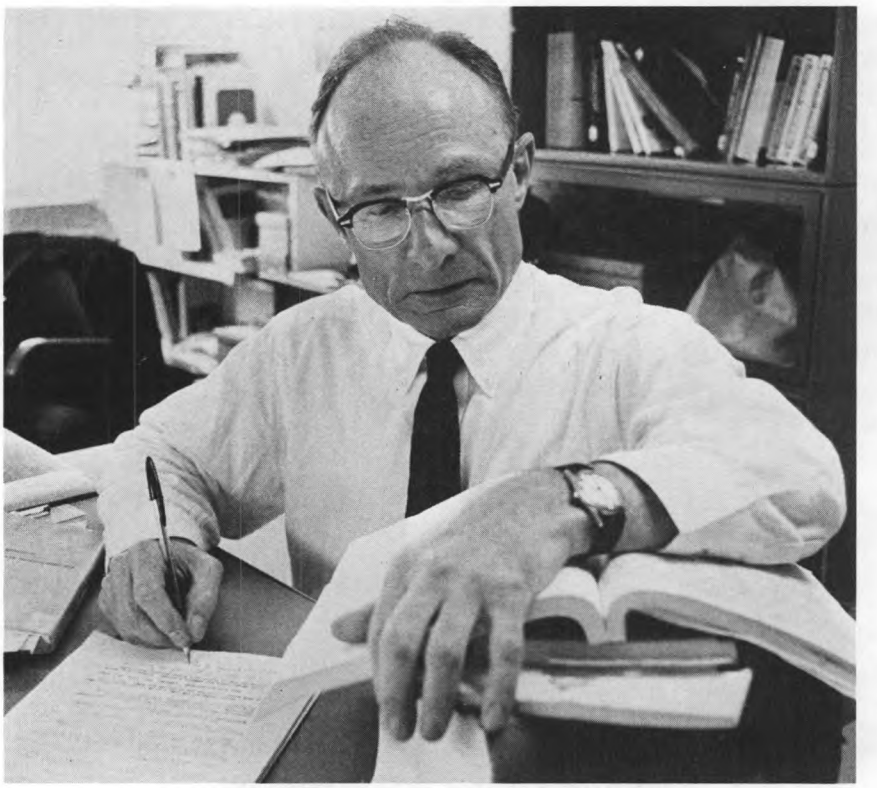
Nature of the Work

At some time in our life, each of us may need a lawyer for advice about our rights and responsibilities when buying property, making a will, or settling an estate. In addition, lawyers, also called attorneys, negotiate the settlement of legal problems out of court or, when necessary, represent clients in court or before government agencies.

Most lawyers are engaged in general practice, handling all kinds of legal work for clients. However, a significant number specialize in one

branch of law, such as corporation, criminal, labor, patent, real estate, tax, or international law. Some attorneys devote themselves entirely to trying cases in the courts. Others never appear in court but instead draw up wills, trusts, contracts, mortgages, and other legal documents; conduct out-of-court negotiations; and do investigative and other legal work to prepare for trials. Some may act as trustees by managing a person's property and funds or as executors by seeing that the provisions of their client's will are carried out. Still others teach, do research or writing, or perform administrative work. Government attorneys play a large part in developing Federal and State laws and programs; they prepare drafts of proposed legislation, establish law enforcement procedures, and argue cases.

Many people who have legal training do not work as lawyers but use their knowledge of law in other occupations. They may, for example, be insurance adjusters, tax collectors, probation officers, credit investigators, or claim examiners. A legal background also is an asset to those seeking or holding public office.



Legal research demands careful attention to detail.

Places of Employment

About 300,000 persons, most of them men, worked as lawyers in 1972. Most were in private practice, either self-employed (alone or in partnerships) or working for other lawyers or law firms.

In 1972, almost 15,000 lawyers worked for the Federal Government, chiefly in the Justice, Defense, and Treasury Departments, and the Veterans Administration; another 15,000 were employed by State and local governments. Others worked for private companies or taught in law schools. Some salaried lawyers also have independent practices; others do legal work part time while in another occupation.

Training, Other Qualifications, and Advancement

In order to practice law in the courts of any State, a person must be admitted to its bar. Applicants for admission to the bar must pass a written examination; however, a few States drop this requirement for graduates of their own law schools. A lawyer who has been admitted to the bar in one State usually can be admitted in another without taking an examination provided he meets that State's standards of good moral character and has a specified period of legal experience. Each Federal court or agency sets its own qualifications for those practicing before it.

To qualify for the bar examination in most States, an applicant must have completed 3 years of college and have graduated from a law school approved by the American Bar Association or the proper State authorities. A few States accept the study of law wholly in a law office or in combination with study in a law school; only California accepts study of law by correspondence as qualification for taking the bar exam. Several States require registration and approval of students by the State Board of Examiners, either before they enter law school, or during the early years of legal study. In a few States, candidates must complete clerkships before they are admitted to the bar.

The required college and law school work usually takes 7 years of full-time study after high school—4 years of college followed by 3 years in law school. Although a number of law schools accept students after 3 years of college, and a few after 2, an increasing number require appli-

cants to have a bachelor's degree. To meet the needs of students who can attend only part time, a number of law schools have night divisions which usually require 4 years of study. In 1971, about one-fourth of all law students in ABA-approved schools were enrolled in evening classes.

Law schools seldom specify college subjects that must be included in students' prelegal education. However, English, history, economics and other social sciences, logic, and public speaking are important for prospective lawyers. Students interested in a particular aspect of the law may find it helpful to take related courses; for example, engineering and science courses for the prospective patent attorney, and accounting for the future tax lawyer. Acceptance by most law schools depends on the applicant's ability to demonstrate an aptitude for the study of law, usually through the "Law School Admissions Test." In 1972, 149 law schools were approved by the American Bar Association. Others—chiefly night schools—were approved by State authorities only.

The first 2 years of law school generally are devoted to fundamental courses such as contracts, property law, and judicial procedure. In the third year, students may elect specialized courses in fields such as tax, labor, or corporation law. Practical experience is often acquired by participation in school-sponsored legal aid activities, in the school's practice court where students conduct trials under the supervision of experienced lawyers, and through writing on legal issues for the school's law journal. Graduates receive the degree of *juris doctor* (J.D.) from most schools, although some confer the *bachelor of laws* (L.L.B.) as the first professional degree. Advanced study is often desirable for those planning to specialize, do research, or teach in law schools.

The practice of law involves a great deal of responsibility. Young people planning careers in law should like to work with people and ideas, and be able to win the confidence of their clients.

Most beginning lawyers start in salaried positions, although some go into independent practice immediately after passing the bar examination. Newly hired salaried attorneys usually act as research assistants (law clerks) to experienced lawyers or judges. After several years of progressively responsible salaried employment, many lawyers go into practice for themselves. Some lawyers, after years of practice, become judges.

Employment Outlook

A rapid increase in the number of law school graduates seeking employment is expected to create keen competition for the available jobs. Graduates of well known law schools and those who rank high in their classes should find salaried positions with law firms, on the legal staffs of corporations and government agencies, and as law clerks for judges. Graduates of less prominent schools and those with lower scholastic ratings may experience some difficulty in finding salaried jobs. However, many will find opportunities in fields where legal training is an asset but not normally a requirement.

The employment of lawyers is expected to grow moderately through the mid-1980's as increased business activity and population create a demand for attorneys to deal with a growing number of legal questions. Supreme Court decisions extending the right to counsel for persons accused of lesser crimes, the growth of legal action in the areas of consumer protection, the environment, safety, and an expected increase in the use of legal services by middle income groups through prepaid legal service programs also should provide employment opportunities. Other jobs will be created by the need to replace lawyers who retire or leave the occupation for other reasons.

Prospects for establishing a new practice probably will continue to be best in small towns and expanding suburban areas. In such communities competition is likely to be less than in big cities and new lawyers may find it easier to become known to potential clients; also, rent and other business costs are somewhat lower. Salaried positions, on the other hand, will be limited largely to urban areas where the chief employers of legal talent—government agencies, law firms, and big corporations—are concentrated.

Earnings and Working Conditions

Lawyers entering practice in 1972 earned starting salaries ranging from $7,000 to $20,000 a year. Factors affecting the salaries offered to new graduates include: their academic records; and types, sizes, and locations of their employers; and whether the new lawyer has any specialized educational background that the employer requires. Lawyers with 1 year's experience working for manufacturing and business firms earned about $14,000 a year; those with a few years of experience earned $18,000 annually. In the Federal Government, annual starting salaries for attorneys were $11,614 or $13,996 in early 1973 depending upon their academic and personal qualifications. Those with a few years of experience earned $19,700 a year. On the average, lawyers earn over three times as much as nonsupervisory workers in private industry, except farming.

Beginning lawyers engaged in legal aid work usually receive the lowest starting salaries. New lawyers starting their own practices may earn little more than expenses during the first few years and may need to work part time in other occupations.

Lawyers on salary receive increases as they assume greater responsibility. In 1972, those in charge of legal staffs in private industry averaged more than $33,700 a year. Incomes of lawyers in private practice usually grow as their practices develop. Private practitioners who are partners in law firms generally earn more than those who practice alone.

Lawyers often work long hours and are under considerable pressure when a case is being tried. In addition, they must keep abreast of the latest laws and court decisions. However, since lawyers in private practice can determine their own hours and workload, many stay in practice well past the usual retirement age.

Sources of Additional Information

The specific requirements for admission to the bar in a particular State may be obtained at the State capital from the clerk of the Supreme Court or the secretary of the Board of Bar Examiners.

Information on law as a career is available from:

Information Service, The American Bar Association 1155 East 60th St., Chicago, Ill. 60637.

Information on specific topics such as developments in financial aid and law school accreditation is available from:

Association of American Law Schools, Suite 370, 1 Dupont Circle NW, Washington, D.C. 20036.

MARKETING RESEARCH WORKERS

(D.O.T. 050.088)

Nature of the Work

Businessmen require a great deal of information to make sound decisions on how to market their products. Marketing research workers provide much of this information by analyzing available data on products and sales, making surveys, and conducting interviews. They prepare sales forecasts and make recommendations on product design and advertising.

Most marketing research starts with the collection of facts from sources such as company records, published materials, and experts on the subject under investigation. For example, marketing research workers making sales forecasts may begin by studying the growth of sales volume in several different cities. This growth may then be traced to increases in population, size of the company's sales force, or amount of money spent on advertising. Other marketing research workers may study changes in the quantity of company goods on store shelves or make door-to-door surveys to obtain information on company products.

Marketing research workers are often concerned with customer's opinions and tastes. For example, to help decide on the design and price of a new line of television sets, marketing research workers may survey consumers to find out what styles and price ranges are most popular. This type of survey usually is supervised by marketing researchers who specialize in consumer goods; that is, merchandise sold to the general public. They may be helped by statisticians who select a group (or sample) to be interviewed and "motivational research" specialists who phrase questions to produce reliable information. Once the investigation is underway, the marketing research worker may supervise the interviewers. He also may direct the office workers who tabulate and analyze the information collected.

Marketing surveys on products used by business and industrial firms

Marketing research worker reviews results of survey.

may be conducted somewhat differently from consumer goods surveys. The marketing researcher often conducts the interviews himself to gather opinions of the product. He also may speak to company officials about new uses for it. He must therefore have specialized knowledge of both marketing techniques and the industrial uses of the product.

Places of Employment

About 25,000 full-time marketing research workers were employed in 1972; most were men. They included research assistants and others in junior positions as well as supervisors and directors of research. In addition, a limited number of other professionals (statisticians, economists, psychologists, and sociologists) and several thousand clerical workers were employed full time in this field. Thousands of additional workers, many of them women, worked part time or on a temporary basis as survey interviewers.

Most jobs for marketing research workers are found in manufacturing companies and independent advertising and research organizations. Large numbers also are employed by stores, radio and television firms, and newspapers; others work for university research centers and govment agencies. Marketing research organizations range in size from one-man enterprises to firms having a hundred employees or more.

The largest number of marketing research workers is in New York City, where many major advertising and independent marketing research organizations are located, and where many large manufacturers have their central offices. The second largest concentration is in Chicago. However, marketing research workers are employed in many other cities—wherever there are central offices of large manufacturing and sales organizations.

Training, Other Qualifications, and Advancement

Although a bachelor's degree is the usual entry requirement for marketing research trainees, graduate training is becoming important for some specialized positions and for advancement to higher level positions. Many graduates qualify for jobs through previous experience in other types of research, while employers may hire university teachers of marketing or statistics to head new marketing research departments.

College courses considered to be valuable preparation for work in marketing research are statistics, English composition, speech, psychology, and economics. Some marketing research positions require skill in specialized areas, such as engineering, or substantial sales experience and a thorough knowledge of the company's products. Knowledge of data processing is helpful because of the growing use of computers in sales forecasting, distribution, and cost analysis.

Trainees usually start as research assistants or junior analysts. At first, they may do considerable clerical work, such as copying data from published sources, editing and coding questionnaires, and tabulating survey returns. They also learn to conduct interviews and write reports on survey finding. As they gain experience, assistants and junior analysts may assume responsibility for specific marketing research projects, or advance to supervisory positions. An exceptionally able worker may become marketing research director or vice president for marketing and sales.

Either alone or as part of a team, marketing research workers must be resourceful as they analyze problems and apply various techniques to their solution. As advisers to management, they should be able to write clear reports informing company officials of their findings.

Employment Outlook

College graduates trained in marketing research, and statistics will find favorable job opportunities in this occupation through the mid-1980's. The growing complexity of marketing research techniques also will expand opportunities for psychologists, economists, and other social scientists. Job opportunities for those who hold master's and doctor's degrees will be excellent.

The demand for marketing research services is expected to increase very rapidly through the next decade. Existing marketing research organizations will expand and new marketing research departments and independent firms will be set up. Business managers will find it increasingly important to obtain the best information possible for appraising marketing situations and planning marketing policies. Also, as marketing research techniques improve and more statistical data accumulate, company officials are likely to turn more often to marketing research workers for information and advice.

Earnings and Working Conditions

Starting salaries for market research trainees averaged about $9,000 a year in 1972, according to the limited data available. Persons having masters degrees in business administration and related fields usually started with annual salaries close to $13,000.

Earnings were greater for experienced marketing research workers who held management positions of high responsibility. Vice presidents of marketing and directors of marketing research often earned between $25,000 and $35,000 a year.

Marketing research workers usually work in modern, centrally located offices. Some, especially those employed by independent research firms, do a considerable amount of traveling in connection with their work. Also, they may frequently work under pressure and for long hours to meet deadlines.

Sources of Additional Information

Additional information on careers in marketing research is available from:

American Marketing Association, 230 North Michigan Ave., Chicago, Ill. 60601.

PERSONNEL WORKERS

(D.O.T. 166.088 through .268)

Personnel worker administers test to job applicant.

Nature of the Work

Attracting the best employees available and matching them to jobs they can do effectively are important for the successful operation of business and government. Personnel workers interview, select, and recommend applicants who have the education and experience to fill vacancies. In addition to staffing, they counsel employees, plan training, develop wage and salary scales, and investigate methods to improve personnel operations. Some jobs require only limited contact with people; others involve frequent contact with employees, union representatives, job applicants, and other people outside the organization.

Large organizations employ personnel workers at varying levels of responsibility. Department heads formulate policy, advise company officials on personnel matters, and administer the work of their staffs. Supervisors and specialists in wage administration, training, safety, and job classification direct the work of staff assistants and clerical employees. Small organizations employ relatively few personnel workers; sometimes one individual performs personnel duties in addition to other work.

Personnel workers in government agencies generally do the same kind of work as those in large business firms. Government personnel workers, however, spend considerably more time classifying jobs, and devising, administering, and scoring competitive examinations given to job applicants.

Places of Employment

In 1972, about 235,000 people—three-fourths of them men—were personnel workers. Well over half worked in private industry including banks, telephone companies, and department stores. Large numbers also worked in Federal, State, and local government agencies. A few were in business for themselves, often as management consultants or employee management relations experts. In addition, some taught college or university courses in personnel administration, industrial relations, and similar subjects.

Most jobs for personnel workers are located in the highly industrialized sections of the country.

Training, Other Qualifications, and Advancement

A college education is becoming increasingly important for personnel work. Many employers in private industry prefer applicants who have majored in business or personnel administration; people inter-

ested in working for the government should major in public administration, political science, or personnel administration. However, those with other majors also are eligible for government positions.

For some positions, specialized training may be necessary. Testing and counseling often require a bachelor's degree with a major or graduate degree in psychology. An engineering degree may be desirable for work dealing with time studies or safety standards, and training in industrial relations may be helpful for work involving employee management relations. An accounting background is useful for positions concerned with wages, pensions, and other employee benefits.

Although most employers seek college graduates to work in personnel, some prefer workers who already have firsthand knowledge of operations, regardless of their educational preparation. Large numbers now in personnel work who are not college graduates entered the field this way.

New workers usually enter formal or on-the-job training programs to learn how to classify jobs, interview applicants, or perform other personnel functions. After training, they are assigned to work in specific areas.

Personnel workers should speak and write effectively and be able to work with people of all levels of intelligence and experience. They also must be able to see both the employee's and the employer's points of view. In addition, personnel workers should be able to work as part of a team. They need supervisory abilities and must be able to accept responsibility. A personnel worker should like detail, be persuasive, and have a congenial personality.

After gaining experience, personnel workers usually can advance within their own organization or transfer to other employers. Those in the middle ranks of a big organization often transfer to a top job in a smaller one. Employees with exceptional ability usually are promoted to executive positions, such as personnel director.

Employment Outlook

The number of personnel workers is expected to expand very rapidly through the mid-1980's as employers recognize the need for trained personnel to maintain good employee relations. In addition to new jobs created by growth, many openings will become available each year to replace workers who die, retire, or leave the occupation for other reasons. People trained in psychological testing and in handling work-related problems will find particularly good job prospects. Advancement to personnel positions from production, clerical, or subprofessional jobs will be limited.

Earnings and Working Conditions

Beginning personnel workers in private industry started at $9,500 a year in 1972, according to a Bureau of Labor Statistics survey in urban areas. Experienced workers earned $15,000, about twice as much as the average for all nonsupervisory workers in private industry, except farming. Directors of personnel earned between $14,300 and $24,700 a year; some top personnel and industrial relations executives in large corporations earned considerably more.

In the Federal Government, inexperienced graduates with bachelor's degrees earned $7,700 a year in early 1973; those having exceptionally good academic records or one year of graduate work began at $9,500. Inexperienced workers having a master's degree and a high class standing started at $11,600 a year. Personnel workers having high levels of administrative responsibility and several years of experience earned more than $16,500; some in charge of personnel for major departments in the Federal Government earned more than $26,800 a year.

Employees in personnel offices generally work 35 to 40 hours a week. During a period of intensive recruitment or emergency, they may work much longer. As a rule, personnel workers are paid for holidays and vacations, and share in the same retirement plans and other benefits available to all professional workers in their organizations.

Sources of Additional Information

General information on careers in personnel work may be obtained from:

American Society for Personnel Administration, 19 Church St., Berea, Ohio 44017.

General information about government careers in personnel is available from:

International Personnel Management Association, 1313 East 60th St., Chicago, Ill. 60637.

PUBLIC RELATIONS WORKERS

(D.O.T. 165.068)

Nature of the Work

How successfully an organization presents itself may affect its public acceptance and influence. Public relations workers help an employer build and maintain a beneficial public image. To accomplish this,

they must understand changing attitudes and opinions of customers, employees, and other groups.

Public relations departments are found in many different organizations, so that workers must tailor their programs to an employer's particular needs. For example, a public relations director for a small college may devote most of his energies to attracting additional students, while one in a business firm may handle the employer's relationship with stockholders, government agencies, and community groups.

Public relations workers gather and give out information that keeps the public aware of their employer's projects and accomplishments. They prepare and assemble information and contact the people who may be interested in publicizing their material. Many newspaper items, magazine articles, and pamphlets giving information about a company start at public relations workers' desks.

Public relations workers also arrange and conduct direct public contact programs. Such work includes setting up speaking engagements for officials and writing the speeches they deliver. These workers often serve as an employer's representative during community projects and occasionally show films at school assemblies, plan conventions, or manage fund-raising campaigns.

Public relations staffs in large firms sometimes number 200 or more. The director of public relations may develop overall plans and policies with a company vice-president or another executive having the authority to make final decisions. In addition, large public relations departments employ writers, research workers, and other specialists who prepare material for the different media or write reports sent to stockholders.

Workers who handle publicity for an individual or direct public relations for a university or small business may do all aspects of the job. They make contacts with outsiders, do the necessary planning and research, and prepare material for publication. These workers may combine public relations duties with advertising or managerial work; some are top-level officials and others have lower level positions. The most skilled public relations work of making overall plans and maintaining contacts usually is done by the department director and highly experienced staff members.

Public relations worker checks material for press release.

Places of Employment

More than 85,000 persons—nearly one-third women—were public relations workers in 1972. In recent years, an increasing number of women have entered the field. Manufacturing firms, stores, and trade and professional associations hire the majority of public relations workers. Others work for consulting firms furnishing public relations services to clients for a fee.

Public relations workers are concentrated in large cities where press services and other communications facilities are readily available, and where many businesses and trade associations have their headquarters. More than half of the public relations consulting firms in the United States are in New York City, Los Angeles, Chicago, and Washington, D.C.

Training, Other Qualifications, and Advancement

A college education or journalism experience generally is the best preparation for public relations work. Although most workers major in public relations, journalism, or English, some employers prefer a background in science or some field related to the firm's business. Others, especially small firms, want college graduates with secretarial skills who can combine clerical duties with public relations. Still others want college graduates with at least one year's experience working for the news media. After a few years' experience, these workers may advance to full-time public relations jobs.

In 1972, over 80 colleges and more than 30 graduate schools offered degree programs or special curriculums in public relations. In addition, nearly 200 colleges offered at least one course in this field.

Courses in journalism, business administration, psychology, and public speaking help in preparing for a public relations career. Extracurricular activities, such as writing for a school publication, give valuable experience. Part-time or summer jobs in selling or public relations provide training that can help overcome competition for entry positions.

Creativity, initiative, and the ability to express thoughts clearly and simply are important to the public relations worker. Fresh ideas are so vital in public relations that some experts spend all their time developing new ideas with management, leaving the job of carrying out programs to others.

A person choosing public relations work as a career needs an outgoing personality, self-confidence, and an understanding of human psychology. He should have the enthusiasm necessary to motivate people. Public relations workers need a highly developed sense of competitiveness and the ability to function as part of a team.

Some companies—particularly those with large public relations staffs—have formal training programs for new workers. In other firms, new employees learn by working under the guidance of experienced staff members. Beginners often maintain files of material about company activities, scan newspapers and magazines for appropriate articles to clip, and assemble information for speeches and pamphlets. After gaining experience, they work on progressively more difficult assignments such as writing press releases, speeches, and articles for publication.

Promotion to supervisory jobs may come as the worker shows he can handle more difficult and creative assignments. Some experienced public relations workers start their own consulting firms.

Employment Outlook

Employment of public relations workers is expected to increase moderately through the mid-1980's. In addition to new jobs created as expanding organizations require more public relations specialists, openings will occur because of the need to replace workers who leave the field.

The demand for public relations workers will grow as population increases and the general level of business activity rises. In recent years, public relations spending has increased, and many organizations have developed new public relations departments. This trend should continue in the years ahead.

Earnings and Working Conditions

Starting salaries for men beginning public relations work averaged $9,000 a year in 1972, according to the limited data available; entry salaries for newly hired women averaged $6,900 a year. Many experienced public relations workers earned from $15,000 to $25,000 and more a year.

The salaries of experienced workers generally are highest in large organizations having extensive public relations programs. Directors of public relations for medium-sized firms earned $15,000 to $30,000 a year; those at large companies had salaries in the $20,000 to $50,000 range. Salaries for some officials, such as vice-presidents in charge of public relations, can range from $25,000 to $75,000 a year or more. The median salary for directors of public relations was $21,000 in 1972.

Many consulting firms employ large staffs of experienced public relations specialists and often pay somewhat higher salaries than other business organizations. In social welfare agencies, nonprofit organizations and universities, salaries generally are lower.

Although the workweek for public relations staffs usually is 35 to 40 hours, overtime may be necessary to prepare or deliver speeches, attend meetings and community activities or travel out of town. Occasionally, the nature of their regular assignments or special events requires public relations workers to be on call around the clock.

Sources of Additional Information

Further information about the nature of public relations work is available from:

Service Department, Public Relations News, 127 East 80th St., New York, N.Y. 10021.

Research Department, PR Reporter, Meriden. N.H. 03770.

For additional career information and a list of schools offering degrees

and courses in the field write:

Career Information, Public Relations Society of America, Inc., 845 Third Ave., New York, N.Y. 10022.

PURCHASING AGENTS

(D.O.T. 162.158, 180.118, 191.118, and 252.358)

Nature of the Work

If materials, supplies, or equipment are not on hand when needed an organization's work may be interrupted or halted. Maintaining an adequate supply of items a firm needs to operate is the purchasing agent's job.

Purchasing agents and their assistants obtain goods and services of the required quality at the lowest possible cost, and see that adequate supplies are kept on hand. Agents who work for manufacturing firms buy machinery, raw materials, and product components; those working for government agencies may purchase office supplies, furniture, and business machines. ("Buyers" who purchase merchandise for resale in its original form are not included in this statement.)

Purchasing agents buy when stocks on hand reach a predetermined reorder point, or when a department in the organization requisitions items it needs. Because agents usually can purchase from many sources, their main job is selecting the seller who offers the best value.

Purchasing agents use a variety of means to select among suppliers. They compare listings in catalogs and trade journals and telephone suppliers to get information. They also meet with salesmen to examine samples, watch demonstrations of equipment, and discuss items to be purchased. Sometimes agents invite suppliers to bid on large orders; then they select the lowest bidder among those who meet requirements for quality of the goods and delivery date.

It is important that purchasing agents develop good business relations with their suppliers. This can result in savings on purchases, favorable terms of payment, and quick delivery on rush orders or material in short supply. They also work closely with personnel in various departments of their own organization. For example, they may discuss product specifications with company engineers or shipment problems with workers in the shipping and receiving or traffic departments.

Once an order has been placed with a supplier, the purchasing agent makes periodic checks to insure that it will be delivered on time. This is necessary to prevent work flow interruptions due to lack of materials. After an order has been received and inspected, the purchasing agent authorizes payment to the shipper.

Because of its importance, purchasing usually is designated as a separate responsibility within a firm. In a large firm, the head of the purchasing department directs the work of a staff which includes assistant purchasing agents and clerical workers. Assistants may purchase certain categories of goods, such as raw materials or office supplies, or specialize in buying specific items—for example, steel, lumber, cotton, or oil.

Places of Employment

About 180,000 persons—90 percent of them men—were purchasing agents in 1972. Nearly half worked in manufacturing industries. Large numbers also were employed by government agencies, construction companies, hospitals, and schools.

Purchasing agents examine sample equipment.

Most purchasing agents work in firms that have fewer than 10 employees in the purchasing department. Some large firms, however, may have a hundred or more specialized buyers.

Training, Other Qualifications, and Advancement

Many large employers seek college graduates for beginning positions as purchasing agents. Although companies that manufacture complex machinery or chemicals may prefer a background in engineering or science, other firms hire business administration or liberal arts majors for trainee jobs. Courses in accounting, economics, and purchasing are helpful. Many small firms prefer experience with the company, and select purchasing workers from among their own personnel, whether or not they have a college education. For advancement to high-level positions, however, a college degree is becoming increasingly important.

Regardless of previous training, the beginning purchasing agent must spend considerable time learning about his company's operations and purchasing procedures. He may be assigned to the storekeeper's section to learn about purchasing forms, inventory records, or storage facilities. Next he may work with an experienced buyer to learn about types of goods purchased, prices, and suppliers.

Following the initial training period, a trainee often becomes a junior buyer of standard catalog items. As he gains experience and exercises good judgment in the various aspects of purchasing, he may be promoted to assistant purchasing agent and then to purchasing agent. Some agents advance to positions as vice presidents of purchasing or procurement officers.

The purchasing agent must be able to analyze numbers and technical data in order to make buying decisions and take responsibility for spending large amounts of company money. The job requires the ability to work independently and a good memory for details. In addition, a purchasing agent must be tactful in dealing with salesmen and able to motivate others.

Employment Outlook

A moderate increase in the employment of purchasing agents is expected through the mid-1980's. In addition to job openings resulting from growth, many opportunities are expected annually because of the need to replace personnel who retire, transfer, or leave the field for other reasons.

Major factors underlying this growth include the continued increase in the size of business and manufacturing firms and the development of new products and sources of supply such as foreign markets. In particular, the ever-increasing complexity and specialization of business functions and products will spur demand for purchasing agents with knowledge in specific areas.

Earnings and Working Conditions

College graduates hired as purchasing trainees in large firms earned from $7,500 to $8,500 a year in 1972, according to the limited data available. In the Federal Government, beginning purchasing agents who had college degrees earned $7,700 or $9,500 in early 1973, depending on scholastic achievement and performance on the Federal Service Entrance Examination.

In 1972, experienced agents purchasing standard items averaged more than $10,500; buyers purchasing complex or technical goods averaged more than $15,000. Some top purchasing executives earned over $45,000 a year. Purchasing agents earn about one and one-half times as much as the average for all nonsupervisory workers in private industry, except farming.

Sources of Additional Information

Further information on education and training is available from:

National Association of Purchasing Management, 11 Park Place, New York, N.Y. 10007.

SERVICE OCCUPATIONS

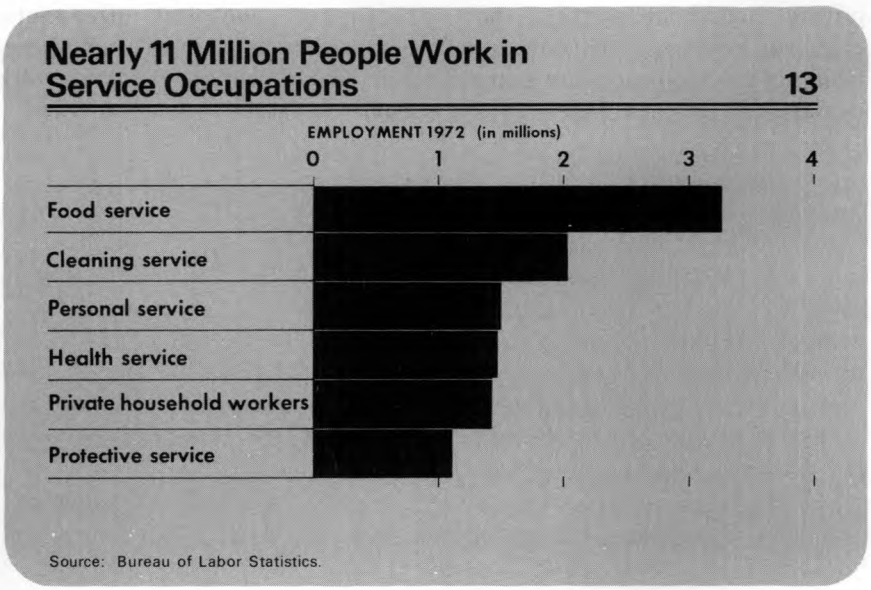
Workers in service occupations police streets, serve food, put out fires, clean homes and buildings, and provide services to the American people in many other ways. In 1972 approximately 11 million service workers were employed in a wide range of occupations that included babysitters, policemen, cooks, hospital attendants, theater ushers, barbers, and buildings custodians. The major groups of service workers are discussed below:

Food service occupations. In 1972, more than 3.0 million people, or about 1 in 3 service employees, worked in this group that includes cooks and chefs, kitchen workers, waiters and waitresses, and bartenders. These workers are employed in hotels, restaurants, hospitals, schools, and plant cafeterias.

Cleaning and related occupations. Over 2 million persons who clean and provide other services in buildings made up the second largest group of service workers in 1972. This group includes building custodians, chambermaids, and exterminators.

Private household service occupations. About 1.7 million people were private household service workers in 1972. Most performed domestic tasks that are familiar to all homemakers—preparing and serving meals, making beds, cleaning and doing laundry, and caring for children. Private households also require the services of workers in other occupations including gardeners, chauffeurs, private secretaries, and nurses.

Protective and related service workers safeguard lives and property. More than 1 million people, or about one-tenth of all service workers, were in protective service occupations in 1972. The majority were policemen, guards, or firemen. Most policemen and detectives are government employees, but some work for hotels, stores, and other businesses. Guards and watchmen, another large group of protective service employees, work chiefly for private companies to protect their property and enforce company rules and regulations. Firemen, also a significant group of protective service employees, work mainly for city governments. The remaining protective service workers are sheriffs and bailiffs, crossing watchmen and bridge tenders, and marshals and constables.



Over 3 million additional service workers provide health care, grooming and personal services, or work in occupations related to entertainment and leisure time activities. About half this number worked in health service occupations, including hospital attendants and nurse aides. Occupations concerned with grooming and personal services, such as barbers and cosmetologists, provided employment for over 700,000 workers. More than 100,000 were in occupations related to entertainment, including ski instructors and ushers.

The sections that follow have detailed statements for cleaning, food, personal, private household, and protective service occupations. In-

formation on other service occupations is given in the industry statements on government; transportation, communications, and public utilities; service and miscellaneous; and wholesale and retail trade; the section on health occupations; and the statements on Exterminators, Meat Cutters, and Funeral Directors elsewhere in the *Handbook*.

Training, Other Qualifications, and Advancement

Training and skill requirements differ greatly among the various service occupations. FBI special agents, for example, must have a college degree. Barbers and beauty operators need specialized vocational training. Still other occupations—general maid, waitress, and hotel bellman, for example—have no specific educational requirements for entry, although a high school diploma is always an advantage. The Federal Government sponsors training for many service occupations under provisions of the Manpower Development and Training Act and other legislation.

For many service occupations, personality traits and special abilities may be as important as formal schooling. Thus, physical strength and endurance are a necessity for work as a porter, life guard, or window cleaner; and a pleasing manner and appearance are especially important for the theater usher, elevator operator, and checkroom girl. Other service workers, such as store and hotel detectives and travel guides, need good judgment and should be skillful in dealing with people.

Some service workers eventually go into business for themselves as caterers or restaurant operators, for example, or proprietors of barber or beauty shops. Advanement from service occupations that require little training or skill may be difficult for people without a good basic education and some knowledge of the business in which they work.

Employment Trends and Outlook

In the last decade, the number of workers in service occupations grew at about the same rate—20 percent—as the labor force as a whole. Since the beginning of the 1970's, however, service workers have increased substantially faster than the total labor force. The number of private household workers, however, has continued the downtrend begun in the 1960's, despite a strong demand for their services.

Employment in service occupations is expected to expand moderately to the mid-1980's as income levels rise and leisure time increases. As total employment rises, however, various occupations within the service group are likely to be affected differently—some growing very rapidly, others only moderately, and a few decreasing in size.

Most of the future employment increase is expected to be among policemen and other protective service workers; attendants in hospitals and businesses that offer professional and personal services; beauty operators; and cooks, waiters, and others who prepare and serve meals outside the home. Some of the factors responsible for employment growth in these occupations are: the greater need to protect life and property as urbanization continues and cities become more crowded; the added medical care required by a growing and aging population; and the more frequent use of restaurants, beauty parlors, and other services as income levels rise and an increasing number of housewives take jobs outside the home.

Although jobs for service workers are found throughout the country, firefighters, hospital attendants, hotel service employees, and amusement and recreation attendants work chiefly in larger towns and cities.

CLEANING AND RELATED OCCUPATIONS

The need for cleaning workers coincides with the continued growth of urban centers. As more hospitals, office buildings, hotels, and apartment houses are built, large numbers of people are needed to clean and maintain these structures.

Workers in cleaning and related occupations usually gain their skills on the job, but some learn through specific training courses. Hotel housekeepers and assistants, for example, often take courses in housekeeping procedures and interior decorating. Other cleaning workers participate in training offered by unions and government agencies.

In addition to knowing the duties of their jobs, cleaning employees should have certain personal traits. Exterminators, for example, must be courteous, tactful, and neat because they deal constantly with the public. Building custodians should be able to withstand the tiring and monotonous routine of their jobs.

This section describes 3 cleaning and related occupations: Building Custodians, Exterminators, and Hotel Housekeepers and Assistants.

BUILDING CUSTODIANS

(D.O.T. 187.168, 381.137 and .887; 382.884, 891.138)

Nature of the Work

Building custodians, sometimes called janitors or cleaners, maintain hotels, hospitals, office buildings, apartment houses, and other buildings.

Custodial workers see that heating and ventilating equipment work properly, keep the building clean and orderly, and do other tasks that keep a building in good condition. On a typical day, a custodian may wet- or dry-mop floors, vacuum carpets, clean furniture and other equipment, make minor repairs, and exterminate insects and rodents. (See the statement on Exterminators elsewhere in the *Handbook* for more information on this occupation.)

Custodians use many different tools and cleaning materials. For one job, they may need only a simple mop; for another, they may use an electric polishing machine and a special cleaning compound. Chemical cleaners and power equipment have reduced the effort needed for cleaning jobs. Custodians must be familiar with cleaning equipment and materials designed for specific tasks because improper use of a chemical cleaner or machine may harm surfaces.

Some custodians supervise the cleaning and maintenance of an entire building or section of a building, and see that jobs, such as floor waxing or furniture polishing, are done well.

Places of Employment

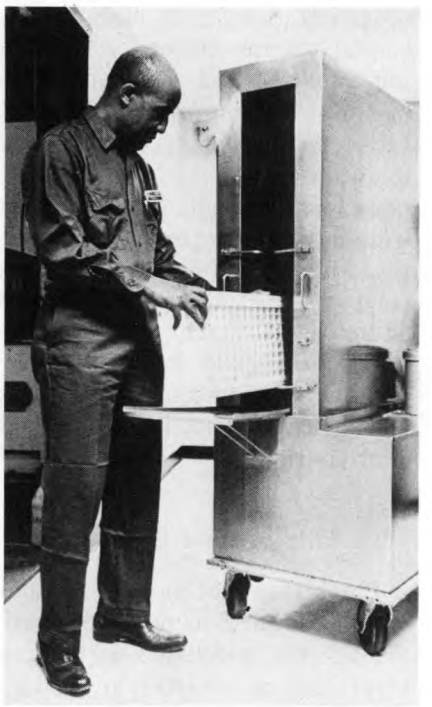
In 1972, about 1.9 million people—75 percent of them men—worked as building custodians. Although jobs for custodians are found in cities and towns throughout the Nation, the majority work in the more populated areas of the country.

Many building custodians are employed by hospitals, hotels, factories, and retail stores. Large numbers also work in apartment houses and office buildings; some are employed by contract firms that provide building maintenance service for a fee.

Training, Other Qualifications, and Advancement

No special education is required for most custodial jobs, but the beginner should know simple arithmetic and be able to follow instructions. High school shop courses are helpful to the building service worker who does various handyman tasks, such as minor plumbing or carpentry.

Most building custodians learn their skills on the job. Usually, beginners do routine cleaning. As



Building custodian replaces light fixture.

workers gain experience, they are given more complicated duties.

In some cities, unions and government agencies have programs to teach necessary skills to building custodians. Students learn about the different kinds of surfaces in modern buildings and ways to clean them. They learn to operate and maintain machines, such as wet and dry vacuums, buffers, and polishers. They also receive instructions concerning minor electrical, plumbing, and other repairs. Students learn to plan their work, to deal with the public, and to work independently without supervision. A few training programs offer remedial courses in reading, writing, and arithmetic.

Advancement opportunities for custodial workers may be limited because the custodian often is the only maintenance worker in a building. Where there is a large maintenance staff, however, custodians can be promoted to supervisory jobs. For advancement to supervisor, a high school diploma is helpful. Some custodians become self-employed and maintain building for clients on a fee basis, after becoming thoroughly familiar with the work.

Building custodians usually find work by answering newspaper advertisements or by applying directly to a company. They also get jobs through State employment offices. For government positions, an employment application must be filled out and the civil service personnel headquarters contacted.

Employment Outlook

Employment of building custodians is expected to rise moderately through the mid-1980's as the construction of apartment houses, motels, and other buildings that use custodial services expands. The growth of the condominium as a form of home ownership also will contribute to the favorable outlook for these workers. In this kind of dwelling unit, custodians perform much of the maintenance formerly done by the homeowner.

In addition to the large number of new jobs that will be created, thousands of workers will be needed each year to replace experienced custodians who retire, die, or leave for other reasons.

Earnings and Working Conditions

Earnings of building custodians vary by industry and area of the country; workers in large cities of the North Central region earn the highest wages. In 1971–72, custodians in private industry had the following average hourly earnings, according to a Bureau of Labor Statistics survey in urban areas:

Industry	*Average hourly earnings*
Manufacturing	$3.23
Public Utilities	3.33
Wholesale Trade	2.80
Retail Trade	2.37
Finance	2.68
Services	2.32

In general, custodial workers earn about three-fourths as much as the average earnings for all nonsupervisory workers in private industry, except farming.

In the Federal Government, building custodial workers' pay rates are similar to those paid by private industries in the same local areas.

Most building service workers receive paid holidays and vacations, and health insurance.

Although custodians usually work inside heated, well-lighted buildings, sometimes they work outdoors sweeping walkways, mowing lawns, or shoveling snow. Those who maintain machinery and heating systems may work in noise and grease. Custodial workers often suffer from minor cuts, bruises, and burns caused by machines, hand tools, and chemicals. An additional hazard of custodial work is heavy lifting.

Building custodians stand up most of the time at work. Many tasks, such as dusting or sweeping, require constant bending, stooping, and stretching. Some must clean buildings after the regular staff has left for the day. To provide 24-hour maintenance, custodians may be assigned shift work.

Sources of Additional Information

Information about opportunities in custodial work and training under provisions of the Manpower Development and Training Act and other legislation may be obtained from the local office of your State employment service.

General information on job opportunities and wage rates in local areas may be obtained for this occupation from:

Service Employees International Union, 900 17th St. NW., Washington, D.C. 20006.

EXTERMINATORS

(D.O.T. 389.781 and 389.884)

Nature of the Work

Rats, mice, and common household insects, such as flies and roaches, contaminate food and spread sickness; termites can eat away houses. Eliminating these pests from homes and businesses is the job of professional exterminators who are classified either as pest-control routemen or termite treaters. Although these fields of work are

separate, many exterminators do both.

Routemen service restaurants, hotels, food stores, and other customers who have problems with rats, mice, and common household insects. Since these pests can be difficult to stamp out, many customers have contracts for regular service. Routemen serving such commercial accounts may visit a dozen or more locations in one day, and return to most of them two weeks to a month later. Service to homes may require only one to three visits per year. Routemen usually work alone.

Termite treaters, on the other hand, may spend one or more days servicing a single building. Additional visits are seldom necessary, because a treatment usually keeps termites away for many years. Treaters frequently work in pairs or are assisted by helpers.

On a typical day at the office, exterminators load their trucks or cars with chemical pesticides and other supplies and receive written instructions of services to be performed. Most customers are billed, but sometimes they pay the exterminator who keeps work records, including pesticides used and amount of time spent at each location, to be turned in to the office.

To choose the safest and most effective pesticide for each job, routemen must know the habits and hiding places of different insects and rodents, what attracts them, and how they get into buildings. Behind cabinets, under sinks, and in cracks and crevices, exterminators apply liquid pesticides, which are usually premixed, through a portable sprayer. Power bulbs are used in some areas.

Traps or poisonous baits are placed near areas where rats or mice nest. Routemen must be careful not to apply poisons around areas where food is exposed or where there would be a danger to children or pets. Most

of their work is fairly routine, but occasionally they handle an unusual job, such as removing bird nests from an attic.

Routemen tell customers how to correct conditions that attract pests. For example, they may recommend replacing damaged garbage containers, sealing open food containers, and repairing cracks in walls. Pest-control salesmen usually contact prospective customers.

Subterranean termites, the most common wood-attacking insects, live in underground colonies and build mud "commuter tubes" to reach the house above. To destroy a colony, termite treaters put a poisonous chemical barrier between it and the wooden parts of the house. One way is to treat the soil around the foundation of the house using special tools attached to a pressure pump. To block all avenues of entry, however, it is sometimes necessary to get at the soil underneath masonry surfaces, such as basement floors and brick steps. Treaters drill holes through these surfaces, and pour or pump the chemical into the holes. They seal these holes with a cement-like putty and replace any floor coverings, such as tiles, which had to be removed. Because termites cannot cross treated areas, those in the ground must find food or starve and those trapped in the house die for lack of moisture.

Treaters sometimes have to alter buildings to prevent pests from returning. For example, they may raise foundations, replace wood, install concrete flash walls, or insulate earth-to-earth contacts with concrete.

Helpers assist treaters by digging

around and underneath houses, helping set-up and operating equipment, and mixing cement, and doing general clean-up work.

Some highly experienced treaters inspect houses for termites, estimate costs, and explain the proposed work to customers. In most exterminating firms, however, the manager, supervisor, or pest control salesmen do these jobs.

Places of Employment

More than half of the estimated 25,000 exterminators employed in 1972 were pest-control routemen; the rest were termite treaters and combination routemen-treaters. Very few women held these jobs.

Most exterminators work for or own firms that specialize in pest control. A small number work for Federal, State, and local governments.

Jobs in this field can be found throughout the country. Employment, however, is concentrated in major metropolitan areas and large towns. In towns too small to support a firm that specializes in exterminating, pest control may be a part-time activity for workers in other occupations.

Training, Other Qualifications, and Advancement

Beginning exterminators are trained by supervisors and experienced workers. Many large firms also provide a few weeks of training, which includes classes on the characteristics of termites or other pests, the safe and effective use of pesticides, customer relations, and the preparation of work records. To aid beginners, many employers provide training manuals. Beginners gain practical experience by helping pest-control routemen or termite treaters on the job. Most can complete training for routine work in one of these occupations after 2 to 3 months.

About 30 States require exterminators to be licensed. In most States, the license is only for registration, but a growing number of these States require applicants to pass a written examination.

Employers prefer trainees who are high school graduates, have safe driving records, and are in good health. Many firms require their employees to be bonded; applicants for these jobs must have a record of honesty and respect for the law. Because routemen frequently deal with customers, employers look for applicants who are courteous, tactful, and well-groomed. Termite treaters need manual dexterity and mechanical ability. Some firms give aptitude tests to determine an applicant's suitability for the work.

High school courses in chemistry and business arithmetic provide a helpful background for exterminators. Students interested in becoming routemen also may benefit from courses in salesmanship. Those interested in termite treatment work can gain valuable experience by taking courses in carpentry.

Experienced workers with ability can advance to higher-paying positions, such as service manager or pest-control salesman. Those who acquire the necessary capital can open their own businesses.

The skills learned by exterminators also can be transferred to other occupations. Much of the pest-control routeman's work is similar to that of routemen who sell and deliver products to retail stores. With additional training, termite treaters can get jobs as carpenters.

Employment Outlook

Employment of exterminators is expected to grow rapidly through the mid-1980's. The need to replace experienced workers who retire or die or transfer to other occupations also will create many job openings.

Because pests reproduce rapidly and tend to develop immunity to pesticides, their control is a never-ending problem. Population growth and further congestion of metropolitan areas will add to the need for more exterminators. The deterioration of older buildings also is increasing the need for these workers, since buildings become more prone to infestation as they age.

Earnings and Working Conditions

Based on the limited information available, starting pay for inexperienced trainees ranged from $2 to $2.25 an hour in 1972. Earnings of experienced exterminators ranged from $2.50 to $4 an hour.

Some routemen are paid an hourly rate or weekly salary. Others receive a commission based upon charges to customers. Nearly all termite treaters are paid an hourly rate or weekly salary.

On the average, exterminators work 40 to 44 hours a week. During spring and summer, however, hours may be longer because pests are more prevalent. Most work is done during the day. Routemen, however, occasionally work nights because many restaurants and stores do not want them to work while customers are present.

Most firms provide holiday and vacation pay. Typically, employees receive 1 week's paid vacation after 1 year of service, 2 weeks after 2 years, and 3 weeks after 15 years. Many firms also provide paid sick leave, furnish laundered uniforms free of charge, and contribute to life and health insurance.

Exterminators work both indoors and outdoors in all kinds of weather.

They frequently lift and carry equipment and materials, but most items weigh less than 50 pounds. Routemen also do a great deal of walking. Termite treaters occasionally must crawl under buildings and work in dirty, cramped spaces. Workers in these occupations are subject to some hazards. Although most pesticides are not harmful to humans, some can cause injury if they are inhaled or left on the skin. Such injuries, however, are avoided if safety precautions are followed. Because they spend a lot of time driving, routemen have a relatively high exposure to traffic hazards. Termite treaters risk injury from power tools and sharp or rough materials in buildings.

Exterminators are on their own to a great extent. They do not work under strict supervision and, within limits, may decide how they will handle a job.

Sources of Additional Information

Further information on opportunities in this field may be available from local exterminating companies and the local office of the State employment service. General information about the work can be obtained from the National Pest Control Association, Inc., 250 W. Jersey St., Elizabeth, N.J. 07207.

HOTEL HOUSEKEEPERS AND ASSISTANTS

(D.O.T. 321.138)

Nature of the Work

Hotel housekeepers are responsible for keeping hotels or motels clean and attractive. They account for furnishings and supplies. They also hire, train, and supervise maids, linen and laundry workers, housemen, seamstresses, and repairmen. In addition, they keep employee records and perform other duties which vary by size and type of hotel.

Executive housekeeper demonstrates the proper way to make a bed.

Housekeepers employed in middle-size and small hotels not only supervise the cleaning staffs but also may do some of their work. In large hotels and smaller luxury hotels, the duties of executive or head housekeepers are primarily administrative. Besides supervising a staff that may number in the hundreds, they prepare the budget for the housekeeping department; submit reports to the manager on the condition of rooms, needed repairs, and suggested improvements; and purchase supplies and new furnishings. Some executive housekeepers employed by large hotel chains may have special assignments such as reorganizing housekeeping procedures in an established hotel or setting up the housekeeping department in a new hotel.

In many hotels, executive housekeepers are assisted by floor housekeepers who supervise the work on one or more floors. Large hotels also may employ assistant executive housekeepers. More than 16,000 persons, most of them women, worked as hotel housekeepers in 1972.

Training, Other Qualifications, and Advancement

Although no specific educational requirements exist for housekeepers, most employers prefer applicants having at least a high school diploma. Experience also is helpful in getting a job.

Training in hotel administration, including courses in housekeeping, is available at several colleges and universities. Some offer summer courses or evening classes; many receive guidance and approval from the National Executive Housekeepers Association. In addition, the American Hotel and Motel Association offers courses for classroom and individual home study. The most helpful courses deal with housekeeping; personnel management; budget

preparation; interior decoration; and the purchase, use, and care of different types of equipment and fabrics.

Executive housekeepers should be good at planning and organizing work. In addition, they must get along well with people, especially those they supervise. Housekeepers also should be able to work independently and analyze numbers and written data.

Assistant housekeepers may be promoted to executive housekeepers after several years of experience. Opportunities are limited, however, because only one executive housekeeper job is available in any hotel or motel.

Employment Outlook

Several hundred openings for hotel housekeepers and their assistants are expected each year through the mid-1980's. Although most openings will be to replace workers who die, retire, or transfer to other jobs, some new positions will become available in newly built hotels and the growing number of luxury motels.

Because established hotels usually fill vacancies by promotions from within (assistant housekeepers to executive housekeepers) outsiders will find their best job opportunities in newly built motels or hotels. Competition is likely to be keen.

See the Hotel statement elsewhere in the *Handbook* for information on Earnings and Working Conditions, Sources of Additional Information, and for additional information on Employment Outlook.

FOOD SERVICE OCCUPATIONS

Food service workers make up one of the largest and fastest-growing occupational groups in the Nation's labor force. In 1972 more than 3 million of these workers were employed, mostly in restaurants, hotels, factory and school cafeterias, and catering firms. Job opportunities can be found almost everywhere, because even very small communities have roadside diners and school cafeterias.

There are no specific educational requirements for most food service work and skills usually can be learned on the job. Young persons who have less than a high school education and no previous experience often can get jobs as kitchen workers, dishwashers, or fountain workers. Also, many restaurants hire inexperienced persons as waiters and waitresses, cooks and bartenders. Experience is needed, however, to get one of these jobs in large restaurants and catering firms. A head cook or chef must have special training or many years of experience.

Many vocational schools, both public and private, offer courses in cooking, catering, and bartending.

Employment of food service workers is expected to grow moderately through the mid-1980's. The demand for these workers will increase as new restaurants, cafeterias, and bars open in response to population growth and increased spending for food and beverages outside the home. Higher average incomes and more leisure time will allow people to eat out more often.

Detailed discussions of the work, training, outlook, and earnings of waiters and waitresses, cooks and chefs, and bartenders are presented in the statements that follow.

BARTENDERS

(D.O.T. 312.878)

Nature of the Work

Cocktails range from the ordinary to the exotic and bartenders make these concoctions by combining different kinds of liquor with mixes such as soda water, bitters, fruit juices, and cream. There are dozens of combinations, and each one can be made in several ways. Because most people have a preference for a particular brand of liquor or a certain cocktail recipe, bartenders are often asked to mix drinks to suit a customer's taste.

Besides cocktails, bartenders also serve wine, draft or bottled beer, and a wide variety of nonalcoholic beverages.

Bartenders usually are responsible for ordering and maintaining an inventory of liquor, mixes, and other bar supplies. They also arrange bottles and glasses to form a display, wash glassware, and clean the bar.

In some establishments, bartenders work at service bars and simply make drinks for waiters and waitresses to serve. In others, they work at public bars and take orders, serve drinks, and collect payment from customers.

Bartenders working in large restaurants or hotels usually have barboys or *bartender helpers* (D.O.T. 312.887) to help them with their duties. These workers keep the bar supplied with liquor, mixes, and ice; stock refrigerators with wines and beer; and replace empty beer kegs with full ones. They also keep the bar area clean, polish fixtures, and remove empty bottles and trash.

Places of Employment

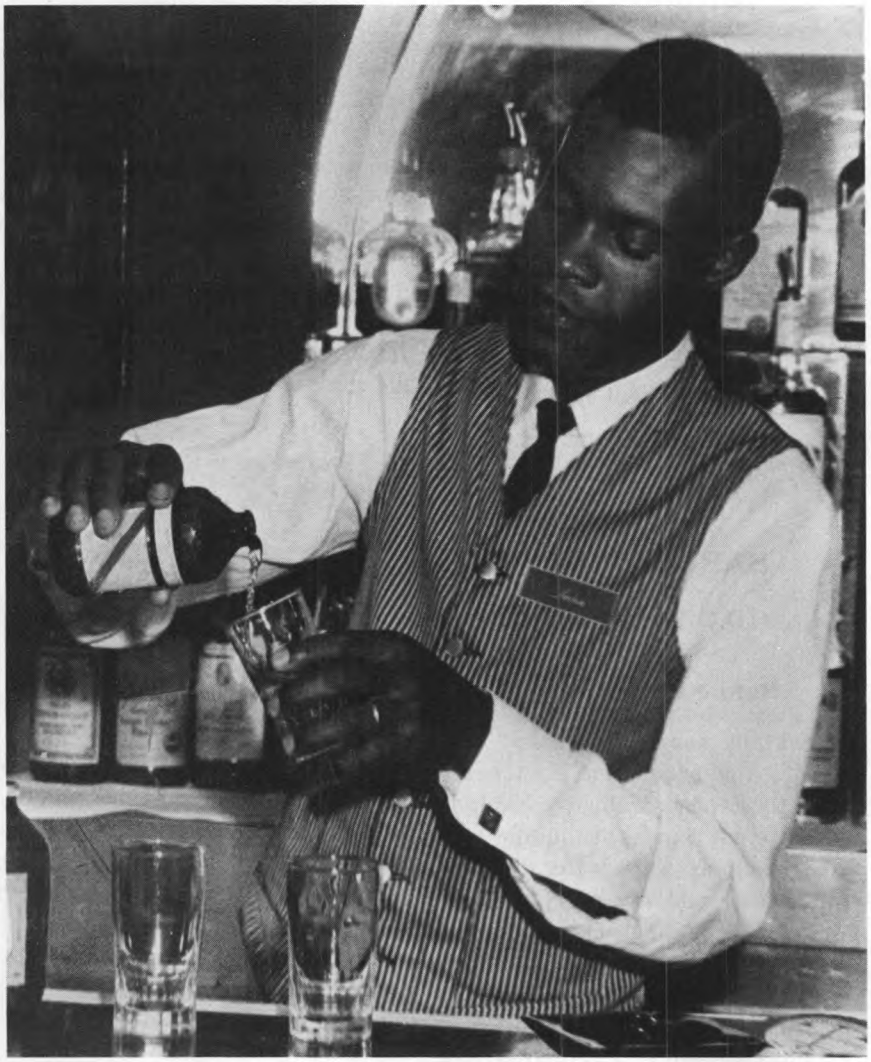
About 200,000 bartenders worked full-time in 1972, nearly one-fourth of them women. Most bartenders work in restaurants and bars, but many are also employed by hotels, entertainment and recreation places, and private clubs. Roughly one-third are self-employed.

In addition, several thousand people tend bar part time. They usually have full-time jobs in other occupations or attend college. Part-time workers often serve at banquets and private parties; usually they get these jobs through a union clearing house.

Most bartenders work in the urban population centers of New York, California, and other large States, but many are employed in small communities also. Vacation resorts offer seasonal employment, and some bartenders alternate between summer and winter resorts rather than remain in one area the entire year.

Training, Other Qualifications, and Advancement

Although preparing drinks at home can be good practice, it does not qualify a person to be a bartender. Besides knowing a variety of cocktail recipes, bartenders must know how to stock a bar properly and also must be aware of State and



local laws concerning the sale of alcoholic beverages. Most bartenders learn their trade on the job.

Young persons who wish to become bartenders can get good experience by working as barboys, busboys, or busgirls. They can watch the bartender at work, and when he has time to give instructions they can learn how to mix drinks and do other tasks. Working as a waiter or waitress also is good training.

Some private schools offer short courses in bartending that include instructions on State and local laws and regulations, cocktail recipes, attire and conduct, and stocking a bar. Some of these schools help their graduates find jobs.

Bartenders should have pleasant personalities because they deal with the public. They also need physical stamina, since they work on their feet and may have to lift heavy kegs and cases. Bartenders must be able to measure and pour ingredients quickly and accurately to turn out well-made drinks when serving large crowds.

Generally, bartenders must be at least 21 years of age, although some employers prefer those who are 25 or older. Some States require bartenders to have health certificates assuring that they are free from contagious diseases. In some instances, they must be bonded.

Small restaurants, neighborhood bars, and resorts usually offer a beginner the best entry opportunities. Once he has gained experience, a bartender may wish to work in a large restaurant or cocktail lounge where he can probably earn more, and may advance to head bartender, wine steward, or beverage manager. Some bartenders open their own business.

Employment Outlook

Employment of bartenders is expected to increase moderately through the mid-1980's. In addition to those caused by employment growth, several thousand job openings will arise annually from the need to replace experienced bartenders who retire, die, or transfer to other occupations.

The demand for bartenders will increase as new restaurants, hotels, and bars open in response to population growth and increased spending for food and beverages outside the home. Higher average incomes and more leisure time will allow people to go out for dinner or cocktails more often, and to take more vacations. Also, as more women enter the labor force, families often find dining out a welcome convenience. These factors will contribute to the growing demand for bartenders.

Earnings and Working Conditions

Hourly earnings of bartenders ranged from $2.50 to $4.63 in 1972, according to limited data from union contracts in the restaurant industry. Besides wages, bartenders at public bars often receive tips that increase their earnings. Since bartenders at service bars do not receive tips, they

are often paid higher wages to compensate.

Bartenders usually receive free meals at work and may be furnished bar jackets or complete uniforms. Paid holidays and vacations are customary, as are various types of employee benefits such as health and accident insurance and pension plans.

Many bartenders work more than 40 hours a week, but there is a trend toward working fewer hours. Night- and weekend-work and split shifts are common. For many bartenders, however, the opportunity to socialize with customers and the possibility of someday managing or owning a bar or restaurant more than offset these disadvantages. For others, the opportunity to get part-time work is important.

Sources of Additional Information

Information about job opportunities may be obtained from the Hotel and Restaurant Employees and Bartenders International Union, which is the principal union organizing bartenders, and from the State employment service.

COOKS AND CHEFS

(D.O.T. 313.131 through .887; 314.381 through .878; and 315.131 through .381)

Nature of the Work

A reputation for serving fine food is an asset to any restaurant, whether it prides itself in "home cooking" or exotic foreign cuisine. Cooks and chefs are largely responsible for the reputation a restaurant acquires. Many chefs have earned fame for both themselves and the restaurants and hotels where they work because of their skill in creating new dishes and improving familiar ones.

A cook's work depends partly on the type and size of the establishment in which he works. Preparing Chinese dishes, for example, is different from charcoaling steaks. Many small restaurants offer a few short order dishes plus pies and other baked goods bought from a bakery. In these places, one cook prepares all the food with the help of a short order cook and one or two kitchen helpers.

Large eating places usually have more varied menus and prepare more of the food they serve. Kitchen staffs often include several cooks, sometimes called assistant cooks, and many kitchen helpers. Each cook usually has a special assignment and often a special job title—pastry cook, fry cook, roast cook, vegetable cook, or sauce cook, for example. The head cook or chef coordinates the work of the kitchen staff, and often takes direct charge of certain kinds of food preparation. He decides on the size of servings, sometimes plans menus, and buys food supplies. He also sees that every item on the menu looks attractive and tastes good.

Places of Employment

About 870,000 cooks and chefs were employed in 1972. Most worked in restaurants, but many worked in schools, colleges, hotels and hospitals. Government agencies, manufacturing plants, private clubs, and many other kinds of establishments also employed cooks and chefs. Three out of 5 of these workers are women.

Training, Other Qualifications, and Advancement

Most cooks acquire their skills on the job while employed as kitchen helpers. Less frequently, they are trained as apprentices under trade union contracts or in the training programs some large hotels and restaurants run for new employees. Inexperienced workers usually can qualify as assistant or fry cooks after several months of on-the-job training, but acquiring all-round skills necessary for advancement to head cook or chef in a fine restaurant often takes several years.

Young people who have had courses in restaurant cooking will have an advantage when looking for jobs in large restaurants and hotels because hiring standards are often high in these establishments. Many vocational programs—in both public and private high schools—offer this kind of training to students. Other courses, ranging from a few months to 2 years or more, and open in some cases only to high school graduates, are given under the guidance of restaurant associations, hotel management groups, trade unions, and technical schools and colleges. The Armed Forces are also a good source of training and experience in food service work. Programs to train unemployed and underemployed workers for jobs as cooks were operating in several cities in 1972 under the Manpower Development and Training Act.

Although curricula may vary, a student usually spends most of his time learning to prepare food through actual practice in well-equipped kitchens. The student learns to bake, broil, and otherwise prepare food, and to use and care for kitchen equipment. He also may be taught to select and store food, use leftovers, determine the size of portions, plan menus, and buy food supplies in quantity. Students also learn hotel and restaurant sanitation and public health rules for handling food.

Many school districts provide on-

the-job training for cafeteria workers who wish to become cooks. In addition, they may conduct workshops during the summer, and select school cooks from employees who have participated.

Young people who want to become cooks or chefs should like to work with people in a team relationship and be able to work under pressure during busy periods. Cleanliness and a keen sense of taste and smell are also important qualifications. A cook or chef in a supervisory position not only must be an expert cook, but also must be able to organize and direct kitchen operations effectively. Most States require health certificates, indicating that cooks and chefs are free from contagious diseases.

Many cooks acquire higher paying positions and new cooking skills by moving from restaurant to restaurant. Some eventually go into business as caterers or restaurant owners; others may become instructors in vocational programs in high schools, junior and community colleges, and other institutions.

Employment Outlook

Employment of cooks and chefs is expected to increase moderately through the mid-1980's. In addition to employment growth, thousands of job openings will arise annually from the need to replace experienced workers who retire, die, or transfer to other occupations.

The demand for cooks and chefs will increase as population grows and people spend more money on eating away from home. Higher average incomes and more leisure time wil allow people to go out for dinner more often, and to take more vacations. Also, as more women enter the labor force, families often find dining out a welcome convenience. These factors will contribute to the growing demand for cooks and chefs.

Small restaurants and other eating places where food preparation is fairly simple will provide the greatest number of starting jobs for cooks. Beginners who have had training in restaurant cooking, however, will be able to find jobs in hotels and restaurants where foods are prepared more elaborately.

Cook instructs trainees.

Earnings and Working Conditions

Limited wage data from union contracts in large metropolitan areas indicate that in 1972 hourly pay rates ranged from $2.83 to $5.22 for chefs, $2.46 to $4.63 for cooks of various types, and $1.89 to $4.36 for assistant cooks. Most cooks and chefs, however, are not covered by union contracts.

Wages of cooks and chefs vary depending on the part of the country and the type of establishment in which they work. Wages generally are higher in the West and in large, well known restaurants and hotels. Cooks and chefs in famous restaurants earn much more than the minimum rates and several chefs with national reputations earn more than $30,000 a year.

In addition to wages, restaurant cooks usually receive uniforms and at least one free meal a day. Paid vacations and holidays are common, and various types of health insurance programs also are provided. Hours in restaurants include late evening, holiday, and weekend work, and range from 40 to 48 hours a week. Cooks employed in public and private schools work regular school hours during the school year only, usually for 9 months.

Many kitchens are air-conditioned and have convenient work areas and modern equipment. Others, particularly in older or smaller eating places, are often not as well equipped and working conditions may be less desirable. In kitch-

ens of all kinds, however, cooks must stand most of the time, lift heavy pots and kettles, and work near hot ovens and ranges.

The principal union organizing cooks and chefs is the Hotel & Restaurant Employees and Bartenders International Union.

Sources of Additional Information

Information about job opportunities may be obtained from local employers, locals of the Hotel & Restaurant Employees and Bartenders International Union, and local offices of the State employment service. The State employment service also may have information about the Manpower Development and Training Act and other training programs.

General information about restaurant cooks and chefs is available from the:

Culinary Institute of America, P.O. Box 53, Hyde Park, N.Y. 12538.

Educational Director, National Institute for the Food Service Industry, 120 South Riverside Plaza, Chicago, Ill. 60606.

The Educational Institute, American Hotel and Motel Association, 77 Kellogg Center, Michigan State University, East Lansing, Mich. 48823.

The Council on Hotel, Restaurant and Institutional Education, 1522 K St. NW., Washington, D.C. 20005.

MEATCUTTERS

(D.O.T. 316.781, 316.884)

Nature of the Work

Meatcutters prepare meat, fish, and poultry for sale in supermarkets or wholesale food outlets. Their primary duty is to divide animal carcasses into steaks, roasts, chops, and other serving-sized portions. They also prepare meat products such as sausage and corned beef. Meat cutters who work in retail food stores may set up counter displays and wait on customers.

In cutting a beef carcass, meatcutters divide it into halves with a band saw, and then into quarters by cutting each half between the ribs with a knife and sawing through the backbone. A special meat cutting saw is used to divide the quarters into primal cuts. Primal cuts yield only one cut of meat such as T-bone steaks or rib roasts. Meatcutters divide the primal cut into pieces small enough for an average serving.

Meatcutters use a butcher knife or slicer to divide boneless cuts and a band saw or cleaver to divide cuts containing bones. Any bone chips left on the meat are scraped off with a knife or brushed off by a machine. Meatcutters grind trimmings into hamburger.

Places of Employment

The estimated 200,000 meatcutters employed in 1972 were located in almost every city and town in the Nation. Only a small proportion were women. Most meatcutters worked in retail food stores. About 1 in 10 worked in wholesale food outlets; a few worked in restaurants, hotels, hospitals, and other institutions.

Training, Other Qualifications, and Advancement

Meatcutters acquire their skills on the job either through apprenticeship programs or informally. Generally, trainees begin by doing odd jobs, such as removing bone chips from retail cuts. Under the guidance of skilled meatcutters, they learn the

identity of various cuts and grades of meats and the proper use of tools and equipment. After demonstrating skill with tools, they learn first to divide primal cuts into individual portions and then to divide quarters into primal cuts.

In addition to learning to cut meat, beginning meatcutters may learn to cut and prepare fish and poultry, roll and tie roasts, grind hamburger, prepare sausage, and cure and corn meat. During the later stages of training, they may learn marketing operations such as inventory control, meat buying and grading, and recordkeeping.

Meatcutters who learn the trade through apprenticeship generally complete 2 to 3 years of supervised on-the-job training which may be supplemented by some classroom work. At the end of the training period apprentices are given a meatcutting test which is observed by their employer. A union member is also present in union shops. If they pass the test, apprentices become fully qualified journeyman meatcutters. If they fail, apprentices can

take the test again at a later time. In many areas of the country, apprentices may become journeymen in less than the usual training time if they can pass the meat-cutting test.

The most common method of entering this occupation is to be hired and trained by an individual retailer or wholesaler. A few meatcutters have gained entry by attending vocational schools that offer courses in meat-cutting. Unemployed and underemployed workers seeking entry jobs as meatcutters are trained in many cities under the Manpower Development and Training Act.

Employers prefer applicants who have a high school diploma and the potential to develop into meat department managers. High school or vocational school courses in business arithmetic are helpful to young people interested in becoming meatcutters, since they may be called on to weigh and price meats and to make change. A pleasant personality, a neat appearance, an the ability to communicate clearly also are important qualifications because meatcutters may wait on customers.

Manual dexterity, good depth perception, color discrimination, and good eye-hand coordination are important in cutting meat. Better than average strength is necessary since meatcutters work standing up and often lift heavy loads. In some communities, a health certificate may be required for employment.

Meatcutters may progress from journeymen to first cutter and then to a supervisory job, such as manager of the meat department in a supermarket. Some become meat buyers. Some experienced cutters open their own meat markets or retail food stores.

Employment Outlook

Little or no increase in the employment of meatcutters is expected through the mid-1980's. Nevertheless, thousands of entry jobs will be available as experienced meatcutters retire, die, or transfer to other occupations.

Central cutting, the practice of having one location at which meat for several stores is cut and wrapped, is expected to limit employment growth. Central cutting permits meatcutters to specialize in both a type of meat and a type of cut, thus increasing their efficiency. This specialization also reduces the amount of training necessary to become a cutter.

Earnings and Working Conditions

According to union contracts in six large cities, hourly earnings of most journeyman meatcutters ranged from $4.46 to $5.51 in 1972. Some meatcutters earned $6.18 an hour.

Beginning apprentices usually receive between 60 and 70 percent of the journeymen wage and generally receive increases every 6 to 8 months until they reach the journeyman level. Most meatcutters are members of the Amalgamated Meat Cutters and Butcher Workmen of North America.

Meatcutters generally work in cold rooms designed to prevent meat from spoiling. They must be careful when working with sharp tools, especially those that are powered.

Sources of Additional Information

Further information about work opportunities can be obtained from local employers or local offices of the State employment service. The State employment service also may have information about training opportunities under the Manpower Development and Training Act, apprenticeship, and other training programs. Information on training and other aspects of the trade also may be obtained from:

American Meat Institute, 59 East Van Buren St., Chicago, Ill. 60605.

Amalgamated Meat Cutters and Butcher Workmen of North America, 2800 North Sheridan Rd., Chicago, Ill. 60657.

WAITERS AND WAITRESSES

(D.O.T. 311.138 through .878)

Nature of the Work

Waiters and waitresses take customers' orders, serve food and beverages, make out checks, and sometimes take payments. In diners, coffee shops, and other small restaurants they provide fast, efficient service. In other restaurants, waiters and waitresses serve food at a more leisurely pace and offer more personal service to their customers. For example, they may suggest wines and explain the preparation of items on the menu.

Waiters and waitresses may have duties other than waiting on tables. They set up and clear tables and carry dirty dishes to the kitchen. In very small restaurants they may combine waiting on tables with counter service, preparing sandwiches, or cashiering. In large restaurants and in places where meal service is formal, waiters and waitresses are relieved of most additional duties. Busboys and busgirls often set up tables, fill water glasses, and do routine tasks.

Places of Employment

About 1,120,000 waiters and waitresses were employed in 1972. Many were part-time workers. More than

80 percent of all waiters and waitresses work in restaurants, but many work in hotels, schools, and colleges.

Training, Other Qualifications, and Advancement

Most employers prefer to hire waiters and waitresses who have had at least 2 or 3 years of high school. Although most waiters and waitresses pick up their skills on the job, some public and private schools and restaurant associations offer special training for waiters and waitresses. Unemployed and underemployed workers in several cities were trained for jobs as waiters and waitresses in 1972 under provisions of the Manpower Development and Training Act.

A pleasant appearance, an even disposition, and stamina are important to waiters and waitresses. They should also be good at arithmetic and, in a few restaurants, knowledge of a foreign language is helpful. State laws often require waiters and waitresses to obtain health certificates showing that they are free of contagious diseases.

In most small eating places opportunities for promotion are limited. After gaining experience, however, a waiter or waitress may transfer to a larger restaurant where earnings and prospects for advancement are better. Advancement can be to cashier jobs or to supervisory work as a maitre d', headwaiter, or hostess. Some supervisory workers advance to managerial positions.

Employment Outlook

Employment of waiters and waitresses is expected to increase moderately through the mid-1980's. Most job openings, however, will result from the need to replace experienced workers who retire, die, or leave their jobs.

The demand for waiters and waitresses will increase as new eating and drinking places open in response to population growth and increased spending for food and beverages outside the home. Higher average incomes and more leisure time will encourage people to go out for dinner or cocktails more often and to take more vacations. Also, as more women enter the labor force families often find dining out a welcome convenience.

Eating places that employ waiters and waitresses, however, will share only part of the additional business. Some of it will be handled by food and beverage vending machines, and some will go to drug stores, variety stores, carry outs, and cafeterias where service is provided by counter and fountain workers instead of waiters and waitresses.

Waiters and waitresses seeking jobs in formal restaurants will find competition keen for the jobs that become available. Beginners will find their best opportunities for employment in the thousands of restaurants where food service is less elaborate.

Earnings and Working Conditions

Limited data from union contracts that cover eating and drinking places in several large cities indicate that straight-time hourly rates for waiters and waitresses (excluding tips) ranged from $1.11 to $2.57 in 1972. For many waiters and waitresses, tips are greater than hourly wages. Tips vary, however, depending on the skill of the waiter or waitress, tipping customs of the community, and the type of restaurant. Since tips generally average between 10 and 20 percent of guests' checks, those who work in more expensive restaurants have the highest earnings.

Most waiters and waitresses receive meals at work and many are furnished with uniforms. Paid vacations are customary and various types of health insurance and pension plans also may be available.

Waiters and waitresses often work split shifts—that is, they work for several hours during the middle of the day, take a few hours off in the afternoon, and then return to their jobs for the evening hours. They also may work on holidays and weekends. Large restaurants and dining rooms usually have convenient working areas and are often air-conditioned. Working conditions in other eating places—particularly small ones—may be less desirable. In all restaurants, waiters and waitresses stand most of the time and often have to carry heavy trays of food. During lunch and dinner hours they may have to rush to serve several tables at once. Workers also must be careful not to slip or fall, or burn themselves when handling hot food and beverages.

The principal union organizing waiters and waitresses is the Hotel and Restaurant Employees and Bartenders International Union.

Sources of Additional Information

Information about job opportunities may be obtained from local

employers, locals of the union previously mentioned, and local offices of the State employment service. The State employment service also may be a source of information about the Manpower Development and Training Act and other programs that provide training opportunities. General information on waiter and waitress jobs is available from:

National Institute for the Foodservice Industry, 120 South Riverside Plaza, Chicago, Ill. 60606.

Council on Hotel, Restaurant, and Institutional Education, 1522 K St. NW., Washington, D.C. 20005.

PERSONAL SERVICES OCCUPATIONS

Personal service workers care for individuals and their belongings by performing services, including cleaning and pressing clothes, cutting hair, carrying baggage, and arranging funerals.

Training requirements vary among personal service jobs and may require state licensing. To be eligible for licensing exams, workers usually must complete an apprenticeship that may be preceded by specialized training. The length of training varies by State, but can last up to 4 years; an apprenticeship usually takes 1 to 2 years. Other jobs, such as bellman, have no specialized training.

Personal service workers should be neat, tactful, and able to get along with people. Many jobs demand physical stamina for lifting, carrying objects, and standing for long periods. Many workers wear uniforms supplied by the employer, and some must purchase their own equipment.

Personal service workers may receive salaries, commissions, or both. Many also receive tips. Part-time employment generally is good because extra workers often are hired during peak business periods.

This section describes 4 personal service occupations: Barbers, Cosmetologists, Funeral Directors and Embalmers, and Bellmen and Bell Captains.

BARBERS

(D.O.T. 330.371)

Nature of the Work

Although most men go to a barber for just a haircut, other services such as hairstyling and coloring are becoming increasingly popular. Specially trained barbers called "hairstylists," are employed in styling salons and some barber shops. They cut and style hair to suit each customer and may color or straighten hair and fit hair pieces. All barbers offer hair and scalp treatments, shaves, facial massages and shampoos.

As part of their responsibilities, barbers keep their scissors, razors, and other instruments sterilized and in good condition. They clean their work areas and may sweep the shop, as well. Those who own or manage a shop have additional responsibilities such as ordering supplies, paying bills, keeping records, and hiring employees.

Places of Employment

Most of the 160,000 barbers in 1972 worked in barber shops. More than half operated their own businesses. A small number of barbers worked for government agencies and hospitals.

All cities and towns have barbershops. Employment, however, is concentrated in large cities and in the most populous States.

Training, Other Qualifications, and Advancement

All States require barbers to be licensed. To obtain a license a person must have graduated from a State approved barber school, have completed the eighth grade, meet certain health requirements, and be at least 16 (in some States 18) years old.

Nearly all States require a beginner to take an examination for an apprentice license, and then, after 1 or 2 years of work, take a second examination for a license as a registered barber. The examinations usually include both a written test and a demonstration of ability to cut hair. Fees for these examinations range from $5 to $25. A few States do not charge a fee for the apprentice examination.

Barber training is offered in many public and private schools and a few vocational schools. Courses usually last 6 to 11 months. Trainees buy their own tools which cost about $100. They study the basic services—haircutting, shaving, massaging, and facial and scalp treatments—and, under supervision, practice on fellow students and customers in school "clinics." Besides attending lectures on barber services and the use and care of instruments, students take courses in anatomy, sanitation, and hygiene, and learn

how to recognize certain skin conditions. Instruction is also given in salesmanship and general business practices. Advanced courses are available in some localities for barbers who wish to specialize in hair styling, coloring, and the sales and service of hairpieces.

Dealing with customers requires patience and a better than average disposition. Good health and stamina also are important because a barber spends most of the time standing and works with both hands at shoulder level.

Beginners may get their first jobs through the barber school they attended, or through the local barber's union or employer's association.

Some experienced barbers advance by becoming managers of large shops or by opening their own shops. A few may teach at barber schools. Barbers who go into business for themselves must have the capital to buy or rent a shop and install equipment. Supplying a one-chair shop with new equipment usually costs from $1,500 to $2,500. Some shop owners buy used equipment and fixtures at reduced prices.

Employment Outlook

Employment of barbers should change little. Most job openings will result from the need to replace experienced barbers who retire, die, or transfer to other occupations. Replacement needs are relatively high because barbers are somewhat older, on the average, than workers in other occupations.

Employment opportunities for barbers have been limited in recent years by the trend toward longer hair. In the future, however, the effect of this trend is expected to be offset by population increases and the growing popularity of hair styling for men.

Because most barber shops will probably remain one- or two-man shops, opportunities will be best in the larger shops opening in suburban shopping centers.

Earnings and Working Conditions

Barbers receive income from commissions or wages and from tips. Most barbers who are not shop owners normally receive 65 to 75 percent of the money they take in; a few are paid straight salaries.

Weekly earnings of experienced barbers (including tips) generally ranged between $150 and $225 in 1972, according to limited information available. Some hairstylists, as well as some barbers who operated their own shops, earned more than $400 a week. Beginning barbers usually earn about $75 to $125 a week, hairstylists $125 to $200 a week.

Earnings depend on the size and location of the shop, customers' tipping habits, competition from other barbershops, and the barber's ability to attract and hold regular customers.

Most full-time barbers work more than 40 hours a week and a workweek of over 50 hours is not uncommon. Although Saturdays and lunch hours are generally very busy, a barber may have some time off during slack periods. To assure an even workload, some barbers ask customers to make appointments. Under some union contracts, barbers receive 1- or 2-week paid vacations, insurance, and medical benefits.

The principal union which organizes barbers—both employees and shopowners—is the Journeymen Barbers, Hairdressers, Cosmetologists and Proprietors' International Union of America. The principal trade association which represents and organizes shopowners and managers is the Associated Master Barbers and Beauticians of America.

Sources of Additional Information

Information on State licensing requirements and approved barber schools may be obtained from the State Board of barber examiners or other State authority at each State capital.

General information on training facilities and State licensing laws may be obtained also from:

National Association of Barber Schools, Inc., 338 Washington Ave., Huntington, W. Va. 25701.

Additional information on this occupation is available from:

Associated Master Barbers and Beauticians of America, 219 Greenwich Rd., P. O. Box 17782, Charlotte, N.C. 28211.

Journeymen Barbers, Hairdressers, Cosmetologists, and Proprietors' International Union of America, 4755 Kingsway Drive #320, Indianapolis, Ind. 46205.

BELLMEN AND BELL CAPTAINS

(D.O.T. 324.138 and .878)

Nature of the Work

Bellmen, sometimes called bellboys or bellhops, carry baggage for hotel and motel guests and escort them to their rooms on arrival. For the new guest the bellman checks to see that the room is in order and may suggest the use of hotel services, such as the dining room and valet service. Bellmen also run errands and deliver packages. In smaller hotels, they may relieve the elevator operators or switchboard operator. In 1972, more than 16,000, persons—

most of them men—worked as bellhops and bell captains.

Bell captains are employed in large and medium-sized hotels to supervise bellmen. They assign work, keep time records, and train new bellmen. They also may obtain transportation information for guests and send a bellman to pick up tickets. In addition, bell captains handle complaints regarding their department and take care of unusual service requests. At times, bell captains also may perform the duties of bellmen.

Superintendents of service, who are found only in a few hotels with large service departments, supervise elevator operators, doormen, and washroom attendants, as well as bellmen and bell captains.

Training, Other Qualifications, and Advancement

Bellmen do not have to meet any specific educational requirements. High school graduation, however, improves a bellman's chances for promotion to a front office clerical job. (See the Front Office Clerk statement elsewhere in the *Handbook*.) Many hotels fill bellman jobs by promoting elevator operators.

Since bellmen have frequent contact with the public, it is important that they be neat, tactful, and courteous. A knowledge of the local community is an asset. They also must be able to stand for long periods, carry heavy baggage, and work independently.

Bellmen can advance to bell captain and then to superintendent of service, but opportunities are limited. Because there is only one bell captain position in each hotel, many years may pass before an opening occurs. Opportunities for advancement to superintendent of service are even fewer.

Employment Outlook

Employment of bellmen should remain about the same through the mid-1980's as motels, which let guests drive to their rooms, are expected to account for most of the lodging industry's growth. Most of the hundreds of yearly openings for bellmen will be to replace those who die, retire, or leave the field for other reasons. Openings also will occur in small hotels as experienced bellmen shift to jobs in luxury hotels where tips may be higher. In addition, many temporary jobs will arise in resort hotels open only part of the year.

See Hotel Industry statement elsewhere in the *Handbook* for information on Earnings and Working Conditions, Sources of Additional Information, and for additional information on Employment Outlook.

COSMETOLOGISTS

(D.O.T. 332.271 and .381; 331.878 and 339.371)

Nature of the Work

Cosmetologists help their customers to look as attractive as possible. These workers, who are also known as *beauty operators, hairdressers,* or *beauticians,* shampoo, cut, set, and style women's hair; they also straighten, bleach, or tint it and give permanent waves. Cosmetologists may give manicures and scalp and facial treatments; provide makeup analysis; shape eyebrows; and clean and style wigs and hair pieces. Their duties include making appointments with customers, cleaning equipment, and sanitizing implements.

Cosmetologists may specialize in different parts of the work such as styling, manicuring, or hair tinting; many men cosmetologists specialize in styling. Self-employed beauticians have managerial duties in addition to their work as operators. They keep records, control supplies, and supervise other workers.

Places of Employment

About 495,000 persons worked as hairdressers and cosmetologists in 1972; 10 percent were men. This occupation has a relatively high proportion of part-time workers.

Although employment is concentrated in urban areas, many cosmotologists find jobs in small towns and rural areas. Most work in independently operated salons or in those connected with hotels and department or specialty stores. A few work in motion picture and television studios, hospitals, and on ocean liners.

Most beauty salons are small, having fewer than four employees; more than half are owner-operated.

Training, Other Qualifications, and Advancement

All States require that beauty operators be licensed. Before applicants are eligible to take State licensing examinations in cosmetology, they usually must be 16 years of age, present certificates of good health, and have completed the 10th grade. Many States require a high school diploma. Successful completion of a State-approved cosmetology course is recognized as adequate preparation for these examinations in all States; in some, a period of apprenticeship may be substituted. Most States provide for reciprocity which enables licensed operators in one State to work in another without taking an additional licensing examination.

About 2,800 public vocational schools and private schools offer training which meets State licensing requirements for cosmetologists. In many of them, instruction preparing students for an operator's license is available in evening classes as well as in full-time day classes. Many daytime courses offered by public and private schools require from 6 months to a year to complete. Other public school courses, which include academic subjects required for a high school diploma, last from 2 to 3 years. Apprentice training usually continues over 1 to 2 years. Many States issue special manicurists' licenses which require substantially fewer hours of training than general operators' licenses.

Both public and private school training programs include classroom study, lectures, demonstrations, and practical work. Beginning students usually work on each other or on manikins; when they have satisfactorily completed a period of preliminary training, they practice on patrons in school "clinics." Practically all beauty schools help their students find jobs after graduation.

Cosmetologists must keep abreast of changing hair styles and beauty techniques. They also need finger dexterity, a sense of form and artistry, and the physical stamina to stand for long periods of time. Beauticians should be willing and able to follow customers' instructions.

Operators usually provide their own uniforms; a few salons require them to furnish brushes, combs, and clips.

Newly hired cosmetologists start as manicurists, shampooers, or all-around operators performing a variety of tasks. Advancement usually comes in higher earnings as they gain experience and build a steady clientele or specialize in one or more phases of the work. Some experienced operators manage large salons or open their own; others teach in cosmetology schools or use their knowledge and skill to demonstrate cosmetics in department stores. A few work as inspectors for State cosmetology boards.

Employment Outlook

Employment of cosmetologists will grow rapidly through the mid-1980's as the use of beauty salons increases. Rising incomes and the growing number of women working outside the home are among the factors that will spur demand for the services cosmetologists provide.

In addition to openings from growth of the industry, thousands of workers will be needed each year to replace those who leave the occupation. Job opportunities are expected

to be good for newcomers as well as for experienced cosmetologists, and this occupation will offer many opportunities for those seeking part-time work.

Earnings and Working Conditions

Many cosmetologists are paid a salary plus commission (a percentage of receipts from their customers). Others are paid only a percentage of the receipts. A few are paid straight salary. Estimating total earnings is difficult because most cosmetologists receive tips in addition to salaries and commissions. Earnings also depend on experience, speed of performance, skill, location of the salon, and the ability to satisfy customers.

Many beginning operators earn from $100 to $200 a week, according to the limited information available. A very few top stylists and others in highly specialized jobs may earn $400 or more a week. Most full-time operators work 40 hours or more a week, usually including early evening and Saturday work. Many part-time operators also are employed during these busy periods.

In many large salons, department stores, and hotels, operators may participate in group life and health insurance and other benefit plans sponsored by the employer. Some establishments allow their employees annual paid vacations of at least 1 week after a year's service.

The most active union in this occupational field is the Journeymen Barbers, Hairdressers, Cosmetologists and Proprietor's International Union of America. Other organizations in the field are the National Hairdressers and Cosmetologists Association, Inc., which includes both shopowners and operators; The Associated Master Barbers and Beauticians of America, representing salon owners and managers; the National Association of Cosmetology Schools, Inc., representing school owners and teachers; and the National Beauty Culturists' League, made up of Negro operators, teachers, managers, and salon owners.

Sources of Additional Information

For information about approved training schools and licensing requirements, write your State board of cosmetology.

Additional facts about careers in beauty culture and State licensing requirements are available from:

National Beauty Career Center, 3839 White Plains Rd., Bronx, N.Y. 19467.

National Hairdressers and Cosmetologists Association, 3510 Olive St., St. Louis, Mo. 63103.

General information about cosmetology may be obtained from:

Journeymen Barbers International Union, 4755 Kingsway Drive #320, Indianapolis, Indiana 46205.

FUNERAL DIRECTORS AND EMBALMERS

(D.O.T. 187.168, 338.381)

Nature of the Work

Few occupations require the tact, discretion, and compassion called for in the work of funeral directors and embalmers. The families and friends of the deceased may be under considerable emotional stress and bewildered by the many details of the occasion. The *funeral director* (D.O.T. 187.168) helps them to make the personal and business arrangements necessary for the service and burial. The *embalmer* (D.O.T. 338.381) prepares the body for viewing and burial. In many instances, the funeral director and the embalmer are the same person.

The director's job begins when a call is received from a family requesting services. After arranging for the deceased to be removed to the funeral home, the director obtains the information needed for the death certificate, such as date and place of birth and cause of death. The director makes an appointment with the family to discuss the details of the funeral. These include: time and place of service; clergyman and organist; selection of casket and clothing; and provisions for burial or cremation. Directors also make arrangements with the cemetery, place obituary notices in newspapers, and take care of many other details. Directors must be familiar with the funeral and burial customs of various religious faiths and fraternal organizations.

Embalming is a sanitary and preservative measure, and under certain circumstances, such as delayed burials, is required by law. Embalmers, perhaps with the help of apprentices, first wash the body with germicidal soap and shave it if necessary. The embalming process proper replaces the blood with a preservative fluid. Embalmers apply cosmetics to give the body a natural appearance and, if necessary, restore disfigured features. Finally, they dress the body and place it in the casket selected by the family.

On the day of the funeral, directors attend to floral displays, provide cars for the family and pallbearers, receive and usher guests to their seats, and organize the funeral cortege. After the service they may help the family file claims for social security, veteran's and union benefits, and insurance. Directors may serve a family for several months following the funeral until all these matters are satisfactorily completed.

Places of Employment

About 45,000 people were licensed as funeral directors and embalmers in 1972. About 2 percent were women.

Funeral homes, which numbered 23,000 in 1972, employed nearly all of the directors and embalmers. Most funeral homes had 1 to 3 of these workers, including the owner. Many large homes, however, had 20 or more. Several hundred embalmers worked for morgues and hospitals.

Geographically, employment in these occupations is concentrated in cities.

Training, Other Qualifications, and Advancement

A license is needed to practice embalming. State licensing standards vary but generally an embalmer must be 21 years old, have a high school diploma or its equivalent, graduate from a mortuary science school, serve an apprenticeship, and pass a State board examination. One-half of the States require a year or more of college in addition to training in mortuary science.

All but six States also require funeral directors to be licensed. Qualifications are similar to those for embalmers, but directors may have special apprenticeship training and board examinations. Most people obtain both licenses. Information on licensing requirements is available from the State office of occupational licensing.

High school students can start preparing for a career in this field by taking courses in biology, chemistry, speech, and psychology. Students may find a part-time or summer job in a funeral home. Although these jobs consist mostly of maintenance and clean-up tasks, such as washing and polishing hearses, they can be helpful in gaining familiarity with the operation of funeral homes.

In early 1972, 22 schools had mortuary science programs accredited by the American Board of Funeral Service Education. About one-half were private vocational schools that offer 1-year programs emphasizing basic subjects such as anatomy and physiology, as well as practical skills, such as embalming techniques and restorative art. A small number of colleges and universities offer 2- and 4-year programs in funeral service. These programs included liberal arts and management courses as well as mortuary science. All programs offered courses in psychology, accounting, and funeral law.

Apprentices work under the guidance of experienced embalmers and directors. Depending on State regulations, an apprenticeship usually lasts 1 or 2 years and may be served before, after, or during the time one attends mortuary school.

State board examinations consist of written and oral tests and actual demonstrations of skills. After passing the examination, apprentices receive a license to practice. If they want to work in another State they may have to pass its examination, although many States have mutual agreements which make this unnecessary.

Important personal traits for funeral directors are courtesy, tact, and the ability to communicate easily with the public. They also should have the desire and ability to comfort people in their time of sorrow.

Advancement opportunities are best in large funeral homes where directors and embalmers may earn promotion to higher paying positions such as personnel manager or general manager. Some workers eventually acquire enough money and experience to establish their own businesses.

Employment Outlook

Little change in the employment of funeral directors and embalmers is expected through the mid-1980's. Nevertheless, many openings will arise each year to replace experienced workers who retire, die, or transfer to other occupations.

In recent years, the number of mortuary school graduates has approximately equaled the number of jobs available. Barring any significant growth in enrollments, future graduates should find employment opportunities available.

Demand for funeral services will rise as the population grows and deaths increase. Most funeral homes, however, will be able to meet the demand without expanding their employment. Most homes conduct only one or two funerals each week and are capable of handling several more.

Earnings and Working Conditions

In 1972, funeral directors and embalmers generally earned from $150 to $250 a week. Managers generally earned between $10,000 and $15,000 a year, and many owners earned more than $20,000. Apprentices earned between $1.80 and $3.50 an hour.

In large funeral homes, employees usually have a regular work schedule. Typically they put in 8 hours a day, 5 or 6 days a week. Overtime, however, may be necessary when emergencies arise. Some employees work shifts; for example, nights one week, and days the next.

Occasionally embalmers may come into contact with contagious diseases but the possibility of their becoming ill is remote, even less likely than for a doctor or nurse.

Most directors and embalmers receive paid vacations and sick leave, retirement benefits, and life, health, and accident insurance. Some also

receive license renewal fees and suits to wear on the job.

Sources of Additional Information

Information about job opportunities in this field is available from local funeral homes and from:

National Funeral Directors Association of the United States, Inc., 135 W. Wells St., Milwaukee, Wisc. 53203.

National Selected Morticians, 1616 Central St., Evanston, Ill. 60201.

For a list of accredited schools of mortuary science and information about scholarship opportunities, contact:

The American Board of Funeral Service Education, Inc., 201 Columbia St., Fairmont, W. Va. 26554.

PRIVATE HOUSEHOLD SERVICE OCCUPATIONS

In 1972, private household service work employed 1.7 million people, most of them women. The majority were domestic workers who eased the burden of running and maintaining their employers' residences by doing any of the tasks found in those homes, such as cooking, cleaning, or caring for children. Some specialized in one aspect of household work, such as cooking; others held jobs that combined several tasks.

Private households also require the services of workers in a variety of other occupations, including gardeners, chauffers, nurses, and private secretaries. Gardeners, for example, keep the grounds of private residences neat and orderly by planting, fertilizing, and pruning flowers, trees, and shrubs. Chauffeurs drive their employers' cars, keep the vehicles clean and in good running condition, and sometimes help with other chores such as exercising pets.

Some of the most important domestic occupations found in private households, including those of maid, companion, and housekeeper, are discussed in the statement that follows. For information on the services that nurses, painters, and secretaries may perform in private households, see the statements on these occupations elsewhere in the *Handbook*.

PRIVATE HOUSEHOLD WORKERS

(D.O.T. 099.228, 301.887, 303.138 and .878; 304.887, 305.281, 306.878, 307.878, and 309.138 through .999)

Nature of the Work

Thousands of people employ private household workers to ease the burden of running and maintaining their homes. These workers perform a variety of jobs ranging from child care to cleaning and cooking. Some household occupations involve one or more related tasks while others require a mixture of many. In addition, the duties of some workers change from day to day.

The *general maid* or *mother's helper* cleans floors and bathrooms and may be responsible for meals, laundry, and child care. When hired by the hour or day, she is called a *day worker.* The *handyman* or *odd-job man* does heavy household tasks and minor household and yard maintenance. He cleans furniture, washes windows, waxes floors, paints fences, and cares for the yard. A few handymen work only in the house and sometimes are called *housemen.* If employed year-round, handymen may be known as *caretakers.*

Often private household workers specialize in one aspect of household work. *Cooks* prepare meals. Some do everything from planning the meal and ordering food to serving and cleaning the kitchen. Others get meal-planning instructions from a family member. Some cooks are aided by a *cook's helper.* The helper, who is less skilled than a cook, does things such as clean and peel vegetables or cut and grind meats. Another specialized household worker is the *laundress* who washes, irons, and folds clothing.

Some private household workers provide personal services and care for members within a household. The *personal maid* attends to a woman's needs while the *valet* attends a man. They maintain clothing, clean an employer's quarters, and help him to dress. Personal maids and valets may have additional duties including mixing drinks and running errands. *Companions* do the work of a personal maid or valet and also act as a friend or aide to a convalescent, elderly, or handicapped person. Companions may read or talk with their employer and look after social or business affairs.

Many private household workers specialize in child care. The *nursemaid,* for example, cares for the physical needs of children. She bathes them, prepares meals, washes and irons clothes, and supervises their play. *Infants' nurses* are responsible for very small children; they have additional duties connected with babies such as sterilizing bottles and other equipment and preparing formulas. *Babysitters* are nursemaids who work on a daily or hourly basis. The *governess,* who has greater responsibilities than a nursemaid, supervises children's recreation, health, and diet; she follows the parents' instruction in taking charge of their education. She also disciplines children, arranges activities, and may teach music and languages.

A household with a large staff of workers may employ a *home housekeeper* or a *butler* to supervise and coordinate domestic activities. They also may hire and fire other household employees. Butlers receive and

announce guests, answer the telephone, and serve food and drinks. They may act as valets. The housekeeper orders food and cleaning supplies and keeps a record of expenditures. Often a *working housekeeper* is the household's only employee. Her duties combine those of the general maid and housekeeper.

Places of Employment

In 1972 more than 1.4 million people were private household workers; 98 percent of them were women. Most household workers are employed part-time—a few days a week for part or all of a day. Those who live in usually work the longest hours.

Although a few specialized workers, such as laundresses or nursemaids, may work in their own homes, most jobs are found in the employer's home. Household workers are employed throughout the country, but most work in urban areas.

Training, Other Qualifications, and Advancement

For most household worker jobs there are no formal educational requirements. Instead, the ability to cook, sew, wash and iron, clean house, and care for children is important. Employers prefer workers who can operate household equipment such as vacuum cleaners and floor waxers. Often young people learn these skills while helping with the housework at home.

Some people acquire the necessary abilities by working for about a year as a mother's helper under the supervision of an experienced household worker or housewife. High schools, vocational schools, and junior colleges give home economics courses that help to develop domestic skills beyond the level ordinarily reached in the home. Training programs sponsored by Federal agencies, State employment service offices, and local welfare departments also can develop these skills.

Work experience is less important than educational and cultural background for the governess or companion. A companion's background, interests, and age should be similar to his employer's. Practical nursing experience may be helpful if the employer is an invalid. A background in the arts is useful to a governess and teaching skills are helpful for those who care for young children.

Private household workers need physical stamina and the ability to work independently. They should be able to get along with people and want to help them. In addition, they must have a neat personal appearance and like to work with their hands. Some household workers, particularly cooks and infants' nurses, need a health certificate; often the employer arranges and pays for the necessary physical examination.

With the knowledge learned at home or as a mother's helper, a woman can take a job as a general household worker or nursemaid. Advancement other than a wage increase generally is not available in households with only one or two workers. The domestic worker usually must transfer to a job requiring greater skills, such as personal maid, infant's nurse, cook or housekeeper. These opportunities are limited in number.

Employment Outlook

Although the number of private household workers is expected to

decline rapidly through the mid-1980's, thousands of openings will result each year from the need to replace those who die, retire, or leave for other reasons. Most of these jobs will be for maids and childcare workers.

The demand for services that private household workers provide will continue to grow as more women work outside the home and as family incomes increase. The decrease in the number of workers stems from low earnings and the lack of benefits as well as increasing opportunities in other lines of work. The demand for private household services will be met in part by new and improved home appliances and cleaning and child care businesses.

Earnings and Working Conditions

In 1972, full-time private household workers averages $2,478, less than half the average for non-supervisory workers in private industry, except farming.

Wages vary according to employer's income, type of work, and local pay standards. Earnings are higher in large cities, especially in the North. Workers who live in generally are paid more than those who live out and have room and board. Workers who live out may receive a free meal and transportation money.

Frequently the employee works on her own and has a key to admit herself when the employer is away. Private household work is hard at times, especially for day workers, who generally are given the less desirable household tasks. Long or irregular working hours can isolate workers who live in from family and friends, and if they are the sole employees in the households, they are likely to be alone most of the time.

Sources of Additional Information

Facts about employment opportunities and training programs in private household work are available from local offices of State employment services.

Information on laws affecting household workers and guidelines for work is available from:

National Committee on Household Employment, 1625 I St. NW., Washington, D.C. 20006.

PROTECTIVE AND RELATED SERVICE OCCUPATIONS

The growth of our Nation's population and economy demands an ever increasing emphasis on protective services. Each city, suburban area, and National port of entry requires protective and related service workers to check crime, minimize loss of life and property, and enforce regulations that protect the health and safety of our citizens.

Careers in protective and related service occupations require varied combinations of education and experience. Workers such as FBI special agents and some inspectors for the Federal government must have at least a bachelor's degree, while some guards and watchmen have less than a high school education. Most occupations in this group, however, require a high school diploma. In many cases, a college degree is an asset for advancement to higher level positions.

In addition to educational requirements, most workers in protective and related services must undergo formal training programs and get on-the-job experience before they are fully qualified. Training programs last from several days to a few months and emphasize specific job-related skills.

Personal qualifications such as honesty and an understanding of human nature are important. Persons seeking careers in protective and related service occupations should sincerely desire to serve the community and be able to exercise proper judgment under a variety of conditions.

This section describes several occupations in protective and related services, FBI Special Agents, Firefighters; State and Local Police, Guards and Watchmen, and Health, Regulatory and Construction Inspectors.

FBI SPECIAL AGENTS

(D.O.T. 375.168)

Nature of the Work

Federal Bureau of Investigation (FBI) Special Agents investigate violations of Federal laws such as bank robberies, kidnappings, frauds against the Government, thefts of Government property, espionage, and sabotage. The FBI, which is part of the U.S. Department of Justice, has jurisdiction over more than 185 Federal investigative matters. Special Agents, therefore, may be assigned to any type of case; however, those with specialized training usually work on cases related to their background. Agents with an accounting background, for example, investigate frauds involving Federal Reserve Bank records.

Because the FBI is a fact-gathering agency, its Special Agents function strictly as investigators. (The FBI does not give personal protection to individuals or do police work to insure that the law is obeyed. Such matters are handled by local and State law enforcement agencies.) To perform their duties, Special Agents may interview people, observe the activities of suspects, and participate in raids; their duties may involve extensive travel. Because the FBI's work is highly confidential, Special Agents may not disclose any of the information gathered in the course of their official duties to unauthorized persons, including members of their families. Agents may have to testify in court about cases which they investigate, but they do not make recommendations concerning prosecution or express opinions on the guilt or innocence of suspects.

Although they work alone on most assignments, agents communicate with their supervisors by radio or telephone as the circumstances dictate. In performing potentially dangerous duties, such as arrests and raids, two or more agents are assigned to work together.

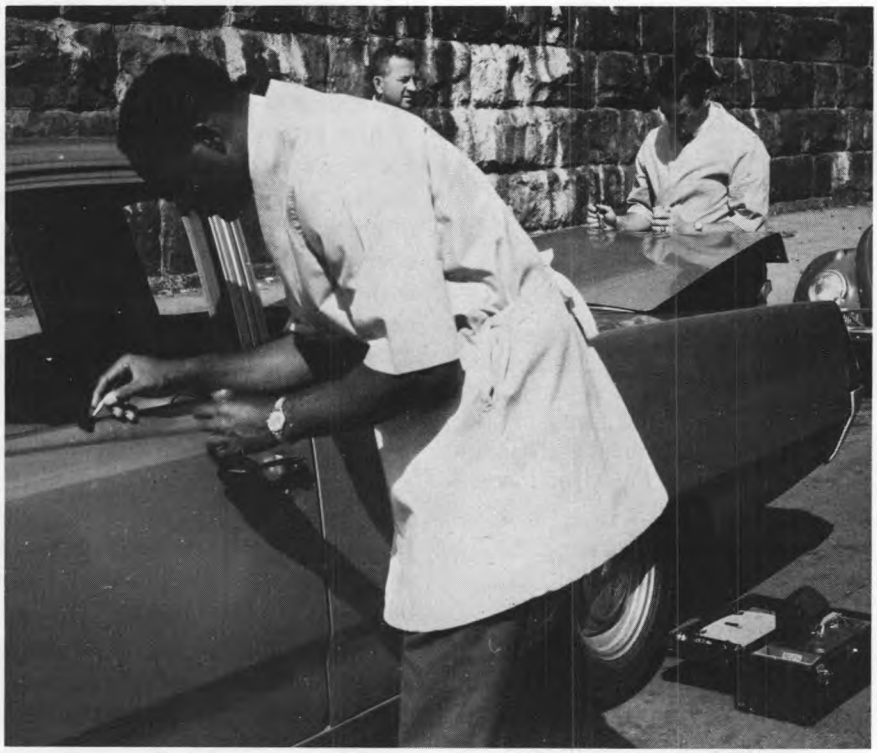
Places of Employment

About 8,600 persons were Special Agents in 1972. Although the vast majority were men, in May, 1972, the FBI began accepting applications from women. There are now a small number of women assigned as Special Agents.

Most agents were assigned to the FBI's 59 field offices located throughout the Nation and in Puerto Rico. They worked in cities where field office headquarters are located or in resident agencies (sub-offices) established under field office supervision to provide prompt and economic handling of investigative matters arising throughout the field office territory. Some agents are assigned to the Bureau headquarters staff in Washington, D.C., which supervises all FBI activities.

Training, Other Qualifications, and Advancement

To be eligible for appointment as



FBI Special agents inspect car for fingerprints.

an FBI Special Agent, an applicant usually must have graduated from a State-accredited resident law school or a 4-year resident college with a major in accounting. The law school training must have been preceded by at least 2 years of resident undergraduate college work. Accounting graduates must have at least 1 year of experience in accounting, auditing, or a combination of both. In addition, the position is available to persons who have a 4-year resident college degree with a physical science major or fluency in a foreign language for which the FBI has a current need, or 3 years of professional, executive, complex investigative, or other specialized experience.

Applicants for the position of FBI Special Agent must be citizens of the United States, at least 23 and not more than 40 years old, and willing to serve anywhere in the United States or Puerto Rico. They must be at least 5 feet 7 inches tall and capable of strenuous physical exertion; they must have excellent hearing and vision, normal color perception, and no physical defects which would prevent their using firearms or participating in dangerous assignments. Each applicant must pass a rigid physical examination, as well as written and oral examinations testing his knowledge of law or accounting and his aptitude for meeting the public and conducting investigations. All of the tests except the physical examinations are given by the FBI at its facilities. Exhaustive background and character investigations are made of all applicants. Appointments are made on a probationary basis and become permanent after 1 year of satisfactory service.

Each newly appointed Special Agent is given approximately 14 weeks of training at the FBI Academy at the U.S. Marine Corps Base in Quantico, Virginia before assignment to a field office. During this period, agents receive intensive training in defensive tactics and firearms. In addition, they are thoroughly schooled in Federal criminal law and procedures, FBI rules and regulations, fingerprinting, and investigative work. After assignment to a field office, the new agent usually works closely with an experienced agent for about 2 weeks before handling any assignments independently.

All administrative and supervisory jobs are filled from within the ranks by selecting those FBI Special Agents who have demonstrated the ability to assume more responsible positions.

Employment Outlook

The FBI has experienced a substantial expansion in its jurisdiction over the years. Although it is impossible to forecast Special Agent personnel requirements, employment may be expected to increase with growing FBI responsibilities.

The FBI provides a career service and its rate of personnel turnover is traditionally low. Nevertheless, the FBI is always interested in applications from qualified persons who would like to be considered for the position of Special Agent.

Earnings and Working Conditions

The entrance salary for FBI Special Agents was $12,776 in January 1973. Special Agents are not appointed under Federal Civil Service regulations, but, like other Federal employees, they receive periodic within-grade salary raises if their work performance is satisfactory; they can advance in grade as they gain experience.

Special Agents are subject to call 24 hours a day and must be avail-

able for assignment at all times and places. They frequently work longer than the customary 40-hour week and, under certain specified conditions, receive over-time pay up to $3,000 a year. They are granted paid vacations, sick leave, and annuities on retirement.

Sources of Additional Information

The Federal Bureau of Investigation, U.S. Department of Justice, Washington, D.C. 20535.

FIREFIGHTERS

(D.O.T. 373.118 through .884)

Nature of the Work

Every year fires destroy thousands of lives and property worth millions of dollars. Firefighters help protect the public against this danger. This statement gives information about firefighters who work full time for city fire departments. It does not cover part-time volunteers, private firefighters, or those employed by the Federal and State governments.

During duty hours firefighters must be prepared to rush to a fire and handle any emergency that occurs. Because firefighting is dangerous and complicated it requires teamwork and good organization. At every fire, firefighters perform specific duties assigned by their commanding officer: They may connect hose lines to hydrants, operate a pressure pump, or position ladders. Because their duties may change several times while the company is in action they must be skilled in many different firefighting activities. In addition, they help people to safety and administer first aid.

Fire departments also are responsible for fire prevention. Many departments provide specially trained personnel to inspect public buildings for conditions that might cause a fire. They may check the number and working condition of fire escapes and fire doors, the storage of flammable materials, and other possible hazards. In addition, firefighters educate the public about fire prevention and safety measures. They frequently speak on this subject before school assemblies and civic groups; and, in some communities, they inspect private homes for fire hazards.

Between alarms, firefighters spend much time improving their skills and doing maintenance work. They also have practice drills, clean and lubricate equipment, and stretch hoses to dry.

Places of Employment

About 200,000 men worked as firefighters in city fire departments in 1972. Some very large cities have several thousand firemen; some towns have fewer than 25. In addition, about 1,000 women worked as dispatchers in city fire stations.

Training, Other Qualifications, and Advancement

Applicants for firefighting jobs must pass a written intelligence test, a medical examination, and tests of strength, physical stamina, and agili-

ty, as specified by local civil service regulations. In most communities, these examinations are open to men who are at least 21 years of age, meet certain height and weight requirements, and have a high school education. Those who receive the highest scores on the examinations have the best chances for appointment. Extra credit usually is given for military service, and experience gained as a volunteer fireman or through training in the Armed Forces also may improve an applicant's chances for appointment.

As a rule, beginners in large fire departments are trained for several weeks at the city's fire school. Through classroom instruction and practice drills, the recruits study firefighting techniques, fire prevention, local building codes, and first aid; also, they learn how to use axes, chemical extinguishers, ladders, and other equipment. After completing this training, they are assigned to local fire companies.

Experienced firefighters often continue study to improve their job performance and prepare for promotional examinations. Fire departments frequently conduct training programs, and many colleges and universities offer courses such as fire engineering and fire science that are helpful to firefighters.

Among the personal qualities firefighters need are mental alertness, courage, mechanical aptitude, endurance, and a sense of public service. Initiative and good judgment are extremely important because firefighters often must make quick decisions in emergency situations. Because members of a crew eat, sleep, and work closely together under conditions of stress and danger, they should be dependable and able to get along well with others in a group. Leadership qualities are assets for officers who must establish and maintain a high degree of discipline and efficiency as well as plan and direct the activities of the firefighters in their companies.

Opportunities for promotion are good in most fire departments. As firefighters gain experience, they may advance to higher ratings. After 3 to 5 years of service they may become eligible for promotion to the grade of lieutenant. The line of further promotion usually is to captain, then battalion chief, assistant chief, deputy chief, and finally to chief. Chances for advancement generally depend upon each candidate's position on the promotion list, as determined by his score on a written examination, his supervisor's rating, and his seniority.

Employment Outlook

The employment of firefighters is expected to increase rapidly through the mid-1980's to meet the need for fire protection in growing urban communities. Many jobs will become available in new and expanding departments; thousands of additional openings will occur as firefighters die, retire, or leave their jobs for other reasons.

Employment of firefighters should continue to grow as new fire departments form and others enlarge their fire prevention sections. Many jobs also will be created as smaller communities replace volunteer fire companies with official departments. In addition, more firemen will be required as city fire departments continue to shorten the hours that their men work.

The number of young men who qualify for firefighter jobs in large cities usually is greater than the number of job openings, even though the written examination and physical requirements eliminate many applicants. Therefore, competition among candidates is apt to remain keen.

Earnings and Working Conditions

In 1972, most firefighters in cities with populations of 100,000 or more who had 1 or 2 years' experience earned between $9,000 and $10,700 a year.

Salaries varied by city size and region of the country. For example, firefighters earned from $8,100 to $9,700 in small cities, $8,800 to $10,500 in cities of 500,000 to 1 million in population, and $10,400 to $12,250 in those larger than 1 million. Earnings for firefighters were lowest in the South and highest in the West. Average earnings of all firefighters were about one and one-half times as much as the average of all nonsupervisory workers in private industry, except farming.

Fire chiefs in cities of 100,000 or more averaged $23,700 a year in 1972. Those who headed fire departments in cities with populations of more than 1 million earned $32,000.

Practically all fire departments furnish allowances to pay for protective clothing (helmets, boots, and rubber coats) and many also provide dress uniforms.

In some cities, firefighters are on duty for 24-hours, then off for 24 hours, and receive an extra day off at intervals. In other cities, they work a day shift of 10 hours or a night shift of 14; shifts are rotated at frequent intervals. The average workweek for firefighters is 51 hours, but duty hours usually include some time when they are free to read, study, or pursue other personal interests. In addition to scheduled hours firefighters often must work extra hours when they are bringing a fire under control. When overtime is worked most fire departments give compensatory time off or extra pay.

The job of a firefighter involves risk of death or injury from sudden cave-ins of floors or toppling walls and danger from exposure to flames

and smoke. Firemen also may come in contact with poisonous, flammable, and explosive gases and chemicals. In addition, they frequently work in bad weather.

Firefighters generally are covered by liberal pension plans that often provide retirement at half pay at age 50 after 25 years of service or at any age if disabled in the line of duty. Firefighters also receive paid vacations. Provisions for sick leave usually are liberal. Health and surgical benefit plans are offered in many fire departments and compensation is provided for firefighters injured in the line of duty. Most fire departments provide paid holidays—ranging to 11 or more a year—or compensatory time off for working on holidays.

Nearly three-fourths of all firefighters are members of the International Association of Firefighters (AFL-CIO).

Sources of Additional Information

Information on obtaining a job as a firefighter is available from local civil service commission offices or fire departments.

Information about a career as a firefighter or specific job duties may be obtained from:

International Association of Fire Fighters, 905 16th St. NW., Washington, D.C. 20006.

International Association of Fire Chiefs, 1725 K St. NW., Washington, D.C. 20006.

Additional information on the salaries and hours of work of firemen in various cities is published annually by the International City Management Association in its *Municipal Yearbook*, which is available in many libraries.

GUARDS AND WATCHMEN

(D.O.T.372.868)

Nature of the Work

Guards and watchmen patrol and inspect property to protect it against fire, theft, vandalism, and illegal entry. The specific duties of these workers, however, vary by size, type, and location of employer.

In office buildings, banks, hospitals, and department stores, guards and watchmen protect records, merchandise, money, and equipment. Department store guards often work with plainclothesmen watching for theft by store employees.

At ports and railroads, guards and watchmen protect merchandise in shipment as well as property and equipment. They make sure that nothing is stolen while being loaded or unloaded, and guard against fires, prowlers, and trouble among work crews. Sometimes they direct traffic.

Guards who work in public buildings, such as museums or art galleries, protect paintings or exhibits from fire, theft, or damage. They also answer routine questions from visitors and sometimes guide traffic.

In large factories, aircraft plants, and defense installations where valuable information must be protected, some guards check the credentials of persons and vehicles entering and leaving the premises. University, park, or recreation guards perform similar duties and also may issue parking permits and direct traffic.

At social affairs, sports events, conventions, and other public gatherings, guards maintain order, give information, and watch for suspicious persons.

In a large organization, guards may serve under a security officer who is in charge of the guard force; in a small organization a single watchman may be responsible for security. Patrolling is usually done on foot; but if the property is large, guards or watchmen may make their rounds by car or motor scooter.

As they make their rounds, guards and watchmen check all doors and windows, see that no unauthorized persons remain after working hours, and insure that fire extinguishers, alarms, sprinkler systems, furnaces, and various electrical and plumbing systems are working properly. Guards sometimes set thermostats or turn on machines for janitorial workers.

Guards and watchmen usually are uniformed and often carry a nightstick or gun. They also may carry a flashlight, whistle, two-way radio, and a watch clock—a device that indicates the time at which they reach various check-points.

Places of Employment

In 1972, about 250,000 persons—90 percent of them men—worked as guards and watchmen.

Most guards and watchmen work

in office buildings, defense installations and other government buildings, hospitals, nursing homes, hotels, banks, and schools. Large numbers also work in manufacturing industries including automobiles, aerospace, steel, and rubber.

Although guard and watchman jobs are found throughout the country, most are located in highly industrialized areas.

Training, Other Qualifications, and Advancement

Although there are no specific educational requirements, most employers prefer guards and watchmen who are high school graduates. Applicants with less than a high school education usually are tested for their reading and writing abilities and their competence in following written and oral instructions. Employers also seek people who have had experience in the military police or in State and local police departments.

Candidates for guard and watchman jobs in the Federal Government must be veterans, have some experience as guards, and pass a written examination. For most Federal guard positions, applicants must qualify in the use of firearms. A driver's permit is required for some jobs.

Many employers give newly hired guards pre-job instruction and several weeks of on-the-job training. Guards may be taught the use of firearms, the administration of first aid, how to handle various emergencies, and ways to spot and deal with security problems.

Applicants are expected to have good character references; no police record; good health—especially in hearing and vision; and good personal habits such as neatness and dependability. They also should be mentally alert, emotionally stable, and physically fit to cope with emergencies. Some employers require guards to meet height and weight specifications or to be within a certain age range. For example, insurance companies and accounting firms may hire older guards; while banks and jewelers, often threatened by robberies, may prefer younger applicants better able to handle intruders.

Although guards and watchmen in small companies receive periodic salary increases, advancement is likely to be limited. However, most large organizations use a military-type ranking of guards—from patrolman, through intermediate ranks, to captain—that offers advancement in position and salary. Guards with some college education may advance to jobs that involve administrative duties or the prevention of espionage and sabotage.

Employment Outlook

Employment of guards and watchmen is expected to grow moderately through the mid-1980's as the number of plants, stores, and other organizations where they work expands. The increase in crime, vandalism, and social unrest also should heighten the need for these workers.

In addition to new jobs created by employment growth, thousands of openings will occur each year as guards retire, die, or leave their jobs for other reasons. Replacement needs in this occupation are relatively high because guards and watchmen are somewhat older, on the average, than workers in most occupations.

Earnings and Working Conditions

Guards and watchmen in private industry averaged $100 a week in 1972, according to a Bureau of Labor Statistics survey of urban areas. Those working in the North earned more than the average while guards employed in the South earned somewhat less. Guards and watchmen earn about four-fifths as much as the average for all nonsupervisory workers in private industry, except farming.

Depending on their experience, newly hired guards in the Federal Government earned between $112 and $126 a week. Top supervisory guards in the Federal Government may be paid up to $225 a week. These workers usually receive over-time pay as well as a wage differential for the second and third shifts. Guards and watchmen generally have paid vacations, sick leave, and insurance and pension plans.

About two-thirds of all guards and watchmen work at night; the usual shift lasts 8 hours. Some employers have three shifts where guards rotate to divide daytime, weekend, and holiday work equally. Guards and watchmen usually eat on the job instead of taking a regular lunch break.

Because guards often work alone, they have no one to call if an accident or injury occurs. To reduce this hazard, some large firms use a reporting service that enables guards and watchmen to be in constant contact with a central station outside the plant. If they fail to transmit an expected signal, the central station investigates.

Sources of Additional Information

Further information about work opportunities for guards and watchmen is available from local employers and the nearest State employment service office.

POLICE OFFICERS

(D.O.T. 375.118 through .868 and 377.868)

Nature of the Work

The security of our Nation's cities and towns depends greatly on the work of local policemen whose jobs range from controlling traffic to preventing and investigating crimes. Whether on or off duty, these officers are expected to exercise their authority whenever necessary.

The policeman who works in a small community has many duties. In the course of a day's work, he may direct traffic at the scene of a fire, investigate a housebreaking, and give first aid to an accident victim. In a large police department, by contrast, officers usually are assigned to a specific type of duty. Most policemen are detailed either to patrol or traffic duty; smaller numbers are assigned to special work, such as accident prevention or operation of communications systems. Others work as detectives (plain-clothesmen) assigned to criminal investigation; still others, as experts in chemical and microscopic analysis, firearms identification, and handwriting and fingerprint identification. In very large cities, a few officers may work with special units such as mounted and motorcycle police, harbor patrols, helicopter patrols, canine corps, mobile rescue teams and youth aid services.

Some city police departments have women on their forces. Although some are assigned to regular patrol duty, most work with juvenile delinquents, or search, question, book, and fingerprint women prisoners. They may also work with detective squads, where they normally handle crimes involving women.

Most newly recruited policemen begin on patrol duty. Patrolmen may be assigned to such varied areas as congested business districts, outlying residential areas, or other sections of a community. They may cover their beats alone or with other patrolmen, and they may ride in a police vehicle or walk on "foot" patrol. In any case, they become thoroughly familiar with conditions throughout their area and, while on patrol, remain alert for anything unusual. They note suspicious circumstances, such as open windows or lights in vacant buildings, as well as hazards to public safety such as burned-out street lights or fallen trees. Patrolmen also watch for stolen automobiles and enforce traffic regulations. At regular intervals, they report to police headquarters through call boxes, by radio, or by walkie-talkie. They must also prepare reports about their activities and may be called on to testify in court when cases result in legal action.

Places of Employment

About 370,000 full-time officers worked for local police departments in 1972. Although most were men, an increasing number of women are now being employed.

Some cities have very large police forces. For example, New York has over 30,000 police officers and Chicago over 13,000. Hundreds of small communities employ fewer than 25 policemen each. Policewomen work mainly in large cities.

Training, Other Qualifications, and Advancement

Local civil service regulations govern the appointment of police officers in practically all large cities and in many small ones. Candidates must be U.S. citizens, usually at least 21 years of age, and be able to meet certain height and weight standards. Eligibility for appointment depends

on performance on competitive examinations, as well as on education and experience. The physical examinations often include tests of strength and agility.

Because personal characteristics such as honesty, good judgment, and a sense of responsibility are especially important in police work, candidates are interviewed by a senior officer at police headquarters, and their character traits and background are investigated. In some police departments, candidates also may be interviewed by a psychiatrist or a psychologist, or given a personality test. Although police officers work independently, they must perform their duties in line with laws and departmental rules. They should enjoy working with people, and should want to serve the public.

In large police departments, where most jobs are found, applicants usually must have a high school education. A few cities require some college training and some hire law enforcement students as police interns. A few police departments accept men who have less than a high school education as recruits, particularly if they have worked in a field related to law enforcement.

More and more police departments encourage applicants to take post-high school training in sociology and psychology. As a result, more than 500 junior colleges, colleges, and universities now offer programs in law enforcement. Other courses helpful in preparing for a police career include English, American history, civics and government, business law, and physics. Physical education and sports are especially helpful in developing the stamina and agility needed for police work.

Young persons who have completed high school can enter police work in some large cities as police cadets, or trainees, while still in their teens. As paid civilian employees of the police department, they attend classes to learn police skills and do clerical work. They may be appointed to the regular force at age 21 if they pass all necessary qualifications.

Before their first assignments, policemen usually go through a period of training. In small communities, recruits learn by working for a short time with experienced officers. Training provided in large city police departments is more formal and may last several weeks or a few months. This training includes classroom instruction in constitutional law and civil rights; in State laws and local ordinances; and in accident investigation, patrol, and traffic control. Recruits learn how to use a gun, defend themselves from attack, administer first aid, and deal with emergencies.

Policemen and policewomen usually become eligible for promotion after a specified length of service. In a large department, promotion may allow an officer to specialize in one type of police work such as laboratory work, traffic control, communications, or work with juveniles. Promotions to the rank of sergeant, lieutenant, and captain usually are made according to each candidate's position on a promotion list, as determined by his performance on written examinations and his work as a police officer.

Many types of training help police officers improve their performance on the job and prepare for advancement. Through training given at police department academies and colleges, officers keep abreast of crowd-control techniques, civil defense, legal developments that affect policemen, and advances in law enforcement equipment. Many police departments encourage officers to work toward college degrees, and some pay all or part of the tuition.

Employment Outlook

Employment opportunities for police officers are expected to be favorable for qualified applicants through the mid-1980's. Police employment should rise rapidly as population and economic growth create a need for more officers to protect life and property, regulate traffic, and provide other police services. Many openings also will occur as policemen retire or leave their jobs for other reasons.

The use of modern police methods has increased the need for officers with specialized skills. In an increasing number of departments, for example, electronic data processing is used to compile administrative, criminal, and identification records, and to operate emergency communications systems. Many departments also need officers with specialized training to apply engineering techniques to traffic control or social work techniques to crime prevention. At the same time, the use of automatic signal lights has somewhat reduced the number of policemen needed for directing traffic.

Earnings and Working Conditions

In 1972, starting salaries of police officers in cities with populations of 100,000 or more averaged $9,500 a year. Most officers receive regular salary increases during the first few years of employment until they reach a set maximum. Maximum earnings averaged just over $11,000 a year in 1972. In general, police officers are paid about one and one-half times as much as nonsupervisory workers in private industry, except farming.

Although sergeants, lieutenants, and captains receive higher basic salaries than patrolmen, the highest earnings are paid to police chiefs or commissioners. These top law en-

forcement officials may earn as much as $40,000 a year in the largest cities.

Police departments usually provide officers with special allowances for uniforms and furnish revolvers, night sticks, handcuffs, and other required equipment.

The scheduled workweek for police officers usually is 40 hours. Because police protection must be provided around the clock, in all but the smallest communities some officers are on duty over weekends, on holidays, and at night. Policemen are subject to call any time their services are needed and may work overtime in emergencies. In some departments, overtime is paid at straight time or time and a half; in others, officers may be given an equal amount of time off on another day of the week.

Police officers generally are covered by liberal pension plans, enabling many to retire at half pay by the time they reach age 55. In addition, paid vacations, sick leave, and medical and life insurance plans frequently are provided.

Policemen may have to work outdoors for long periods in all kinds of weather. The injury rate is higher than in many occupations and reflects the risks officers take in pursuing speeding motorists, capturing lawbreakers, and dealing with public disorder.

Sources of Additional Information

Information about entrance requirements may be obtained from local civil service commissions or police departments.

Additional information describing careers as policemen or policewomen may be obtained from:

International Association of Chiefs of Police, 11 Firstfield Rd., Gaithersburg, Md. 20760.

Fraternal Order of Police, National Headquarters, 3094 Bertha St., Flint, Mich. 48504.

STATE POLICE OFFICERS

(D.O.T. 375.118, .138, .168, .228, .268, and .388)

Nature of the Work

The laws and regulations that govern the use of our Nation's roadways are designed to insure the safety of all citizens. State policemen (sometimes called State highway patrolmen or troopers) patrol our highways and enforce these laws.

State police officers issue traffic tickets to motorists who violate the law. At the scene of an accident, they direct traffic, give first aid, call for emergency equipment including ambulances, and write reports to be used in determining the cause of the accident.

In addition, State police officers provide services to motorists on the highways. For example, they radio for road service for drivers in mechanical trouble, direct tourists to their destination, or give information about lodging, restaurants, and tourist attractions.

State police officers also provide traffic assistance and control during road repairs, fires, and other emergencies, as well as for special occurrences such as parades and sports events. They sometimes check the weight of commercial vehicles, conduct driver examinations, and give information on highway safety to the public.

State policemen may investigate crimes, such as thefts, murders, and narcotics violations, particularly in areas that do not have a police force. They sometimes help city or county police investigate criminals, catch lawbreakers, and control civil disturbances. State highway patrols, however, normally are restricted to responsibilities involving vehicle and traffic matters.

State police investigate serious accident.

Some police officers specialize in fingerprint classification, chemical or microscopic analysis of criminal evidence, instructing trainees in State police schools, and piloting police aircraft. Others work with special State police units such as the mounted police, canine corps, and marine patrols.

State police officers also write reports and maintain police records. Some officers, including division or bureau chiefs responsible for training or investigation and those who command police operations in an assigned area, have administrative duties.

Places of Employment

About 44,000 State police officers were employed in 1972. Although almost all were men, positions for women are expected to increase in the future.

The size of State police forces varies considerably. The largest force (in California) has over 5,000 officers; the smallest (in North Dakota) has fewer than 100. One state (Hawaii) does not maintain a police force.

Training, Other Qualifications, and Advancement

State civil service regulations govern the appointment of State police officers. All candidates must be citizens of the United States. Other entry requirements vary by State, but most require applicants to have a high school education or an equivalent combination of education and experience and be at least 21 years old.

Officers must pass a competitive examination and meet physical and personal qualifications. Physical requirements include standards of height, weight, and eyesight. Tests of strength and agility often are required. Because honesty and a sense of responsibility are important in police work, an applicant's character and background are investigated.

Although State police officers work independently, they must perform their duties in line with department rules. They should want to serve the public and be willing to work outdoors in all types of weather.

In all States, recruits enter a formal training program for several months. They receive classroom instruction in State laws and jurisdictions, and they study procedures for accident investigation, patrol, and traffic control. Recruits learn to use guns, defend themselves from attack, handle an automobile at high speeds, and give first aid. After gaining experience, some officers take advanced training in police science, administration, law enforcement, or criminology. Classes are held at junior colleges, colleges and universities, or special police institutions such as the National Academy of the Federal Bureau of Investigation.

High school and college courses in English, reading, government, psychology, sociology, and physics help in preparing for a police career. Physical education and sports are useful for developing stamina and agility. Completion of a driver education course and training received in military police schools also are assets.

Police officer recruits serve a probationary period ranging from six months to three years. After a specified length of time, officers become eligible for promotion. Most States have merit promotion systems that require officers to pass a competitive examination to qualify for the next highest rank. Although the organization of police forces varies by State, the typical avenue of advancement is from private to corporal, to sergeant, to first sergeant, to lieutenant, and then captain. Police officers who show administrative ability may be promoted to higher level jobs such as commissioner or director.

In some States, high school graduates may enter State police work as cadets. These paid civilian employees of the police organization attend classes to learn various aspects of police work and are assigned nonenforcement duties. Cadets who qualify may be appointed to the State police force at age 21.

Employment Outlook

State police employment is expected to rise very rapidly through the mid-1980's. Although most jobs will result from growth in employment, some openings will be to replace officers who retire, die, or leave the occupation for other reasons.

Although some State police will be needed in criminal investigation and other nonhighway functions, the greatest demand will be for officers to work in highway patrol. This is the result of a growing and more mobile population. Along with an increasing number of motor vehicles, the nature of highway systems is rapidly changing. Limited access highways need heavier police patrol to control high speeds, prevent accidents, and help stranded motorists. The newer dual highways also require more patrolmen, because officers can handle only one side of these roads.

Because law enforcement work is becoming more complex, specialists will be needed in crime laboratories and electronic data processing centers to develop administrative and criminal information systems.

Earnings and Working Conditions

In 1972, beginning salaries for State policemen ranged from about

$500 to nearly $800 a month. The most common entry rates ranged from $600 to $700 a month. Although starting salaries are normally higher in the West and lower in the South, State police officers on the average earn about one and one-half times as much as nonsupervisory workers in private industry, except farming.

State policemen generally receive regular increases, based on experience and performance, until a specified maximum is reached. The 1972 maximums ranged from $700 to over $1,200 a month; the most common maximum rates ranged between $800 and $900 a month. Earnings increase with promotions to higher ranks. The most common maximum salaries for State police sergeants were between $900 and $1,000. Lieutenants earn more, often between $1,100 and $1,200 a month.

State police agencies usually provide officers with uniforms, firearms, and other necessary equipment, or give special allowances for their purchase.

In many States, the scheduled workweek for police officers is 40 hours. Although the workweek is longer in some States, hours over 40 are being reduced. Since police protection must be provided around the clock, some officers are on duty over weekends, on holidays, and at night. Police officers also are subject to emergency calls at any time.

State policemen usually are covered by liberal pension plans. Paid vacations, sick leave, and medical and life insurance plans frequently are provided.

The work of State police officers is sometimes dangerous. They always run the risk of an automobile accident while pursuing speeding motorists or fleeing criminals. Officers also face the risk of injury while apprehending criminals or controlling disorders.

Sources of Additional Information

Information about specific entrance requirements may be obtained from State civil service commissions or State police headquarters, usually located in each State Capitol.

HEALTH AND REGULATORY INSPECTORS (GOVERNMENT)

(D.O.T 168.168, 168.268, and 168.287)

Nature of the Work

Protecting the public from health and safety hazards, prohibiting unfair trade and employment practices, and raising revenue are included in the wide range of responsibilities of government. Health and regulatory inspectors insure observance of the laws and regulations that govern these responsibilities.

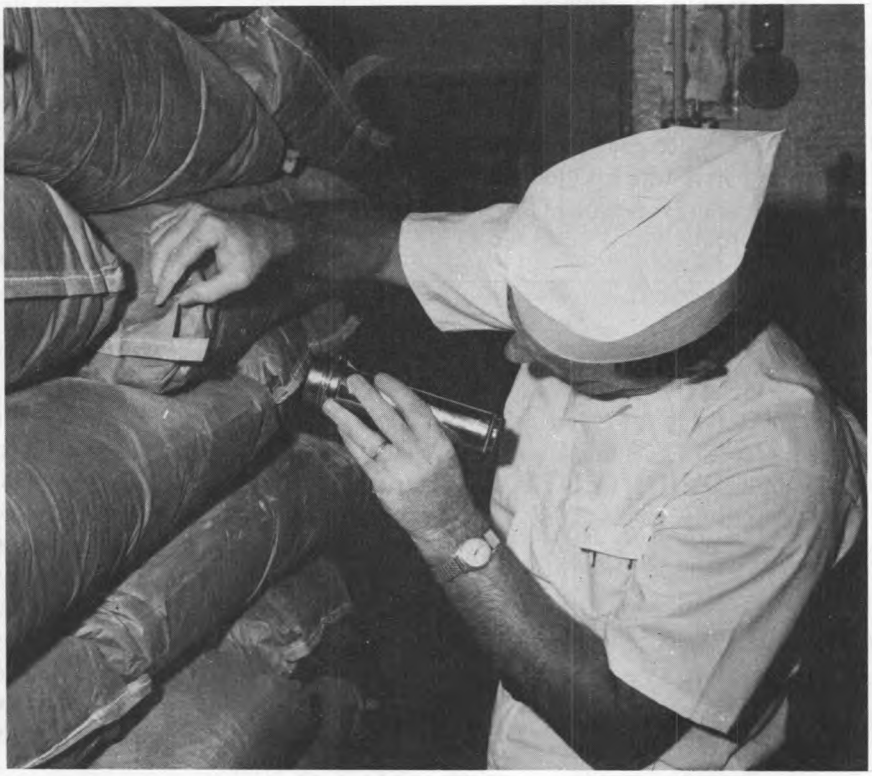
The duties, titles, and responsibilities of Federal, State, and local health and regulatory inspectors vary widely. Some types of inspectors work only for the Federal Government while others also are employed by State and local governments. Health and regulatory inspectors are two of the principal types of government inspectors. For discussion of a third, see the statement on Construction Inspectors (Government) elsewhere in the *Handbook*. Many other workers employed as accountants, agricultural cooperative extension service workers, and other agricultural professionals, manufacturing inspectors, safety professionals, and sanitarians also have inspection duties.

Health inspectors work with engineers, chemists, microbiologists, and health workers to insure compliance with public health and safety regulations governing food, drugs, and various other consumer products. They also administer regulations that govern the quarantine of persons and products entering the United States from foreign countries. The major types of health inspectors are: food and drug, meat and poultry, egg products, foreign quarantine, and agricultural quarantine inspectors.

Federal, State, and local government laws declare that marketed foods must be wholesome and produced under sanitary conditions; that drugs, cosmetics, therapeutic devices, and other products must be safe and effective for their intended uses; and that such products must be honestly packaged and labeled. *Food and drug inspectors* make certain that the Nation's businesses comply with these laws.

Most food and drug inspectors specialize in one area of inspection such as food, feeds and pesticides, weights and measures, or drugs and cosmetics. Some, especially those who work for the Federal government, may be proficient in several of these areas. Working individually or in teams under the direction of a senior or supervisory inspector they travel throughout a geographical area to check, periodically, firms that produce, handle, store, and market food, drugs, and cosmetics. They look for evidence of inaccurate product labeling, decomposition, chemical or bacteriological contamination, and other factors that could result in a product becoming detrimental to consumer health. They assemble evidence of violations using portable scales, cameras, ultraviolet lights, container sampling devices, thermometers, chemical testing kits, and other types of equipment.

Product samples collected as part



Food and drug inspector checks food for leakage or signs of contamination.

of their examinations are sent to laboratories for analysis. After completing their inspection, they discuss their observations with the management of the plant and point out any areas where corrective measures are needed. They prepare written reports of their findings, and, when necessary, compile evidence that may be used in court if legal actions must be taken to effect compliance with the law.

Federal and State laws empower *meat and poultry inspectors* to inspect meat, poultry, and their by-products to insure that they are wholesome and safe for public consumption. Working as part of a constant on-site team under the general supervision of a veterinarian, they inspect meat and poultry, slaughtering, processing, and packaging operations. Those carcasses or parts found to be safe and wholesome are conspicuously stamped to that effect. They condemn as unfit for human consumption any animals, carcasses, or processed meat and poultry which they find displaying evidence of disease, contamination, or poor processing. Meat and poultry inspectors also collect samples for laboratory analysis and examine all nonmeat ingredients used in processing. They check to see that products are labeled correctly and that proper sanitation is maintained in slaughtering and processing operations.

Egg products inspectors are entrusted by law with the responsibility of insuring that egg products are sanitarily processed and packaged free of contamination or spoilage. Working at egg processing plants, they supervise the washing and examination of shell eggs to insure that broken eggs are removed and destroyed or denatured. They supervise the processing, cooling, pasteurization, storage, and handling of all dried, liquid, or frozen egg products. Periodically, they select samples of processed egg products for laboratory analysis to insure that they have not spoiled or become contaminated due to improper storage or handling. Each day before production begins, they also inspect the plant and its equipment to insure that it has been properly cleaned and that the standards of sanitation are maintained.

The responsibility of *foreign quarantine inspectors* is to prevent the importation of communicable diseases. They inspect the passengers, crew, and cargo of aircraft, and maritime vessels arriving at airports and seaports, to determine their medical acceptability for entrance into the United States. Working closely with customs, immigration, and agricultural quarantine inspectors, they examine travelers for symptoms of diseases, such as smallpox. Any individuals that they believe to be ill they detain for examination by a physician. Foreign quarantine inspectors also enforce regulations pertaining to the admission of animals into the United States since many diseases common to various species of animals are communicable to man. In addition, they prepare and maintain documents, certificates, and reports on persons or animals detained under suspicion of having contracted a communicable disease.

Agricultural quarantine inspectors protect American agricultural products from the introduction and spread of foreign plant pests and animal diseases. To safeguard the health of crops, forests, and gardens, they inspect ships, aircraft, railroad cars, and motor vehicles seeking to enter the United States for the presence of restricted or prohibited plant or animal materials. They often work with customs inspectors to inspect mail and passenger baggage. They examine fruits and

vegetables, nursery stock, plants, seeds, and soil passing through ports of entry for the presence of foreign insects, mites, snails, or plant diseases. Plants and plant products restricted, suspected to be pest infested, or with which "hitchhiking" pests are associated are ordered destroyed or fumigated. Agricultural quarantine inspectors also examine meat and animal products and by-products entering the United States from foreign countries to determine that they are properly processed and do not carry dangerous foreign animal diseases. At the request of American exporters, they may also inspect and certify domestically grown plants and plant and animal products for compliance with the import requirements of foreign countries.

Regulatory inspectors insure compliance with various laws and regulations that protect the public welfare Important types of regulatory inspectors are: immigration, customs, aviation safety, mine, wage-hour compliance, and alcohol, tobacco, and firearms inspectors.

Immigration inspectors interview and examine people seeking admission, readmission, or the privileges of passing through or residing in the United States. They inspect the passports of aliens and U.S. citizens to determine whether they are legally eligible to enter the United States and to verify their citizenship, status, and identity. Working closely with inspectors in foreign quarantine, agricultural quarantine, and customs, they examine the visas of aliens and inquire as to the reasons for their visit. If they question an individual's admissibility, he can be detained. Immigration inspectors also prepare reports, maintain records, and process applications and petitions by aliens for privileges such as immigrating to or temporarily living in the United States.

Customs inspectors enforce the laws governing U.S. imports and exports. Stationed at airports, seaports, and border crossing points they count, weigh, gauge, measure, and sample commercial cargoes entering and leaving the United States to determine the amount of tax that must be paid. They also inspect baggage and articles worn or carried by the passengers and crew of ships, aircraft, and motor vehicles to insure that all merchandise being brought through ports of entry is declared and the proper taxes paid.

Most often, customs inspectors participate in a traveler inspection program at points that have a large volume of travelers passing through. They screen travelers and baggage for violations of immigration laws, public health quarantine regulations, or transportation of prohibited meats, plants, or other materials. Customs inspectors who work at isolated border crossing points often perform the added duties of health, immigration and agricultural inspecting. They also participate in the enforcement of gold, narcotics, and trademark restrictions and work with Federal Bureau of Investigation (FBI) agents, treasury agents, and other law enforcement officers. When not conducting inspections, they write reports and keep records.

Aviation safety officers insure that Federal Aviation Administration (FAA) regulations that govern the quality and safety of aircraft equipment and personnel are maintained. Aviation safety officers may inspect aircraft manufacturing, maintenance, or operations procedures. They usually specialize in inspecting either commercial aircarriers or general aviation (privately owned and operated aircraft).

Working under the direction of a principal inspector, teams of from two to four manufacturing inspectors check the construction of every aircraft to assure that it conforms to its approved and certificated design. They spend about one half of their time visiting production facilities to make measurements and check the materials used during construction. Their results and observation are recorded and any changes or deviation they find from the certificated production model must receive approval or be corrected. They issue Airworthiness Certificates to acknowledge that an aircraft conforms to its design type. They also inspect manufacturers' production facilities and evaluate production methods and quality control systems in order to improve the quality and safety of aircraft being manufactured.

Aviation maintenance inspectors administer Federal regulations relating to the maintenance of commercial and private aircraft. They periodically examine and certify mechanics, mechanic training programs, and schools. They also inspect and certificate aircraft repair and maintenance facilities and major overhauls of aircraft or alterations. They determine if work was performed in accordance with the manufacturer's latest instructions and FAA approved methods, techniques, and practices.

Aviation operation inspectors inspect and certify aircraft pilots and flight crews, training programs and schools, pilot examiners, flight instructors, and instructional materials. Most operations inspectors examine and certify the pilots and crews of one or two models of planes. They also observe the semiannual proficiency flight checks given commercial pilots by their airlines or supervise the activities of approved FAA pilot examiners and inspect and certify general aviation ground and flight instructors, pilots, and other airmen. Operations inspectors

spend much of their time in the cockpit of aircraft observing the pilot and crews under actual flight conditions.

Mine inspectors work to enhance the health and safety of miners and to promote good mining practices. Federal mine inspectors are responsible for inspecting nearly 21,000 mining and quarrying operations.

To insure compliance with safety laws and regulations, mine inspectors visit mines and related facilities to obtain information on health and safety conditions. Before an inspection, they study the mine's permits, authorizations, and records to familiarize themselves with its operations. They note areas where violations were discovered in previous inspections and check on how these were corrected. At the work site, they look for evidence of flammable, combustible, or explosive gasses and dust and check roof supports, quantity of airflow, storage of explosives, haulage systems, and automatic mining equipment. They also inspect the surface equipment such as the electrical installations, elevators, and ventilation systems.

Mine inspectors discuss their findings with the management of the mine, prepare written reports that substantiate their findings and decisions, and issue notices of findings that describe violations and hazards that must be corrected. They also investigate and prepare reports on mine accidents and direct rescue and firefighting operations when fires or explosions occur.

Wage-hour compliance officers inspect the employer's time, payroll, and personnel records to insure compliance with the provisions of various Federal laws on minimum wages, overtime, pay, employment of minors, equal employment, and wage garnishment. They often interview employees to verify the employer's records and to check for any complaints. As recognized authorities on wage and hour standards, compliance officers often are consulted for advice by members of management and labor union officials.

Alcohol, tobacco, and firearms inspectors insure that the liquor, tobacco, and firearms industries comply with the provisions of revenue laws and other regulations on operating procedures, unfair competition, and trade practices. They spend most of their time inspecting distilleries, wineries, breweries; cigar and cigarette manufacturing plants; wholesale liquor dealers and importers; firearms and explosives manufacturers, dealers, and users; and other regulated facilities. They periodically audit these establishments to determine that appropriate taxes are correctly determined and paid. Alcohol, tobacco, and firearms inspectors also safeguard against unfair competition and trade practices.

Places of Employment

Nearly 25,000 people, 5 percent of them women, worked as health and regulatory inspectors in 1972. Of these, about 3 out of 5 are health inspectors, nearly half of whom are food and drug inspectors. The largest single employer of food and drug inspectors is the U.S. Food and Drug Administration but the majority work for State governments. Meat, poultry, and egg products inspectors who work in processing plants are employed mainly by the U.S. Department of Agriculture. Foreign quarantine and agricultural quarantine inspectors work either for the U.S. Public Health Service or the U.S. Department of Agriculture.

Regulatory inspectors work for various agencies within the Federal Government, mainly in regional and district offices distributed throughout the United States. For example, aviation safety officers work for the Federal Aviation Administration; wage-hour compliance officers, for the Department of Labor; mine inspectors, the Department of the Interior; and alcohol, tobacco, and firearms inspectors, the Treasury Department. Immigration, customs, and foreign and agricultural quarantine inspectors work at airports, seaports, border crossing points, and at foreign airports and seaports. They are employed by the Justice and the Treasury Departments.

Training, Advancement, and Other Qualifications

People who want to become health or regulatory inspectors should be able to accept responsibility and like detail work. They should be neat and personable and able to express themselves well orally and in writing. Curiosity is important since inspectors must keep abreast of technological advances and other developments in their fields. Persuasiveness also is an asset, since they frequently must convince people to comply with policies and procedures.

The U.S. Food and Drug Administration requires applicants for food and drug inspector jobs to have a bachelor of science degree which includes at least 18 semester hours of chemistry or biology. They also must achieve a satisfactory score on the Federal Service Entrance Examination (FSEE). Applicants who are accepted receive on-the-job training in the coverage of the Food, Drug, and Cosmetic Act, the extent of their authority, standards of sanitation and purity, inspections and sampling techniques, and the use of product testing equipment. They are given progressively more difficult field assignments under supervision until they are able to conduct independent inspections.

After 1 to 3 years of experience, food and drug inspectors may elect

to specialize in bacteriological sanitation, food, or drug inspection. Courses in these specialized areas are given by the U.S. Food and Drug Administration, usually in conjunction with colleges and universities. Inspectors often become experts in their chosen specialty fields and may be promoted to senior inspector and then supervisory inspector. Inspectors who display a high level of expertise in a specialty occasionally transfer to administrative positions in that area of operation. Food and drug inspectors who do not choose to specialize may advance to senior or resident inspector and, if qualified, to supervisory inspector.

A high school diploma and experience in meat or poultry slaughtering or processing generally are minimum requirements for becoming a meat and poultry inspector. A college education may be substituted for experience.

Working under the close supervision of experienced inspectors, trainees are taught plant inspection procedures that insure sanitary conditions and practices. They are instructed how to examine animals, carcasses, and processed meat and poultry for evidence of disease, contamination, or other undesirable conditions. When they are ready to assume their full inspectional duties, they usually begin as slaugher inspectors. After gaining experience they may advance to processing inspector, inspection supervisor, and officer-in-charge in a processing establishment.

A high school education and at least 3 years of experience in the quality control of fresh or processed food generally is the minimum requirement for employment as an egg products inspector. College education may be substituted for experience at the rate of one year of undergraduate study for 9 months of experience. Egg products inspectors receive classroom instruction in plant sanitation, facilities, proper handling of egg products, correct pasteurization procedures, sampling techniques, and record keeping. They get additional training on the job while working closely with an experienced inspector. Experienced inspectors can advance to supervisory positions.

Applicants for jobs as foreign quarantine inspectors should have at least 4 years of experience in communicable disease control or environmental sanitation; sanitary inspection at airports, seaports, or border points; performance of laboratory tests and analyses to determine the presence of germs or chemical composition; or recognizing illness, administering innoculations, and dispensing medicines. Courses above the high school level in the biological or physical sciences, public health, or sanitary engineering may be substituted for up to 3 years of experience. Applicants also must take a written examination.

Foreign quarantine inspectors begin as trainees and attend a training center where they learn regulations and inspection techniques. They also receive on-the-job training. Experienced inspectors can advance to supervisory positions.

The minimum educational requirement for agricultural quarantine inspectors is a bachelor's degree with a major in one of the biological sciences. Undergraduate work should include at least 20 semester hours in the life sciences. They receive additional on-the-job training and classroom instruction in these subjects during their first year of employment. After one year of successful service, inspectors are eligible for promotion and may eventually progress to specialists, supervisory, or administrative positions.

People can enter the immigration inspection field as an aide or trainee if they have a minimum of 3 years of administrative or responsible clerical work experience that demonstrates their ability to deal with people, learn and interpret facts, and obtain the cooperation of others in following procedures and regulations. College training may be substituted for up to 3 years of general experience at the rate of one scholastic year for 9 months of experience. Applicants must take the FSEE.

Immigration aides and inspector trainees receive a combination of formal instruction and on-the-job training. Trainees may be promoted after their first year of duty and may reach the journeyman level after an additional year. Further advancement to immigration examiner or supervisory and administrative positions depends upon individual merit.

The minimum requirement for beginning customs inspector jobs is 4 years of work experience in government, education, business, or the Armed Forces dealing with people and enforcing regulations or instructions. College education may be substituted for up to three years of experience at the rate of one year of college for 9 months of experience. Completion of all requirements for a law degree may be substituted for all experience. Applicants must take the FSEE, be in good physical condition, and be free of handicaps which might hinder them in the performance of their duties.

Customs inspectors begin as trainees and receive over a month of formal instruction in their duties. After a year of on-the-job training in which they work an experienced inspector, they receive regular assignments. Advancement is possible to supervisory inspector or to administrative positions.

At least 5 years of aviation related experience usually is required to get a job as an aviation safety officer.

Resident study in an appropriate field at an accredited college or university, however, may be substituted for up to 3 years of experience. Maintenance inspector applicants must have aircraft maintenance experience and hold an FAA mechanics certificate. Manufacturing inspector applicants must have experience in manufacturing of aircraft and aircraft components. Applicants for these positions may substitute a bachelor's degree in engineering or aviation for 3 years of experience. Operations inspector applicants must have pilot experience and a commercial pilot certificate.

Aviation safety officers are trained on-the-job and usually attend a 5-week indoctrination course in Oklahoma City. They periodically receive additional training to familiarize them with the operation, maintenance, or inspection of various models of aircraft or new aircraft manufacturing technology. Qualifed aviation safety officers may advance to supervisory inspector, principal inspector, or district office supervisor.

Applicants for beginning mine inspection jobs must be in good physical condition and possess at least 3 years of experience in mining or construction work where underground excavation is the principal activity. They also must take a general aptitude test and demonstrate their ability to drive a car. Persons who have at least 5 years of responsible experience in the mining industry are not required to take the aptitude test and may begin at higher salaries. A bachelor's degree may be substituted for 3 years of experience.

Trainees receive 10 weeks of classroom training in math, English, public speaking, inspection procedures, mining technology, surface structures, ventilation systems, roof supports, respirable dust, and fire protection. They also receive on-the-job training by teaming with an experienced inspector. Their inspection assignments become progressively more difficult until they are able to make a solo inspection.

Mine inspectors can advance to inspection supervisors, subdistrict and district managers, and specialists in dealing with specific types of mine hazards. Many become mine examiners or mine safety personnel in private industry.

Wage-hour compliance officers should have a bachelor's degree from an accredited college or university with at least 24 semester hours credit in any one or a combination of accounting, business administration, economics, government, industrial relations, journalism, law, political science, sociology, statistics, or closely related subjects. Three years of non-clerical work experience that provides knowledge of the basic principles of finance, economics, accounting, statistics, law, business, or public administration may be substituted for a bachelor's degree. After a few weeks on the job, compliance officer trainees attend a 4-week training program to acquaint them with wage-hour laws and standards. They accompany experienced compliance officers on field assignments and help them make inspections until they are ready to undertake independent assignments.

At least 3 years of working experience are generally the minimum requirement to become an alcohol and tobacco tax inspector. Education at an accredited college or university may be substituted for experience at the rate of one year of study for 9 months of experience or a bachelor's degree in lieu of experience. Applicants also must achieve a satisfactory score on the Federal Service Entrance Examination (FSEE).

People enter the field as trainee inspectors and receive a year of training that includes classroom instruction in the laws of regulations governing liquor, tobacco, and firearms industries; orientation in the inspection techniques used to determine compliance; and on-the-job training under the close supervision of an experienced inspector. The complexity of their assignments is gradually increased until they can work independently.

Employment Outlook

Employment of health and regulatory inspectors as a group is expected to increase very rapidly through the mid-1980's. The growth in employment of health inspectors is expected to be very rapid but regulatory inspectors are expected to have moderate growth. In addition to job opportunities stemming from growth, many inspectors will be needed each year to replace those who die, retire, or transfer to other occupations.

Health and regulatory inspection programs are expected to receive increased emphasis as the importance of existing programs is recognized and new mandatory inspection programs are created in areas where government involvement is new, particularly at the State and local level. Increased food consumption caused by population growth and growing public concern over potential health hazards should create additional jobs for food and drug, meat, and poultry, and egg products inspectors.

Aviation industry growth, increased international travel, and increases in the volume of U.S. imports and exports should continue to create new openings for aviation safety officers, foreign and agricultrual quarantine inspectors, immigration inspectors, and customs inspectors. Continued public concern over mine safety and equal employment rights should create

additional mine inspector and wage-hour compliance officer jobs.

Earnings and Working Conditions

With the exception of aviation safety officers, the Federal Government paid health and regulatory inspector trainees starting salaries of $7,694 a year in early 1973; or $9,520 if they had exceptional qualifications. Aviation safety officers received starting salaries of $11,614.

Salaries of experienced meat and poultry inspectors, egg products inspectors, foreign and agricultural quarantine inspectors, and customs and immigration inspectors ranged from $11,614 to $15,097 a year in 1973. Salaries of experienced alcohol, tobacco, and firearms inspectors ranged from $11,614 to $18,190. Experienced food and drug inspectors and wage-hour compliance officers received salaries ranging from $13,996 to $18,190. Mine inspector and aviation safety officers earned between $16,682 and $21,686.

Most health and regulatory inspectors live an active life, meeting many people and working in a variety of environments. They must often travel a great deal but are usually furnished with an automobile.

At times inspectors must work under unfavorable working conditions. For example, meat and poultry, egg products, and alcohol, tobacco, and firearms inspectors frequently come in contact with strong, unpleasant odors; aviation maintenance inspectors who spend much of their time in maintenance and repair shops, must tolerate a lot of noise, and mine inspectors spend a great deal of time in mines where they are exposed to the same hazards as miners. Many inspectors work long and often irregular hours.

Sources of Additional Information

For facts about public administration inspector careers in the Federal Government, contact:

Interagency Board of U.S. Civil Service Examiners for Washington, D.C. 1900 E St. NW., Washington, D.C. 20415.

Information about career opportunities as inspectors in State and local governments is available from the State Civil Service Commissions, usually located in each State capital, or from local government offices.

CONSTRUCTION INSPECTORS (GOVERNMENT)

(D.O.T. 168.168 and 182.287)

Nature of the Work

Federal, State, and local government construction inspectors insure that recognized standards of safe construction and quality workmanship are observed in public and private construction. They inspect the construction, alteration, or repair of highways, streets, sewer and water systems, dams, bridges, buildings, and other structures to insure compliance with building codes and ordinances, zoning regulations, and contract specifications.

Construction inspectors visit worksites to inspect recently completed construction. On large projects, visits generally are required after each new stage of construction is completed. Members of large inspection staffs may be assigned to a single complex project. Inspectors prepare written reports and often keep a daily log of their work. Inspections are primarily visual in nature, although blueprints, tape measures, standard electrical metering devices and equipment frequently are used for testing the quality of concrete.

Construction inspectors notify the construction contractor, superintendent, or foreman when they discover a detail of a project that is not in compliance with the appropriate codes, ordinances, or contract specifications. If the deficiency is not corrected within a reasonable period of time, they have authority to issue a "stop-work" order.

Many inspectors also investigate reported incidents of "bootlegging," construction or alteration that is being carried on without proper permits. Persons found in violation of permit laws are directed to obtain permits and submit to inspection.

Construction inspectors must keep abreast of new building code developments, since they advise representatives of the construction industry and the general public on matters of code interpretation, construction practices, and new technical developments. Senior inspectors usually coordinate the inspection of large projects and handle the most complex inspection assignments.

In addition to their field inspection duties, supervisory construction inspectors assign and coordinate the work of other inspectors and review reports submitted to them. They may review plans and specifications of proposed construction for compliance with codes, interpret codes and ordinances, and prepare construction progress reports. Supervisory building inspectors are often asked to assist in drawing up or revising local building codes and ordinances.

Construction inspectors generally specialize in one particular type of construction work. Broadly categorized, these are building, electrical, mechanical, and public works.

A construction inspector checks a blueprint for compliance with the building code.

Building inspectors inspect the structural quality of buildings. Before construction, they determine whether the plans for the building or other structure comply with local zoning regulations and are suited to the engineering and environmental demands of the building site. They visit the worksite before the foundation is poured to inspect the positioning and depth of the footings. They inspect the foundation after it has been completed. The size and type of structure and the rate of completion determine the frequency and number of other visits they must make. Upon completion of the project, they conduct a final comprehensive inspection. Some building inspectors may specialize, for example, in structural steel or reinforced concrete.

Electrical inspectors inspect the installation of electrical systems and equipment to insure that they work properly and are in compliance with electrical codes and standards. They visit worksites to inspect the installation of new and existing wiring, lighting, sound and security systems, an generating equipment. They also may inspect the installation of the electrical wiring or heating and air conditioning systems, kitchen appliances, and other components.

Mechanical inspectors inspect plumbing systems including septic tanks, plumbing fixtures and traps, water, sewer, and vent lines. They also inspect the installation of the mechanical components of kitchen appliances, heating and air-conditioning equipment, gasoline and butane tanks, gas piping, and gas fired appliances. Some specialize in boiler, mechanical components, or plumbing inspection.

Public works inspectors insure that Federal, State, and local government construction of water and sewer systems, highways, streets, bridges, and dams conform to detailed contract specifications. They inspect excavation and fill operations, the placement of forms for concrete, concrete mixing and pouring, and asphalt paving. They also record the amount of work performed and materials used so that contract payment calculations can be made. Public works inspectors may specialize in inspection of highways, reenforced concrete, or ditches.

Places of Employment

About 23,000 persons, nearly all of them men, worked as Federal, State, and local government construction inspectors in 1972. More than three-fourths worked for municipal or county building departments. Public works construction inspectors were employed primarily at the Federal and State level.

The employment of local government construction inspectors is concentrated in cities and in suburban areas undergoing rapid growth. They employ larger inspection staffs including most of the local construction inspectors who specialize in

structural steel, reenforced concrete, and boiler inspection.

About half the construction inspectors employed by the Federal Government work for the Department of Defense, primarily for the U.S. Army Corps of Engineers.

Training, Advancement, and Other Qualifications

To become a construction inspector, several years of experience is generally required as a construction contractor, supervisor, or craftsman. Federal, State, and most local governments also require an applicant to have a high school diploma.

Workers who want to become inspectors should have a thorough knowledge of construction materials and practices in either a general area like structural or heavy construction, or in a specialized area such as electrical or plumbing systems, reenforced concrete, or structural steel. Many employers prefer inspectors to be graduates of an apprenticeship program, to have studied at least two years toward an engineering or architectural degree, or to have a degree from a community or junior college, with courses in construction technology, blueprint reading, technical mathematics, English, and building inspection.

Construction inspectors must be in good physical condition in order to walk and climb about construction sites. They also must have a motor vehicle operator's license. In addition, Federal, State, and many local governments usually require that construction inspectors pass a civil service examination.

Construction inspectors receive most of their training on the job. During the first couple of weeks, they learn about inspection techniques; codes, ordinances, and regulations; contract specifications; and recordkeeping and reporting duties by working with an experienced inspector. They begin by inspecting less complex types of construction such as residential buildings. The difficulty of their assignments is gradually increased until they are able to handle complex assignments. An engineering degree is frequently needed in order to advance to supervisory inspector.

The Federal Government and most State and large city governments conduct formal training programs for their construction inspectors to broaden their knowledge of construction materials, practices, and inspection techniques or acquaint them with new materials and practices. Inspectors who work for smaller local construction inspection agencies which do not conduct training programs frequently can broaden their knowledge of construction and upgrade their skills by attending State-conducted training programs or by taking college or correspondence courses.

Employment Outlook

Employment of government construction inspectors is expected to grow rapidly through the mid 1980's. Because of the increasing complexity of construction technology as well as the trend towards establishment by State governments of minimum professional standards for construction inspectors, job opportunities should be best for inspectors who have some college education or knowledge of a specialized type of construction.

In addition to growth needs, job openings for construction inspectors will occur each year to replace those who die, retire, or transfer to other occupations.

The rapid growth in employment of construction inspectors should result from population increases and continued expansion in residential construction. The demand for construction inspectors also should increase as they are given more responsibility for insuring quality workmanship and safe construction of prefabricated building materials and other components that are mass produced in factories and assembled on the construction site.

Earnings and Working Conditions

Starting salaries of construction inspectors working in cities and towns averaged $9,430 a year in 1972, according to a survey conducted by the Public Personnel Association. Top salaries for senior inspectors averaged $11,460. Salaries for supervisory inspectors were higher in large cities; they often received as much as $20,000 annually. Among geographic regions, the western region of the United States tended to have the highest salaries, cities in the southern region the lowest.

In the Federal Government, construction inspectors started at $7,694 or $9,520 a year in early 1973, depending on the amount and nature of their earlier work experience. Journeyman construction inspectors were paid salaries ranging from $11,614 to $15,097, and more experienced construction representatives were paid salaries ranging from $13,996 to $18,109.

Construction inspectors often spend a large portion of their time traveling between worksites. Usually, an automobile is furnished for their use or their expenses are reimbursed if they use their own. Since they spend the majority of their time outdoors or in partially enclosed structures, they are exposed to all types of inclement weather.

Unlike the seasonal and intermittent nature of employment in many of the occupations associated with

the construction industry, inspection work tends to be steady and year-round.

Sources of Additional Information

Persons seeking additional information on a career as a State or local government construction inspector should contact their State employment service, their local building department, or:

Secretariat of the National Conference of States on Building Codes and Standards, Building Research Division, National Bureau of Standards, Washington, D.C. 20234.

International Conference of Building Officials, 5360 Workman Mill Rd., Whittier, Calif. 90601.

Persons interested in a career as a construction inspector with the Federal Government can get information from:

Interagency Board of the U.S. Civil Service Examiners for Washington, D.C., 1900 E St. NW., Washington, D.C. 20415.

OTHER SERVICE OCCUPATIONS

MAIL CARRIERS

(D.O.T. 233.138 and 233.388)

Nature of the Work

Most mail carriers, commonly known as mailman, travel planned routes delivering and collecting mail. Carriers start work at the post office early in the morning, spend a few hours arranging their mail for delivery, readdress letters to be forwarded, and take care of other details such as signing receipts for postage-due and cash-on-delivery (c.o.d.) items.

A carrier typically covers the route on foot, toting a heavy load of mail in a leather bag or pushing it in a cart. In outlying suburban areas where houses are far apart a car or small truck is sometimes needed to deliver mail. Residential carriers cover their routes only once a day, but carriers assigned a business district may make two or more trips. Deliveries are made house-to-house except in large buildings, such as apartment houses, which have all the mail boxes on the first floor.

Besides making deliveries, carriers collect postage-due and c.o.d. fees and obtain signed receipts for registered and certain insured mail. If a customer is not home a notice is left that tells where special mail is being held. Carriers also pick up letters to be mailed.

After completing their routes, carriers return to the post office with mail gathered from street boxes and homes. They separate letters and parcels so that stamps can be canceled easily and turn in the receipts and money collected during the day.

Many carriers have more specialized duties than those described above. Some deliver only parcel post. Others collect mail from street boxes and office mail chutes. Rural carriers provide a wide variety of postal services. In addition to delivering and picking up mail, they may sell stamps and money orders and accept parcels and letters to be registered or insured.

All carriers answer customers' questions about postal regulations and service and provide change-of-address cards and other postal forms when requested.

Training, Other Qualifications, and Advancement

Mail carriers must be at least 18 and pass a four-part written examination. The first part tests reading accuracy by asking the applicant to compare pairs of addresses and indicate which are identical. The second part tests ability to follow oral instructions. The third measures general intelligence, including vocabulary, and the fourth tests ability to do simple arithmetic.

Applicants must have a driver's license and pass a road test if the job involves driving. They also must pass a physical examination and may be asked to show that they can lift and handle mail sacks weighing up to 70 pounds. Applicants who have had health conditions that might interfere with work must have a special review to determine their eligibility.

Applicants should apply at the post office where they wish to work because each post office keeps a separate list of those who have passed the examination. Applicants' names are listed in order of their scores. Five extra points are added to the score of an honorably discharged veteran, and 10 extra points to the score of a veteran wounded in combat or disabled. Disabled veterans who have a compensable, service-connected disability of 10 percent or more are placed at the top of the list. When a vacancy occurs, the appointing officer chooses one of the top three applicants; the rest of the names remain on the list to be considered for future openings.

Mail carriers are classified as casual, part-time flexible, part-time regular, or full-time. Casual workers are hired to help handle the Christmas mail. Part-time flexible employees do not have a regular work schedule but replace absent workers and help with extra work as the need arises. Part-time regulars have a set work schedule—for example, four hours a day.

New carriers are trained on the job. They begin as part-time flexible city carriers and become regular or full-time carriers in order of seniority as vacancies occur. Advancement possibilities are limited, but carriers can look forward to obtaining preferred routes as city carriers, or to jobs as rural carriers, as their seniority increases. The supervisory examination may be taken after 4 to 5 years of service.

Employment Outlook

Employment of mail carriers—who numbered 263,000 in 1972—is expected to grow slowly through the mid-1980's. Most job openings, however, will arise as a result of the need to replace experienced workers who retire, die, or transfer to other fields of work.

As population and business grows, mail volume is expected to increase and more carriers will be needed. Most openings will be for city carriers since most of the growth in population and business activity will be in urban and suburban areas. Little or no change is expected in rural carrier employment.

Earnings and Working Conditions

In mid-1972, wages of part-time flexible carriers began at $4.02 an hour, with periodic increases up to $5.31 an hour after 7 years of service. Hourly wages of part-time regulars were $3.88 an hour, with periodic increases up to $5.12 an hour after 7 years of service.

Full-time city carriers are paid on an annual basis, beginning at $8,072 and increasing to a maximum of $10,657 after 7 years. Those promoted to parcel-post carriers earn up to $11,448.

Rural carriers are paid a fixed annual salary plus an amount varying with the number of miles in their routes. They also receive an allowance of 12 cents a mile for the use of their automobiles. For example, as of July 1972, the salary of a carrier with a 61-mile route (the average length) would begin at $8,614 a year and increase to $11,199 after 7 years. The automobile allowance provides an extra $7.32 each work day. Substitute rural carriers receive the same pay as the regular carriers whose routes they are covering.

A full-time city carrier usually works an 8-hour day, 5 days a week. City carriers who work more than 8 hours a day or 40 hours a week are paid one and one-half times their regular rate of pay for the extra hours. City carriers who work either full or part-time receive 10 percent additional pay for work between 6 p.m. and 6 a.m. Rural carriers work either a 5- or 6-day week and do not receive overtime pay.

Most carriers begin work early in the morning, in some cases as early as 6 a.m. if they have routes in the business district. Carriers spend most of their time outdoors in all kinds of weather, walking from house to house with their heavy mailbags. Even those who drive must walk when making deliveries, and must lift heavy sacks of parcel post when loading their vehicles.

The job has its advantages, however. Carriers who begin work early in the morning are through by early afternoon. They are also free to work at their own pace as long as they cover their routes within a certain period of time.

(For information on fringe benefits, see the statement on postal service occupations elsewhere in the *Handbook*.)

Sources of Additional Information

Local post offices and State employment service offices can supply details about entrance examinations and employment opportunities for mail carriers.

TELEPHONE OPERATORS

(D.O.T. 235.862)

Nature of the Work

Although millions of telephone numbers are dialed each day without assistance, practically every one sometimes makes a call that requires help from the operator. Often the operator is asked to reverse long distance charges, locate an individual, or indicate the cost of the call. Frequently the customer needs a correct number. The operator also may be needed to contact the police in an emergency, assist a blind person who is unable to dial, or arrange a conference call for business executives in different locations.

These and many other services are provided by two groups of operators—those at switchboards in telephone company central offices and those at private branch exchange (PBX) switchboards. Usually operators place calls by inserting and removing plugs that make switchboard connections and by listening and speaking into their headsets. Some switchboards are operated by pushbuttons or dials.

Telephone company operators may be assigned to handle either long distance calls or give directory assistance. Long distance operators obtain the information needed to complete the call, make the necessary connections, and record the details for billing. *Directory assistance operators* (D.O.T. 235.862) look up and provide telephone numbers. Service assistants train and help new operators to complete difficult calls.

PBX operators (D.O.T. 235.862) run switchboards for business offices and other establishments. They connect interoffice or house calls, answer and relay outside calls, assist company employees in making outgoing calls, supply information to callers, and record charges. In many small establishments, PBX operators work at switchboards that serve only a limited number of telephones. These operators may do other office work such as typing or sorting mail and many also act as receptionists or information clerks. (The work of receptionists is described elsewhere in the *Handbook*.)

Places of Employment

About 400,000 telephone operators were employed in 1972; about three-fifths worked as operators in telephone companies and the rest as PBX operators in other types of businesses. A large number of PBX operators worked in manufacturing plants, hospitals, schools, and department stores. Telephone company and PBX operators tend to be concentrated in heavily populated areas. Nearly one-fifth of the total were employed in the New York, Chicago, and Los Angeles metropolitan areas.

Training, Other Qualifications, and Advancement

Men and women planning to become telephone operators should like to serve the public, be pleasant and courteous, and able to sit in a confined area for long periods. A clear and pleasing voice also is important. Most telephone companies and many large business firms require applicants to pass physical examinations and general aptitude tests.

New operators receive on-the-job training to become familiar with the equipment, records, and work. Operators first learn the procedures used to handle calls. Then they put through practice calls. After this instruction and practice—which usually lasts from 1 to 3 weeks—they are assigned to regular operator jobs and receive further instructions from supervisors.

PBX operators who handle routine calls may have a somewhat shorter training period than telephone company operators. In small businesses an experienced operator usually supervises the training. In large businesses, an instructor from the local telephone company may train new employees.

Experienced telephone company operators may be promoted to clerical, craft, or supervisory jobs. Similar opportunities exist for PBX operators in large firms; in many small businesses, however, opportunities for advancement are limited.

Employment Outlook

Employment of telephone and PBX operators as a group is expected to show no significant increase through the mid-1980's. Thousands of new workers, however, will be hired each year to replace experienced operators who transfer to other occupations, retire, or stop working for other reasons.

Although direct dialing and other changes have displaced many operators in the past, the number of telephone company operators has increased slightly recently due to the rise in number of directory assistance and long distance calls, and further increases are anticipated.

Because of the widespread use of Central Exchange (CENTREX), the number of PBX operators is expected to show little change. With CENTREX, incoming calls can be dialed direct to any extension without an operator's assistance, and outgoing and intercom calls can be dialed direct by the extension users. The number of new jobs created as more small and medium size businesses require PBX services, however, should about offset reduced demand for PBX operators among large firms converting over to CENTREX.

Earnings and Working Conditions

Telephone company operators in training averaged $2.67 an hour in early 1972; experienced operators $3.11; service assistants $3.90; and managers $5.21. Contracts between unions and telephone companies generally provide for periodic pay increases and extra pay for work on evenings, Sundays, and holidays.

Experienced PBX operators in metropolitan areas averaged $127.50 a week in early 1972; those who handle routine calls averaged $103.00 a week. Average earnings for PBX operators were highest in public utilities and lowest in retail trade and service industries.

Most telephone company and PBX operators work between 35 and 40 hours a week. Often, their scheduled hours are approximately the same as those of other clerical workers in the business community. In telephone companies, however, and in hotels, hospitals, and other places where telephone service is on a 24-hour basis operators usually work on shifts and on holidays and weekends. Some operators work split shifts—that is, they are on duty during the peak calling periods in the late morning and early evening, and have time off between these two periods.

Operators usually work in well-lighted and pleasant surroundings. Lounges often are provided for relaxation during "breaks" in their scheduled hours. Insurance, pension programs, holidays, vacations, and other fringe benefits are much the same as those for other types of clerical employees.

Many operators employed by telephone companies are members of the Communications Workers of America, the International Brotherhood of Electrical Workers, and the Alliance of Independent Telephone Unions.

Sources of Additional Information

For more details about employment opportunities, contact the telephone company in your community or local offices of the unions that represent telephone workers. General information on telephone operators is available from the following organizations:

Alliance of Independent Telephone Unions, P.O. Box 5462, Hamden, Conn. 16518.

United States Independent Telephone Association, 1801 K St. NW., Suite 1201, Washington, D.C. 20006.

Communication Workers of America, 1925 K St. NW., Washington, D.C. 20006.

EDUCATION AND RELATED OCCUPATIONS

The industrial and occupational structure of the Nation has gradually shifted from goods-producing to service-producing, white-collar activities. Accompanying this shift has been a continued rise in the educational achievement of the labor force—in part reflecting changing job requirements. People also have more time to spend on education and personal development.

Today about 3 out of 10 people of all ages participate in the educational process as students or teachers. Many more read and study on their own. The occupations of teachers and librarians play a vital role in the educational process and are covered in this section.

TEACHING OCCUPATIONS

Teaching is the largest of the professions; about 2.7 million full-time teachers were employed in 1972-73 in the Nation's elementary and secondary schools and colleges and universities. In addition, thousands taught part-time; among them were many scientists, physicians, accountants, members of other professions, and graduate students. Similarly, large numbers of craftsmen instructed part-time in vocational schools. Many other people taught in preschool and adult education and recreation programs.

No other profession offers women so many employment opportunities as teaching. About 1.7 million women are teachers, or nearly 2 1/2 times as many as are registered nurses, the second largest field of professional employment for women.

The number of teachers required depends on the number of students enrolled and the number of persons who leave the profession. New teachers also are needed to improve the student-teacher ratio.

Detailed information on how these demand factors are expected to affect the outlook for teachers through the mid-1980's is presented in the following statements.

KINDERGARTEN AND ELEMENTARY SCHOOL TEACHERS

(D.O.T. 092.228)

Nature of the Work

Kindergarten and elementary school teachers introduce children to science, numbers, language, and social studies, and develop students' capabilities in these subject areas. Their primary job is to provide a good learning environment and to plan and present programs of instruction using materials and methods designed to suit the students' needs.

Most elementary school teachers instruct a single group of 25 to 30 children in several subjects. In some schools two or more teachers "team teach" and are jointly responsible for a group of students or for a particular subject. A recent survey indicates that about 1 public elementary school teacher in 6 is team teaching.

An increasing number of elementary school teachers specialize in one or two selected subjects and teach these subjects to several classes; 1 teacher in every 5 teaches on this departmentalized basis. Some teach special subjects such as music, art, or physical education, while others teach basic subjects such as English, mathematics, or social studies.

Besides the actual student instruction, teachers participate in many activities outside the classroom. They generally must attend regularly scheduled faculty meetings and may serve on faculty committees. They must prepare lessons and evaluate student performance. They also work with students who require special help and confer with parents and other school staff. To stay up-to-date on educational materials and teaching techniques, they participate in workshops and other in-service activities.

New forms of instructional media give teachers more opportunities to work with students. Also, about 4 out of every 10 public elementary school teachers have aides who

generally do secretarial work and help supervise lunch and playground activities. Thus, growing numbers of teachers are freed from routine duties and can give more individual attention to students.

Places of Employment

More than 1.3 million people—85 percent of them women—worked as elementary school teachers in 1972. An increasing number of men, concentrated heavily in the upper grades, teach at the elementary level.

Most teachers work in public elementary schools that have six grades; however, some teach in middle schools—schools that cover the three or four years between the lower elementary grades and four years of high school. Only about 11 percent of elementary school teachers work in nonpublic schools.

More than one-third of all public elementary teachers teach in urban areas; about one-fifth in cities of 250,000 or more; one-eighth in rural areas; and the remainder in small towns or suburban areas.

Training, Other Qualifications, and Advancement

All 50 States and the District of Columbia require public elementary school teachers to be certified by the department of education in the State in which they work. Some States also require certification of teachers in private and parochial schools.

To qualify for certification, a teacher must study 4 years at an approved teacher education institution. Besides a bachelor's degree which provides the necessary liberal arts background, States require that prospective teachers have student-teaching and education courses.

In 1972, 11 States required teachers to get supplementary post-graduate education—usually a master's degree or a fifth year of study—within a certain period after their initial certification. Some States required U.S. citizenship; some an oath of allegiance; and several a health certificate.

Local school systems sometimes have additional requirements for employment. Students should write to the local superintendent of schools and to the State department of education for information on specific requirements in the area in which they want to teach.

In addition to educational and certification requirements, a teacher should be dependable, have good judgment, and should have the desire and ability to work with children. Enthusiasm for teaching and the competence to handle classroom situations also are important.

Opportunities for advancement in elementary teaching come principally with experience. Teachers may advance within a school system or transfer to another which recognizes experience and has a higher salary scale. Some teachers may advance to supervisory, administrative, or specialized positions.

Employment Outlook

Kindergarten and elementary school teachers are expected to face competition for jobs through the mid-1980's. If patterns of entry and reentry to the profession continue in line with past trends, the number of persons qualified to teach in elementary schools will exceed the number of openings.

Enrollment is the basic factor underlying the need for teachers. Because of fewer births in the sixties, elementary enrollments have been on the decline since they peaked at nearly 32 million in 1967. The U.S. Office of Education projects that by 1977 the downward enrollment trend will halt at a level of 29 million, and enrollments again will advance to nearly 35 million by 1985.

Besides new positions created by increasing enrollments, additional techers will be needed to replace those who are not now certified; to meet the expected pressure for an improved pupil-teacher ratio; and to fill positions vacated by teachers who retire, die, or leave the profession for other reasons. Many persons leave teaching at least temporarily to take on full-time homemaking or family responsibilities.

Recent college graduates qualified to teach at the elementary level and teachers seeking reentry to the profession make up the basic source of teacher supply. Through the mid-1980's reentrants to the field will face increasing competition from new graduates, and although reentrants have experience in their favor, beginning teachers may have an advantage because they command lower salaries and have more recent training.

While the outlook based on past trends points to a competitive employment situation through the mid-1980's, several factors could influence the demand for teachers. Increased emphasis on early childhood education, special programs for disadvantaged children, and individual instruction may result in larger enrollments, smaller student-teacher ratios, and consequently an increased need for teachers. However, possible budget restraints for educational services might limit program expansion.

A potential decline in the number of children born over the next decade could produce a decrease in the demand for teachers. While the trend has not been clearly established, women since 1970 have continued to have fewer children, and according to a 1972 survey, they expect to continue having smaller families than were common 10 years ago.

Earnings and Working Conditions

According to the National Education Association (NEA), public elementary teachers in 1972-73 averaged $9,823 a year. Average earnings in 1972 were about one and one-third times as much as the average earnings for nonsupervisory workers in private industry, except farming. In the five highest-paying States (Alaska, New York, Michigan, California, and New Jersey), teachers' salaries averaged more than $11,000; in the ten States having the lowest salaries (Mississippi, Arkansas, Idaho, South Dakota, Kentucky, Oklahoma, North Dakota, South Carolina, West Virginia, and Georgia), they averaged less than $8,000.

Public schools systems enrolling 6,000 or more pupils paid teachers with a bachelor's degree average starting salaries of $7,357 a year in 1972-73; those with a master's degree earned an average of $8,176.

Public elementary teachers worked an average of about 36-1/2 hours a week in 1972. Additional time spent preparing lessons, grading papers, making reports, attending meetings, and supervising extracurricular activities increased the total number of hours to about 46.

The elementary teacher usually works 9 months and averages 181 days in the classroom and 4 workdays on nonteaching activities. In addition, many teach summer sessions, and others take courses for professional growth or work at other jobs during the summer months.

Employment in teaching is steady, and business conditions usually do not affect the market for teachers. In 1972, 38 States and the District of Columbia had tenure laws that insured the jobs of teachers who had successfully taught for a certain number of years.

Collective bargaining agreements cover an increasingly large number of teachers. In early 1973, 30 States had enacted laws which required collective bargaining in the teacher contract negotiation process. More than one-half of the public school systems that enroll 1,000 students or more bargain with teacher organizations over wages, hours, and the terms and conditions of employment.

Sources of Additional Information

Information on schools and certification requirements is available from local school systems and State departments of education.

Information on the Teacher Corps, internships, graduate fellowships, and other information on teaching may be obtained from:

U.S. Department of Health, Education, and Welfare, Office of Education, Washington, D.C. 20202.

Other sources of general information are:

American Federation of Teachers, 1012 14th St. NW., Washington, D.C. 20005.

National Educational Association, 1201 16th St. NW., Washington, D.C. 20036.

SECONDARY SCHOOL TEACHERS

(D.O.T. 091.228)

Nature of the Work

Secondary school teachers introduce students to subjects ranging from world history and elementary algebra to anthropology and computer mathematics. They help mold their students for future roles as citizens, homemakers, and jobholders.

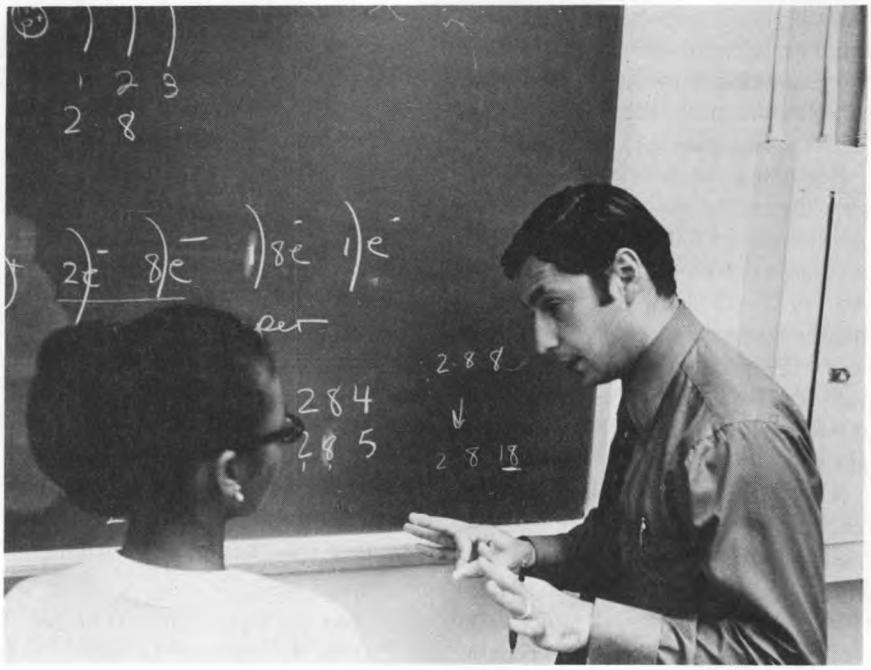
Secondary school teachers usually specialize in a particular field. English, mathematics, social studies, and science are the subjects most commonly taught. Other specialties include health and physical education, business education, home economics, foreign languages, and music. Increasingly, teachers are developing courses which deal with particular areas within the broad subjects so students may acquire in-depth as well as general knowledge of a field.

Secondary school teachers usually conduct classes in their specialty for 5 or 6 groups of students a day. The average daily pupil load for public school teachers is 134 students.

Teachers design their classroom presentation to meet the demands of a balanced curriculum and to suit the individual student's needs. Secondary school teachers instruct students at a single grade level or from different grades. They must consider the subject matter, as well as instructional methods and materials that best meet the students' needs.

Secondary school teachers also supervise study halls and homerooms, prepare lessons, grade papers, evaluate students, and attend meetings with parents and school personnel. Often they work with student groups outside of class. Teachers also participate in activities, such as workshops and college classes, to keep up-to-date on their subject specialty and on current trends in education.

Increasingly, in recent years, teachers have been able to devote more time towards improved instruction due to the increased availability of teacher aides who perform secretarial work, grade papers, and do other routine tasks. New developments in educational technology also have provided teachers with instructional media and other new materials and techniques to improve student learning.



A chemistry teacher provides his student with special help.

Places of Employment

More than 1 million teachers worked in secondary schools in 1972. Of these, about one-half were women.

According to a recent survey, slightly more than one-half of all public secondary teachers work in senior high schools; about one-third teach at the junior high level. About one-tenth teach in junior-senior high schools, and a very small number are elementary-secondary combination teachers.

Of those in public schools, about 1 teacher in 5 works in a city of 250,000 or more; 1 in 8 in a city of less than 250,000. Over one-half teach in small town or suburban schools; and about 1 in 7 in a rural location. Only about 1 teacher in 14 works in a nonpublic school.

Training, Other Qualifications, and Advancement

All 50 States and the District of Columbia require the certification of public secondary school teachers. Many States also require certification of secondary teachers in private and parochial schools.

In every State, the minimum educational requirement for certification is a bachelor's degree. Moreover, 12 States have specified that a secondary school teacher must get additional education, usually a fifth-year of study or a master's degree, within a certain period after beginning employment.

In 1972, the District of Columbia was the only jurisdiction requiring a master's degree for initial certification as a senior high school teacher. However, according to a recent national survey, 2 out of every 5 public secondary school teachers had a master's or higher degree.

The educational qualifications for secondary school teachers vary by State and by school system. Approved colleges and universities in every State offer programs which include the education courses and student-teaching that States require. They also offer the academic courses which qualify teachers in subject specialties taught at the secondary level.

States and local jurisdictions often have general teacher requirements, such as the recommendation of the college, a certificate of health, and citizenship. Prospective teachers may get complete information on such educational and general requirements from each State department of education and from the superintendent of schools in each community.

Personal qualifications which a secondary teacher must have include a desire to work with young people, an interest in a special subject, and the ability to motivate students and to relate knowledge to them.

For secondary teachers, education and experience provide the primary bases for advancement. Advancement to supervisory and administrative positions usually requires at least 1 year of professional education beyond the bachelor's degree and several years of successful classroom teaching. Some experienced teachers with special preparation may work as special school service personnel, such as school psychologists, educational specialists, or guidance counselors. Often these jobs require special certification as well as special education.

Employment Outlook

The supply of secondary school teachers through the mid-1980's will greatly exceed anticipated requirements if past trends of entry into the profession continue. As a result, prospective teachers are likely to face keen competition for jobs.

U.S. Office of Education projections indicate that enrollments in secondary schools will begin to decline in the mid-1970's after continuous

growth through the 1960's and into the early seventies. Enrollments are expected to increase slightly in the 1980's, but by 1985 are expected still to be below the 1972 level. Thus, over the 1972-85 period nearly all teaching positions will stem from the need to replace the tens of thousands of teachers who die, retire, or leave the profession for other reasons. Pressures for an improved pupil-teacher ratio and replacement of noncertified teachers will create additional openings.

At the same time demand is leveling off, the number of qualified graduates—the basic source of supply—will continue to grow rapidly, and other teachers will seek reentry to the profession. As a result, an increasing proportion of prospective teachers will have to consider alternatives to secondary school teaching. Many schools may favor hiring new graduates who command lower salaries and whose training is more recent rather than experienced reentrants.

Although the overall outlook for secondary teachers indicates a highly competitive market, employment conditions may be favorable in certain fields. A recent survey found continuing teacher shortages in mathematics, industrial arts, special education, and some vocational-technical subjects.

Earnings and Working Conditions

According to the National Education Association (NEA), public secondary school teachers in 1972-73 averaged $10,460. This is one and one-half times the average for nonsupervisory workers in private industry, except farming. NEA estimates indicate that 11 States (Alaska, New York, California, Michigan, Illinois, New Jersey, Maryland, Minnesota, Arizona, Nevada, and Connecticut) paid average annual salaries of $11,000 or more, and 3 (Mississippi, Arkansas, and Idaho) paid secondary school teachers less than $8,000 a year.

Beginning teachers with a bachelor's degree in school systems with enrollments of 6,000 or more earned average salaries of $7,357 in school year 1972–73. New teachers with a master's degree started at $8,176 a year. Beginning teachers could expect regular salary increases as they gained experience and additional education.

A recent survey of public school teachers indicated that the average required school week for those in secondary schools was 37 hours. However, when all teaching duties, including meetings, lesson preparation, and other necessary tasks are taken into consideration, the total number of hours spent working each week was slightly more than 48.

In some schools, teachers receive supplementary pay for certain school-related activities such as coaching students in sports and working with students in extracurricular music, dramatics, or school publications. About one-fourth of the public secondary teachers receive pay for extra duties, and one-third supplement their incomes with earnings from additional school work.

One-sixth of public school teachers also work in their school systems during the summer. More than one-fourth hold summer jobs outside the school system. In all, about three-fifths of public secondary school teachers have extra earnings from summer work, additional school-year work, or a combination of the two.

During the school-year, teachers work an average of 181 days. They average 26 teaching periods and 5 unassigned periods a week. Laws in 38 States and the District of Columbia ensure the employment of those who have achieved tenure status. Laws requiring collective bargaining of wages, hours, and the terms and conditions of employment cover increasing numbers of teachers.

Sources of Additional Information

Information on schools and certification requirements is available from local school systems and State departments of education.

Information on the Teacher Corps, internships, graduate fellowships, and other information on teaching may be obtained from:

U.S. Department of Health, Education, and Welfare, Office of Education, Washington, D.C. 20202.

Other sources of general information are:

American Federation of Teachers, 1012 14th St. NW., Washington, D.C. 20005,

National Education Association, 1201 16th St. NW., Washington, D.C. 20036.

COLLEGE AND UNIVERSITY TEACHERS

(D.O.T. 090.168 through .999)

Nature of the Work

About 60 percent of all persons in the United States between 18 and 21 attended college in 1972, compared with 40 percent ten years ago. To meet the demand of students for higher education, colleges and universities hire teachers to provide instruction in many fields. The most common subjects include the social sciences, teacher education, the physical sciences, health professions, fine and applied arts, English,

the biological sciences, mathematics, foreign languages, and business and commerce.

Slightly more than one-half of all college and university teachers instruct undergraduates; another one-third teach both graduates and undergraduates; and about one-tenth work only with graduate students.

Most teachers lecture and conduct classroom discussions to present subject matter effectively. Many work with students in laboratories. Some teachers provide individual instruction or supervise independent study. Nearly one-third of the faculty in universities have teaching assistants. Some college and university teachers use closed-circuit television, and especially in two-year colleges, instruction is machine-aided.

To be effective, college teachers must keep up with developments in their field by reading current material, participating in professional activities, and conducting research. Some publish books and articles. The importance of research and publication varies from one institutional level to another. In universities, about 70 percent of the faculty have published professional articles compared to 25 percent of 2-year college faculty. Also, in certain fields, such as engineering and the physical sciences, the demand for research is strong.

In addition to time spent on preparation, instruction, and evaluation, college and university teachers also participate in faculty activities; work with student organizations and individual students outside of classes; work with the college administration; and in other ways serve the institution and the community. Some are department chairmen and have supervisory duties.

Places of Employment

In 1972, about 620,000 teachers worked in more than 2,600 colleges and universities. An estimated 395,000—nearly two-thirds—were full-time senior staff. Of the remainder, about 110,000 were part-time senior staff, and nearly 20,000 were full-time junior instructors; the rest generally worked as part-time assistant instructors, teaching fellows, teaching assistants, or laboratory assistants.

Of full-time faculty, about one-third teach in universities; nearly one-half work in 4-year colleges; and about one-seventh teach in 2-year colleges. About two-thirds of the faculty in universities and 4-year colleges teach in public institutions; nearly nine-tenths of the faculty in two-year institutions work in public junior and community colleges.

In 1972, about one-fourth of all college and university teachers were women. Women worked more frequently in 2-year colleges than in 4-year colleges and universities and were more likely to teach certain subjects such as nursing, home economics, and library science. On the other hand, men were the principal instructors in agriculture, law, the earth sciences, engineering, and other subjects.

Training, Other Qualifications, and Advancement

Most college and university faculty are classified in four academic ranks: instructors, assistant professors, associate professors, and full professors. About one-fifth of all faculty are instructors; another one-fifth are professors. Slightly more than one-third are assistant professors; and one-fourth are associate professors.

To get an initial appointment, instructors generally must have a master's degree. For advancement to higher ranks, they need further academic training plus experience. Assistant professors usually need a

year of graduate study beyond the master's degree and at least a year or two of experience as an instructor. Appointments as associate professors frequently demand the doctoral degree and an additional 3 or more years of college teaching experience. For a full professorship, the doctorate and extensive teaching experience are essential.

In addition to advanced study and college-level teaching experience, outstanding academic, administrative, and professional contributions influence advancement. Research, publication, and work experience in a subject area may hasten advancement.

The ranks of college and university teachers and their educational backgrounds differ by institutional level. In universities, more than 50 percent of the faculty have doctoral degrees compared with less than 10 percent in 2-year colleges. Correspondingly, more than 50 percent of the faculty in universities are either professors or associate professors, while in 2-year colleges, only 1 teacher in 6 is within these upper ranks. Conversely, in community and junior colleges, where the master's is the highest degree held by nearly two-thirds of the faculty, instructors constitute a relatively large faculty segment.

Teachers should be able to motivate students and to adapt their field of study to students' needs and interests.

Employment Outlook

Entrants to college and university teaching are expected to face keen competition through the mid-1980's. Although the demand for teachers will continue to expand, the supply of new doctoral and master's degree graduates—the principal source of teacher supply—is expected to more than meet these needs.

College enrollment represents the basic factor underlying the demand for teachers. During the 1960's and early 1970's, teacher employment expanded due to growth in both the number of college-age persons and the proportion of 18- to 21-year olds enrolled in college. While the proportion attending college is expected to continue to rise, the number of college-age persons will decline after 1978, and by the early 1980's, enrollment will taper off and begin to fall. Over the 1972-85 period, the total number of college teachers needed is expected to rise only 20 percent. This compares with a more than 100 percent increase over the previous 13-year period.

Through the mid-1980's as demand is slowing, the numbers of both master's and Ph.D. degree recipients are expected to grow rapidly. Consequently, a smaller proportion of each year's degree recipients will be needed for college teaching. An increasing proportion of prospective college teachers, therefore, will have to seek nonacademic jobs. Alternative opportunities will exist in government and industry, which have traditionally competed with colleges and universities for Ph.D.'s and holders of master's degrees. Also, some of those persons holding graduate degrees may find it increasingly necessary to enter occupations that have not traditionally required advanced levels of study. Secondary school teaching may provide opportunities for an increasing number of master's graduates.

The employment outlook also depends on the institutional level and on the teacher's qualifications. Although enrollments in the 1970's are expected to stabilize in 4-year colleges and universities, many institutions, including junior and community colleges, may hire additional Ph.D.'s to upgrade their faculties. Master's graduates also will continue to find jobs in 2-year colleges. Public institutions are expected to continue to attract an increasing proportion of total college enrollment. Thus, opportunities in public colleges will be greater than in private institutions.

Earnings and Working Conditions

In 1972-73, full-time college and university faculty on 9-10 month contracts averaged $13,813, or twice the average earnings for nonsupervisory workers in private industry, except farming. Salaries varied, however, by teacher rank and by institutional level. Average salaries were:

Instructors	$10,662
Assistant professors	12,046
Associate professors	14,354
Professors	18,916

In general, larger institutions paid higher salaries. Salaries of teachers in 4-year colleges tended to be higher than those in 2-year colleges; university teachers averaged the highest salaries.

College and university teachers' salaries also vary by geographic region. According to a recent survey of 4-year colleges and universities, schools in the Mideast and New England paid the highest full-time faculty salaries.

Since about 2 out of 3 college teachers have 9-10 month contracts, many have additional summer earnings from research, writing for publication, or other employment. Royalties and fees for speaking engagements may provide additional earnings. Some teachers also undertake additional teaching or research projects or work as consultants.

College and university teachers also may enjoy certain benefits, including tuition waivers for dependents, housing allowances, travel allowances, and leaves of absence.

Colleges typically grant a semester's leave after 6 or 7 years of employment.

About 95 percent of all college and university teachers work in institutions which have tenure systems. Of the full-time teachers employed in these institutions, over one-half are tenured. Under a tenure system, a teacher usually receives 1-year contracts for a probationary period ranging from 3 to 7 years; some universities award 2- or 3-year contracts. After the probationary period, institutions consider teachers for tenure and the assurance of continuing employment with freedom from dimissal without cause.

The working hours and environment of college teachers generally are favorable. Classrooms, office facilities, and laboratories usually are well-equipped and teachers have access to library facilities and clerical assistance.

College teachers usually have flexible teaching schedules. According to a recent survey, the undergraduate faculty in 4-year colleges and universities normally teach 12 hours and usually no more than 14 or 15 hours a week. Graduate faculty have a teaching load of about 10 hours a week. In addition to time spent in the classroom, college and university teachers devote much time to preparation and other duties. Overall, full-time faculty spend about 40 hours a week on school-related activities. For faculty in junior and community colleges, the normal teaching load is slightly heavier, but the total number of hours on the job are fewer.

Sources of Additional Information

Information on college teaching as a career is available from:

U.S. Department of Health, Education, and Welfare, Office of Education, Washington, D.C. 20202.

American Association of University Professors, 1 Dupont Circle NW., Washington, D.C. 20036.

American Council on Education, 1 Dupont Circle NW., Washington, D.C. 20036.

American Federation of Teachers, 1012 14th St. NW., Washington, D.C. 20065.

Professional societies in the various subject fields will generally provide information on teaching requirements and employment opportunities in their particular fields. Names and addresses of societies are given in the statements on specific professions elsewhere in the *Handbook*.

LIBRARY OCCUPATIONS

People in all walks of life are in the midst of an information explosion. Worlds that just a matter of a few years ago were beyond imagination are being explored, and information is growing at a rapid pace. Each day 1,000 books are printed.

Librarians and library technical assistants, described in detail in the following statements, serve people of all ages and lifestyles. They collect and organize books, periodicals, and other printed materials, as well as less conventional information such as microfilms and computer tapes for library users.

LIBRARIANS

(D.O.T. 100.118 through .388)

Nature of the Work

Making information available to people is the job of librarians. They select and organize collections of books, pamphlets, manuscripts, periodicals, clippings, and reports, and assist readers in their use. In many libraries, they also provide phonograph records, maps, slides, pictures, tapes, films, paintings, braille and talking books, microfilms, and computer tapes and programs.

Through the librarian, information in the library becomes available to users. Librarians classify and catalogue materials.

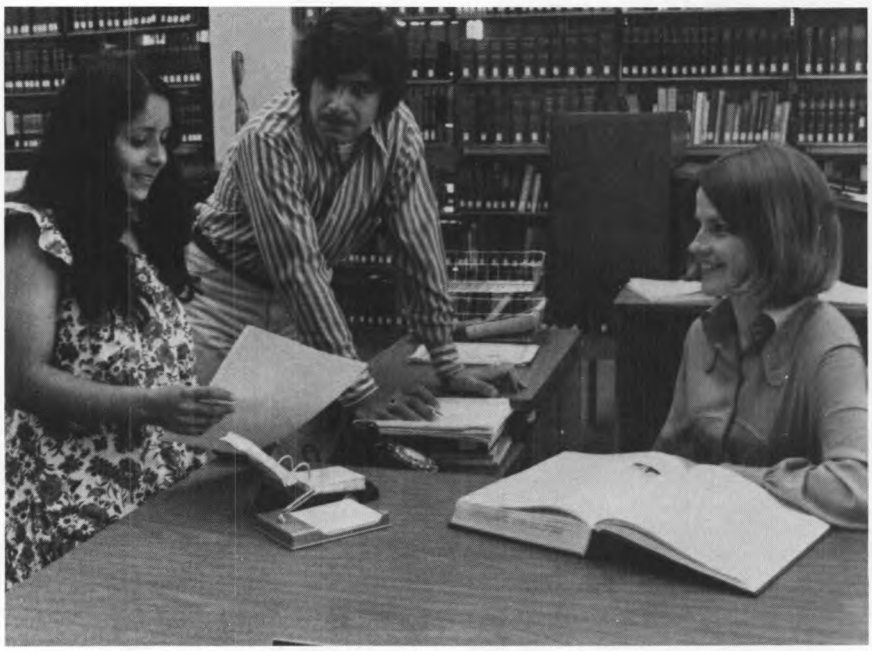
Two principal kinds of library work are reader and technical services. Librarians in reader services—for example, reference and children's librarians—work directly with the public. Librarians in technical services—for example, catalogers and acquisitions librarians—deal less frequently with the public; they order, classify, catalog, and in other ways prepare the materials for use.

The size of the library determines to a large extent the scope of a librarian's job. In small libraries, the job may include both technical and reader services. The librarian may select and organize materials, publicize services, do research, and give reference help to groups and individuals. In large libraries, librarians usually specialize in either technical or reader services. They may specialize further in certain areas, such as science, business, the arts, or medicine. Their work may involve reviewing and abstracting published materials and preparing bibliographies in their specialty.

Librarians generally are classified according to the type of library in which they work: public libraries, school media centers, college and university libraries, and special libraries.

Public librarians serve all kinds of people—children, students, research workers, housewives, teachers, and others. Increasingly, public librarians are providing special materials and services to culturally and educationally deprived persons, and to persons who because of physical handicaps cannot use conventional print.

The professional staff of a large public library system may include the chief librarian, an assistant chief, and several division heads who plan and coordinate the work of the entire library system. The system also may include librarians who supervise branch libraries and specialists in certain areas of library work. The duties of some of these specialists are briefly described as follows:



Reference librarian helps student find information.

Acquisition librarians purchase books and other materials and maintain a well-balanced library that meets the needs and interests of the public. *Catalogers* classify these materials by subject and otherwise describe them to help users find what they are looking for. *Reference librarians* answer specific questions and suggest sources of information that may be useful.

Some librarians work with specific groups of readers. *Children's* librarians serve the special needs of young people by finding books they will enjoy and showing them how to use the library. They may plan and conduct special programs such as story hours or film programs. Their work in serving children often includes working with school and community organizations. *Adult services librarians* serve adults by suggesting materials suited to their needs and interests. They may cooperate in planning and conducting education programs, such as community development, public affairs, creative arts, problems of the aging, and home and family life. *Young adult services librarians* help junior and senior high school students select and use books and other materials. They may organize programs of interest to young adults, such as book or film discussions or concerts of recorded popular and classical music. They also may coordinate the library's work with school programs. *Bookmobile librarians* offer library services to people not adequately served by a public library such as those in inner city neighborhoods, migrant camps, rural communities and institutions including hospitals and homes for the aged.

School media specialists instruct students in the use of the school library and help them choose from the media center's collection of print and non-print materials items that are related to their interests and to the subjects that they study in the classroom. Working with teachers and supervisors, school media specialists familiarize students with the library's resources. They prepare lists of materials on certain subjects and help select materials for school programs. They also select, order, and organize the library's materials. In some schools, media specialists may work with teachers to develop units of study and independent study programs, or they may participate in team teaching. Very large high schools may employ several media specialists, each responsible for a particular function of the library program or for a special subject area.

College and university librarians serve students, faculty members, and research workers in institutions of higher education. They may provide general reference service or may work in a particular subject field, such as law, medicine, economics, or music. Those working on university research projects operate documentation centers that use computers and other modern devices to record, store, and retrieve specialized information. College and university librarians may teach classes in the use of the library.

Special librarians work in libraries maintained by government agencies and by commercial and industrial firms, such as pharmaceutical companies, banks, advertising agencies, and research laboratories. They provide materials and services covering subjects of special interest to the organization. They build and arrange the organization's information resources to suit the needs of the library users. Special librarians assist users and may conduct literature searches, compile bibliographies, and in other ways provide information on a particular subject.

Others called *information science specialists,* like special librarians, work in technical libraries or information centers of commercial and industrial firms, government agencies and research centers. Although they perform many duties of special librarians, they must possess a more extensive technical and scientific background and a knowledge of new techniques for handling information. The information science specialist abstracts complicated information into short, readable form, and interprets and analyzes data for a highly specialized clientele. Among other duties, they develop classification systems, prepare coding and programming techniques for computerized information storage and retrieval systems, design information networks and develop microform technology.

Information on library technical assistants is found in a separate statement in the *Handbook.*

Places of Employment

Of the approximately 125,000 professional librarians in 1972, school librarians accounted for nearly one-half; public libraries and colleges and universities each employed about one-fifth. An estimated one-seventh worked in special libraries, including libraries in government agencies. Some librarians worked in correctional institutions, hospitals, and State institutions, while a small number served as consultants, State and Federal Government administrators, and teachers and administrators in schools of library science. The Federal Government employed more than 3,500 professional library administrators.

More than 85 percent of all librarians are women. In college and university libraries, however, men make up about 35 percent of the total professional staff. Men also are relatively numerous in law libraries and in special libraries concerned

with science and technology.

Most librarians work in cities and towns. Those attached to bookmobile units serve widely scattered population groups.

Training, Other Qualifications, and Advancement

A professional librarian ordinarily must complete a 1-year master's degree program in library science. A Ph.D. degree is an advantage to those who plan a teaching career in library schools or who aspire to a top administrative post, particularly in a college or university library or in a large library system. For those who are interested in the special libraries field, a master's degree or doctorate in the subject of the library's specialization is highly desirable.

In 1972, 49 library schools in the United States were accredited by the American Library Association and offered a master's degree in library science (M.L.S.). In addition, many other colleges offer graduate programs or courses within 4-year undergraduate programs.

Most graduate schools of library science require (1) graduation from an accredited 4-year college or university. (2) a good undergraduate record, and (3) a reading knowledge of at least one foreign language. Some schools also require introductory undergraduate courses in library science. Most prefer a liberal arts background with a major in an area such as the social sciences, the arts, or literature. Some schools require entrance examinations.

Special librarians and information science specialists must have extensive knowledge of their subject matter as well as training in library science. In libraries devoted to scientific information, librarians should be proficient in one or more foreign languages. They also must be well informed about new equipment, methods, and techniques used in storing and recalling technical information.

Most States require that public school librarians be certified and trained both as teachers and librarians. The specific education and experience necessary for certification vary according to State and the school district. The local superintendent of schools and the State department of education can provide information about specific requirements in an area.

In the Federal Government, beginning positions require completion of a 4-year college course and a master's degree in library science, or demonstration of the equivalent in experience and education by passing an examination.

Many students attend library schools under cooperative work-study programs by combining the academic program with practical work experience in a library. Scholarships for training in library science are available under certain State and Federal programs and from library schools, as well as from a number of the large libraries and library associations. Loans, assistantships, and financial aids also are available.

Librarians should be intellectually curious and able to express themselves verbally, and should have the desire and ability to search out and help others use library materials.

Experienced librarians may advance to administrative positions or to specialized work. Promotion to these positions, however, is limited primarily to those who have completed graduate training in a library school, or to those who have specialized training.

Employment Outlook

The employment outlook for librarians is expected to be favorable through the mid-1980's. Although employment in the field is expected to grow over the period to 1985, the supply of persons qualified for librarianship is likely to expand rapidly as an increasing number of new graduates and labor force reentrants seek jobs as librarians.

The anticipated increase in demand for librarians in the 1970's and early 1980's will not be nearly as great as it was in the 1960's. Then, school enrollments were rising rapidly and Federal expenditures supported a variety of library programs.

Fewer births during the 1960's will result in a slight decline in elementary and secondary school enrollments through the remainder of the 1970's; an upturn in enrollments is expected thereafter. The effect of birth rates in the 1960's will begin to be manifested in colleges and universities in the early 1980's, when total degree-credit enrollment is expected to level off. In both the schools and the colleges and universities, as a result, the demand for librarians will increase at a slower pace than in the past.

On the other hand, requirements for public librarians are expected to increase through 1985. The growth of an increasingly well-educated population will necessitate an increased number of librarians to serve the public. Also, the educationally disadvantaged, handicapped, and various minority groups will need qualified librarians to provide special services.

Employment of special librarians also will continue to grow. Because of ever-increasing demands upon high-level executives in business and industry, management will rely more heavily on special librarians and information specialists to keep abreast of new developments. Expanding use of computers to store and retrieve information will contribute to increased demand for information

specialists and library automation specialists.

In addition to openings from growth, thousands of job openings for librarians will occur each year to replace those who retire, die, transfer to other types of work, or leave the labor force.

Although overall employment opportunities are favorable, some librarians may have to compete for jobs of their choice. New graduates in commanding lower beginning salaries and in having more recent training may have an employment advantage over reentrants to the profession.

Employment opportunities will vary not only by type of library but also by the librarian's educational qualifications and area of specialization. Also, whether the librarian seeks a job in a large or small city, a suburb or town, or a rural area, and the region of the country in which a person wants to work will affect work employment prospects.

Earnings and Working Conditions

Salaries of librarians vary by type of library, individual's qualifications, and the size and geographical location of the library.

Starting salaries of graduates of American Library Association accredited library school programs averaged $9,248 a year in 1972, ranging from $8,713 in public libraries to $9,549, in school libraries. According to a recent survey, the average annual salary for special librarians was $13,900 in 1973. For librarians in college and university libraries, average salaries in 1972–73 ranged from $8,700 a year for librarians with limited experience working in private 4-year colleges to over $13,000 for university librarians with more extensive experience. Salaries for library administrators ranged somewhat higher. Department heads in college libraries generally earned between $10,000 and $14,000 a year.

In the Federal Government, the entrance salary for librarians with a master's degree in library science was $11,614 a year in early 1973.

The typical workweek for librarians is 5 days, ranging from 35 to 40 hours. The work schedule of public and college librarians may include some weekend and evening work. School librarians generally have the same workday schedule as classroom teachers. A 40-hour week during normal business hours is common for government and other special librarians.

The usual paid vacation after a year's service is 3 to 4 weeks. Vacations may be longer in school libraries, and somewhat shorter in those operated by business and industry. Many librarians are covered by sick leave; life, health, and accident insurance; and pension plans.

Sources of Additional Information

Additional information, particularly on accredited programs, and scholarships or loans may be obtained from:

American Library Association, 50 East Huron St., Chicago, Ill. 60611.

For information on requirements of special librarians write to:

Special Libraries Association, 235 Park Ave., South, New York, N.Y. 10003.

Information on Federal assistance for library training under the Higher Education Act of 1965 is available from:

Division of Library and Educational Facilities, Bureau of Libraries and Learning Resources, Office of Education, U.S. Department of Health, Education, and Welfare, Washington, D.C. 20202.

Those interested in a career in Federal Libraries should write to:

Secretariat Federal Library Committee, Room 310, Library of Congress, Washington, D.C. 20540.

Information on information science specialists may be obtained from:

American Society for Information Science, 1140 Connecticut Ave. NW., Washington, D.C. 20036.

Individual State library agencies can furnish information on scholarships available through their offices, on requirements for certification, and general information about career prospects in their regions. State boards of education can furnish information on certification requirements and job opportunities for school librarians.

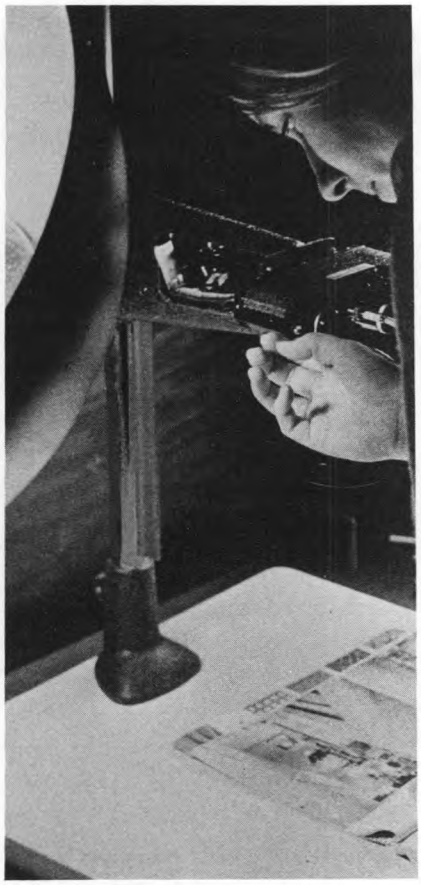
LIBRARY TECHNICAL ASSISTANTS

(D.O.T. 249.368)

Nature of the Work

Library technical assistants support and assist professional librarians in providing information. They are supervised by a librarian and have duties in either technical services or reader services.

In technical services, library technical assistants prepare the library's materials and equipment for reader use. For example, they may keep current files of special materials, such as newspaper clippings and pictures. They may operate and maintain audiovisual and data processing equipment, including slide projectors and tape recorders, as well as readers that magnify, project on a screen, and sometimes print out information on



Library technical assistant photographs magazine to make slides.

microfilm and microfiche cards. Library technical assistants also may perform many of the routine tasks involved in purchasing and processing library materials. The details of cataloging new books and other additions to the library's collection are often an important part of their job.

In reader's services, library technical assistants furnish information on library services, facilities, and rules, and answer questions that involve simple fact-finding in standard reference sources. They also assist readers in the use of catalogs and indexes to locate books and other materials. Library technical assistants may check-out, reserve, and receive materials that users borrow.

In some libraries, library technical assistants may supervise the work of others who handle routine duties that keep the library functioning.

Places of Employment

An estimated 25,000 people—four-fifths of them women—worked as library technical assistants in 1972. Most worked in large public libraries or in college and university libraries. Smaller numbers worked in school libraries and in medical, law, scientific, technical, and other special libraries.

In 1972, the Federal Government employed about 3,300 library technicians. These people worked chiefly in the Department of Defense and the Library of Congress, although many worked in small Federal libraries throughout the country.

Training, Other Qualifications, and Advancement

Library technical assistants may receive training for their work either on the job or in a formal post-high school program. Depending on the library, on-the-job programs generally require from 1 to 3 years to complete.

Junior or community colleges and technical institutes offer 2-year formal educational programs which lead to an associate or arts degree in library technology. Many people working in libraries take courses part-time to become certified or to get their degree.

Junior and community college programs generally include 1 year of liberal arts courses and a year of library-related study on purposes and organization of libraries, and on procedures and processes involved in operating a library. Students learn to order and process, catalog, and circulate library materials. Some receive training in data processing as it applies to libraries. Many learn to use and maintain audiovisual materials and equipment.

In 1972, 120 institutions offered library technical assistants training. These institutions—mostly 2-year colleges—are in over 30 States. Over the next several years, the number is expected to grow and formal training may become an established requirement for library technical assistants. Some programs teach skills for a particular type of library. Therefore, a prospective student should select a program with a knowledge of the curriculum, instructional facilities, faculty qualifications, and the kinds of jobs that graduates have found. Also, while programs may lead to an associate degree, credits earned in a library technology program may not apply toward a professional degree in library science.

A high school diploma or its equivalent is the standard requirement for both academic and on-the-job training programs. Many programs also require typing.

Library technical assistants should enjoy detail and have manual dexterity, verbal ability to explain procedures, and numerical ability to handle circulation statistics. Jobs may require much standing, stooping, bending, and reaching.

Employment Outlook

The employment outlook for library technical assistants is expected to be good through the mid-1980's particularly for graduates of academic programs. Opportunities are likely to be especially favorable in large public libraries and in college and university libraries.

Factors influencing the steadily growing demand for library technical assistants are population growth and expansion of library

service. Library technical assistants increasingly are performing some of the routine tasks formerly done by the professional staff.

In addition to openings created by growth, several thousand library technical assistants will be needed annually to replace those who die, retire, or transfer to other fields.

Earnings and Working Conditions

Salaries for library technical assistants vary widely depending on the size of the library or library system in which they work as well as the geographical location and size of the community.

In the Federal Government, salaries of library technicians generally ranged from $6,882 to $9,520 a year in early 1973. A few earned $11,614 a year, or more.

Library technical assistants in government and special libraries usually work a regular 40-hour week, but persons in public libraries and college and university libraries may have schedules that include weekend and evening hours. In schools, library technical assistants work during regular school hours.

Most libraries provide fringe benefits such as group insurance and retirement pay. Additional benefits offered by private businesses often include education assistance programs. Library technicians employed by the Federal Government receive the same benefits as other Federal workers.

Sources of Additional Information

Information on institutions offering programs for the training of library technical assistants, may write:

Council of Library Technical Assistants,
6800 South Wentworth Ave., Chicago,
Ill. 60621.

SALES OCCUPATIONS

Saleswork offers career opportunities for people who have completed high school as well as for college graduates, for those who want to travel and those who do not, and for salaried workers as well as men and women who wish to run their own businesses.

Workers in these jobs may sell for manufacturers, service firms, wholesalers, and retailers.

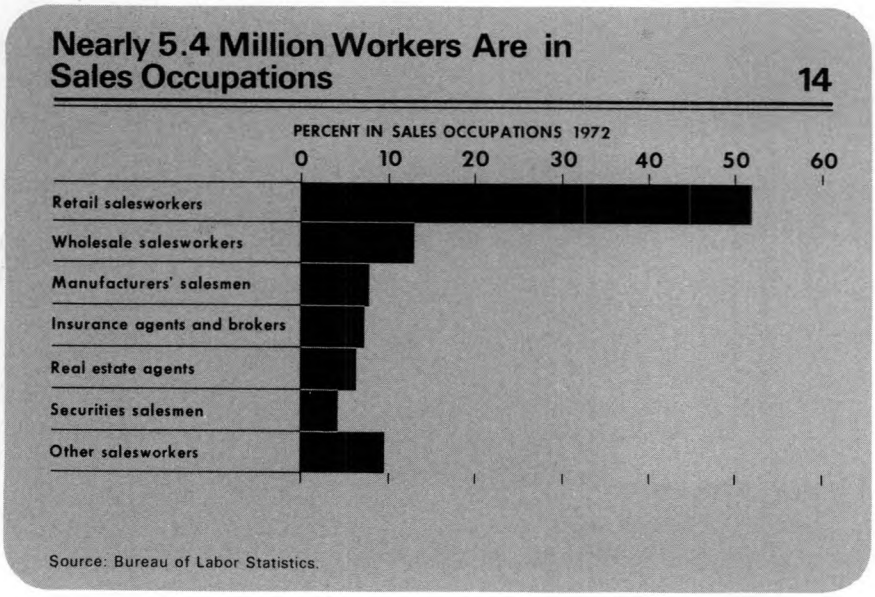
In 1972 about 5.4 million people, were in sales occupations; about 25 percent worked part-time. Forty percent were women who worked mainly in retail stores. Most salesworkers outside of retail stores were men. Chart 14 shows employment in the major sales occupations discussed in this section. The *Handbook* also includes individual statements for automotive salesworkers, automobile parts countermen, automobile service advisors, gasoline service attendants, models, and routemen.

Training, Other Qualifications, and Advancement

Training requirements for saleswork are as varied as the work itself. Salesworkers who sell standardized merchandise such as magazines, candy, cigarettes, and cosmetics usually are trained on the job by experienced salesclerks; in some large stores, they may attend brief training courses. The salesworker who sells complex products or services, such as electronic equipment or liability insurance, needs more education and training than most retail salesclerks. For some positions, salesworkers must be college graduates with majors in a field such as engineering. Others get the necessary technical knowledge from university or manufacturers' courses. Still others learn through years of on-the-job experience, often supplemented by home study. Thus, a real estate agent may take university extension courses; a department store beauty counselor may participate in an industry-sponsored training program; or a jewelry salesworker may learn through years of observation and study on the job.

Even in the most routine kinds of selling, a high school diploma is an asset to a beginner. Courses in business, as well as specialized courses in distributive education, are particularly good preparation. The Federal Government also sponsors training for some salesworkers under provisions of the Manpower Development and Training Act and other legislation.

Salesworkers must understand the needs and viewpoints of their customers and be poised and at ease with strangers. Other important attributes for selling are energy, self-confidence, imagination, self-discipline, and the ability to communicate. Arithmetic skills are an asset. In almost all saleswork except retail trade, salesworkers need initiative to locate prospective customers and to plan work schedules.



Employment Outlook

Employment in sales occupations is expected to rise moderately through the mid-1980's. In addition to jobs from growth, thousands of

openings will occur each year as workers die, retire, or leave for other reasons.

As employment rises, the proportion of part-time workers—already higher than in most occupational groups—also is likely to increase. Many part-time jobs will be in suburban shopping centers which have retail stores open several nights a week.

Further information about employment prospects for salesworkers in individual occupations, including retail trade, is given in statements that follow.

AUTOMOBILE PARTS COUNTERMEN

(D.O.T. 289.358)

Nature of the Work

Automobile parts countermen sell replacement parts and accessories for automobiles, trucks, and other motor vehicles. Most of them work in wholesale stores and automobile dealerships. They sell over the counter and take telephone orders for items such as piston rings, head gaskets, shock absorbers, rearview mirrors, and seat covers.

Parts countermen employed by wholesalers sell parts for many makes of automobiles and trucks to independent repair shops, service stations, self-employed mechanics, and "do-it-yourselfers." Countermen employed by dealers usually sell parts only for the makes of automobiles and trucks sold by the dealers. They may spend most of their time supplying parts to mechanics employed by the dealer.

Parts countermen identify and locate in the stockroom items the customer needs—often only from general description. By knowing parts catalogs and the layout of the stockroom they quickly can find any of several thousand items. If a customer needs a part that is not stocked, countermen may suggest one that is interchangeable, place a special order, or refer the customer elsewhere.

Parts countermen determine the prices of parts from lists, fill out sales receipts, and accept payments. When necessary they package items sold.

In addition to selling, countermen keep catalogs and price lists up to date, replenish stock, unpack and distribute incoming shipments, record sales, and take inventories. Large firms employ stock and receiving clerks to do some of the work.

Parts countermen use micrometers, calipers, fan belt measures, and other devices to measure parts for interchangeability. They also may use coil condenser testers, spark plug testers, and other equipment to find defective parts. In some firms, particularly small wholesale stores, they repair parts by using equipment such as brake riveting machines and brake drum lathes.

Places of Employment

Most of the estimated 72,000 automobile parts countermen employed in 1972 worked for automobile dealers and parts wholesalers. Most dealers employed one to four parts countermen; many wholesalers employed more than four. Other employers include truck dealers, retail automobile parts stores, and warehouse distributors of automotive parts. Trucking companies and buslines employ parts countermen to maintain stockrooms and dispense parts to mechanics who repair their fleets.

Parts countermen work throughout the country in dealerships and automobile parts wholesale stores. Those who work for warehouse distributors, trucking companies, and buslines are employed mainly in large cities.

Training, Other Qualifications, and Advancement

Automobile parts countermen should know the different types and functions of motor vehicle parts and be able to work with numbers. They should be neat, friendly, and tactful since they deal with the public. A good memory and the ability to write legibly and concentrate on details also are desirable. High school or vocational school courses in automobile mechanics, commercial arithmetic, salesmanship, and book-

Auto parts counterman looks in catalogue to get correct part.

keeping are helpful to young persons interested in becoming parts countermen. Practical experience from working in a gasoline service station or automobile repair shop, or working on cars as a hobby also is helpful. Employers generally prefer high school graduates for entry jobs.

Most parts countermen learn the trade on the job. Beginners usually are hired as parts delivery men or trainees. In some large firms, beginners start as stock or receiving clerks. Trainees gradually learn the different types of parts, the use of catalogs and price lists, and the layout of the stockroom. Although trainees may wait on customers after a few months' experience, generally about 2 years are required for a parts counterman to become fully qualified.

Parts countermen training programs for unemployed and underemployed workers were in operation in 1972 in several cities under the Manpower Development and Training Act. Persons who complete these programs, which usually last up to a year, may need additional on-the-job training to become fully qualified.

Parts countermen who have supervisory and business management ability may become parts department or store managers. Others may become "outside salesmen" for parts wholesalers and distributors. Salesmen call on automobile repair shops, service stations, trucking companies, and other businesses that buy parts and accessories in large quantities. Some parts countermen open their own automobile parts stores.

Employment Outlook

Employment of automobile parts countermen is expected to increase rapidly through the mid-1980's. In addition to jobs from employment growth, more than a thousand openings are expected annually to replace experienced workers who retire, die, or transfer to other occupations.

Employment will rise because more parts will be needed to repair the Nation's growing number of motor vehicles. Moreover, the variety of parts is expanding because manufacturers are producing a greater selection of makes, models, and optional equipment.

Earnings and Working Conditions

Automobile parts countermen are paid a weekly or monthly salary, or an hourly wage rate. In addition, they may receive commissions on sales. Parts countermen employed by automobile dealers in 34 large cities had estimated average earnings of $3.90 an hour in late 1972, slightly higher than the average for all nonsupervisory workers in private industry, except farming.

Most parts countermen work 40 to 48 hours a week. Many firms work half a day on Saturday.

Some employers provide paid holidays and vacations, and part or all of additional benefits such as life and health insurance. Others also contribute to retirement plans.

Stockrooms usually are clean and well lighted. The work is not physically strenuous, but parts countermen spend much time standing or walking. They have to work rapidly when waiting on customers and answering telephone calls at the same time.

Many parts countermen belong to unions including the following: the International Association of Machinists and Aerospace Workers; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.).

Sources of Additional Information

Details about employment opportunities may be obtained from local automobile dealers and parts wholesalers, locals of the unions previously mentioned, or the local office of the State employment service. The State employment service also may be a source of information about the Manpower Development and Training Act and other training programs.

General information about the work of automobile parts countermen may be obtained from:

Automotive Service Industry Association, 230 North Michigan Ave., Chicago, Ill. 60601.

National Automotive Parts Association, 29 East Madison St., Chicago, Ill. 60602.

AUTOMOBILE SALESWORKERS

(D.O.T. 280.358)

Nature of the Work

Automobile salesworkers are important links between dealers and car buyers. Many sell only new or used cars. Others, particularly those employed in small dealerships, sell both new and used cars, as well as trucks. (This statement does not discuss salesmen who sell trucks only.)

Automobile salesmen spend much time waiting on customers in the showroom or used-car lot. They determine the kind of car the customer wants by asking questions and encouraging comments about cars on display. For example, one customer may be interested primarily in economy, but another may be more impressed with styling and performance. The salesmen emphasize the points that satisfy the customers' desires and stimulate their willingness

to buy. To illustrate features such as smoothness of ride and ease of operation, the salesman may invite the customer to test drive the car.

Because cars are a major purchase, customers must be convinced that they are making a wise decision. Successful salesmen can overcome the customer's hesitancy to buy, and get the order. Since closing the sale frequently is difficult for beginners, experienced salesmen or sales managers often lend assistance. Salesmen may quote prices and trade-in allowances, but these figures usually require the approval of sales managers. Salesmen register cars and may get license plates and arrange financing and insurance for customers.

Before salesmen approve delivery, they make sure cars have been serviced properly and have the accessories specified by customers. They answer customers' questions on subjects such as the car's controls and the maintenance warranty. Following delivery, they may contact customers to express appreciation for their business and to inquire about the car. From time to time, salesmen also may send brochures on new-car models and other literature. By keeping in contact with customers, they build repeat business.

Salesmen develop and follow leads on prospective customers. For example, they obtain names of prospects from automobile registration records and dealer sales, service, and finance records. They also can obtain leads from gasoline service station operators, parking lot attendants, and others whose work brings them into frequent contact with people. Salesmen may contact prospects by phone or mail.

Places of Employment

Of the 130,000 persons who worked as automobile salesworkers in 1972, a small number were women. New-car dealers employed about 80 percent of the total and used-car dealers the remainder. Although many used-car dealers employ only 1 salesman, a few new-car dealers employ more than 50.

Automobile salesmen work throughout the country, but most are concentrated in heavily populated areas.

Training, Other Qualifications, and Advancement

Most beginners are trained on the job by sales managers and experienced salesmen. Many large dealers also provide several days of classroom training on obtaining customer leads, making sales presentations, and closing sales. Automobile manufacturers may furnish training manuals and other educational material. Experienced and beginning salesmen receive continuing guidance and training from sales managers, both on the job and at periodic sales meetings. Salesmen also may attend training programs offered by automobile manufacturers.

A high school diploma usually is the minimum educational requirement for beginners. Courses in public speaking, commercial arithmetic, English, business law, psychology, and salesmanship provide a good background for selling. Previous sales experience or other work requiring contact with the public is helpful. Many automobile salesmen previously worked as furniture salesmen, route salesmen, door-to-door salesmen, automobile parts countermen, or gasoline service station attendants. However, many sales managers will hire inexperienced appli-

cants who have satisfactory personal and educational qualifications.

Although age requirements for beginning salesmen vary, many employers prefer applicants who are at least in their mid- or late twenties. As a rule, however, 21 is the minimum age for beginners. Age requirements may be waived for a mature applicant.

Automobile salesworkers must be tactful, well-groomed, and able to express themselves well. Initiative and aggressiveness also are important, for the number of cars sold usually depends on the number of prospective customers contacted. Because automobile salesmen occasionally work for days without making a sale, they need self-confidence and determination to get through these slow periods.

Successful salesmen who have managerial ability may advance to assistant sales manager, sales manager, or general manager. Some sales managers and general managers open their own dealerships or become partners in dealerships.

Employment Outlook

Employment of automobile salesmen is expected to grow moderately through the mid-1980's as automobile sales increase. In addition to jobs resulting from employment growth, a few thousand openings will occur each year to replace salesmen who retire, die, or transfer to other occupations. Although selling cars is rewarding for many people, others seek new jobs because they are not suited for the work.

Increased car sales will cause employment to rise as population, multicar ownership, and personal incomes grow. Car sales generally fluctuate from year to year due to changes in business conditions, consumer preferences, and the availability of credit. Salesmen employment also fluctuates, but tends to be more stable than car sales.

Earnings and Working Conditions

Most salesmen are paid a commission based on the selling price of a car or the profit received by the dealer. Additional commissions may be paid when cars are financed and insured through the dealer. Although salesmen work year-round, their sales, and therefore their commissions, vary from month to month. So that commissioned salesmen will have a steady income, many dealers pay a modest weekly or monthly salary. Others advance salesmen money against future commissions. A few dealers pay salesmen a straight salary. Dealers may guarantee beginners a modest income for a few weeks or months. Thereafter, they are paid on the same basis as experienced salesmen.

Salesmen employed by new car dealers had estimated average weekly earnings of $224 in 1972. Earnings varied considerably, depending on individual ability and experience, geographic location, and dealership size. For example, salesmen employed by dealers that sold between 100 and 149 new vehicles annually averaged $168 a week, while those employed by dealers that sold 1,000 or more averaged $257.

Many dealers allow salesmen to use demonstrator cars free of charge. Others sell or lease demonstrators to salesmen at a discount, often at dealer's cost. Salesmen also receive discounts on cars bought for personal use. Most dealers provide paid vacations. Many also offer life and health insurance plans.

Because most customers find shopping after work convenient, salesmen frequently work evenings. In some areas, they may work on Sundays and take a day off during the week. Many dealers assign salesmen "floortime"—hours they spend in the showroom greeting customers. For example, a salesman may work in the showroom from 9 a.m. to 3 p.m. one week, from 3 p.m. to 9 p.m. the next week, and all day on Saturdays. When not assigned to the showroom, salesmen may spend a few hours each day delivering cars to customers and looking for new customers.

Details on employment opportunities may be obtained from local automobile dealers or the local office of the State employment service. General information about the work of automobile salesmen may be obtained from:

National Automobile Dealers Association, 2000 K St. NW., Washington, D.C. 20006.

AUTOMOBILE SERVICE ADVISORS

(D.O.T. 620.281)

Nature of the Work

Many automobile dealers and some large independent garages employ service advisors to wait on customers who bring their automobiles for maintenance and repairs. The service advisor, sometimes called service salesman or service writer, confers with customers to determine their service needs and arranges for a mechanic to perform the work.

For a routine checkup, service advisors merely write the customer's requests on a repair order. However, when the customer complains of mechanical or electrical trouble, the advisor asks about the nature of the trouble and may test drive the automobile. For example, if the customer says his automobile is dif-

ficult to start, the advisor may try to find out if this happens when the engine is cold or after it warms up, and then writes a brief description of these symptoms on the repair order to help the mechanic locate the trouble. Service advisors also include the name of the customer and make of his automobile on the repair order. If a factory warranty covers the repairs, the engine and body numbers, mileage, and date of purchase are recorded.

Service advisors tell customers what repairs are needed, their approximate cost, and how long the work will take. If service advisors cannot tell the customer what repairs are needed until a mechanic has inspected the automobile, they phone him later for permission to do the work. They may advise on the necessity of having work done, by pointing out that it will assure improved performance, safer operation, and prevent more serious trouble. In addition to advising customers on service needs, they may sell accessories such as air-conditioners or radios.

Service advisors give repair orders to the shop dispatcher who then figures cost of repairs and assigns work to mechanics. In some shops, advisors compute repair costs. If a mechanic has questions about a repair order, he contacts the advisor who wrote it. After the mechanic has finished the work, the service advisor may test drive the automobile to be sure the problem has been corrected.

When the customer returns for his automobile, the service advisor answers questions regarding the repairs and settles complaints about their cost or quality. If the automobile is to be returned to the shop because the customer is dissatisfied or the cost of repairs is to be adjusted, the advisor usually must get permission from the service manager. In some dealerships, the most experienced service advisors substitute for service managers when they are absent.

Advisor writes repair order.

Places of Employment

More than 20,000 persons worked as service advisors in 1972; a small number were women. Most service advisors worked for large automobile dealers that employed from one to four advisors, but some worked for large independent automobile repair shops.

Training, Other Qualifications, and Advancement

Service advisors are trained on the job under the guidance of experienced service advisors and the service manager. In many shops, trainees begin by helping the service department dispatcher. They learn to route repair orders through the shop, to compute costs, and to determine the time required for different repairs. The beginner usually can become a qualified service advisor in 1 to 2 years, but learning to estimate the cost of automobile body repairs may take a longer time. In addition to on-the-job training, some advisors attend formal training programs conducted by automobile manufacturers.

For service advisor trainees, employers prefer high school graduates over 21 years of age with work experience in automobile repair or related activities. Employers usually promote young persons from within their own organizations. For example, a young person may apply for a job as service advisor trainee after gaining experience in the firm as a mechanic trainee or parts counterman trainee. Some firms, however, prefer to hire fully experienced mechanics.

Because service advisors deal directly with customers, employers look for applicants who are neat, courteous, even-tempered, attentive listeners, and good conversationalists. High school and vocational school courses in automobile mechanics, commercial arithmetic, salesmanship, public speaking, and English are helpful.

Service advisors with supervisory ability may advance to shop foremen or to service managers. Some open their own automobile repair shops.

Employment Outlook

Employment of automobile service advisors is expected to increase rapidly through the mid-1980's as a result of the increasing number of automobiles. In addition to the job openings resulting from employment growth, a few hundred openings are expected each year to replace experienced service advisors who retire, die, or transfer to other occupations.

The number of automobiles is expected to grow as population, con-

sumer purchasing power, and multicar ownership increase. More automobiles and their increasing complexity will require additional service advisors. Also, some small dealers are expected to hire service advisors as work increases.

Earnings and Working Conditions

Service advisors employed by automobile dealers in 34 large cities had estimated average earnings of $5.03 an hour in late 1972, more than one-third higher than the average for all nonsupervisory workers in private industry, except farming.

Many service advisors are paid a salary plus commission; others are paid a straight commission. Commissions usually are based on both the cost of repairs and the price of accessories sold. Commissions may vary as the amount of repair work fluctuates.

Many employers provide paid holidays and vacations, and pay all or part of the cost of life and health insurance. Others also contribute to retirement plans. Many employers furnish laundered uniforms.

Most service advisors work 40 to 48 hours a week. They are busiest in the early morning when most customers bring their cars for repairs, and in late afternoon when they return. During these peak hours advisors may be rushed to wait on customers.

Service advisors stand much of the time and may be outdoors in all kinds of weather, but their work is not physically strenuous. Occasionally, they have to deal with disgruntled customers, but most customers are pleasant.

Unions that organize service advisors include the International Association of Machinists and Aerospace Workers; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffers, Warehousemen and Helpers of America (Ind.).

Sources of Additional Information

Details on employment opportunities may be obtained from local automobile dealers or repair shops; locals of the unions previously mentioned; or the local office of the State employment service.

General information about the work of automobile service advisors may be obtained from:

Automotive Service Industry Association, 230 North Michigan Ave., Chicago, Ill. 60601.

Automotive Service Councils of America, Inc., 4001 Warren Blvd., Hillside, Ill. 60162.

GASOLINE SERVICE STATION ATTENDANTS

(D.O.T. 915.867)

Nature of the Work

Gasoline service station attendants (also called gasoline station salesmen or servicemen) help keep the Nation's 115 million motor vehicles running and in good operating condition.

Service station attendants pump gasoline, clean windshields, and offer the additional services of checking water level, oil level, and tire air pressure. They also may check the tires, fan belt, and other parts for excessive wear.

Attendants have other responsibilities besides servicing cars. They sell and install parts and accessories such as tires, batteries, fan belts, and windshield wiper blades. When a customer pays the bill, attendants either make change or prepare a charge slip. They may perform minor maintenance and repair work, such as changing oil, rotating tires, repairing tires, or replacing a muffler. Some attendants, called mechanic-attendants, perform more difficult repairs.

Attendants also may keep the service areas, building, and restrooms clean and neat. In some stations, they help the station manager take inventory, set up displays, and perform other duties associated with the operation of a small business.

If a service station provides emergency road service, attendants occasionally may drive a tow truck to a disabled car to "boost" the battery, change a flat tire, or perform other minor repairs. If more extensive repairs are needed, they tow the customer's vehicle back to the service station.

Gasoline service station attendants may use simple handtools such as screwdrivers, pliers, and wrenches, and power tools such as pneumatic wrenches. Mechanic-attendants frequently use more complex equipment, such as motor analyzers and wheel alignment machines.

Places of Employment

About 435,000 people worked as gasoline service station attendants in 1972. More than one-third of these were part-time employees. In addition to attendants, more than 225,000 gasoline service station managers and owners did similar work.

Service station attendants work in every section of the country, in the largest cities, in the smallest towns, and in outlying areas.

Training, Other Qualifications, and Advancement

Applicants for jobs as gasoline ser-

vice station attendants should have a driver's license, a general understanding of how an automobile works, and some sales ability. They should be friendly and able to speak well, present a generally neat appearance, and have self-confidence. Applicants should know simple arithmetic so they can make change quickly and accurately and help keep business records. They also should be familiar with local roads, highways, and points of interest in order to give directions to strangers and to locate vehicles whose owners have called for road service.

Although completion of high school is not generally a requirement for getting an entry job, it is an advantage because it indicates to many employers that a young person can "finish a job." A high school education usually is required for service station management training programs conducted by oil companies.

Service station attendants usually are trained on the job, although there are some formal training programs. Attendants who train on the job do relatively simple work at first, such as cleaning the station, pumping gas, and cleaning windshields. Gradually, they progress to more advanced work such as doing simple maintenance, installing accessories on cars, and helping to keep the station records. It usually takes from several months to a year to become fully qualified.

Formal training programs for gasoline service station work are offered in many high schools around the country. In this curriculum, students in their last 2 years of high school take business education courses and work part-time in a gasoline service station, where they receive instruction in all phases of service station work.

Some attendants are enrolled in formal training programs for service stations managers, which are conducted by most major oil companies. These programs usually last from 2 to 8 weeks and emphasize subjects such as simple automobile maintenance, salesmanship, and business management.

Several avenues of advancement are open to gasoline service station attendants. Additional training qualifies attendants to become automobile mechanics; those having business management capabilities may advance to station manager. Many experienced station managers and automobile mechanics go into business for themselves by leasing a station from an oil company or by buying their own station. Oil companies hire some service station managers as salesmen or district managers.

Employment Outlook

Employment of gasoline service station attendants is expected to increase moderately through the mid-1980's. In addition to the job openings from employment growth, thousands of openings are expected each year from the need to replace attendants who retire, die, or transfer to

other occupations.

Increased employment of service station attendants is expected due to the growing consumption of gasoline and other service station products. The number of motor vehicles is expected to rise because of growing population and income, multiple car ownership, and the continuing movement to the suburbs. Also, greater use of cars is expected as families have more leisure time. Continued fuel shortages, however, may adversely affect highway travel.

More attendants also may be needed to perform additional maintenance on newer, more complex cars. For example, more cars will have devices that reduce exhaust fumes, and these devices must be serviced periodically.

Earnings and Working Conditions

Earnings of gasoline service station attendants vary considerably. Hourly earnings for many attendants ranged from $2.00 to $3.00 in 1972, according to the limited information available. Attendants employed in large metropolitan areas generally had higher earnings than those in small towns.

In many stations, employers provide fringe benefits such as health insurance and paid vacations. Some employers furnish uniforms and pay for their cleaning. More than one-half of the attendants work over 40 hours a week; many work more than 48 hours. Attendants frequently work at night and on weekends and holidays.

Attendants work outdoors in all kinds of weather. They do considerable lifting and stooping and spend much time on their feet. Possible injuries include cuts from sharp tools and burns from hot engines. For many attendants, however, the opportunity to deal with people and the possibility of someday managing their own service stations more than offset these disadvantages. For others, the opportunity to get part-time employment is important.

Some college students have been able to work their way through school as service station attendants. Some workers also supplement their income from regular jobs by working part-time as attendants.

Sources of Additional Information

For more details about work opportunities, contact local gasoline service stations or the local office of the State employment service.

INSURANCE AGENTS AND BROKERS

(D.O.T. 250.258)

Nature of the Work

Insurance agents and brokers sell policies that protect individuals and businesses against future losses and financial pressures. They may help plan financial protection to meet the special needs of a customer's family; advise about insurance protection for an automobile, home, business, or other property; or help a policyholder obtain settlement of an insurance claim.

Agents and brokers usually sell one or more of the three basic types of insurance: life, property/liability, and health. Life insurance policies pay survivors when a policyholder dies; they also may provide retirement income, funds for the education of children, and other benefits. Property/liability insurance protects policyholders from financial losses as a result of automobile accidents, fire and theft, or other hazards. Health insurance policies offer protection against the costs of hospital and medical care or loss of income due to illness or injury. Many agents also offer securities, such as mutual fund shares.

An insurance agent may be either an insurance company salesworker or an independent business person authorized to represent one or more insurance companies. Brokers, on the other hand, are not under contract with any company; they place policies directly with the company that best meets a client's needs. Otherwise, agents and brokers do much the same kind of work.

Agents and brokers spend most of their time discussing insurance policies with prospective and existing customers. Some time must be spent in office work to prepare reports, maintain records, plan insurance programs that are tailored to prospects' needs, and draw up lists of prospective customers. Specialists in group policies may help an employer's accountants set up a system of payroll deductions for employees covered by the policy.

Places of Employment

About 385,000 agents and brokers—90 percent of them men—sold insurance full time in 1972. Many others worked part time. About half specialized in life insurance; the rest, in some type of property/liability insurance. Almost all also sold health insurance.

Agents and brokers are employed in cities and towns throughout the country, but most work near large population centers.

Training, Other Qualifications, and Advancement

Although some employers prefer

Agent discusses policy with customer.

college graduates for jobs selling insurance, most hire high school graduates with work experience. College training may help the agent grasp the fundamentals and procedures of insurance selling more quickly. Courses in accounting, economics, finance, business law, and insurance subjects are helpful.

All agents and most brokers must be licensed in the States where they plan to sell insurance. In most States, licenses are issued only to applicants who pass written examinations covering insurance fundamentals and the State insurance laws. New agents usually receive training at insurance company home offices or at the agencies where they will work. Beginners sometimes attend company-sponsored classes to prepare for examinations. Others study on their own and accompany experienced salesworkers when they call on prospective clients.

Agents and brokers can broaden their knowledge of the insurance business by taking courses at colleges and universities and attending institutes, conferences, and seminars sponsored by insurance organizations. The Life Underwriter Training Council (LUTC) awards a diploma in life insurance marketing to agents who successfully complete the Council's 2-year life program. They also offer other courses in life and health insurance. As an agent or broker gains experience and knowledge, he can qualify for the Chartered Life Underwriter (CLU) designation by passing a series of examinations given by the American Society of Chartered Life Underwriters. In much the same way, a property/liability agent can qualify for the Chartered Property Casualty Underwriter (CPCU) designation by passing an examination given by the American Institute for Property and Liability Underwriters, Inc. The CLU and CPCU designations are recognized marks of achievement in their respective fields.

Agents and brokers should be enthusiastic, self-confident, and able to communicate effectively with different types of people. Because agents usually work without supervision, they need initiative to locate new prospects. For this reason, many employers seek people who have been successful in other jobs.

Insurance agents who show unusual sales ability and leadership may be promoted to sales manager in a district office or to a managerial job in a home office. A few agents may advance to top positions as agency superintendents or company vice-presidents. Many who have built up a good clientele prefer to remain in sales work. Some, particularly in the property/liability field, eventually establish their own independent agencies or brokerage firms.

Employment Outlook

Employment of insurance agents and brokers is expected to grow moderately through the mid-1980's as the volume of insurance sales continues to expand. Many additional jobs will open as agents and brokers die, retire, or leave their jobs to seek other work. Due to the competitive nature of insurance selling, beginners often leave their jobs because they have been unable to establish a successful clientele.

As personal incomes rise and life expectancy increases, more families will depend on life insurance for educational funds for their children and retirement income. Expansion in industrial plant and equipment and a growing number of major consumer purchases, such as homes or automobiles, will stimulate sales of property/liability insurance. Rising medical costs will increase sales of health insurance.

Employment of agents and brokers, however, is not expected to keep pace with growing insurance sales because more policies will be sold to groups and by mail. Also,

agents should be able to handle more business as computers relieve them of time-consuming clerical tasks.

Earnings and Working Conditions

Beginners in this occupation often are guaranteed moderate salaries or advances on commissions while they are learning the business and building a clientele. Thereafter, most agents are paid a commission. The size of the commission depends on the type and amount of insurance sold, and whether the transaction is a new policy or a renewal. After a few years, an agent's commissions on new policies and renewals may range from $8,000 to $20,000 annually. A number of established and highly successful agents and brokers earn more than $30,000 a year.

Agents and brokers generally pay their own automobile and traveling expenses. In addition, those who own and operate independent businesses must pay office rent, clerical salaries, and other operating expenses out of their earnings.

Although insurance agents usually are free to arrange their own hours of work, they often schedule appointments during evenings and weekends for the convenience of clients. Some agents work more than the customary 40 hours a week. (See the statement on the Insurance Industry for more information about work in life and property/liability companies.)

Sources of Additional Information

General occupational information about insurance agents and brokers may be obtained from the home office of many life and property/liability insurance companies. Information on State licensing requirements may be obtained from the department of insurance at any State capital.

Information about a career as a life insurance agent also is available from:

Institute of Life Insurance, 227 Park Ave., New York, N.Y. 10017.

Life Insurance Agency Management Association, 170 Sigourney St., Hartford, Conn., 06105.

The National Association of Life Underwriters, 1922 F St., NW., Washington, D.C. 20006.

Information about sales training in life and health insurance is available from:

The Life Underwriter Training Council, 1922 F St. NW., Washington, D.C. 20006.

Information about property/liability agents and brokers can be obtained from:

Insurance Information Institute, 110 William St., New York, N.Y. 10038.

National Association of Insurance Agents, Inc., 85 John St., New York, N.Y. 10038.

MODELS

(D.O.T. 297.868 and 961.868)

Nature of the Work

Models convey the idea that life can become happier, more glamorous, or secure if people buy the products or use the services they advertise. The attractive female model or handsome male model furnishes the indispensable image that can trigger public demand for a new look or product.

Most models specialize in some line of live or photographic work.

Some *fashion models* work before an audience, often by participating in style shows. Models walk past customers and pause to exhibit favorable features of the clothes they are wearing. On some jobs they may stop to tell individual customers a garment's price and style number. Fashion models who work for clothing designers, manufacturers, and distributors are called showroom or wholesale models. They work constantly during peak seasons, but during slack times they may have clerical duties such as typing.

Informal models work in department stores and custom salons where the pace is more leisurely than in showrooms. Still others, may demonstrate new products and services at manufacturers' exhibits and trade shows.

Photographic models usually are hired on an assignment basis. After arriving for an assignment, the model changes into the appropriate clothing. The photographer then decides on poses, adjusts lights, and takes several pictures. Most photographic models display fashions, but some pose with other merchandise such as cars or china.

In addition to fashion and photographic work, some models pose for artists or sculptors, or work in films or television. Models available for all types of assignments are known as free-lancers. They work on their own or through a model agency which schedules clients' assignments.

Places of Employment

More than 7,000 persons worked as full-time models in 1972; many others had part-time modeling jobs. Most models are women. Although models work in nearly all urban areas, most jobs are in New York City, the center of the fashion industry. Large numbers also work in Chicago and Los Angeles.

Manufacturers, designers, and wholesalers employ the largest

Models prepare to pose.

number of full-time models. In New York City's garment district, hundreds of firms and designers employ one or two permanent models. Some models work for advertising agencies, retail stores, and magazines; others are hired by artists, photographers, and sculptors.

Training, Other Qualifications, and Advancement

Prospective models should know hair styling, and the use of makeup, and the proper way to walk and stand. Modeling schools and many agencies in large cities provide this instruction. In photographic modeling courses, students are taught to pose for the photographer and to show different emotions before the camera. Although employers have no specific educational requirements, some models complete high school and others have college training. Courses in art, drama, dancing, and fashion design can develop poise and a sense of style.

Fashion models must be well proportioned and slim to fit manufacturers' samples. A female shoe model generally must wear size 5, and a hosiery model needs long and graceful legs. The male model should wear trim clothing—usually a size 40 or 41 long suit.

Because photographs distort images and emphasize undesirable traits, photograhic models usually are thinner than other models and have fine physical features. Female photographic models, for instance, must be long-waisted and at least 5 feet 7 inches tall. They also need good teeth and a face that is pretty or reflects the style of the period.

Models should like working as part of a team. The ability to withstand the pressures of competition, close schedules, and quick changes is important. Sometimes they work under uncomfortable conditions, such as modeling furs in the summer or swim suits in winter. The job demands not only perfect grooming, poise, and a pleasant personality, but also physical stamina and a generous helping of determination.

Placement offices at modeling schools provide jobs for many students. Some jobseekers find employment by registering at a model agency. An agency usually asks the applicant for photos in a number of modeling poses to show prospective clients. Department stores may hold auditions that give inexperienced models a chance to show the newest styles. In addition, many sales jobs in department stores provide useful experiences in handling clothing, observing customers, and occasional modeling. Sometimes a model can gain experience in local fashion shows given to raise funds for charity.

Modeling can be a stepping stone to other jobs in the fashion field, such as fashion coordinator, staff editor of a fashion magazine, or fashion consultant. Models who work as doubles or stand-ins in movies or television may become actors or actresses. Some work their way through art school by modeling and then qualify for jobs as fashion illustrators.

Employment Outlook

Full-time modeling will remain highly competitive through the mid-1980's. Because young people are attracted by the glamour of this occupation, the number of job hunters is expected to be much larger than the number of full-time jobs. Opportunities for part-time work, however, should be favorable.

Employment of models is expected to increase moderately during the next decade as apparel manufacturing and sales expand. As the competition for sales grows, manufacturers will stress advertising, and this emphasis on product promotion will contribute to the demand for models.

Most openings for models will be to replace those who leave the field. Many high fashion models have to retire when they lose their youthful appearance, and others are eased out of the field because they are identified with outdated products. Although a female model seldom works more than 8 years, a male model often works 20 years or more.

Earnings and Working Conditions

A model's earnings depend chiefly on the number of assignments and their length. Although a few top models make as much as many top executives, most earn far less. According to the limited information available, fashion models working full time for manufacturers or wholesalers earned from $125 to $200 a week in 1972. Models working for New York City retail stores were paid from $110 to $180 a week, and those working outside of New York from $80 to $120.

Free-lance models charge their clients fees. Those working through agencies pay a commission to the agency. In 1972, free-lance models working in fashion shows averaged $50 an hour in New York City. Photographic models in New York earned $40 to $75 an hour. These rates are misleading because many models, especially beginners, work only a few hours each week. Although photographic modeling often pays well, many models must provide their own accessories and pay for other expenses such as transportation. Occasionally, a complete outfit is needed to get a job.

Television models earn at least $35 for an appearance as an extra, and about $135 for an appearance as a principal character; they are paid an additional amount for each rerun. Television models must be members of the American Federation of Television and Radio Artists or the Screen Actors Guild, Inc.

Modeling may influence personal life. Because the camera highlights the effects of keeping late hours, for example, a model may limit evenings out to be fresh for the next day's work. In addition, a female model must spend part of each night on beauty care, and sometimes prepares clothing and accessories for the next day.

Sources of Additional Information

Employers of models such as magazines and newspapers may be able to recommend reputable modeling agencies or schools to those interested.

A list of approved modeling schools is available from individual State Departments of Education. Write the directors of particular modeling schools for catalogs describing the program, entrance requirements, and tuition costs.

MANUFACTURERS' SALESWORKERS

(D.O.T. 260. through 289.458)

Nature of the Work

Practically all manufacturers—whether they make computers or can openers—employ salesworkers. Manufacturers' salesworkers sell mainly to other businesses—factories, railroads, banks, wholesalers, and retailers. They also sell to hospitals, schools, and other institutions.

Most manufacturers' salesworkers sell nontechnical products. They must be well informed about their firms' products and also about the special requirements of their customers. When salesworkers visit firms in their territory, they use an approach adapted to the particular line of merchandise. A salesworker who handles crackers or cookies, for example, emphasizes the wholesomeness, attractive packaging, and variety of these products. Sometimes salesworkers promote their products by displays in hotels and conferences with wholesalers and other customers.

Salesworkers who deal in highly technical products, such as electronic equipment, often are called sales engineers or industrial salesworkers. In addition to having a thorough knowledge of their firms' products, they must be able to help prospective buyers with technical problems. For example, they may try to determine the proper materials and equipment for a firm's manufacturing process. They then present this information to company officials and try to negotiate a sale. Often, sales engineers work with the research-and-development departments of their own companies to devise ways to adapt products to a customer's specialized needs. Sales-

Manufacturer's salesworkers learn the advantages of new packaging materials.

workers who handle technical products sometimes train their customers' employees in the operation and maintenance of new equipment, and make frequent return visits to be certain that it is giving the desired service.

Although manufacturers' salesworkers spend most of their time visting prospective customers, they also do paperwork including reports on sales prospects or customers' credit ratings. In addition, they must plan their work schedules, draw up lists of prospects, make appointments, handle some correspondence, and study literature relating to their products.

Places of Employment

Over 42,000 people—10 percent of them women—were manufacturers' salesworkers in 1972. About 25,000 were sales engineers. Some work out of home offices, often located at manufacturing plants. The majority, however, work out of branch offices, usually in big cities near prospective customers.

More salesworkers are employed by companies that produce food products than by any other industry. Large numbers also work in the printing and publishing, chemicals, fabricated metal products, and electrical and other machinery industries The largest employers of sales engineers produce heavy machinery, transportation equipment, fabricated metal products, and professional and scientific instruments.

Training, Other Qualifications, and Advancement

Although high school graduates can be successful manufacturers' salesworkers, college graduates increasingly are preferred as trainees.

Manufacturers of nontechnical products often hire college graduates who have a degree in liberal arts or business administration. Some positions, however, require specialized training. Drug salesworkers usually need training at a college of pharmacy. Manufacturers of electrical equipment, heavy machinery, and some types of chemicals prefer to hire college-trained engineers or chemists. (Information on chemists, engineers, and other professionally-trained workers who may be employed as manufacturers' salesmen is given elsewhere in the *Handbook*.)

Beginning salesworkers take specialized training before they start on the job. Some companies, especially those that manufacture complex technical products, have formal training programs that last 2 years or longer. In some of these programs, trainees rotate among jobs in several departments of the plant and office to learn all phases of production, installation, and distribution of the product. Other trainees take formal class instruction at the plant, followed by on-the-job training in a branch office under the supervision of field sales managers.

A pleasant personality and appearance, and the ability to meet and get along well with many types of people are important. Because salesworkers may have to walk or stand for long periods or carry product samples, physical stamina is necessary. As in most selling jobs, arithmetic skills are an asset.

Sales representatives who have good sales records and leadership ability may advance to sales supervisors, branch managers, or district managers. Those having managerial skill eventually may advance to sales manager or other executive positions; many top executive jobs in in-

dustry are filled by people who started as salesworkers.

Because of frequent contact with business people in other firms, salesworkers often transfer to better jobs. Some go into business for themselves as manufacturers' agents selling similar products of several manufacturers. Other experienced salesworkers find opportunities in advertising and marketing research.

Employment Outlook

The number of manufacturers' salesworkers is expected to rise moderately through the mid-1980's as a result of general economic growth and the greater emphasis manufacturers will place on their sales activities. In addition to openings from growth, several thousand jobs will emerge annually as existing positions become vacant because of retirements or deaths. Still other vacancies will occur as salesworkers leave their jobs to enter other types of employment.

Among the factors expected to influence employment growth in the occupation are the expansion of markets for technical products and the resulting demand for trained salesworkers. In addition, the increased volume of business transacted with some customers—modern industrial complexes, chain stores, and large institutions of many kinds—will heighten competition among the manufacturers supplying these organizations and intensify the need for effective selling. Although they will fill thousands of sales jobs each year, manufacturers are expected to be selective in hiring. They will look for ambitious young people who are well trained and temperamentally suited for the job.

Earnings and Working Conditions

According to limited data, salaries for beginning salesworkers averaged about $9,000 a year in 1972, exclusive of commissions and bonuses. The highest starting salaries generally were paid by manufacturers of electrical and electronic equipment, construction materials, hardware and tools, and scientific and precision instruments.

Some manufacturing concerns pay experienced salesworkers a straight commission, based on their dollar amount of sales; others pay a fixed salary. The majority, however, use a combination plan of salary and commission, salary and bonus, or salary-commission and bonus. Commissions vary according to the salesworkers' efforts and ability, the commission rate, location of their sales territory, and the type of product sold. Bonus payments may depend on individual performance, that of all salesworkers in the group or district, or on the company's sales. Some firms pay annual bonuses; others offer bonuses as incentive payments on a quarterly or monthly basis. In 1972, many experienced salesworkers earned between $16,000 and $32,000 annually; some earned more. In general, the earnings of manufacturers' salesworkers are higher than the average for nonsupervisory workers in private industry, except farming.

Some manufacturers' salesworkers have large territories and do considerable traveling. Others usually work in the neighborhood of their "home base." When on business trips, salesworkers are reimbursed for expenses such as transportation and hotels. Some companies provide a car or pay a mileage allowance to salesworkers who use their own cars.

Manufacturers' salesworkers call at the time most convenient to customers and may have to travel at night or on weekends. Frequently, they spend evenings writing reports. However, some plan their schedules for time off when they want it. Most salesworkers who are not paid a straight commission receive 2 to 4 weeks' paid vacation, depending on their length of service. They usually share in company benefits, including life insurance, pensions, and hospital, surgical, and medical benefits.

Sources of Additional Information

For more information on the occupation of manufacturers' salesworker write:

Sales and Marketing Executives International, Student Education Division, 630 Third Ave., New York, N.Y. 10017.

REAL ESTATE SALESWORKERS AND BROKERS

(D.O.T. 250.358)

Nature of the Work

Real estate salesworkers and brokers represent property owners in selling or renting their properties. They are also called real estate agents or, if they are members of the National Association of Realtors, ® "Realtors®."

Brokers are independent businessmen who not only sell real estate, but also sometimes rent and manage properties, make appraisals, and develop new building projects. In closing sales, brokers usually make arrangements for loans to finance the purchases, for title searches, and for meetings between buyers and sellers, when details of the transaction are agreed upon and the new owners take possession. Brokers must also manage their own offices, advertising

properties, and handle other business operations. Some combine other work such as selling insurance or practicing law with their real estate business.

Salesworkers or agents work for brokers. They show and sell real estate, handle rental properties, and obtain "listings" (owner agreements to place properties for sale with the firm). Because obtaining listings is an important job duty, salesworkers may spend much time on the telephone exploring leads gathered from advertisements and personal contacts. They also answer inquiries about properties over the telephone.

A worker who sells real estate or handles rental properties often must leave the office to call on prospects and drive them to inspect properties for sale. When a number of houses are for sale in a new development, the agent may operate from a model home.

Most real estate salesworkers and brokers sell residential property. A few, usually in large firms, specialize in commercial, industrial or other types of real estate. Each specialty requires knowledge of the particular type of property. For example, selling or leasing business property requires an understanding of leasing practices, business trends, and location needs; those who sell or lease industrial properties must know about transportation, utilities and labor supply. To sell residential properties the agent must know the location of schools, churches, shopping facilities, and public transportation. Familiarity with tax rates and insurance is also important. The salesworker who is a broker's only employee may need some knowledge of all types of property.

Real estate salesworker points out features of condominium project.

Places of Employment

About 350,000 persons—60 percent of them men—were full-time real estate brokers and salesworkers in 1972. Many others sold real estate part time. The total number of men and women licensed to sell was about 1 million in 1972, according to the National Association of Real Estate License Law Officials.

Most real estate employees work for small business establishments; a few, in urban areas, work for firms with large staffs. Brokers generally are self-employed. Real estate is sold in all areas but employment is concentrated in large urban areas and in smaller but rapidly growing communities.

Training, Other Qualifications, and Advancement

Real estate salesworkers and brokers must be licensed in every State and in the District of Columbia. All States require prospective agents to pass written tests. The examination—more comprehensive for brokers than for salesworkers—includes questions on basic real estate transactions and on laws affecting the sale of property. In more than 60 percent of the States, candidates for a broker's license must have a specified amount of experience in selling real estate or the equivalent in related experience or education (generally 1 to 3 years). State licenses usually can be renewed annually without reexamination.

Employers prefer applicants with at least a high school education. High school courses in selling, architectural drawing, business law, eco-

nomics, and public speaking are helpful for those planning a career in real estate. Most agents have some college training and many are college graduates. College courses in real estate subjects as well as psychology, economics, finance, and business administration are an asset.

Young men and women interested in beginning jobs as real estate salesworkers often apply in their own communities, where their knowledge of local neighborhoods is an advantage. The beginner usually learns the practical aspects of the job under the direction of an experienced agent.

Many firms offer formal training programs for both beginners and experienced salesworkers. About 360 universities, colleges, and junior colleges offer courses in real estate. At some, a student can earn an associate's or bachelor's degree with a major in real estate; several offer advanced degrees. Many local real estate boards that are members of the National Association of Realtors ® sponsor courses covering the fundamentals and legal aspects of the field. Advanced courses in appraisal, mortgage financing, and property development and management also are available through various National Association affiliates.

Characteristics important for success in selling real estate include a pleasant personality, honesty, and a neat appearance. Maturity, tact, and enthusiasm for the job are required in order to motivate prospective customers in this highly competitive field. Agents also should have a good memory for names and faces and business details such as prices and zoning regulations.

Trained and experienced salesworkers can advance in many large firms to sales or general managers. Licensed brokers may open their own offices. Training and experience in estimating property value can lead to work as a real estate appraiser, and people familiar with operating and maintaining rental properties may specialize in property management. Those who gain general experience in real estate, and a thorough knowledge of business conditions and property values in their localities, may enter mortgage financing or real estate counseling.

Employment Outlook

Employment of real estate salesworkers and brokers is expected to rise moderately through the mid-1980's as more salesworkers are needed to serve a growing population. In addition to opportunities that result from growth, several thousand openings will occur each year as employees die, retire, or leave for other reasons. Replacement needs are relatively high in this occupation because agents are older, on the average, than workers in most other job fields; in addition, many beginners transfer to other work after a short time selling real estate.

Mature workers, including those transferring from other kinds of saleswork, are likely to find many job opportunities. The proportion of part-time real estate salesworkers may decline, as State licensing requirements change and agents need more specialized knowledge to handle real estate transactions.

The favorable outlook for employment in this field will stem partly from increased demand for new home purchases or rentals by the many young people born following World War II. Continued migration to metropolitan areas and urban renewal programs are among other factors which will contribute to a growing need for agents. Although this field is likely to remain highly competitive it should offer many career opportunities to people with an aptitude for selling.

Earnings and Working Conditions

Commissions on sales are the main source of earnings—very few real estate agents work for a salary. The rate of commission varies according to the type of property and its value; the percentage paid on the sale of farm and commercial properties or unimproved land usually is higher than that paid for selling a home.

Commissions may be divided among several employees of a real estate firm. The person who obtained the listing often receives a part when the property is sold; the broker who makes the sale either gets the rest of the commission, or else shares it with the agent who handles the transaction. Although an agent's share varies greatly from one firm to another, often it is about half of the total amount received by the firm.

Many full-time real estate agents earn between $12,000 and $20,000 a year, according to the limited data available. Beginners usually earn less. Experienced real estate salesworkers may earn $30,000 or more a year.

Income usually increases as an agent gains experience, but individual ability, economic conditions, and the type and location of the property also affect earnings. Salesworkers who are active in community organizations and local real estate boards can broaden their contacts and increase their earnings. A beginner's earnings often are irregular because a few weeks or even months may go by without a sale. Although some brokers allow a salesworker a drawing account against future earnings, this practice is not usual with new employees. The beginner, therefore, should have enough money to live on until commissions increase.

Brokers provide office space, but salesworkers generally furnish their own automobiles. Agents and

brokers often work in the evenings and during weekends to suit the convenience of customers. Some firms, especially the large ones, furnish group life, health, and accident insurance.

Sources of Additional Information

The real estate commission or board located in each State capital can supply details on licensing requirements for real estate salesworkers and brokers in the State. Most local real estate organizations also have this information. Many States can furnish manuals helpful to applicants who are preparing for the required written examinations.

More information about opportunites in real estate work, as well as a list of colleges and universities offering courses in this field, may be obtained by writing to:

National Association of Realtors ®
Department of Education, 155 East Superior St., Chicago, Ill. 60611.

RETAIL TRADE SALESWORKERS

(D.O.T. 260. through 290.877)

Nature of the Work

The success of any retail business depends largely on its salesworkers. Courteous and efficient service from behind the counter or on the sales floor does much to satisfy customers and build a store's reputation. Even though contact with customers is a part of all sales jobs, the duties, skills, and responsibilities of salesworkers are as different as the kinds of merchandise they sell.

In selling items such as furniture, electrical appliances, or clothing, the salesworker's primary job is to create an interest in the merchandise. The salesman or saleswoman may answer questions about the construction of an article, demonstrate its use, and show various models and colors. In some stores, special knowledge or skills may be needed to sell the merchandise carried. For example, in a pet shop, the salesworker should know about the care and feeding of animals. On the other hand, people who sell standardized articles, such as many items in hardware and drug stores, often do little more than take payments and wrap customer's purchases. (In supermarkets and some drugstores, cashiers wrap or bag purchases, receive payments, and make change. See statement elsewhere in the *Handbook* on Cashiers.)

In addition to selling, most retail salesworkers make out sales or charge slips, receive cash payments, and give change and receipts. They also handle returns and exchanges of merchandise and keep their work areas neat. In small stores, they may help order merchandise, stock shelves or racks, mark price tags, take inventory, and prepare displays. (Route salesmen, who sell bread, milk, and other products directly to customers on a regular route, are discussed under Driving Occupations elsewhere in the *Handbook*.)

Places of Employment

In 1972, about 2.8 million salesworkers—three-fifths of them

Retail salesworker describes fabric content to customer.

women—were employed in retail businesses. They worked in stores ranging from the small drug or grocery store that employs one part-time salesclerk to the giant department store that has hundreds of salesworkers. They worked also for door-to-door sales companies and mail-order houses. The largest employers of retail trade salesworkers are department stores and those selling general merchandise, food, and apparel and accessories. Men predominate in stores that sell furniture, household appliances, hardware, farm equipment, shoes, and lumber, and in automobile dealerships. (See statement on Automobile Salesworkers elsewhere in the *Handbook*.) Women outnumber men in department and general merchandise, variety, apparel and accessories, and in drugstores.

Although sales jobs are found in almost every community, most salesworkers are employed in large cities and populated suburban areas.

Training, Other Qualifications, and Advancement

Employers prefer high school graduates for sales jobs. Subjects such as salesmanship, commercial arithmetic, and home economics provide a good background for many selling positions. Some high schools have distributive education programs that offer courses in merchandising and principles of retail selling; many give students a chance to gain practical experience working part time in local stores. Such part-time selling experience may be helpful in getting a full-time job.

Young persons interested in sales jobs may apply to the personnel offices of large retail stores, where they are interviewed and sometimes given aptitude tests. Employers prefer those who enjoy working with people and have the tact to deal with different personalities. Among other desirable characteristics are an interest in sales work, a pleasant personality, a neat appearance, and the ability to communicate clearly. Also, prospective salesworkers should be healthy since they must stand for long periods. Arithmetic skills are an asset for those who calculate prices and make change.

In many small stores, an experienced employee or the proprietor instructs newly hired sales personnel in making out sales slips and operating the cash register. In larger stores, training programs are likely to be more formal, and to include specialized training in selling certain products.

Although large retail businesses often promote college graduates hired as trainees to executive jobs, retail selling remains one of the few fields in which able employees may advance regardless of education. Some salesworkers eventually become buyers, department managers, or store managers. Others, particularly in large stores, may advance to administrative work in areas such as personnel or advertising. Opportunities for advancement are limited in small stores where one person, often the owner, does most managerial work. Retail selling experience may be an asset in qualifying for sales work with wholesalers or manufacturers.

Employment Outlook

Employment of salesworkers in retail trade is expected to increase moderately through the mid-1980's, as the volume of sales rises and the trend for stores to remain open longer continues. Thousands of openings will occur each year because of employment growth and the need to replace salesworkers who retire or leave the occupation for other reasons. In addition to full-time jobs, there will be many opportunities for part-time workers, as well as for temporary workers during peak selling periods such as the Christmas season.

Sales employment will increase more slowly than the volume of sales as self-service—already the rule in most food stores—is extended to drug, variety, and other kinds of stores. On the other hand, rising income levels probably will increase the demand for some merchandise (such as electrical appliances and automobiles) that requires the salesworker to spend a good deal of time with each customer.

Earnings and Working Conditions

In 1972, salesworkers starting in routine jobs where they did little more than "wait on" customers generally earned $1.60 an hour (in many stores, the minimum wage required by law). In stores where selling is more important, starting salaries were sometimes higher. Salaries usually are lower in rural than in urban areas.

Often, experienced salesworkers, including those whose pay scales are determined by union contracts, earn $3 an hour or more. Many are paid a straight salary; in addition some receive commissions—that is, a percentage of the sales they make; still others are paid a straight commission alone. Earnings are likely to be highest in jobs that require special skill in dealing with customers, or technical knowledge of the merchandise sold. Among the highest paid are people who sell automobiles, major appliances, and furniture. On the average, retail trade salesworkers earn about as much as nonsupervisory workers in private industry, except farming.

Salesworkers in many retail stores can buy merchandise at a discount,

often from 10 to 25 percent below regular prices. This privilege sometimes is extended to the employee's family. Some stores, especially the large ones, pay all or part of the cost of such employee benefits as life insurance, retirement, hospitalization, and surgical and medical insurance.

Many full-time salesworkers have a 5-day, 40 hour week, although in some stores the standard workweek is longer. Because Saturday is a busy day in retailing, employees usually work that day and have another weekday off. Longer than normal hours may be scheduled before Christmas and during other peak periods, and employees who work overtime receive additional pay or an equal amount of time off during slack periods. Some, especially those employed by stores in suburban shopping centers regularly work one evening a week or more.

Part-time salesworkers generally work during the store's peak hours of business—daytime rush hours, evenings, and weekends.

Salesworkers in retail trade usually work in clean, well-lighted places and many stores are air-conditioned. Some jobs, however, require work outside the store. A kitchen equipment salesworker may visit prospective customers at their homes, for example, to help them plan renovations, and a used-car salesworker may spend much time at an outdoor lot.

Sources of Additional Information

Information about careers in retail sales is available from:

The National Retail Merchants Association, 100 W. 31st St., New York, N.Y. 10001.

Additional information on careers in retailing may be obtained from the personnel offices of local stores; from State merchants' associations; or from local unions of the Retail Clerks International Association.

Information on retailing courses given in high schools may be obtained from local Superintendents of Schools or from the State Supervisor of Distributive Education in the Department of Education at each State capital.

ROUTEMEN

(D.O.T. 292.358)

Nature of the Work

Routemen drive light trucks over assigned routes to sell and deliver goods or provide services. They are sometimes known as driver-salesmen or route-salesmen. They must, through their selling ability, increase sales to existing customers and obtain new business by canvassing potential customers within their territories.

Routemen's work varies according to the industries in which they are employed, the type of routes they have (retail or wholesale), and the companies employing them. Some specific examples, however, may describe in a general way what most routemen do.

On a typical day, laundry and drycleaning routemen begin by picking up cleaned garments at the processing plant and load their trucks, which are equipped with carrying racks. They deliver the cleaned garments to homes and there pick up soiled clothing. They mark the soiled articles so that they can be identified at the plant. Sometimes, they make notes of the type of stains to be removed or of special processes to be used, such as waterproofing. Each cleaned garment has an itemized bill attached so that drivers can collect the amounts of money due.

Although all routemen must be able to get along well with people, it is particularly important for the drycleaning and laundry routemen. Their reactions to complaints and requests for special services may be the difference between increasing business or losing customers. Periodically, they may call at homes along their routes to try to sell their company's services.

Wholesale bakery routemen deliver bread and other baked goods to grocery stores. Their trucks are loaded the night before or early in the morning, and they check to see whether the proper variety and quantity of products are aboard before starting on the route. Each of them generally stops at from 10 to 50 grocery stores, and at each stop, carries the orders of bread and other baked goods into the store and arranges them on the display racks. Together with the store owner or manager, bakery routemen check the merchandise delivered. They also credit the store for the value of the stale items left over from the previous delivery.

Bakery routemen prepare a list of products they plan to deliver the next day. These lists are estimates of the amount and variety of baked goods that will be sold by the grocery stores. From time to time, they call on grocers along the route who are not customers and try to get orders from them.

Vending machine routemen make certain the machines on their routes are stocked with merchandise and in good working order. At each location, they check the items remaining in machines and the money deposited in the cash boxes. They check vending machines to see that merchandise and change are dispensed properly, and make minor adjustments to machines that are broken. They clean machines, removing waste and accumulated dust, and replace stock.

Routemen keep records of the merchandise placed in each machine and the money removed. They may try to find new locations for vending machines by calling on stores, factories, and other businesses along their routes.

Places of Employment

About 190,000 routemen worked for a wide variety of businesses in 1972. Since most of them were employed by companies that distributed food products or provided personal services, they worked in small towns as well as in large cities. The greatest concentration of employment was in dairies, bakeries, food and beverage distributors, and drycleaning plants in the large cities.

Training, Other Qualifications, and Advancement

In addition to being good drivers, routemen must have sales ability. To get people to buy, they must have a thorough knowledge of the product or service they sell and a persuasive personality. Other important sales qualifications are a pleasant voice, ability to speak well, and a neat appearance. They also need self-confidence, initiative, and tact.

Routemen must be able to work without direct supervision, do simple arithmetic, and write legibly. In most States, a routeman is required to have a chauffeur's license, which is a commercial driving permit. Information regarding this license can be obtained from State Motor Vehicle Departments.

Most employers require their routemen to be high school graduates, preferably 25 years of age or older. Many large companies give applicants aptitude tests to determine whether they will make good salesmen and safe drivers. Routemen who handle a great deal of money may have to be bonded.

School-and-work programs in retail and wholesale merchandising are helpful to a person interested in entering this occupation. High school courses in salesmenship, public speaking, driver training, bookkeeping, and business arithmetic are helpful; almost immediately after high school graduation, valuable experience may be obtained as a sales clerk in a store or in some other type of selling job.

Another method of entering this occupation is to get a job as a *routeman helper* (D.O.T. 292.887). Employers occasionally hire persons 18 years of age or over to assist routemen. When an opening occurs, helpers may be promoted to routemen. Helpers, however, are not likely to be employed in the dairy or vending machine industries.

Most companies give their routemen on-the-job training which varies in length and thoroughness. Many large companies have classes in salesmanship. Some companies assign newly hired routemen for brief periods to jobs in the different departments of the plant, so that they can become familiar with processing operations and answer customers' questions intelligently.

Routemen may be promoted to route foreman or sales supervisor, but these jobs are relatively scarce. Advancement usually is limited to moving from a retail to a wholesale route, where earnings are generally higher. However, some routemen obtain better-paying sales jobs as a result of their experience in route selling.

Employment Outlook

The total number of routemen is expected to change little through the mid-1980's, although employment trends will differ for various types of routemen. For laundry and drycleaning retail routemen, for example, the outlook is for a decrease in employment as more people take their clothes to neighborhood plants or drive-up stores for quicker, more economical service. Even in declining fields, however, openings for new workers will arise as experienced routemen transfer to other fields of work, retire or die.

Employment of wholesale bakery and dairy routemen probably will remain at about present levels or decline slightly. Since large supermarkets have been replacing small neighborhood stores, fewer routemen are required. Moreover, some manufacturers and wholesale food companies are replacing their routemen with salesmen who cover territories by automobile and truck-drivers who follow-up with the deliveries.

On the other hand, opportunities for employment as vending machine routemen will be excellent through the mid-1980's because of the expected rapid increase in the vending machine business. Some of the factors expected to stimulate the business are the development of new and improved machines and the greater use of automatic food service in industrial plants, schools, hospitals, and other high-traffic areas.

Earnings and Working Conditions

Most routemen receive a minimum salary plus a percent of the sales they make. Thus, earnings are determined largely by their selling ability and initiative. According to limited information available in 1972, retail routemen in the dairy and baking industries were guaranteed weekly wages of $110 to $180 plus commissions on sales. Many of these routemen earned more than $200 a week. Wholesale routemen usually earn more than retail routemen.

The number of hours worked by routemen varies. Some work only about 30 hours a week; others may work 60 hours or more depending upon whether the individual has a well-established route or is trying to build up a new one, whether he has a retail or a wholesale route, and how ambitious he is. The number of hours worked may be limited by a union contract, although many contracts specify merely the earliest hour that work may begin and the latest quitting time. The hours may also vary with the season. During the spring-cleaning season, for example, dry-cleaning routemen may work about 60 hours a week, but in winter they may work less than 30 hours.

Many companies require routemen to wear uniforms. Some employers pay for the uniforms and for keeping them clean.

Most routemen receive paid vacations, generally ranging from 1 to 4 weeks, depending upon length of service, and 6 paid holidays or more a year. Many employers also provide hospitalization and medical benefits; some have pension plans.

The routemen is on his own to a great extent. He does not work under strict supervision and, within certain broad limits, may decide how rapidly he will work and where and when he will have a lunch or rest period. On the other hand, a routeman has to make deliveries in bad weather and do a great deal of lifting, carrying, and walking. He also may have to work unusual hours. For example retail milk routemen generally start work in the very early morning.

Many routemen, particularly those delivering bakery and dairy products, are members of the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.) Some belong to the unions which represent the plant workers of their employers.

Sources of Additional Information

For details on routemen employment opportunities, contact local employers, such as bakeries and vending machine companies, or the local office of the State employment service.

SECURITIES SALESWORKERS

(D.O.T. 251.258)

Nature of the Work

When investors buy or sell stocks, bonds, or shares in mutual funds, they call on securities salesworkers to put the "market machinery" into operation. Both the individual who invests a few hundred dollars and the large institution with millions to invest need such services. Often these workers are called *registered representatives, account executives,* or *customers' brokers.*

In initiating buy or sell transactions, securities salesworkers relay orders through their firms' offices to the floor of a securities exchange. When the trade takes place in the over-the-counter market instead, they send the order to the firm's trading department. In either case, the salesworker promptly notifies the customer of the completed transaction and the final price.

In addition, they provide many related services for their customers. They may explain to new investors the meaning of stock market terms and trading practices. For more experienced investors who may have a variety of holdings, they may give suggestions and advice on the purchase or sale of a particular security. Some individuals may prefer long-term investments designed for either capital growth or income over the years; others might want to make short-term investments which seem likely to rise in price quickly. Securities salesworkers furnish information about the advantages and disadvantages of each type of investment based on each person's objectives. They also supply the latest stock and bond quotations on any security in which the investor is interested, as well as information on the activities and financial positions of the corporations these securities represent.

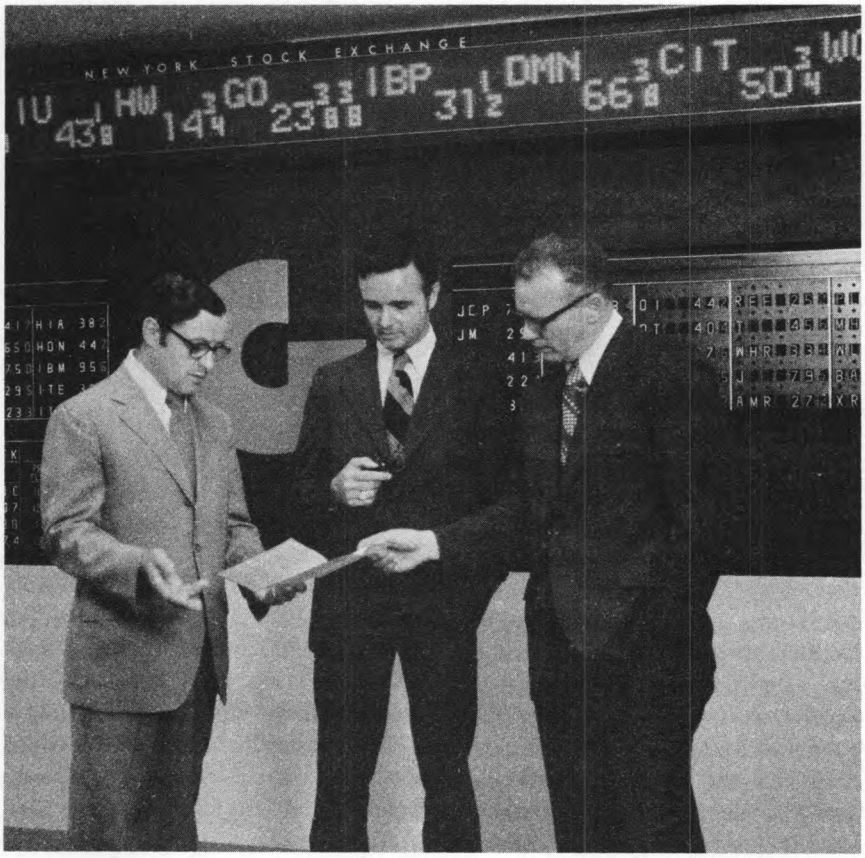
Securities salesworkers may serve all types of customers or they may specialize in one type only, such as institutional investors. They also may specialize in handling only certain kinds of securities such as mutual funds. Some handle the sale of "new issues", such as corporation securities issued for plant expansion funds.

Beginning securities salesworkers spend much of their time searching for customers. Once they have established a clientele, however, they put more effort into servicing existing accounts and less into seeking new ones.

Places of Employment

About 220,000 persons—90 percent of them men—sold securities in 1972. Half worked full time in securities firms and in selling mutual funds. The rest include insurance salespersons offering securities to their customers, and part-time mutual fund representatives.

Securities salesworkers are employed by brokerage firms, investment bankers, mutual funds, and insurance companies in all parts of the country. Many of these firms are very small. Most salesworkers, however, work for a small number of large firms with main offices in big



Salesworkers discuss new stock offering.

cities (especially in New York) or for the nearly 7,000 branch offices in other areas.

Training, Other Qualifications, and Advancement

Because a securities salesworker must be well informed about economic conditions and trends, a college education is increasingly important, especially in the larger securities firms. This is not true, however, for part-time work selling mutual funds. Although employers seldom require specialized training, courses in business administration, economics, and finance are helpful.

Almost all States require persons who sell securities to be licensed. State licensing requirements may include passing an examination and furnishing a personal bond. In addition, salesworkers usually must register as representatives of their firms according to regulations of the securities exchanges where they do business or the National Association of Securities Dealers, Inc. (NASD). Before beginners can qualify as registered representatives, they must pass the Securities and Exchange Commission's (SEC's) General Securities Examination, or examinations prepared by the exchanges or the NASD. These tests measure the prospective representative's knowledge of the securities business. Character investigations also are required.

Most employers provide training to help salesworkers meet the requirements for registration. In member firms of all major exchanges the training period is at least six months. Trainees in large firms may receive classroom instruction in security analysis and effective speaking, take courses offered by schools of business and other institutions and associations, and undergo a period of on-the-job training. In small firms, and in mutual funds and insurance companies, training programs may be brief and informal. Beginners read assigned materials and watch other salesworkers transact business.

Many employers consider personality traits as important as academic training. Employers seek applicants who are well groomed, able to motivate people, and ambitious. Because maturity and the ability to work independently also are important, many employers prefer to hire those who have achieved success in other jobs. Successful sales or managerial experience is very helpful to an applicant.

The principal form of advancement for securities salesworkers is an increase in the number and the size of the accounts they handle. Although beginners usually service the accounts of individual investors, eventually they may handle very large accounts such as those of corporations. Some experienced salesworkers advance to positions as branch office managers, who supervise the work of other salesworkers while executing "buy" and "sell" orders for their own customers. A few representatives may become partners in their firms or do other administrative work.

Employment Outlook

The number of securities salesworkers is expected to grow moderately through the mid-1980's as securities investments continue to increase. In addition to jobs result-

ing from growth, many salesworkers will be needed to replace those who die, retire, or transfer to other jobs. Because of the competitive nature of the occupation, many leave their jobs, unable to establish a successful clientele.

Employment of securities salesworkers will expand as economic growth and rising personal incomes increase the funds available for investment. The activities of investment clubs, which enable small investors to make minimum monthly payments toward the purchase of securities, also will contribute to the demand for securities salesworkers. Growth in the number of institutional investors will be particularly strong as more people purchase insurance; participate in pension plans; contribute to the endowment funds of colleges and other nonprofit institutions; and deposit their savings in banks. In addition, more workers will be needed to sell securities issued by new and expanding corporations and by State and local governments financing public improvements.

Earnings and Working Conditions

Trainees usually are paid a salary until they meet licensing and registration requirements. After registration, a few firms continue to pay a salary until the new representative's commissions increase to a stated amount. The salaries paid during training usually range from $500 to $700 a month; those working for large securities firms may receive as much as $850 a month.

After candidates are licensed and registered, their earnings depend on commissions from the sale and purchase of securities for customers. Commission earnings are likely to be high when there is much buying and selling, and lower when there is a slump in market activity. Most firms provide salesworkers with a steady income by paying a "draw against commission"—that is, a minimum salary based on the commissions which they can be expected to earn. A few firms pay salesworkers only salary and bonuses, that usually are determined by the volume of company business.

Earnings of full-time, experienced securities salesworkers averaged $21,000 a year in 1972, according to the limited data available. Some earned more than $30,000 a year. Full-time securities salesworkers earn about three times as much as average earnings for nonsupervisory workers in private industry, except farming.

Securities salesworkers usually work in offices where there is much activity. In large offices, for example, rows of salesworkers sit at desks in front of "quote boards" which continually flash information on the prices of securities transactions.

Although established salesworkers usually work the same hours as others in the business community, beginners who are seeking customers may work longer. Some salesworkers accommodate customers by meeting with them in the evenings or on weekends.

Sources of Additional Information

Further information concerning a career as a securities salesworker may be obtained from the personnel departments of individual securities firms.

WHOLESALE TRADE SALESWORKERS

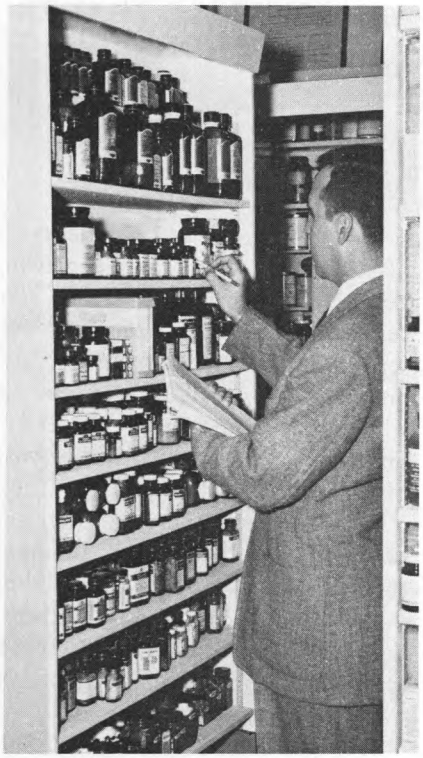
(D.O.T. 260. through 289.458)

Nature of the Work

Salesworkers in wholesale trade play an important role in moving goods from the factory to the consumer. Each salesworker may represent a wholesaler that distributes hundreds of similar products. A wholesale drug company, for example, may stock its warehouse with many brands of drugs, soap, and cosmetics to supply stores that sell directly to the consumer. In much the same way, a wholesale building materials distributor sells hardware and construction materials to builders who would otherwise have to deal with many manufacturers.

At regular intervals, salesworkers visit buyers for retail, industrial, and commercial firms, as well as buyers for institutions such as schools and hospitals. They show samples, pictures, or catalogs that list the items which their company stocks. Salesworkers seldom urge customers to purchase any particular product, since they handle a large number of items. Instead, they offer prompt, dependable service so buyers will become regular customers.

Wholesale salesworkers perform many important services, such as checking the store's stock and ordering items that will be needed before the next visit. Some wholesale salesworkers help store personnel improve and update systems for ordering and inventory. In addition, they often advise retailers about advertising, pricing, and arranging window and counter displays. A salesworker who handles specialized products, such as air-conditioning equipment, may give technical assistance on installation and maintenance.



Wholesale trade salesworker checks drug store inventory before writing order for new shipment.

Salesworkers do some record-keeping and attend to other details. They must forward orders to their wholesale houses, prepare reports and expense accounts, plan work schedules, draw up lists of prospects, make appointments, and study literature relating to their products. Some collect money for their companies.

Places of Employment

About 690,000 people, mostly men, were wholesale salesworkers in 1972. Wholesale houses usually are located in cities, but salesworkers may be assigned territories in any part of the country. Their territory may cover a small section of a city having many retail stores and industrial users; in less populated regions it may cover half a State or more.

Companies that sell food products are leading employers of wholesale salesworkers. Other large employers are wholesalers dealing in drugs, dry goods and apparel, motor vehicle equipment, and electrical appliances. Firms selling machinery and building materials to industrial and business users employ many salesworkers as well.

Training, Other Qualifications, and Advancement

In hiring trainees for sales work, most wholesalers seek people who are neat, outgoing, self-confident, enthusiastic about the job, and understanding of human nature. As in most selling jobs, skills in arithmetic and a good memory are assets. High school graduation is the usual educational requirement, although many companies that sell technical and scientific products prefer applicants who have specialized training beyond high school. In some cases, an engineering degree is required.

Newly hired salesworkers who are college graduates usually participate in formal training programs that combine classroom instruction and short rotations in various nonselling jobs. By working a few weeks in the wholesaler's warehouse, a new employee may gain first-hand experience in writing orders, pricing, and locating stock. Through cooperative programs, some college students combine academic study and on-the-job experience. Graduates having this background often begin outside saleswork without further training.

High school graduates may begin a career with a wholesale firm in a nonselling job or be hired as a sales trainee. In either case, beginners usually work in several kinds of nonselling jobs before being assigned to sales. They may start in the stockroom or shipping department to become familiar with the thousands of items the wholesaler carries. Later they may learn the prices of articles and discount rates for goods sold in quantities. Next, they are likely to work on "inside" sales, and write telephone orders. Later, as they accompany an experienced salesworker on calls, trainees come to know some of the firm's customers. The time spent in these initial jobs varies among companies, but usually it takes 2 years or longer to prepare trainees for outside selling.

Experienced salesworkers who have leadership qualities and sales ability may advance to supervisor, sales manager, or other executive positions.

Employment Outlook

Employment opportunities for salesworkers in wholesale trade are expected to be good through the mid-1980's. In addition to new positions created by growth, thousands of openings will occur each year as salesworkers retire, die, or leave the occupation for other reasons.

The number of wholesale salesworkers is expected to rise moderately as economic growth and increases in population spur continued business expansion. Although the computer will relieve workers of some duties, wholesale salesworkers will spend more time giving special services to customers.

As chain stores and other large firms centralize purchasing activities, the value of the sales made to individual customers becomes larger and competition for sales correspondingly greater. Wholesalers can be expected to meet this competition by emphasizing sales activities.

Earnings and Working Conditions

According to limited information, most beginning salesworkers earned

around $9,000 a year in 1972. Experienced salesworkers averaged $15,000 annually, and many earned considerably more. In general, wholesale salesworkers' earnings are much higher than those of nonsupervisory workers in private industry, except farming.

Most employers pay a salary plus a percentage commission on sales; others pay a straight commission. Although most wholesale salesworkers have steady, year-round work, sales (and commissions) vary because demand for some products—for example, air conditioning—is greater during certain seasons. To provide salesworkers with a steady income, many companies pay experienced personnel a "draw" against annual commissions. Most companies furnish cars or allowances for cars and reimbursements for certain expenses on the road.

Salesworkers often have long, irregular work hours. Although they call on customers during business hours, they may travel at night or on weekends to meet their schedule. However, most salesworkers seldom are away from home for more than a few days at a time. They may spend evenings writing reports and orders, may carry heavy catalogs and sample cases, and may be on their feet for long periods.

Depending on length of service, most salesworkers have a 2-to-4-week paid vacation. Many are covered by company benefits, including health and life insurance and retirement pensions.

Sources of Additional Information

Information on jobs in wholesale selling may be obtained directly from local wholesale houses or from associations of wholesalers in many of the larger cities. If no local association is available, write to:

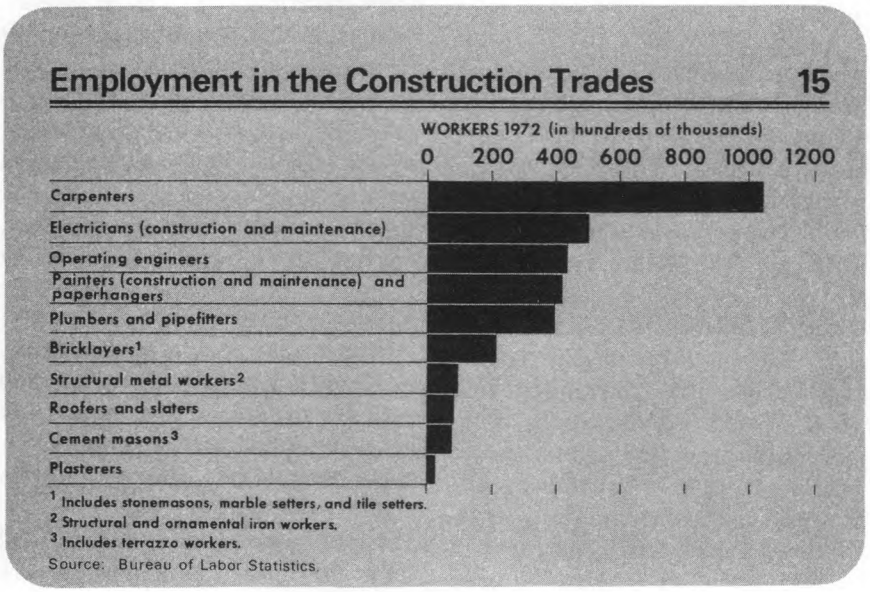
National Association of Wholesaler-Distributers, 1725 K St. NW., Washington, D.C. 20006.

Sales and Marketing Executives International, Student Education Division, 630 Third Ave., New York, N.Y. 10017.

CONSTRUCTION OCCUPATIONS

Construction craftsmen represent the largest group of skilled workers in the Nation's labor force. Altogether, there were 3.3 million of these craftsmen employed in 1972—about 3 out of every 10 skilled workers.

The more than two dozen skilled construction trades vary greatly in size. Several major trades—carpenter, painter, plumber, pipefitter, bricklayer, operating engineer, and electrician—each had more than a hundred thousand workers. (See chart 15.) Carpenters alone numbered 1,045,000—nearly one-third of all construction craftsmen. By contrast, only a few thousand each were employed in trades such as marble setter, terrazzo worker, and stonemason.



What are the Construction Trades?

Workers in the construction trades build, repair, and modernize homes and all kinds of buildings. They also work on a variety of other structures, including highways, airports, and missile launching pads.

The construction trades consist primarily of craftsmen who have a high level of skill and a sound knowledge of their trade. They often are assisted by apprentices, tenders, and laborers.

The work of construction tradesmen may be divided into three categories: structural, finishing, and mechanical. Some craftsmen—for example, carpenters—do both finishing and structural work. In general, each trade falls in one of the following categories:

Trades mainly concerned with structural work: Carpenter, operating engineer (construction machinery operator), bricklayer, structural-iron worker, ornamental-iron worker, cement mason, reinforcing-iron worker (rodman), rigger and machine mover, stonemason, and boilermaker.

Trades mainly concerned with finishing work: Lather, plasterer, marble setter, terrazzo worker, painter, paperhanger, glazier, roofer, floor covering installer, and asbestos worker.

Trades mainly concerned with mechanical work: Plumber, pipefitter, construction electrician, sheetmetal worker, elevator constructor, and millwright.

Most construction trades occupations are described individually later in this chapter. Boilermakers and millwrights are described elsewhere in the *Handbook*. These descriptions are necessarily brief and incomplete, and do not apply fully to all localities.

Also, they are not statements or recommendations concerning the work jurisdiction of these trades, and are inappropriate for use in jurisdictional negotiations or the settlement of jurisdictional questions.

Where Construction Tradesmen Are Employed

Construction tradesmen are employed mostly by contractors in the

construction industry. There are several hundred thousand contractors, and most are small—generally employing fewer than 10 craftsmen. Some large contractors, however, employ thousands. Large numbers of construction tradesmen are employed in other industries, such as mining and manufacturing, mainly to do maintenance and repair work. Chemical manufacturers, for example, need plumbers and pipefitters to maintain the complex pipe networks in their processing plants. Government agencies employ construction tradesmen to maintain highways, buildings, and sanitation systems.

Many construction trades workers are self-employed and work directly for property owners on small jobs. Self-employment is most common in carpentry and painting, but it also is found in other trades.

Employment of construction tradesmen is distributed geographically in much the same way as the Nation's population. Thus, the highest concentration generally is in industrialized and highly populated areas.

Training, Other Qualifications, and Advancement

Most training authorities recommend formal apprentice training as the best way to acquire the all-round skills in the construction trades. Apprenticeship is a prescribed period of on-the-job training, supplemented by related classroom instruction which is designed to familiarize apprentices with the materials, tools, and principles of their trade. Formal apprenticeship agreements are registered with a State apprenticeship agency or the U.S. Department of Labor's Bureau of Apprenticeship and Training.

Many construction tradesmen acquire their skills informally, by working as laborers and helpers and observing experienced craftsmen. Some acquire skills by attending vocational or trade schools or by taking correspondence school courses.

Apprentices in the construction trades generally must be 18 to 25 years old, and in good physical condition. The maximum age limit may be waived for veterans or others who have experience or special qualifications. A high school education, or its equivalent, including courses in mathematics and the sciences, is desirable and is required in a few trades. Often, applicants are given tests to determine their aptitude. For some trades, manual dexterity, mechanical aptitude, and an eye for proper alignment of materials are important.

The formal apprenticeship agreement generally calls for a training period of from 2 to 5 years and 144 hours or more a year of related classroom instruction. The journeymen and the foreman explain to the apprentice how the work is done and show how different operations are performed and the way different tools are used. Ordinarily, most instruction is given by a particular journeyman to whom the apprentice is assigned.

Classroom instruction varies among the construction trades, but usually includes courses such as history of the trade, characteristics of materials, shop mathematics, and basic principles of engineering. It also includes sketching, elementary drafting, and interpretation of drawings; safety practices; and special trade theory such as color harmony for painters and elementary sanitation for plumbers. This instruction seldom is offered in small communities where there may be only a few apprentices. In these communities, apprentices receive instruction through courses offered in the local high school or by visiting instructors who are generally furnished by the State.

The registered apprenticeship agreements also stipulate the length of time the apprentice is to work in each major operation of the trade, as well as the rate of pay. The apprentice is paid a rate that usually starts at 50 percent of the journeyman's pay. The apprentice's rate increases at 6-month or 1-year intervals until a rate of about 90 percent of the journeyman's pay is reached in the final months of training. Often, advanced apprenticeship standing and pay are given to apprentices who have acquired trade skills in the Armed Forces or through trade school instruction.

In most communities, the apprenticeship programs are supervised by joint apprenticeship committees composed of representatives of the local employers or employer groups and the local union. The committee determines the need for apprentices in the locality and establishes minimum standards of education, experience, and training. Whenever an employer cannot provide all-round instruction or relatively continuous employment, the committee transfers the apprentice to another employer. Where specialization by contractors is extensive—for instance, in electrical work—customarily the committee rotates apprentices among several contractors at intervals of about 6 months.

In areas where these committees have not been established, the apprenticeship agreement is solely between the apprentice and the employer or employer group. Many tradesmen have received valuable training under these programs, but they have some disadvantages. No committee is available to supervise the training offered and settle differences over the terms and conditions of training. What the apprentice learns depends largely on the employer's business prospects and policies. If the employer lacks con-

tinuous work or does only a restricted type of work, the apprentice cannot develop all-round skills.

In early 1973, about 155,000 trainees were registered in construction trades apprentice programs. Additional apprentices receive their training in unregistered programs.

In many localities, craftsmen—most commonly construction electricians and plumbers—are required to have a journeyman's license to work at their trade. To qualify for these licenses, they must pass an examination to demonstrate a broad knowledge of the job and of State and local regulations.

Construction trades craftsmen may advance in a number of ways. For example, journeymen may become foremen. In most localities, small jobs are run by "working foremen" who work at the trade along with members of their crews. On larger jobs, the foremen do only supervisory work. Craftsmen also can become estimators for contractors. In these jobs, they estimate material requirements and labor costs to enable the contractor to bid on a particular construction project. Some craftsmen advance to jobs as superintendents on large projects. Others become instructors in trade and vocational schools or salesmen for building supply companies. Many craftsmen have become contractors in the homebuilding field.

Starting a small contract construction business is easier than starting a small business in many other industries. Only moderate financial investment is needed because liberal credit arrangements make it easy to buy materials, and conducting a fairly substantial business from the proprietor's home is possible. However, the contract construction field is highly competitive, and the rate of business failure is especially high among small contractors.

Employment Outlook

Employment in the construction trades is expected to increase rapidly through the mid-1980's. In addition to employment growth, more than 100,000 job openings will result each year from the need to replace experienced workers who transfer to other fields of work, retire, or die.

The rapid growth in employment is expected to result primarily from a rapid rise in construction activity. The anticipated large increases in population and households, and the relatively low-level of housing construction in the late 1960's, are expected to create strong pressure for new housing. Among other factors that will stimulate construction activity are a rise in spending for new industrial plants and equipment and higher levels of personal and corporate income. Also, there will be a growing demand for alteration and modernization work on existing structures, as well as for maintenance and repair work on the expanding highway systems and on the additional numbers of dams, bridges, and similar projects.

The increase in employment is not expected to be as great as the expansion in construction activity. Continued technological developments in construction methods, tools and equipment, and materials will raise output per construction worker. One important development is the growing use of prefabricated units at the job site. For example, preassembled outside walls and partitions can be lifted into place in one operation. An outgrowth of prefabrication is "module building" in which units, including complete rooms, are assembled at a factory.

Also expected to increase workers' efficiency are technological advances in construction tools and equipment. Items formerly unloaded and moved to the construction site by hand, such as concrete and brick, now are being moved by forklift trucks, motorized wheelbarrows, and conveyor belts. The size and speed of cranes and other construction machines have increased considerably. New machines that reduce labor requirements also are being developed. Concrete paving machines that perform the work formerly done by four separate machines are an example.

The rates of employment growth will differ among the various construction trades. Employment growth is expected to be most rapid for construction electricians, cement masons, glaziers, operating engineers, and plumbers and pipefitters. Among the trades that will have a slower growth rate are stonemasons and marble setters.

Earnings and Working Conditions

Hourly wage rates for construction tradesmen are among the highest for skilled workers. However, because construction work is seasonal and time also is lost for other reasons, annual earnings are not as high as the hourly rates of pay would indicate. Union minimum hourly averages for journeymen in 68 large cities in 1972 are shown in the accompanying tabulation.

A substantial proportion of construction trades workers are included in health, insurance, and pension programs negotiated between unions and employers and financed entirely by employer contributions.

Construction work frequently requires prolonged standing, bending, stooping, and working in cramped quarters. Exposure to weather is common as much of the work is done outdoors or in partially enclosed structures. Many people prefer construction work because it permits them to be outdoors.

	Hourly rate
All building trades	$7.27
Journeymen	7.69
Electricians (inside wiremen)	8.19
Plumbers	8.15
Pipefitters	8.14
Sheet-metal workers	8.09
Asbestos workers	8.01
Elevator constructors	8.00
Bricklayers	7.99
Stonemasons	7.87
Structural-iron workers	7.79
Rodmen	7.73
Lathers	7.67
Terrazzo workers	7.52
Marble setters	7.50
Plasterers	7.45
Carpenters	7.41
Roofers, composition	7.37
Cement masons (finishers)	7.24
Glaziers	7.23
Roofers, slate and tile	7.22
Tilesetters	7.16
Paperhangers	7.09
Painters	7.06

Average hourly union scales for construction helpers and laborers are listed in the following tabulation:

	Hourly rate
Helpers and laborers	$5.68
Terrazzo workers' helpers	6.46
Marble setters' helpers	6.35
Tilesetters' helpers	6.25
Bricklayers' tenders	6.06
Plasterers' laborers	5.81
Plumbers' laborers	5.79
Elevator constructors' helpers	5.64
Building laborers	5.57
Composition roofers' helpers	4.62

Construction work generally is more dangerous than work in manufacturing, but the risk of injury is lessened considerably when safe work practices are followed.

Forty hours was the standard workweek for a vast majority of union construction workers in 1972. Time and one-half generally was paid for hours worked beyond the standard workday of 8 hours. Time and one-half or double-time rates were usually paid for work on Saturdays and Sundays or holidays.

The construction trades offer especially good opportunities for young people who are not planning to go to college, but who are willing to spend several years in learning a skilled occupation. Construction tradesmen can find job opportunities in all parts of the country. Their hourly wage rates generally are much higher than those of most other manual workers. As previously noted, construction tradesmen with business ability have greater opportunities to open their own businesses than workers in most other skilled occupations.

A large proportion of construction workers are members of trade unions affiliated with the Building and Construction Trades Department of the American Federation of Labor and Congress of Industrial Organizations.

Sources of Additional Information

Information about opportunities for apprenticeship or other training can be obtained from local construction firms and employer associations, locals of the office of the State apprenticeship agency, or the local office of the Bureau of Apprenticeship and Training, U.S. Department of Labor. Many apprenticeship programs are supervised by local union-management committees. In these instances, an apprentice applicant may apply directly to the coordinator of the committee. In addition, the local office of the State employment service may have information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

For additional information on jobs in the construction trades, write to the organizations listed below:

American Federation of Labor and Congress of Industrial Organizations, Building and Construction Trades Department, 815 16th St. NW., Washington, D.C. 20006.

Associated General Contractors of America, Inc., 1957 E St. NW., Washington, D.C. 20006.

National Association of Home Builders, 1625 L St. NW., Washington, D.C. 20036.

For the names of labor organizations and trade associations concerned with specific trades, see the discussions of individual building trades later in this chapter.

ASBESTOS AND INSULATION WORKERS

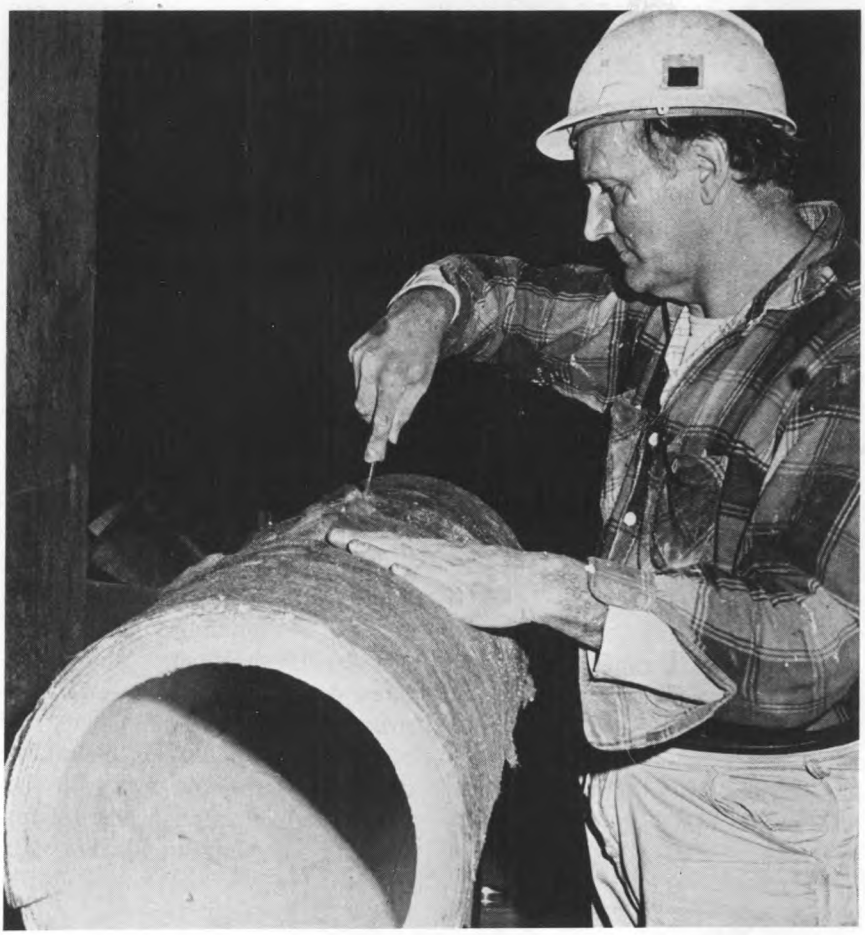
(D.O.T. 863.381, .781, and .884)

Nature of the Work

Asbestos and insulation workers cover pipes, boilers, furnaces, and related equipment with asbestos and other insulating materials. These materials retain heat or cold, absorb sound, and can act as a vapor barrier. Insulated walls and ceilings in a home, for example, reduce fuel costs by preventing loss of heat during the cold months.

Insulating materials are installed by pasting, wiring, taping, stud-welding, spraying, or plastering. When covering pipework, asbestos workers cut either block or preformed insulation to the required size and shape, and then wrap this material around the pipe. They secure the insulating material by using wire bands, or by covering it further with tar paper, cloth, or canvas, sewed or stapled into place. Care is required to cover joints completely.

When covering flat surfaces, asbestos workers spotweld or screw wire fasteners to the surface and install the insulating material. They coat joints with an asbestos cement and wrap them with tape for a tight



Asbestos worker cuts insulating material.

seal. They sometimes spray or plaster insulating material to a wire mesh placed on the surface to be covered. The wire mesh provides a surface for adhesion as well as structural strength for the insulation. A final coat is applied and finished for a smooth appearance.

Asbestos and insulation workers use common handtools—trowels, brushes, scissors, sewing equipment, and stud-welding guns. Powersaws, as well as handtools, are used to cut and fit insulating materials.

Places of Employment

About 30,000 asbestos and insulation workers were employed in 1972, most of whom worked for insulation contractors. Others were employed to alter and maintain insulated pipework in chemical factories, petroleum refineries, atomic energy installations, and similar plants which have extensive steam installations for power, heating, and cooling. Some large firms which have cold storage facilities also employ these workers for maintenance and repair.

Training, Other Qualifications, and Advancement

Most asbestos and insulation workers learn their trade through a 4-year "improvership" program, similar in many respects to apprenticeship programs in other building trades. The improvership program consists of a specified period of on-the-job training in which the trainee learns all aspects of the trade.

Applicants for improvership programs generally must be 18 to 30 years old and in good physical condition. Trainee wage rates start at about 50 percent of the journeyman's rate and increase periodically until the journeyman's rate is reached at the completion of the program. Trainees are required to pass an examination that demonstrates their knowledge of the trade.

A skilled asbestos and insulation worker may advance to foreman, shop superintendent, or estimator, or he may open his own insulation contracting business.

Employment Outlook

Employment of asbestos and insulation workers is expected to increase rapidly through the mid-1980's. Several hundred annual openings are expected because of an increase in construction activity and the need to replace those journeymen who transfer to other occupations, retire or die. Employment growth will result from a rise in commercial and industrial building. (See discussion in construction occupations introduction.) The increasing use of pipe systems in manufacturing processes also will expand job opportunities for these workers.

Earnings and Working Conditions

Union minimum wage rates for asbestos and insulation workers in 68 large cities averaged $8.01 an hour in 1972, compared with $7.69 an hour for all building trades journeymen. Minimum rates for asbestos and insulation workers in 14 of these cities, selected to show how wages differ

among various areas of the country, appear in the accompanying tabulation.

City	*Hourly rate*
Birmingham	$ 6.68
Buffalo	8.39
Cleveland	10.31
Columbus	9.72
Denver	7.45
Indianapolis	8.40
Memphis	7.43
Minneapolis-St. Paul	8.17
Newark	7.49
Norfolk	7.30
Pittsburgh	8.72
San Diego	8.10
Springfield	8.05
Tampa	6.40

Asbestos and insulation workers spend most of the workday on their feet, either standing, bending, stooping, or squatting. Sometimes they work from ladders or in tight spaces when covering pipes and ducts. Removing old insulation before installing new materials is often dusty and dirty.

A large proportion of the workers in this trade are members of the International Association of Heat and Frost Insulators and Asbestos Workers.

Sources of Additional Information

For information about asbestos and insulation workers' improvership programs or other work opportunities in this trade, contact a local asbestos contractor or a local of the International Association of Heat and Frost Insulators and Asbestos Workers. In addition, the local office of the State employment service may provide information about work and training opportunities, including training programs operated under the Manpower Development and Training Act.

BRICKLAYERS

(D.O.T. 861.381, .781, and .884)

Nature of the Work

Bricklayers (or brickmasons) build walls, partitions, fireplaces, and other structures with brick, cinder block, and other masonry materials. They also install fire brick linings in industrial furnaces.

In putting up a brick wall, bricklayers first build the corners at each end of the wall, using plumb lines and a mason's level. A line is then stretched from corner to corner as a guide for each course or layer of brick. Bricklayers spread a bed of mortar (cement mixture) with a trowel, place the brick on the mortar bed, and then tap it into place. When necessary, they cut bricks to fit around windows, doors, and other openings. Mortar joints are finished with jointing tools to leave a neat and uniform appearance.

Bricklayers use handtools primarily, including trowels, brickhammers, levels, chisels, and rules. Powersaws are often used for cutting and fitting bricks and other masonry materials.

Bricklayers are assisted by hod carriers, or helpers, who supply them with bricks and other materials, mix mortar, and set up and move scaffolding. (Detailed occupational descriptions for construction laborers and hod carriers appear elsewhere in the *Handbook*.)

Places of Employment

Bricklayers—who numbered about 180,000 in 1972—are employed mainly in building new homes, schools, hospitals, and other structures. A few specialize in sewer construction, building manholes and catch basins, while others build large chimneys and smokestacks for factories and electric power plants. In addition, many bricklayers alter,

maintain, and repair buildings. They also work in factories that make glass or steel, where furnaces and kilns require fire brick linings.

Bricklayers can find jobs throughout the country, but employment is concentrated in heavily populated areas.

Training, Other Qualifications, and Advancement

Most training authorities recommend the completion of an apprenticeship program as the best way to learn bricklaying. Many workers, however, pick up the trade informally by starting as helpers or hod carriers, and by observing and learning from experienced bricklayers.

Apprentice applicants generally must be 17 to 24 years old, but this requirement may be waived for veterans. A high school education or its equivalent is desirable. The ability to solve arithmetic problems quickly and accurately is an asset.

The apprenticeship program generally consists of 3 years of on-the-job training, in addition to 144 hours of classroom instruction each year in subjects such as blueprint reading, layout work, measurement and sketches, and welding. Some programs qualify the apprentice trainee as a bricklayer-welder. Apprentices also learn the relationship between bricklaying and other building trades. In some areas apprenticeship includes brief pre-job instruction, usually at a vocational school, to give apprentices a basic knowledge of the tools and materials of the trade and prepare them for the start of their on-the-job training.

Hourly wage rates for apprentices generally start at 50 percent of the journeyman bricklayer's rate, and increase periodically until 95 percent of the journeyman's rate is reached during the last period of apprenticeship.

Bricklayers must have an eye for straight lines and proportions. Good physical condition and manual dexterity also are important.

Bricklayers may advance to jobs as foremen. They also may become estimators for bricklaying contractors. Estimators compute material requirements and labor costs. Some journeymen become bricklaying superintendents on large construction projects, while others may start their own contracting businesses.

Employment Outlook

Employment of bricklayers is expected to increase moderately through the mid-1980's. In addition to the job openings that result from employment growth, many openings will arise as journeymen bricklayers retire, die, or transfer to other occupations.

Much of the expected growth in this trade will result from the anticipated large increase in construction activity. The demand for bricklayers also will be favorably affected by the growing use of ornamental brickwork for structures such as lobbies and foyers. In addition, the use of brick load-bearing walls is growing, particularly in apartment construction. Brick panels, laid in factories by bricklayers, are being introduced and will provide additional jobs for bricklayers.

Earnings and Working Conditions

Union minimum wage rates for bricklayers in 68 large cities averaged $7.99 an hour in 1972, compared with $7.69 an hour for all building trades journeymen. Minimum rates for bricklayers in 14 of these cities, selected to show how wages differ among various areas of the country, appear in the accompanying tabulation.

City	*Hourly rate*
Atlanta	$ 7.80
Boston	8.45
Charlotte	5.85
Chicago	8.90
Cleveland	8.86
Detroit	8.44
Indianapolis	8.55
Memphis	7.55
Milwaukee	7.93
Newark	9.00
Sacramento	8.20
Seattle	7.65
Tampa	7.05
Topeka	7.45

Although hourly rates for bricklayers are relatively high, time lost because of poor weather and occasional unemployment between jobs make annual earnings less than the hourly rates would imply.

Bricklaying is sometimes strenuous. It involves stooping to pick up materials, moderately heavy lifting, and prolonged standing. Most of the work is done outdoors.

A large proportion of bricklayers are members of the Bricklayers, Masons and Plasterers' International Union of America.

Sources of Additional Information

For details about apprenticeships or other work opportunities in this trade, contact local bricklaying contractors; a local of the Bricklayers, Masons and Plasterers' International Union of America; a local joint union-management apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service may provide details about the Manpower Development and Training Act, apprenticeship, and other training opportunities. Some local employment service offices provide services such as screening applicants and giving aptitude tests.

General information about the trade is available from:

Associated General Contractors of America, Inc., 1957 E St. NW., Washington, D.C. 20006.

Brick Institute of America, 1750 Old Meadow Road, McLean, Va. 22101.

Bricklayers, Masons and Plasterers' International Union of America, 815 15th St. NW., Washington, D.C. 20005.

CARPENTERS

(D.O.T. 860.281 through .781)

Nature of the Work

Carpenters, the largest group of building trades workers, are employed in almost every type of construction activity. They erect the wood framework in buildings and install windows, doors, paneling, cabinets, and other items. They also build stairs, lay hardwood floors, and install soft floor coverings such as linoleum and asphalt tile.

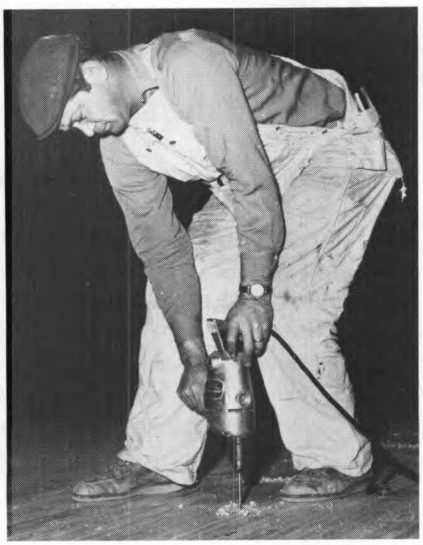
Carpenters install heavy timbers used to build docks, railroad trestles, and similar structures. They build the forms needed to pour concrete decks, columns, piers, and retaining walls used in construction of bridges, buildings, and other structures. They erect scaffolding and temporary buildings at the construction site.

Because of the variety of work in the trade, some carpenters specialize in a particular type of carpentry. For example, some build forms to receive concrete; others install millwork and finish hardware (trimming), lay and finish hardwood floors, or build stairs. Specialization is more common in large cities; in small communities, carpenters often perform a wider range of tasks. In rural areas, carpenters may do the work of other craftsmen, particularly painting, glazing, or roofing. Carpenters generally stay in a particular field of construction, such as home, bridge, or highway construction, or in industrial maintenance.

Carpenters use nails, bolts, wood screws, or glue to fasten lumber, plywood, and other materials. They use handtools such as hammers, saws, and chisels, and power tools such as electric saws, drills, and powder-actuated fastening devices.

Places of Employment

About 1,045,000 carpenters were employed in 1972. Most carpenters are employed by contractors and homebuilders to construct new buildings and other structures. A substantial number, however, alter, remodel, or repair buildings. Some carpenters alternate between wage employment for contractors and self-employment on small jobs. Others work for government agencies, utility companies, or manufacturing plants. A large number of carpenters maintain and repair facilities within factories, hotels, office buildings, and other large establishments. Still others are employed in shipbuilding, in mining, and in the production of many kinds of display materials such as signs and billboards.



Training, Other Qualifications, and Advancement

Most training authorities recommend the completion of a 4-year apprenticeship program as the best way to learn carpentry. A substantial number of workers in this trade, however, acquire some carpentry skills informally (for example, by working on a farm). Many also gain some knowledge of the trade by taking correspondence or trade school courses.

Apprenticeship applicants generally must be 17 to 27 years old, and a high school education or its equivalent is desirable. Good physical condition, a good sense of balance, and lack of fear of working on high structures are important assets. Apprentices should also have manual dexterity and the ability to solve arithmetic problems quickly and accurately. In addition, they should be able to work closely with others.

The apprenticeship program usually consists of 4 years of on-the-job training, in addition to a minimum of 144 hours of related classroom instruction each year. On the job apprentices learn elementary structural design and become familiar with the common systems of frame and concrete form construction. They also learn to use the tools, machines, equipment, and materials of the trade. In addition, they learn the many carpentry techniques, such as laying out, framing, and finishing.

Apprentices receive classroom instruction in drafting and blueprint reading, mathematics for layout work, and the use of woodworking machines. Both in the classroom and on the job they learn the relationship between carpentry and the other building trades, because the work of the carpenter is basic

to the construction process.

Hourly wage rates for apprentices usually start at about 50 percent of the journeyman carpenter's rate and increase by about 5 percent in each 6-month period, until a rate of 85 to 90 percent is reached during the last period of apprenticeship.

Young people interested in carpentry should obtain the all-around training given in apprenticeship programs. Carpenters with such training will have especially favorable long-range job prospects. They will be in much greater demand and will have better opportunities for advancement than those who can do only the relatively simple, routine types of carpentry.

Carpenters may advance to carpenter foremen or to general construction foremen. Carpenters usually have greater opportunities than most other building craftsmen to become general construction foremen since they are involved with the entire construction process. Some carpenters are able to become contractors and employ other journeymen. The proportion of self-employed is higher among carpenters than among most other building trades workers.

Employment Outlook

Employment of carpenters is expected to increase moderately through the mid-1980's. Tens of thousands of openings are expected each year because of both employment growth and the need to replace experienced carpenters who transfer to other fields of work, retire, or die.

The expected rise in construction activity, particularly homebuilding (see discussion in construction occupations introduction), is expected to result in a growing demand for carpenters. Additional carpenters also will be needed in the maintenance departments of factories, stores, large apartment projects, and government agencies.

Employment growth, however, will be limited by technological developments. For example, the use of construction materials prepared away from the building site will reduce the amount of carpentry required in a building. More widespread use of improved tools and equipment will increase the efficiency of carpenters.

Earnings and Working Conditions

Union minimum wage rates for carpenters in 68 large cities averaged $7.41 an hour in 1972, compared with $7.69 for all building trades journeymen. Minimum rates for carpenters in 14 of these cities, selected to show how wages differ among various areas of the country, are shown in the accompanying tabulation.

City	*Hourly rate*
Atlanta	$ 7.40
Boston	8.20
Charlotte	5.50
Chicago	7.65
Cleveland	9.45
Denver	6.57
Detroit	8.18
Los Angeles	6.75
New Orleans	6.57
Philadelphia	8.57
Pittsburgh	8.30
St. Louis	7.71
San Diego	7.06
Seattle	7.00

As in other building trades, the carpenter's work is active and sometimes strenuous, but exceptional physical strength is not required. However, prolonged standing, as well as climbing and squatting, are often necessary. Carpenters risk injury from slips or falls, from contact with sharp or rough materials, and from the use of sharp tools and power equipment. Many young persons like carpentry because they can work outdoors. Some worktime, however, is lost due to bad weather.

A large proportion of carpenters are members of the United Brotherhood of Carpenters and Joiners of America.

Sources of Additional Information

For information about carpentry apprenticeships or other work opportunities in this trade, contact local carpentry contractors or general contractors, a local union of the United Brotherhood of Carpenters and Joiners of America, a local joint union-management apprenticeship committee, or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. Also, the local office of the State employment service can supply information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities. Some local employment services screen applicants and give aptitude tests.

General information on appren-

ticeship in this trade is also available from:

Associated General Contractors of America, Inc., 1957 E St. NW., Washington, D.C. 20006.

United Brotherhood of Carpenters and Joiners of America, 101 Constitution Ave. NW., Washington, D.C. 20001.

CEMENT MASONS (CEMENT AND CONCRETE FINISHERS)

(D.O.T. 844.884 and 852.884)

Nature of the Work

Cement masons finish concrete surfaces on many types of construction projects. The projects range from finishing of small jobs, such as patios and floors, to work on huge dams, miles of concrete highways, and missile launching sites. Finishing concrete can provide wide variation; for example, cement masons may color concrete surfaces, expose aggregate in walls and sidewalks, or fabricate concrete beams, columns, and panels. In addition, materials other than concrete, such as latex and epoxy products applied to floors, vats, and tanks, have enlarged the cement mason's area of work.

On small projects, a mason, assisted by one or two helpers, may do all of the masonry work; on large projects, a crew of several masons and many helpers may be employed.

In preparing the site for pouring (placing) the concrete mixture, the cement mason makes sure that the forms, which are to mold the concrete, are set for the desired pitch and depth and are properly aligned. The mason directs the pouring of the concrete and supervises laborers who use shovels or special rakes to place and spread the concrete. The mason then levels the surface further using a "straightedge" (a rod made of wood or lightweight metal long enough to extend across the freshly poured concrete.) The concrete is now ready for intermediate and final finishing.

The cement mason uses special tools, such as a float, whip, or darby, to fill minor depressions and remove high spots. Final finishing is usually delayed until the concrete has hardened sufficiently to support the weight of a mason on kneeboards. While the concrete is still workable, he uses handtools—a wood or magsium float and a finishing trowel—to bring the concrete to the proper consistency and obtain the desired finish. Concrete finishing may be done also with power-operated trowels; however, edges, corners, and other inaccessible places must be finished by hand.

On concrete work, which is exposed (for example, columns, ceilings, and wall panels), cement masons correct surface defects and air pockets after the forms are stripped. This involves preparing the surface with a hammer and chisel and rubbing brick to remove high spots. A rich cement mixture is rubbed into the concrete surface using a sponge rubber float or piece of burlap to fill imperfections and voids. The end result is a uniformly smooth appearance.

Some cement masons specialize in laying a mastic coat (a fine asphalt mixture) over concrete, particularly in buildings where sound-insulated or acid-resistant floors are specified. Heavy hand tools are used to smooth the hot mastic.

Cement masons must know their materials and be familiar with various chemical additives which speed or slow the setting time. Because of the effects of heat, cold, and wind on the curing of cement, masons must be able to recognize by sight and touch what is occurring in the cement mixture so that they can prevent structural defects.

Places of Employment

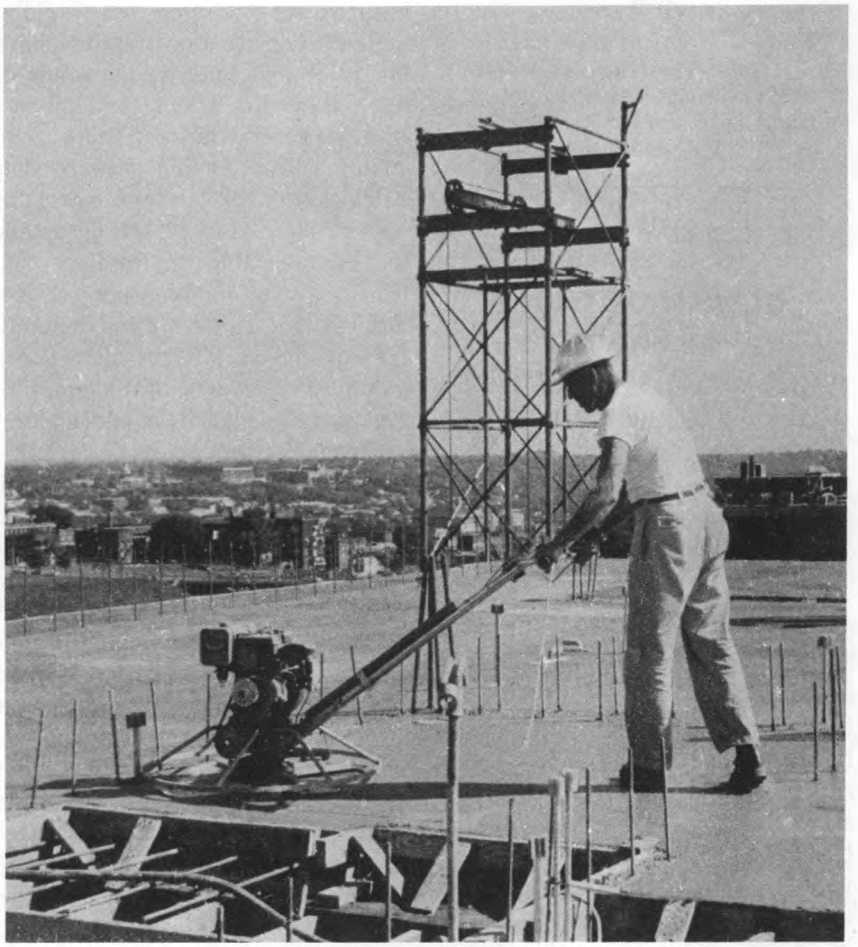
About 75,000 cement masons were employed in 1972. Cement masons work for general contractors who construct entire projects such as highways, or large industrial and residential buildings and for contractors who do only concrete work. Some masons install composition resilient floors for specialty floor contractors. A small number of masons are employed by municipal public works departments, public utilities, and manufacturing firms that do their own construction work. Others are self-employed and contract small jobs, such as sidewalks, driveways, patios, and curbs and gutters.

Training, Other Qualifications, and Advancement

Most training authorities recommend a 3-year apprenticeship program as the best way to learn this trade. A substantial number of workers, however, acquire cement masonry skills informally by working on construction jobs as laborers assisting cement masons.

Apprenticeship applicants generally must be 18 to 25 years old. Good physical condition and manual dexterity are important assets. Ability to work as part of a team and to direct the activities of others are also important.

The apprenticeship program usually consists of 2 to 3 years of on-the-job training, in addition to related classroom instruction. On the job, apprentices learn to use and handle the tools, equipment, machines, and materials of the trade. They also learn finishing, layout work, and safety techniques. In the classroom, apprentices receive instruction in subjects such as applied mathematics and related sciences, blueprint reading, architectural drawing, estimating materials and costs, and local building regulations. Al-



Cement mason operating troweling machine.

though a high school education is not required, education above the grade school level, preferably including mathematics, is needed to understand the classroom instruction.

Cement masons may advance to foremen or become materials and cost estimators for concrete contractors. Others may start their own concrete contracting businesses.

Employment Outlook

Employment of cement masons is expected to increase very rapidly through the mid-1980's. Thousands of openings are expected each year because of employment growth and the need to replace masons who transfer to other occupations, retire, or die.

Employment of cement masons will increase mainly because of the expected increase in construction activity (see discussion in construction occupations introduction), accompanied by the growing use of concrete and concrete products. For example, prestressed concrete makes possible wide spans where column-free construction is desired, and lightweight concrete wall panels that are fire- and weather-resistant are being used increasingly on nonload-bearing walls. Also, new products, such as epoxy and latex flooring systems, provide more job opportunities for cement masons.

Employment of cement masons is not expected to increase as rapidly as the use of concrete products. Many concrete products are precast and generally do not require finishing. The efficiency of masons also has increased through new and improved construction methods, materials, and equipment. For certain jobs, concrete can be applied pneumatically through hoses. Plastic forms provide a smooth surface and reduce rubbing and patching work. Worker efficiency has also been increased because of new machines, such as powered wheelbarrows, electric concrete vibrators, hydraulic joint-forming machines, powered concrete cutting saws, and cement-finishing machines.

Earnings and Working Conditions

Union minimum wage rates for cement masons in 68 large cities averaged $7.24 an hour in 1972, compared with $7.69 for all journeymen in the building trades. Minimum rates for cement masons in 14 of these cities, selected to show how wages differ among various areas of the country, appear in the accompanying tabulation.

City	*Hourly rate*
Birmingham	$ 6.18
Boston	8.90
Charlotte	4.75
Cleveland	10.11
Columbus	7.55
Dallas	6.50
Denver	6.55
Fresno	7.13
Jacksonville	5.68
Milwaukee	7.19
Newark	9.00
Pittsburgh	8.24
Salt Lake City	7.00
Washington, D.C.	7.75

Cement masons usually receive premium pay for hours worked in excess of the regularly scheduled workday or workweek. They often

work overtime, because once concrete has been poured the job must be completed.

The work of the cement mason is active and strenuous, like the work of building tradesmen generally. Since most cement finishing is done on floors or at ground level the mason is required to stoop, bend, or kneel. Much of the work is done outdoors. Worktime is lost because of rain or freezing weather. In some cases, however, concrete can be poured year round by using heated, temporary shelters made of sheet plastic.

A large proportion of cement masons are union members. They belong either to the Operative Plasterers' and Cement Masons' International Association of the United States and Canada, or to the Bricklayers, Masons and Plasterers' International Union of America.

Sources of Additional Information

For information about cement mason apprenticeships or other work opportunities in the trade, contact local cement finishing contractors; locals of unions previously mentioned; a local joint union-management apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service may provide information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about the work of cement masons may be obtained from:

Associated General Contractors of America, Inc., 1957 E St. NW., Washington, D.C. 20006.

Bricklayers, Masons and Plasterers' International Union of America, 815 15th St. NW., Washington, D.C. 20005.

Operative Plasterers' and Cement Masons' International Association of the United States and Canada, 1125 17th St. NW., Washington, D.C. 20036.

CONSTRUCTION LABORERS

(D.O.T. 809.887, 842.887, 844.887, 850.887 through 853.887; 859.887 through 862.887; 865.887, 866.887, and 869.887)

Nature of the Work

Construction laborers work on all types of construction projects—houses, highways, dams, airports, missile sites. They are usually the first workers to arrive on a construction project—assisting in site preparation—and the last to leave. They erect and dismantle scaffolding, set braces to support the sides of excavations, and clean up rubble and debris. Laborers also help unload materials, machinery, and equipment, and deliver these goods to building craftsmen such as carpenters and masons.

On alteration and modernization jobs, laborers tear out the existing work. They perform most of the work done by wrecking and salvage crews during the demolition of buildings.

When concrete is mixed at the worksite, laborers unload and handle materials and fill mixers with ingredients. Whether the concrete is mixed on-site or hauled in by truck, laborers pour and spread the concrete and spade or vibrate it to prevent air pockets. In highway paving, laborers clean the right-of-way, grade and help prepare the site, place the forms into which wet concrete is poured. They cover new pavement with straw, burlap, or other materials to keep it from drying too rapidly.

Some construction laborers have job titles that indicate the kinds of work they do. Bricklayers' tenders and plasterers' tenders, both commonly known as hod carriers, help bricklayers and plasterers by mixing and supply materials, setting up and moving portable scaffolding, and providing the many other services needed. Hod carriers must be familiar with the work of these craftsmen and have knowledge of the materials and tools used. Some hod carriers also help cement masons.

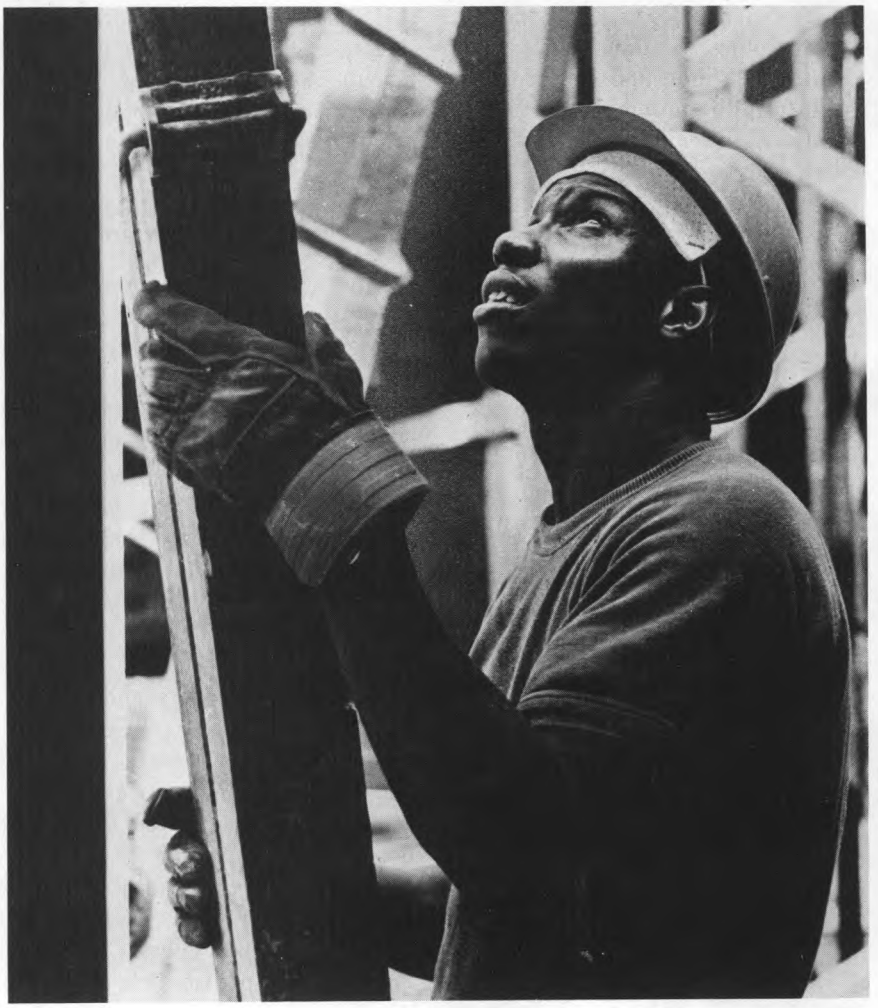
Construction laborers are commonly classified as unskilled workers, but this term can be misleading. Many jobs require training and experience, as well as a broad knowledge of construction methods, materials, and operations. Rock blasting, rock drilling, and tunnel construction are examples of work in which "know-how" is important. Laborers who work with explosives drill holes in rock, handle explosives, and set charges. They must know the effects of different explosive charges under varying rock conditions to prevent injury and property damage. Laborers do all the work in the boring and mining of a tunnel, including operations which would be handled by craftsmen if the job were located above ground.

Places of Employment

About 875,000 construction laborers were employed in 1972. Most of them worked for construction contractors, for State and city public works and highway departments, and for public utility companies.

Training, Other Qualifications, and Advancement

Little formal training is needed to get a job as a construction laborer. Generally, a young man must be at



least 18 years of age and in good physical condition. A laborer's first job is usually on the simplest type of work, but as he gains experience, he does more difficult tasks. If he works closely with a skilled craftsman for several years, he may be able to pick up the skills of the trade.

Many tasks assigned to laborers have, however, now become too complex to learn through on-the-job training alone. Recognizing this problem, contractors and unions have established formal training programs, lasting 4 to 8 weeks, in many areas of the country.

Employment Outlook

Employment of construction laborers is expected to increase slowly through the mid-1980's. Most job openings will occur as experienced laborers transfer to other occupations, retire, or die.

The anticipated large increase in construction activity (see discussion in construction occupations introduction) is expected to result in a growing demand for laborers, but this demand will be somewhat limited by more widespread use of mechanized equipment. For example, materials formerly handled at the construction site, such as brick, concrete, and lumber, are moved by forklift truck, powered wheelbarrows, and conveyor belts. Materials are lifted to the upper floors of high-rise buildings by automatic lifts and heavy duty cranes. The use of earth moving machines, including specialized equipment such as trenchers and front-end loaders, is also increasing.

Earnings and Working Conditions

Union minimum hourly wage rates for building laborers and bricklayers' tenders in 68 large cities averaged $5.57 and $6.06, respectively, in 1972, compared with $7.27 an hour for all building trade workers. Minimum rates for bricklayers' tenders and building laborers in 14 of these cities, selected to show how wages differ among various areas of the country, appear in the accompanying tabulation.

	Hourly rate	
City	*Bricklayers' tenders*	*Building laborers*
Albuquerque	$4.32	$4.02
Baltimore	5.70	5.40
Buffalo	6.39	6.39
Cleveland	7.60	7.60
Columbus	6.26	6.06
Des Moines	6.19	6.19
Fresno	5.65	5.44
Los Angeles	5.85	5.50
Omaha	5.13	5.00
Phoenix	6.14	5.53
Providence	6.50	6.50
Richmond	3.60	3.50
Seattle	5.40	5.10
Tampa	4.93	4.78

Construction work is physically strenuous, since it requires frequent bending, stooping, and heavy lifting. Much of the work is performed outdoors, and some worktime is lost because of bad weather. Many construction laborers are members of the Laborers' International Union of North America.

Sources of Additional Information

For information about work opportunities as a construction laborer, contact local building or construction contractors, a local of the Laborers' International Union of North America or the local office

of the State employment service.

General information about the work of construction laborers may be obtained from:

Laborers' International Union of North America, 905 16th St. NW., Washington, D.C. 20006.

ELECTRICIANS (CONSTRUCTION)

(D.O.T. 821.381, 824.281, and 829.281 and .381)

Nature of the Work

Heat, light, power, air conditioning, and refrigeration components all operate through electrical systems that are assembled, installed, and wired by construction electricians. These craftsmen also install electrical machinery, electronic equipment, controls, and signal and communications systems. (Maintenance electricians, who usually maintain the electrical systems installed by construction electricians, are discussed elsewhere in the *Handbook*.)

Construction electricians follow blueprints and specifications for most installations. To install wiring, they may bend and fit conduit (pipe or tubing) inside partitions, walls, or other concealed areas. They then pull insulated wires or cables through the conduit to complete the circuit between outlets and switches. In lighter construction, such as housing, plastic-covered wire is usually used rather than conduit. In any case, electricians connect the wiring to circuit breakers, transformers, or other components. Wires are joined by soldering or mechanical means. When the wiring is finished, they test the circuits for proper connections and grounding.

Electricians, for safety reasons, must follow National Electrical Code regulations and, in addition, must fulfill requirements of State, county, and municipal electrical codes.

Electricians generally furnish their own tools including screwdrivers, pliers, knives, and hacksaws. Employers furnish heavier tools, such as pipe threaders, conduit benders, and most test meters and power tools.

Places of Employment

Most of the 240,000 construction electricians employed in 1972 worked for electrical contractors. Many others were self-employed contractors. A small number of electricians worked for government agencies or businesses that do their own electrical work. Construction electricians are employed throughout the country, but are concentrated in industrialized and urban areas.

Training, Other Qualifications, and Advancement

Most training authorities recommend the completion of a 4-year apprenticeship program as the best way to learn the electrical trade. However, some people learn the trade informally by working for many years as electricians' helpers. Many helpers gain additional knowledge by taking trade school or correspondence courses, or through special training in the Armed Forces.

The International Brotherhood of Electrical Workers and the National Electrical Contractors Association have jointly developed an extensive apprenticeship program. Apprenticeship applicants generally must be 18 to 24 years old, but exceptions may be made for veterans. A high school education is required; courses in mathematics and physics are desirable. Applicants usually are required to take tests to determine their aptitude for electrical work.

Apprenticeship programs are conducted under written agreement between the apprentice and the local joint union-management apprenticeship committee, which supervises the training. The committee determines the need for apprentices in the locality, establishes minimum apprenticeship standards, and schedules a diversified, rotating work program. This program is designed to provide all-round training by having the apprentice work for several electrical contractors.

The apprenticeship program usually requires 4 years of on-the-job training, in addition to a mini-

mum of 144 hours of related classroom instruction each year in electrical layout, blueprint reading, mathematics, and electrical theory, including electronics. After completing their apprenticeships, many journeymen electricians enroll in courses, which may include advanced electronics, to keep abreast of the latest developments in this rapidly changing occupation.

Hourly wage rates of apprentices usually start at 40 to 50 percent of the journeyman rate and increase by 5 percent in each 6-month period until the journeyman's rate is reached.

To obtain a license, which is necessary in most cities, the electrician must pass an examination which requires a thorough knowledge of the craft and of State and local building codes.

Experienced construction electricians can transfer readily to other types of electrical work. For example, many take jobs as maintenance electricians in factories, and others work as electricians in shipbuilding and aircraft manufacturing.

Many electricians become foremen or superintendents for electrical contractors on construction jobs. Some become estimators for electrical contractors, computing material requirements and labor costs.

A large number of electricians start their own contracting businesses. In most large urban areas, a contractor must have a master electrician's license.

Employment Outlook

Employment of construction electricians is expected to increase rapidly through the mid-1980's. In addition to jobs from employment growth, many openings will arise as experienced electricians retire, die, or transfer to other occupations.

Employment of electricians is expected to increase mainly because of the anticipated expansion in construction; wiring for appliances, air-conditioners, and electrical heating in homes; and the extensive wiring for computers and electrical control devices in commerce and industry.

Earnings and Working Conditions

Union minimum wage rates for electricians in 68 large cities averaged $8.19 an hour in 1972, compared with $7.69 for all building trades journeymen. Because the seasonal nature of construction work affects electricians less than journeymen in most building trades, their annual earnings also tend to be higher. Average minimum rates for construction electricians in 14 of these cities, selected to show how wages differ among various areas, appear in the accompanying tabulation.

City	*Hourly rate*
Birmingham	$7.35
Buffalo	9.71
Charlotte	5.55
Columbus	8.63
Des Moines	8.15
Erie	8.95
Fresno	8.48
Grand Rapids	7.97
Little Rock	7.25
Louisville	8.98
Providence	8.15
Spokane	7.44
Trenton	10.35
Washington, D.C	8.85

Construction electricians are not required to have great physical strength, but they frequently must stand for long periods and work in cramped quarters. Because much of their work is indoors, electricians are less exposed to unfavorable weather than are most other construction workers. They risk falls from ladders and scaffolds, blows from falling objects, and electrical shock. However, safety practices have helped to reduce the injury rate.

A large proportion of construction electricians are members of the International Brotherhood of Electrical Workers.

Sources of Additional Information

For details about electrician apprenticeships or other work opportunities in this trade, contact local electrical contractors; a local union of the International Brotherhood of Electrical Workers; a local joint union-management apprenticeship committee, or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service may have information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities. Some local employment service offices screen applicants and give aptitude tests.

General information about the work of electricians may be obtained from:

International Brotherhood of Electrical Workers, 1125 15th St. NW., Washington, D.C. 20005.

National Electrical Contractors Association, 1730 Rhode Island Ave. NW., Washington, D.C. 20036.

National Joint Apprenticeship and Training Committee for the Electrical Industry, 1730 Rhode Island Ave. NW., Washington, D.C. 20036.

ELEVATOR CONSTRUCTORS

(D.O.T. 825.381 and 829.281)

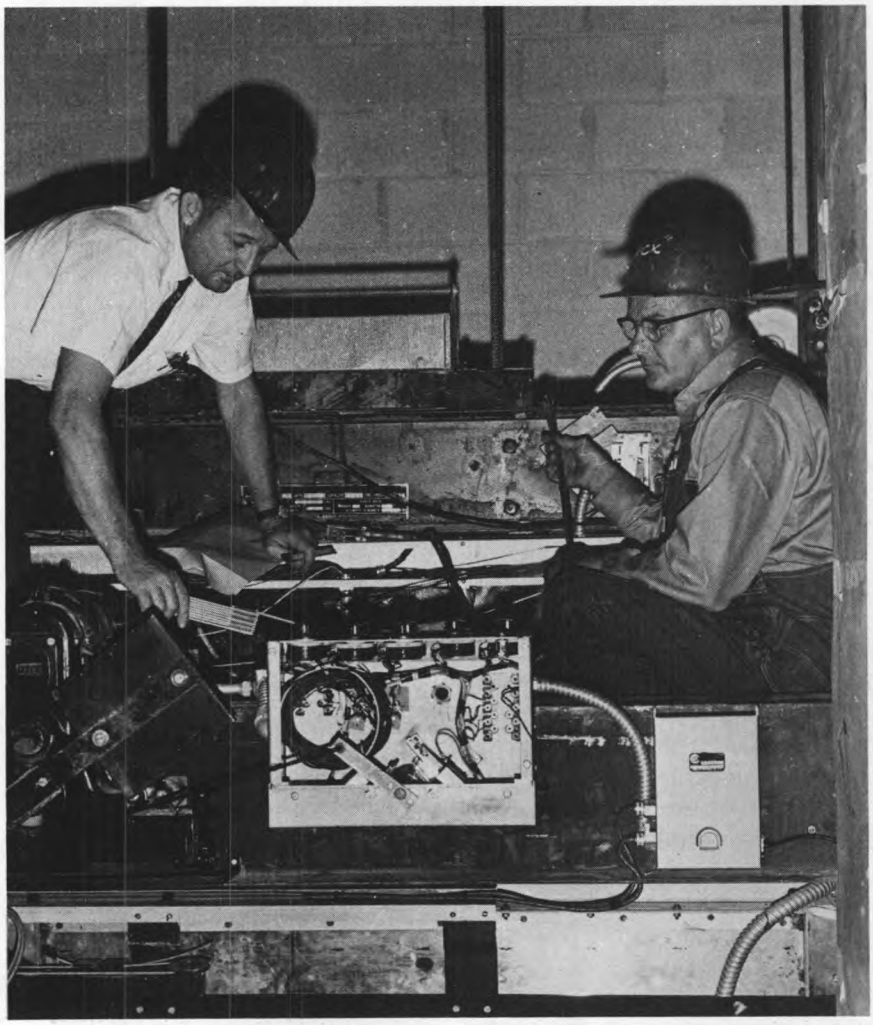
Nature of the Work

Elevator constructors (also called elevator mechanics) assemble and install elevators, escalators, and similar equipment. In new buildings, they install equipment during construction. In older buildings, they replace earlier installations with new equipment. Once the equipment is in service, they maintain and repair it. Installation or repair work is usually performed by small crews consisting of skilled elevator constructors and their helpers.

In elevator construction, the crew first installs the guide rails of the car in the elevator shaft. Then they install the hoisting machines, the car frame and platform, controls, and other elevator parts. Next, the car frame is connected to a counterweight with cables, the cab body and roof are installed, and the control system is wired. Finally, the entire assembly is carefully adjusted and tested. Similar procedures are followed to install other equipment, such as escalators.

Alteration work on elevators is important because of the rapid rate of innovation and improvement in elevator engineering. This work is similar to new installation because all elevator equipment except the old rail, car frame, platform, and counterweight is generally replaced. Elevator mechanics inspect elevator and escalator installations periodically and, when necessary, adjust cables and lubricate or replace parts.

To install and repair modern elevators, most of which are electrically controlled, elevator constructors must have a working knowledge of electricity, electronics, and hydraulics. They also must be able to repair electric motors, as well as control and signal systems. Because of the variety of their work, they use many different handtools, power tools, and testing meters and gages.



Elevator constructor and job superintendent check wiring system.

Places of Employment

Most of the estimated 17,000 elevator constructors in 1972 were employed by elevator manufacturers to do installation, modernization, and repair work. Some are employed instead by small, local contractors who specialize in elevator maintenance and repair. Still others work for government agencies or business establishments that do their own elevator maintenance and repair. Elevator constructors are employed as elevator inspectors, also, for municipal or other government licensing and regulatory agencies.

Training, Other Qualifications, and Advancement

Most elevator constructors begin as helpers and learn their skills primarily through on-the-job training.

The helper-trainee must be at least 18 years of age, in good physical condition, and have a high school education or its equivalent, preferably including courses in mathematics and physics. Mechanical aptitude and an interest in machines are also important.

To become a skilled elevator constructor, at least 2 years of continuous job experience, including 6 months' on-the-job training at the factory of a major elevator firm, is usually necessary. During this period, the helper learns to install, maintain, and repair elevators, escalators, and similar equipment. The helper-trainee generally attends evening classes in vocational schools. Among the subjects studied are mathematics, physics, electrical and electronic theory, and safety techniques.

Elevator constructors may advance to foremen for elevator manufacturing firms. A few may establish small contracting businesses; however, opportunities are limited.

Employment Outlook

A very rapid increase in employment of elevator constructors is expected through the mid-1980's. A few thousand job openings will become available each year because of employment growth and the need to replace experienced workers who transfer to other fields of work, retire, or die.

More elevator constructors will be needed because of growth in the number of new industrial, commercial, and apartment buildings (see discussion in construction occupations introduction). In addition, technological developments in elevator and escalator construction will spur modernization of older installations and thus contribute to the need for these craftsmen. Also, installation and adjustment of automatic control systems on modern elevators require more work and higher skill levels.

Earnings and Working Conditions

Both the hourly wage rates and the annual earnings of elevator constructors are among the highest in the skilled building trades. These craftsmen lose less worktime because of seasonal factors than do most other building trades workers.

Union minimum wage rates for elevator constructors in 68 large cities averaged $8 an hour in mid-1972, compared with $7.69 for all building trades journeymen. Minimum rates for elevator constructors in 14 of these cities, selected to show how wages differ among various areas of the country, appear in the accompanying tabulation.

City	*Hourly rate*
Baltimore	$ 7.92
Chicago	8.75
Cleveland	9.44
Denver	7.47
Fresno	8.99
Houston	6.60
Jacksonville	6.84
Little Rock	6.02
Los Angeles	9.21
Madison	6.75
Philadelphia	9.15
Providence	7.93
Richmond	6.22
Rochester	8.56

Elevator construction involves lifting and carrying heavy equipment and parts, but this is usually done by helpers. Most of the work takes place indoors—sometimes in cramped and awkward positions.

Most elevator constructors are members of the International Union of Elevator Constructors.

Sources of Additional Information

For further details about work opportunities as a helper in this trade, contact elevator manufacturers, elevator construction or maintenance firms, or a local of the International Union of Elevator Constructors. In addition, the local office of the State employment service may have information about opportunities in this trade.

General information about the work of elevator constructors may be obtained from the International Union of Elevator Constructors, 12 South 12th St., Philadelphia, Pa. 19107.

FLOOR COVERING INSTALLERS

(D.O.T. 864.781)

Nature of the Work

Floor covering installers (also called *floor covering mechanics* and *floor layers*) install, replace, and repair floor coverings, including resilient tile, linoleum and vinyl sheets, and carpeting. These craftsmen install coverings over floors made of wood, concrete, or other materials. They generally specialize in either carpet or resilient floor installation, although some can install both types.

Before putting down resilient covering (such as asphalt tile) installers first inspect the floor to be sure that it is firm, dry, smooth, and free of dust or dirt. Some floors have to be prepared for covering. For example, installers may sand a rough or painted floor and fill cracks and indentations. An extremely uneven floor may be resurfaced with wood or other materials.

On newly poured concrete floors or floors laid over earthwork, installers test for moisture content. If the moisture is too great, they may suggest postponing installation of floor covering or recommend a covering technique suited to the floor's condition.

Installers of resilient flooring meas-

ure and mark off the floor according to a plan. The plan may be architectural drawings that specify every detail of the covering design, or a simple, verbal description by the customer. When the plan is completed, installers, often assisted by apprentices or helpers, cut, fit, and glue the flooring into place. It must be carefully fit, particularly at door openings, along irregular wall surfaces and around fixtures, such as columns or pipes. Installers must take special care also in cutting out and setting in decorative designs. After the flooring is in place, they run a roller over it to insure good adhesion.

Carpet craftsmen, like the installer of resilient coverings, first inspect the floor to determine its condition. Then they plan the layout after allowing for expected traffic patterns so that best appearance and long wear will be obtained. To hold the carpet after it is installed, craftsmen fasten tackless strips with adhesive, nails, or tacks along the borders. Padding is cut and placed along the framework of the strip and the carpet is placed approximately in position. If the carpet has not been precut and seamed, installers will do this work before stretching it into place. Edges are trimmed for a secure and smooth fit.

Places of Employment

An estimated 60,000 floor covering installers were employed in 1972. Most worked for flooring contractors. Many others worked for retailers of floor covering and home alteration and repair contractors.

Installers can find jobs throughout the Nation, but most are concentrated in urban areas that have high levels of construction activity.

Training, Other Qualifications, and Advancement

Employers prefer applicants with a high school education, but this qualification generally is not required. Most seek applicants 17 to 30 years of age who have average physical strength and manual dexterity. A neat appearance and a pleasant business-like manner also are important, because the work is performed on the customer's premises.

Training authorities generally recommend a 3- or 4-year apprenticeship program as the best way to learn the floor covering trade. Many people, however, have learned the trade by observing and working with experienced installers.

Most apprenticeship programs include on-the-job training and classroom instruction. Apprentices attend classes to learn about materials they will be using, and the use and care of tools and equipment. They also study the mathematics of layout work, interpretation of architectural drawings, and planning and layout techniques. Some apprenticeship programs cover either carpet or resilient floor covering work; others cover both.

Skilled floor covering installers may advance to foremen or installation managers for large floor laying firms. Some become salesmen or estimators. Floor covering installers may go into business for themselves.

Employment Outlook

Employment of floor covering installers is expected to increase

rapidly through the mid-1980's. In addition to job openings resulting from employment growth, many openings will arise as experienced installers transfer to other fields of work, retire, or die.

Employment of floor covering installers is expected to increase mainly because of the expected expansion in construction and the more widespread use of resilient floor coverings and carpeting. In many new buildings plywood has replaced hardwood flooring, thus making wall-to-wall carpeting a necessity. More versatile materials and colorful patterns also will contribute to the growing demand for floor coverings. The best job opportunities will be for installers who have all-round training.

Earnings and Working Conditions

Information from a limited number of firms indicates that most experienced floor layers earned between $5 and $7 per hour in 1972, although rates ranged from about $4 an hour in some areas to more than $8.75 an hour in others. Starting wage rates for apprentices and other trainees usually are about half of the experienced worker's rate.

Most floor covering installers are paid by the hour. In some shops, part of the installer's pay may be in bonuses. In others, installers receive a monthly salary or are paid according to the amount of floor covering they install.

Floor covering installers generally work regular daytime hours. Particular circumstances, however, such as installing a floor in a store or office, may require work during evenings or weekends.

Unlike many construction craftsmen, floor coverers usually do not lose time due to weather conditons. During the winter, most work is done in heated buildings. The job is not hazardous, but installers may get back injuries from lifting heavy materials and knee injuries from working in a kneeling position for long periods. Most injuries can be avoided if proper work procedures are followed

Many floor covering installers belong to unions including the United Brotherhood of Carpenters and Joiners of America, and the International Brotherhood of Painters and Allied Trades.

Sources of Additional Information

For details about apprenticeships or work opportunities in the trade, contact local flooring contractors or retailers; a local union of the United Brotherhood of Carpenters and Joiners of America (in Eastern States); a local union of the International Brotherhood of Painters and Allied Trades (in Western States); or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. Local offices of the State employment services may have information about apprenticeship, the Manpower Development and Training Act, and other programs that provide training opportunities.

General information about the work of floor covering installers may be obtained from:

Carpet and Rug Institute, P.O. Box 2048, Dalton, Ga. 30720.

Resilient Tile Institute, 101 Park Ave., New York, N.Y. 10017.

GLAZIERS

(D.O.T. 865.781)

Nature of the Work

Construction glaziers install plate glass, ordinary window glass, mirrors, and special items such as leaded glass panels. To install windows, glaziers cut the glass to size and use precut pieces. They apply putty to the window frames, press the glass into place, and secure it with wire clips or triangular metal points. They then place another strip of putty outside the window to keep out moisture.

To install structural glass on walls and partitions, glaziers press glass into cement which has been applied to the supporting backing. They may use a cutter to trim glass which has not been precut. Glaziers install many kinds of structural glass, including shower doors and bathtub enclosures, mirrors of all types, and automatic glass doors.

Glaziers use handtools, such as glass cutters and putty knives, and power tools, such as cutters and grinders.

Places of Employment

About 12,000 construction glaziers were employed in 1972. Most worked for glazing contractors engaged in new construction, alteration, and repair. Others worked for government agencies or businesses that do their own construction work.

About 15,000 glaziers worked outside the construction industry. Many are employed in factories to install glass in windows, doors, and mirror frames. Others install glass or mirrors in furniture or replace automobile windshields and windows.

Training and Other Qualifications

Most training authorities recommend the completion of a 3-year apprenticeship program as the best way to learn glazier skills. A substantial proportion of glaziers, however, have learned the trade informally by working for, observing, and being taught by experienced glaziers. In smaller communitites, many painters and paperhangers also learn to do glazing work as part of the training for their trade.

Apprenticeship applicants generally must be 18 to 26 years old; veterans are exempt from the maximum age limit. A high school diploma or its equivalent is required. The apprenticeship program usually consists of 3 years of on-the-job training, in addition to a minimum of 144 hours of classroom instruction each year. On the job, apprentices learn to use the tools, equipment, and materials of the trade. Classroom instruction includes mathematics, blueprint and job specifications reading, design and layout planning, safety measures, and first aid.

Glazier apprentices usually start at 50 percent of the journeyman rate and increase periodically until the journeyman rate is reached at the completion of training.

Employment Outlook

A very rapid increase in employment of construction glaziers is expected through the mid-1980's. In addition to jobs created by employment growth, openings will arise as experienced glaziers transfer to other occupations, retire, or die.

The anticipated increase in construction activity and the trend toward the use of more glass in buildings are expected to result in more work for glaziers. Replacement and modernization work, frequently involving large glass installations, also will contribute to the demand for these workers.

Earnings and Working Conditions

Union minimum hourly wage

rates for construction glaziers in 68 large cities averaged $7.23 in 1972, compared with $7.69 for all building trades journeymen. Hourly rates for construction glaziers in 14 of these cities, selected to show how wages differ among various areas, appear in the accompanying tabulation.

City	*Hourly rate*
Albuquerque	$5.09
Atlanta	6.80
Baltimore	7.30
Cleveland	9.36
Dallas	6.18
Detroit	8.00
Jackson	4.95
Kansas City	7.91
Los Angeles	8.17
Madison	6.85
Providence	7.56
San Diego	8.55
Spokane	5.89
Trenton	7.73

Glaziers may be injured by glass edges, cutting tools, plate glass lifting, or falls from scaffolding. To reduce injuries, employers and unions emphasize safety training.

Many glaziers employed in construction are members of the International Brotherhood of Painters and Allied Trades.

Sources of Additional Information

For more information about glazier apprenticeships or work opportunities, contact local glazing or general contractors; a local of the International Brotherhood of Painters and Allied Trades; a local joint union-management apprenticeship agency, or the Bureau of Apprenticeship and Training, U.S. Department of Labor. Local offices of the State employment services may have information about the Manpower Development and Training Act, apprenticeship, and other training opportunities.

General information about the work of glaziers may be obtained from the International Brotherhood of Painters and Allied Trades, 1925 K St. NW., Washington, D.C. 20006.

LATHERS

(D.O.T. 842.781)

Nature of the Work

Lathers install supports that hold plaster, stucco, or concrete materials. These supports usually are either metal lath (strips of expanded metal or a metal wire mesh) or gypsum lath boards. Plaster, mixed properly, easily sticks to either type of lath.

When installing metal lath, the lathers first build a light metal framework (furring), which is fastened to the structural framework of the building. On many ceilings or walls; however, the lath may be attached directly to the wood framework or partitions. In either method, attachment to the furring or framework may be done by nailing, clipping, wire-tying, or machine stapling. As the lath is being installed, lathers cut openings for electrical outlets and piping. Gypsum lath boards are installed in much the same way. The method of installation varies slightly in other types of lath work. For example, when cornices or other ornamental plaster shapes are specified, the lather builds the framework that approximates the desired shape or form. Metal lath is then attached to the framework.

Lathers install wire mesh reinforcement in all inside angles and corners to prevent structural cracking. On outside or exposed corners, a metal reinforcement called a corner bead is attached for protection and strength.

When stucco (a mixture of portland cement and sand) is to be applied over wood framework, lathers install two layers of wire mesh, separated by a layer of felt, to act as a base.

The tools of the trade include drills, hammers, hacksaws, shears, wirecutters, hatchets, stapling machines, and powder- or power-actuated fastening devices.

Places of Employment

Most lathers—who numbered about 30,000 in 1972—work for lathing and plastering contractors on new residential, commercial, or industrial construction. They also work on modernization and alteration jobs. Some lathers are employed outside the construction industry; for example, they make the lath backing for plaster display materials or scenery.

Training, Other Qualifications, and Advancement

Most training authorities recommend 2 years of apprenticeship as

the best way to learn lathing. However many lathers, particularly in small communities, have acquired skills informally, by working as helpers, observing, or being taught by experienced lathers.

Apprenticeship applicants generally must be 16 to 26 years old and in good physical condition. Aptitude tests often are given to determine whether applicants have manual and finger dexterity, as well as other qualifications. Apprentices generally must pass examinations that are given at the end of each 6-month period.

On the job, apprentices learn to use and handle the tools and materials of the trade. For example, they install gypsum lath, wall furring, and metal lathing. In addition, they generally receive classroom instruction in subjects such as applied mathematics, geometry, reading of blueprints and sketches, welding, estimating, and safety practices. Today, a high school education is encouraged, and education above grade school level, particularly courses in mathematics, is needed to understand apprenticeship classroom instruction.

Hourly wage rates for lather apprentices usually start at 50 percent of the journeyman rate. The rate is increased periodically by 5 percent every third or fourth month until a rate of 85 percent is reached in the final quarter of the second year of training.

Some experienced lathers may become foremen. Others may be able to start their own lath contracting business.

Employment Outlook

Employment of lathers is expected to increase rapidly through the mid-1980's. In addition to employment growth, job openings will arise as experienced lathers retire, die, or transfer to other occupations. Retirements and deaths alone will provide a few hundred openings annually.

Employment is expected to grow primarily as a result of the anticipated large increase in construction activity. Moreover, the increasing use of new plasters and improved methods of applying plaster will increase the need for lathers. Demand for these workers also may be stimulated by the trend to curved surfaces and ceilings made of plaster, both as a form of architectural treatment and to achieve special lighting and acoustical effects. Machine plastering and fireproofing are growing in importance. Because these machines reduce the cost of plastering, their greater use should increase the demand for plaster work and for lathers. These developments are expected to more than offset the loss of lathing work resulting from the use of nonplaster (dry-wall) construction.

Earnings and Working Conditions

Union minimum wage rates for lathers in 68 large cities averaged $7.67 an hour in 1972, compared with $7.69 for all journeymen in the building trades. Hourly rates for lathers in 14 of these cities, selected to show how wages vary among different areas, appear in the accompanying tabulation.

City	*Hourly rate*
Boston	$ 7.50
Charlotte	4.98
Cleveland	10.41
Des Moines	7.35
Knoxville	6.20
Los Angeles	8.05
Louisville	7.84
Newark	7.90
Peoria	7.33
Philadelphia	8.54
Rochester	8.68
Sacramento	7.20
Shreveport	6.63
Washington, D.C	7.68

A large proportion of lathers are members of The Wood, Wire and Metal Lathers International Union.

Sources of Additional Information

For information about lathers' apprenticeships or other work opportunities in the trade, contact a local lathing or plastering contractor; a local of The Wood, Wire and Metal Lathers International Union; a local joint labor-management apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. Local offices of the State employment services may have information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about the work of lathers may be obtained from:

International Association of Wall and Ceiling Contractors, 1775 Church St., NW., Washington, D.C. 20036.

International Council for Lathing and Plastering, 221 North LaSalle St., Chicago, Ill. 60601.

National Lathing Industries Joint Apprenticeship Program, 140 Main St., Annapolis, Md. 21401.

The Wood, Wire and Metal Lathers International Union, 6530 New Hampshire Ave., Takoma Park, Md. 20012.

MARBLE SETTERS, TILESETTERS, AND TERRAZZO WORKERS

(D.O.T. 861.381 and .781)

Nature of the Work

Marble setters install marble, terrazzo panels, and structural glass in large buildings and other structures. Tilesetters attach tile to

walls, floors, and ceilings. Terrazzo workers apply an ornamental concrete used mainly for floors in buildings such as stores, offices, and hospitals.

Marble is often used as a facing for concrete walls, columns, and floors. To set marble panels in a wall, marble setters drill holes in the edges of the marble and fasten anchors in the holes. They then apply a plaster mixture to the wall and set the marble in place. A special cement mixture is packed into the joints between the pieces and then finished with a trowel. Marble setters' helpers mix plaster and cement, carry marble slabs, and clean the completed work.

Tilesetters apply a cement-like coating to the wall, floor, or other surface that is to be covered with tile. In some cases, the coating is applied to the back of the tile. Tilesetters put each tile into place and tap it so that it will stick securely to the wall or floor. To fit tile in corners or around pipes, they use chisels and other tools to shape each piece to proper size. Tilesetters usually are assisted by helpers who carry materials, mix cement, and clean up after the job is finished.

Terrazzo is a tinted ornamental concrete with marble chips, and is used primarily for floors. Terrazzo workers lay a base of cement mortar and then level it with a long rod or straightedge. Metal strips are placed in the mortar base wherever there is to be a joint or change of color between panels. Terrazzo workers mix the top layer of cement and marble chips, pour it onto the base, and then roll and level it. After the mixture has hardened for a few days, the terrazzo floor is ground and polished with a grinding machine.

Terrazzo workers are assisted by helpers who carry cement, sand, and other materials, and mix and pour base and terrazzo mixtures. Helpers also grind, polish, and clean floors.

Places of Employment

Marble setters, tilesetters, and terrazzo workers—who numbered about 35,000 in 1972—are employed mainly in nonresidential construction projects, such as schools, hospitals, and public and commercial buildings. These craftsmen work throughout the country, but they are found largely in the more populated urban areas.

Training, Other Qualifications, and Advancement

Most training authorities recommend the completion of a 3-year apprenticeship program as the best way to learn each of these trades. A substantial proportion of tilesetters, terrazzo workers, and marble setters, however, acquire their skills informally by working as helpers and being taught by experienced craftsmen.

Apprenticeship applicants generally must be 17 to 22 years old; a high school education or its equivalent is desirable. Good physical condition and manual dexterity are important assets. Applicants should have a good sense of color harmony.

The apprenticeship programs in each of these trades generally consist of on-the-job training and related classroom instruction in subjects such as blueprint reading, layout work, and basic mathematics.

Hourly wage rates for apprentices start at about 50 or 60 percent of the journeyman rate and increase periodically until 95 percent

of the journeyman rate is reached during the last period of apprentice training.

Skilled tile, terrazzo, or marble setters may become foremen or start their own contracting businesses.

Employment Outlook

Employment of terrazzo workers and tilesetters is expected to increase moderately through the mid-1980's because of the expected expansion in construction activity. Growth in these two crafts, however, will be limited by the increasing use of such competing materials as resilient flooring, paving brick, and plastic-coated wallboard, which usually are installed by workers in other trades. Most job openings for terrazzo workers and tilesetters will result from the need to replace experienced craftsmen who retire, die, or transfer to other occupations.

Tilesetter installs ceramic floor tile.

Despite rising construction activity, employment of marble setters is not expected to change significantly through the mid-1980's. Marble is a very expensive building material. Although it will continue to be installed in some buildings, the trend is to less costly materials. Nevertheless, a small number of job openings will arise as some experienced marble setters retire, die, or transfer to other occupations.

Earnings and Working Conditions

In 1972, union minimum hourly wage rates for terrazzo workers in 68 large cities averaged $7.52; for marble setters, $7.50; and for tilesetters, $7.16. In comparison, union minimum rates for all building trades journeymen averaged $7.69 an hour. Average minimum rates for these three crafts in 14 of the cities, selected to show how wages differ among various areas, appear in the accompanying tabulation.

	Hourly rates		
City	*Marble setters*	*Tile-setters*	*Terrazzo workers*
Atlanta	$6.75	$6.75	$6.75
Baltimore	8.60	6.99	6.99
Boston	7.65	8.10	7.65
Chicago	8.77	8.15	7.35
Cleveland	8.86	9.94	8.79
Dallas	6.50	6.90	6.90
Denver	6.83	6.83	6.83
Detroit	9.84	8.76	8.47
Little Rock	5.75	5.75	5.75
New Orleans	6.95	6.55	6.55
Norfolk	5.10	5.10	5.10
Sacramento	—	7.25	8.20
Spokane	8.15	8.21	8.40
Toledo	8.78	8.29	8.29

Marble setters and terrazzo workers work both indoors and outdoors, depending on the type of installation. Tilesetters work mostly indoors.

The principal unions organizing these workers are the Bricklayers,

Masons and Plasterers' International Union of America; and the International Association of Marble, Slate and Stone Polishers, Rubbers and Sawyers, Tile and Marble Setters' Helpers and Marble Mosaic and Terrazzo Workers' Helpers.

Sources of Additional Information

For details about apprenticeship or other work opportunities in these trades, contact local tile, terrazzo, and marble setting contractors or locals of the unions previously mentioned. In addition, the local office of the State employment service may provide information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about the work of marble setters, tilesetters, and terrazzo workers may be obtained from:

Bricklayers, Masons and Plasterers' International Union of America, 815 15th St. NW., Washington, D.C. 20005.

International Association of Marble, Slate and Stone Polishers, Rubbers and Sawyers, Tile and Marble Setters' Helpers and Marble Mosaic and Terrazzo Workers' Helpers, 821 15th St. NW., Washington, D.C. 20005.

National Terrazzo and Mosaic Association, Inc., 716 Church St., Alexandria, Va. 22314.

Tile Contractors' Association of America, Inc., 112 North Alfred St., Alexandria, Va. 22314.

OPERATING ENGINEERS (CONSTRUCTION MACHINERY OPERATORS)

(D.O.T. 850.782 through .887, 851.883 and .887, 852.883, 853.782 and .883, 859.782, and 859.883)

Nature of the Work

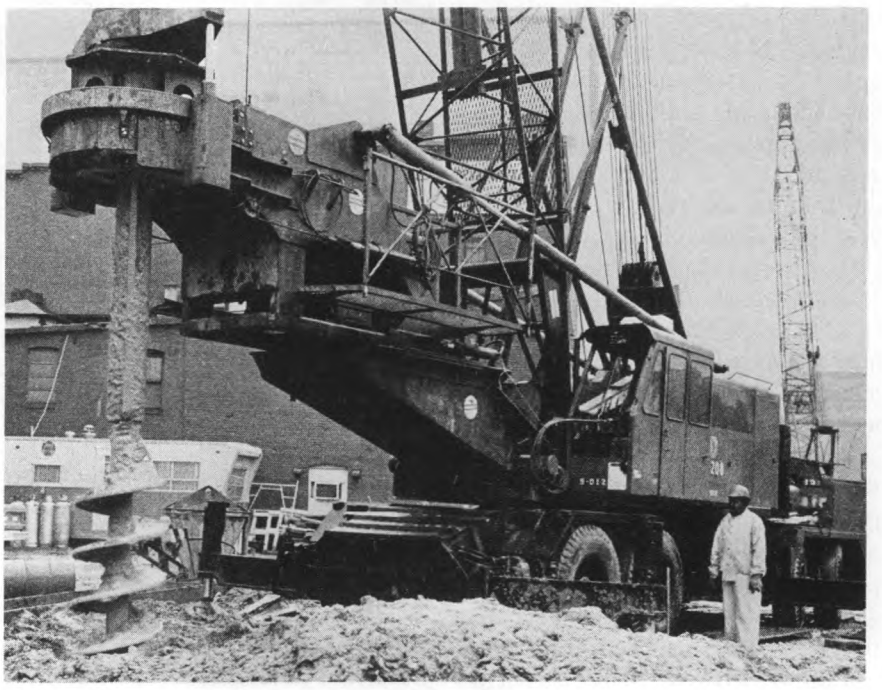
Operating engineers are at the controls of bulldozers, cranes, trench excavators, and many other types of construction machinery. These craftsmen have a wide range of skills and work with many different machines—some complex and others relatively simple. The duties of engineers who operate cranes and earthboring machines describe these skills.

The crane operator manipulates various pedals and levers to rotate the crane and to raise and lower the boom and loadline. If not controlled properly large cranes can damage property and endanger other workers at the construction site, so operators must judge distances accurately and handle controls precisely. Cranes are very versatile when equipment is attached; for example, buckets lift dirt, pile drivers hammer steel beams into the ground, and wrecking balls do demolition work. In comparison, earthboring machine operators need less skill to set the proper auger (drill) in the spindle, start the machine, and stop its boring at the correct depth.

Operating engineers often are identified by the machines they use; for example, craneman, bulldozer operators, or derrickman. An individual who wants steady employment, however, should know how to operate several different machines.

Places of Employment

An estimated 310,000 operating engineers were employed as excavating, grading, and road machinery operators in 1972. In addition, about 125,000 worked as bulldozer



operators. Many operating engineers were employed on other construction machinery, including cranes, derricks, hoists, air-compressors, trench-pipe layers, and dredges.

Most operating engineers work for contractors in highway, dam, airport, and other large-scale construction projects. Others work for utility companies, manufacturers, and other business firms that do their own construction work, as well as State and local highway and public works departments. A few operating engineers are self-employed. Some operating engineers control cranes, hoists, and other power-driven machinery in factories and mines.

Operating engineers are employed in every section of the country. Some work on highways and dams being built in remote locations.

Training, Other Qualifications, and Advancement

Most training authorities recommend completion of a 3-year apprenticeship as the best way to become a journeyman operating engineer. Since apprentices learn to operate a variety of machines, they have many job opportunities.

The apprenticeship program consists of at least 3 years of on-the-job training, as well as 144 hours a year of related classroom instruction. Apprenticeship applicants generally must be 18 to 30 years old; in good physical condition; have a high school education or its equivalent; and the ability and aptitude to master the trade.

Hourly wage rates for apprentices start at about 65 percent of the journeyman rate and increase periodically until the journeyman rate is reached.

Many young people who enter this occupation as oilers (operating engineer's assistants) or as helpers to heavy equipment repairmen, learn to repair and maintain machinery. In time, they may receive instruction on machine operation from experienced engineers. Farm equipment workers may get jobs operating simple construction machines.

City	*Hourly rates*		
	Crane operator	*Bulldozer operator*	*Air compressor operator*
Baltimore	$ 7.65	$6.97	$6.34
Boston	8.71	8.59	7.23
Cincinnati	8.63	8.48	8.33
Denver	5.80	5.65	5.15
Erie	9.18	9.03	8.45
Houston	6.65	6.65	6.01
Los Angeles	7.91	7.81	7.03
Milwaukee	8.27	8.02	7.17
Newark	11.88	—	8.51
Norfolk	5.90	4.70	3.95
Omaha	6.80	6.55	6.00
Phoenix	8.55	8.27	6.42
San Diego	7.81	7.71	6.83
Tampa	8.44	7.24	5.69

Employment Outlook

Employment of construction machinery operators is expected to increase rapidly through the mid-1980's. Thousands of openings are expected each year because of both employment growth and the need to replace experienced craftsmen who transfer to other fields of work, retire, or die.

The rise in construction, particularly highway construction, is expected to increase the demand for operating engineers. More workers also will be needed for highway maintenance. In addition, the increasing mechanization of materials movement in factories and mines should result in growing employment of operating engineers outside of construction.

Earnings and Working Conditions

Wage rates for operating engineers vary according to the machine operated, its capacity, and sometimes, the construction activity in which it is used. Union minimum hourly rates for crane, bulldozer, and air-compressor operators in 14 cities in 1972, selected to show how wages differ among various occupations and areas of the country, appear in the accompanying tabulation.

Operating engineers work outdoors; consequently, they usually work steadily during the warmer months and experience slow periods during the colder months. Time also may be lost due to rain or snow. The operation of some machines, particularly bulldozers and some types of scrapers, is physically tiring because the constant movement of the machine shakes or jolts the operator.

Many operating engineers are members of the International Union of Operating Engineers.

Sources of Additional Information

For further information about apprenticeships or work opportunities in this occupation, contact local general contractors; a local of the International Union of Operating Engineers; a local joint apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Appren-

ticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service may provide information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about the work of operating engineers may be obtained from:

Associated General Contractors of America, Inc., 1957 E St. NW., Washington, D.C. 20006.

International Union of Operating Engineers, 1125 17th St. NW., Washington, D.C. 20036.

PAINTERS AND PAPERHANGERS

(D.O.T. 840.381, .781 and .884, and 841.781)

Nature of the Work

Painting and paperhanging are separate, skilled trades, although many craftsmen do both types of work. Both apply finishes to walls and other building surfaces, but the materials they use and the methods of application differ.

Painters apply paint, varnish, and other finishes to building surfaces to decorate or protect them. Paperhangers cover interior walls and ceilings of rooms with decorative wallpaper, fabric, vinyl, or similar materials.

One of the primary duties of painters is to prepare the surface to be painted. They must remove loose paint by scraping, or by heating with a blowtorch and then scraping. They also must remove dust and grease, fill nail holes and cracks, sandpaper rough spots, and brush off dust. When painting new surfaces, they usually cover them with a prime sealer or coat to make a suitable surface or base for the finish coat.

Painters must be skilled in handling brushes and other painting tools so that they can apply paint thoroughly, uniformly, and rapidly to any type of surface. They must be able to mix paints and match colors, using a knowledge of paint composition and color harmony. They also must know the characteristics of common types of paints and finishes from the standpoints of durability, suitability for different purposes, and ease of handling and application.

Painters often use rollers or spray guns instead of brushes. Rollers are used on even surfaces such as walls and ceilings. Spray guns are used on surfaces that are difficult to paint with a brush, such as cinder block and metal fencing. Both rollers and spray guns permit faster painting, thus reducing labor costs.

Painters also erect scaffolding, including "swing stages" (scaffolds suspended by ropes or cables attached to roof hooks) and "bosun chairs," which they use when working on tall buildings and similar structures.

The first step in paperhanging is to prepare the surface to be covered. Paperhangers apply "sizing", a prepared material that makes the plaster less porous and assures better sticking of the paper to the surface. In doing redecorating work, they may have to remove old paper by soaking or—if there are many layers—by steaming. Frequently, it is necessary for paperhangers to do minor plaster patching.

Paperhangers measure the area

to be covered and cut a length from the roll of wallpaper, after carefully positioning the patterns to match at the ceiling and baseboard. They then apply paste to the strip of paper, place it on the wall, and smooth it by hand or with a brush. They cut and fit edges at ceiling and base, and smooth seams between strips with a roller or other special tool. They inspect the paper for air bubbles and other imperfections in the work. Air bubbles are removed by smoothing the paper strip toward the outer edges. When working with wall coverings other than paper, paperhangers follow the same general procedure.

Places of Employment

About 410,000 painters and 10,000 paperhangers were employed in 1972. Many worked for contractors engaged in new construction, repair, alteration, or modernization work. Hotels, office buildings, shipyards, manufacturing firms, schools, and other organizations that own or manage extensive property holdings also employ maintenance painters. When interior redecorating involves wallpapering, as in hotels or apartment buildings, maintenance painters also may do the paperhanging.

Training, Other Qualifications, and Advancement

Most training authorities recommend the completion of a 3-year formal apprenticeship as the best way to become a journeyman painter or paperhanger. A substantial proportion of painters and paperhangers, however, learn the trade informally, working as helpers to experienced craftsmen. Workers without formal apprentice training have gained acceptance as journeymen more easily in these crafts than in most of the other building trades.

Apprentice applicants generally must be 16 to 25 years old and in good physical condition. A high school education is preferred, although not essential. Applicants should have manual dexterity and a discerning color sense. They cannot be allergic to fumes from paint or other materials used in these trades.

The apprenticeship for painters and paperhangers generally consists of 6,000 hours (3 years) of on-the-job training, in addition to 144 hours a year of related classroom instruction. Apprentices receive instruction in subjects such as color harmony; paint chemistry; cost estimating; and paint mixing and matching. They also learn the relationship between painting and paperhanging and the work performed by the other building trades craftsmen. Many apprenticeships combine painting and paperhanging.

Hourly wage rates for apprentices usually start at 50 percent of the journeyman rate and increase periodically until the journeyman rate of pay is reached upon completion of apprenticeship.

Painters and paperhangers may advance to foremen. They also may advance to jobs as cost estimators for painting and decorating contractors. Some may become superintendents on large contract painting jobs, or they may establish their own painting and decorating businesses.

Employment Outlook

Employment of painters is expected to increase slowly through the mid-1980's. In addition to employment growth, many new workers will be needed each year to replace experienced painters who transfer to other fields of work, retire, or die.

The large rise anticipated in construction activity (see discussion in construction occupations introduction) is expected to result in a growing demand for painters. Moreover, recently developed paints, such as polyester, epoxy and vinyl coatings, that resist heat, abrasion, and corrosion, have resulted in new uses for paints and additional job opportunities for painters. Furthermore, a growing number of painters are expected to be needed in the maintenance departments of large industrial and commerical firms.

Although the total number of openings for paperhangers will be small, employment is expected to increase rapidly through the mid-1980's. More paperhangers will be needed as construction activity rises. Also, greater use of fabric, vinyl, plastic, and similar wall coverings should contribute to the demand for these workers. In addition, job openings will arise as experienced paperhangers transfer to other fields of work, retire, or die.

Earnings and Working Conditions

Union minimum hourly rates for painters and paperhangers in 68 large cities averaged $7.06 and $7.09, respectively, in 1972. In comparison, the average rate for all building trades journeymen was $7.69 an hour. Minimum rates for painters and paperhangers in 14 of these cities, selected to show how wages differ among various areas of the country, appear in the accompanying tabulation.

City	*Hourly rates*	
	Painters	*Paperhangers*
Atlanta	$7.05	$7.30
Boston	7.21	—
Chicago	8.28	8.28
Cincinnati	7.93	7.93
Cleveland	8.71	8.71
Detroit	7.95	7.95
Houston	6.11	6.36
Newark	6.60	—
New Orleans	5.38	5.38
Philadephia	6.92	7.14
Richmond	4.65	4.65
Salt Lake City	5.77	6.02
San Diego	7.43	7.93
Spokane	6.78	6.78

Their work often requires painters and paperhangers to stand for long periods of time, to climb, and to bend. A painter must have strong arms because much of the work is done with arms raised overhead. Painters and paperhangers risk injury from slips or falls off ladders and scaffolds. Painters on outside jobs lose some worktime due to bad weather.

A large proportion of painters and paperhangers are members of the International Brotherhood of Painters and Allied Trades. A few are members of other unions.

Sources of Additional Information

For details about painting and paperhanging apprenticeships or other work opportunities in these trades, contact local painting and decorating contractors; a local of the International Brotherhood of Painters and Allied Trades; a local joint union-management apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service can supply information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about the work of painters and paperhangers may be obtained from:

International Brotherhood of Painters and Allied Trades, 1925 K St. NW., Washington, D.C. 20006.

Painting and Decorating Contractors Association of America, 2625 West Peterson Ave., Chicago, Ill. 60605.

PLASTERERS

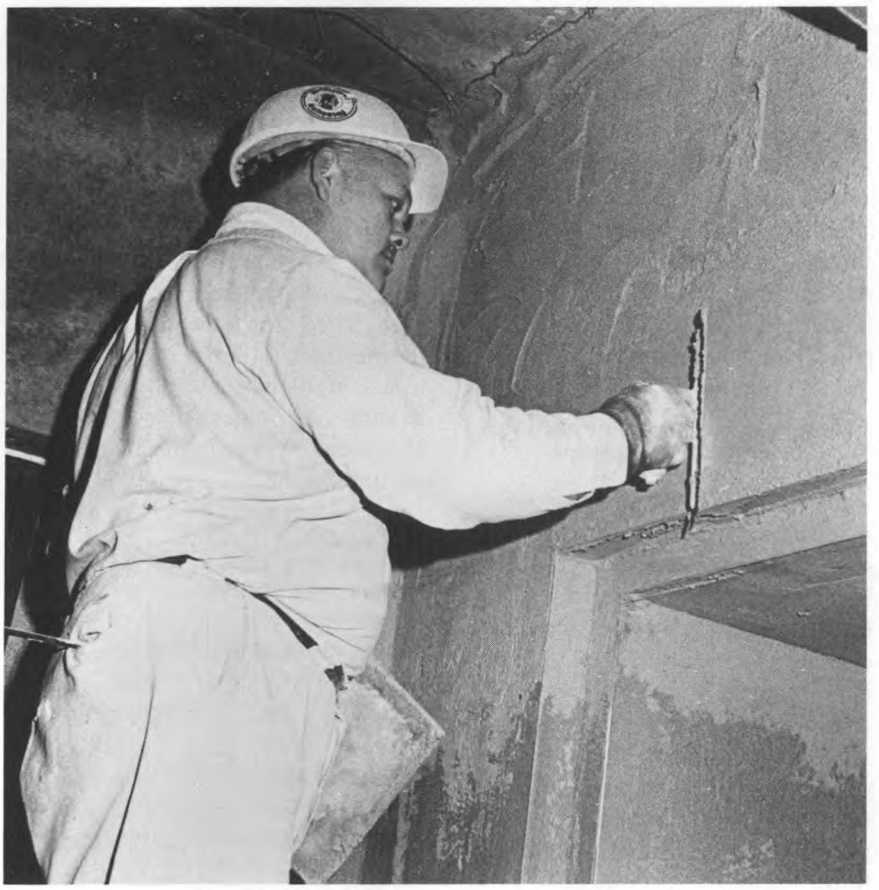
(D.O.T. 842.381 and .781)

Nature of the Work

Plasterers finish interior walls and ceilings with plaster coatings that form fire-resistant and relatively sound-proof surfaces; they apply durable cement plasters or stucco to exterior surfaces. Plasterers also cast ornamental designs in plaster.

In interior work, these craftsmen usually apply three distinct coats of plaster—scratch, brown, and finish. They apply an initial or scratch coat directly to either metal or gypsum lath (backing to which plaster readily adheres) and then scratch this coat with a special raking tool before it hardens. The raking helps the next coat stick. When the plaster has set sufficiently, the brown coat or second layer of plaster is applied. Plasterers straighten and float this second layer with various plastering tools to prepare the surfaces for final finishing. The finish coat, usually a white lime mixture, is a thin covering that plasterers must apply quickly and finish smoothly with trowel, brush, and water. Instead of a smooth coat they often make a variety of decorative textures, such as swirl, stipple (dots), and sand finishes, by floating or skip troweling.

In exterior cement plaster or stucco work plasterers apply an initial or scratch coat to wire lath in the same way as they plaster interior surfaces. The finish coat is usually a mixture of white cement and sand or another finish material. Marble or gravel chips, for example, may be



imbedded into the soft plaster to form a textured surface.

Plasterers sometimes do complex decorative and ornamental work. For example, they may mold intricate designs for the walls and ceilings of public buildings. Plasterers who do this work must follow blueprints and other specifications furnished by architects.

Plasterers use many special tools. They hold the plaster mixture on a hawk (a light metal plate with a handle) and apply the wet mixture with a trowel. Smoothing and finishing is done with straightedges, beveledges, rods, floats, and other handtools. They also may use spray machines to apply plaster on both base and finish coats.

Apprentices work directly with journeymen to acquire their craft skills. Laborers (hod carriers) mix and carry materials for plasterers. They also set up scaffolding.

Places of Employment

Plasterers—who numbered about 30,000 in 1972—worked mostly on new construction. Many also do alteration work, particularly where special architectural and lighting effects are part of the building modernization. Some plasterers repair older buildings.

Training, Other Qualifications, and Advancement

Most training authorities recommend completion of an apprenticeship as the best way to learn plastering. However, many beginners have learned the trade by working as helpers or laborers, observing, and being taught by experienced plasterers.

Apprentices generally must be 17 to 25 years old but this requirement may be waived for veterans. Good physical condition and manual dexterity are important assets.

Apprenticeship programs generally consist of 3 or 4 years of on-the-job training, in addition to at least 144 hours of annual classroom instuction in drafting, blueprint reading, and mathematics for layout work.

Plasterers may advance to foreman, superintendent, or estimator for a plastering contractor. Many plasterers are self-employed.

Employment Outlook

Employment of plasterers is expected to increase slowly through the mid-1980's. Most job openings will result from the need to replace experienced workers who retire, die, or transfer to other occupations.

More plasterers will be needed because of rising construction activity. The greater use of curved surfaces, plaster ceilings, and one-coat veneer plasters will also add to the demand for these craftsmen.

Earnings and Working Conditions

Union minimum rates for plasterers in large cities averaged $7.45 an hour in 1972, compared with $7.69 for all building trades journeymen. Hourly rates for plasterers in 14 of these cities, selected to show how wages differ among various areas, appear in the accompanying tabulation.

City	*Hourly rate*
Birmingham	$ 6.32
Charlotte	5.10
Chicago	8.40
Cleveland	10.41
Dayton	8.45
Detroit	8.80
Grand Rapids	7.47
Little Rock	6.49
Madison	7.70
New Haven	8.52
New Orleans	6.15
Philadelphia	8.52
Sacramento	6.90
Spokane	7.00

Plastering requires considerable standing, stooping, and lifting. Plasterers work outdoors when applying stucco but most jobs are indoors.

A large proportion of plasterers are members of unions. They are represented by either the Operative Plasterers' and Cement Masons' International Association of the United States and Canada, or the Bricklayers, Masons and Plasterers' International Union of America.

Sources of Additional Information

For information about apprenticeships or other work opportunities in the trade, contact local plastering contractors; locals of the unions previously mentioned; a local joint union-management apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service may have information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about the work of plasterers may be obtained from:

Bricklayers, Masons and Plasterers' International Union of America, 815 15th St. NW., Washington, D.C. 20005.

International Association of Wall and Ceiling Contractors, 1775 Church St. NW., Washington, D.C. 20036. 20036.

International Council for Lathing and Plastering, 221 North LaSalle St., Chicago, Ill. 60601.

Operative Plasterers' and Cement Masons' International Association of the United States and Canada, 1125 17th St. NW., Washington, D.C. 20036.

PLUMBERS AND PIPEFITTERS

(D.O.T. 862.381)

Nature of the Work

Plumbers and pipefitters install pipe systems that carry water, steam, air, or other liquids or gases. They also alter and repair existing pipe systems and install plumbing fixtures, appliances, and heating and refrigeration units.

Although plumbing and pipefitting are sometimes considered to be a single trade, journeymen can specialize in either craft. Plumbers install water, gas, and waste disposal systems in homes, schools, factories, and other buildings. Plumbers initially "rough in" (install) the pipe system as the building progresses; during the final construction stages they install the heating and air conditioning units and connect radiators, water heaters, and plumbing fixtures such as bathtubs and sinks. Pipefitters install both high- and low-pressure pipes that carry hot water, steam, and other liquids and gases. For example, pipefitters install the complex pipe systems in oil refineries and chemical processing plants.

Some plumbers and pipefitters specialize in gas, steam, or sprinkler fitting. Gas fitters install and maintain the fittings and extensions that connect gas line mains with the lines leading to homes. Steamfitters assemble and install steam or hot water systems for commercial and industrial uses. Sprinkler fitters install and maintain the piping for fire extinguishing systems.

Plumbers and pipefitters use wrenches, reamers, drills, braces and bits, hammers, chisels, saws, and other handtools. Power machines often are used to cut, bend, and thread pipes. Hand-operated hydraulic pipe benders are also used. In addition, plumbers and pipefitters use gas or acetylene torches and welding, soldering, and brazing equipment in their work.

Places of Employment

Most plumbers and pipefitters—who numbered about 400,000 in 1972—work for plumbing and pipefitting contractors engaged in new construction activity, and work mainly at the construction site. A substantial proportion of plumbers are self-employed or work for plumbing contractors doing repair, alteration, or modernization work. Some plumbers install and maintain pipe systems for government agencies and public utilities, and some work on the construction of ships and aircraft. Others do maintenance work in industrial and commercial buildings. Pipefitters, in particular, are employed as maintenance personnel in the petroleum, chemical, and food-

processing industries where manufacturing operations include the processing of liquids and gases through pipes.

Training, Other Qualifications, and Advancement

Most training authorities recommend a formal 5-year apprenticeship for plumbers or for pipefitters as the best way to learn all aspects of these trades. A large number of plumbers and pipefitters, however, acquire skills by working for several years with craftsmen, and observing and receiving instruction from them. Many gain some knowledge of their trade by taking trade or correspondence school courses.

Apprentice applicants generally are required to be 16 to 25 years old and in good physical condition. A high school education or its equivalent, including courses in mathematics, physics, and chemistry, is generally recommended. Applicants may be given tests to determine whether they have the mechanical aptitude required in these trades.

Most apprentice training programs for plumbers and pipefitters are conducted under written agreements between the apprentices and local apprenticeship committees, composed of union and management representatives, who supervise the training. These committees determine the need for apprentices in the locality, establish minimum training standards and, if necessary, schedule a rotating work program. Programs are designed to give apprentices diversified training by having them work for several plumbing or pipefitting contractors.

The apprenticeship program for plumbers or for pipefitters usually consists of 5 years of on-the-job training, in addition to at least 144 hours of related classroom instruction annually. On the job, the plumber or pipefitter apprentice learns to use the tools, machines, equipment, and materials of the trade. Classroom instruction covers subjects such as drafting and blueprint reading, mathematics applicable to layout work, applied physics and chemistry, and local building codes and regulations.

Hourly wage rates of apprentices usually start at 40 to 50 percent of the journeyman rate and increase every 6 months, until a rate of 85 to 90 percent is reached during the last period of the apprenticeship. To obtain a journeyman's license, which some communities require, an apprentice must pass a special examination to demonstrate knowledge of the trade and of the local building codes.

Some plumbers and pipefitters may become foremen for plumbing and pipefitting contractors. Many go into business for themselves. As they expand their activities, they may employ other workers and become contractors. In most localities, contractors are required to obtain a master plumber's license.

Employment Outlook

Employment of plumbers and pipefitters is expected to grow moderately through the mid-1980's. Thousands of job openings are expected because of employment growth and the need to replace plumbers and pipefitters who retire, die, or stop working for other reasons.

Employment is expected to grow mainly as a result of the anticipated large increase in construction activity. Furthermore, plumbing will become more important in many types of construction. For example, the trend to more bathrooms per home is likely to continue, and many homes will have air-conditioning and appliances such as washing machines, gas dryers, and kitchen waste disposal equipment. Industries such as chemical and petroleum refining, which use extensive pipework in their processing activities, are expected to expand their facilities, thus creating additional jobs for plumbers and pipefitters. Maintenance, repair, and modernization of existing plumbing or piping systems also will create employment opportunities.

Earnings and Working Conditions

Union minimum wage rates for plumbers and for pipefitters in 68 large cities averaged $8.15 and $8.14 an hour, respectively in 1972, compared with $7.69 an hour for all building trades journeymen. Average minimum rates for plumbers and pipefitters in 12 of these cities. selected to show how wage rates differ among various areas of the country, appear in the accompanying tabulation. Annual earnings of workers in these fields are among the highest in the building trades because plumbing and pipefitting are affected less by seasonal factors than are most other building trades.

	Hourly rates	
City	*Plumbers*	*Pipefitters*
Atlanta	$7.85	$7.85
Boston	9.05	9.26
Columbus	9.62	9.62
Dallas	7.20	7.20
Kansas City	8.65	8.02
Memphis	7.44	7.17
Newark	8.54	8.86
Phoenix	7.74	7.74
Pittsburgh	8.66	8.69
Sacramento	7.58	7.58
Shreveport	6.51	6.51
Tulsa	7.51	7.51

Plumbing and pipefitting work is active and sometimes strenuous. These craftsmen frequently must stand for long periods and occasionally work in cramped or uncomfortable positions. They risk the danger of falls from ladders, cuts from sharp tools, and burns from hot pipes. The injury rate for

employees of plumbing, heating, and air-conditioning contractors in the construction industry has been lower than that for contract construction as a whole, but higher than the average for production workers in manufacturing.

Many plumbers and pipefitters are members of the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada.

Sources of Additional Information

For information about plumber or pipefitter apprenticeships or work opportunities in these trades, contact local plumbing, heating, and air-conditioning contractors; a local union of the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada; a local joint union-management apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service may have information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about the work of plumbers, pipefitters, and sprinkler fitters may be obtained from:

National Association of Plumbing-Heating-Cooling Contractors, 1016 20th St. NW., Washington, D.C. 20036.

National Automatic Sprinkler and Fire Control Association, 277 Park Ave., New York, N.Y. 10007.

United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada, 901 Massachusetts Ave. NW., Washington, D.C. 20001.

ROOFERS

(D.O.T. 804.281, 843.884, and 866.381)

Nature of the Work

Roofers apply composition roofing and other materials, such as metal and tile, to the roofs of buildings. They also waterproof and dampproof walls and other building surfaces.

To apply composition roofing, roofers first place strips of asphalt or tarred felt over the entire surface. They then apply a coating of tar, asphalt, or other tarlike bituminous material. This process is repeated until at least three layers of felt are in place. Finally, they apply an asphalt or gravel-and-tar surfacing or a smooth surface asphalt to protect the roofing materials from weather.

Other types of composition roofing, such as roll roofing and asphalt shingles, are overlapped and fastened to the roof with nails or asphalt cement. If necessary, material is cut to fit corners, pipes, and chimneys. Wherever two roof surfaces intersect, roofers cement or nail flashing (strips of felt or metal) to make the joints watertight.

Roofers also use metal, tile, and slate. They build metal roofs by soldering together metal sheets which are nailed to the wood sheathing. To install tile and slate roofs, they place a covering of roofing felt over the wood sheathing, punch holes in the slate or tile, and nail it to the sheathing. Each row of slate or tile overlaps the preceding row. Finally, roofers cover exposed nailheads with cement to prevent rust and water leakage. They use handtools such as hammers, roofing knives, mops, and calking guns.

Roofers also waterproof and dampproof masonry, concrete walls, or swimming pools and tanks. To prepare surfaces for waterproofing, they remove rough spots with a hammer and chisel or rubbing brick before applying a coat of liquid waterproofing compound with a brush. They also may paint or spray surfaces with a waterproofing material or nail waterproofing fabric to surfaces. When dampproofing, they usually spray a coating of tar or asphalt on interior or exterior surfaces.

Places of Employment

About 80,000 roofers were employed in 1972. Most worked for roofing contractors in construction or repair jobs. Some worked for businesses and government agencies that do their own construction and repair work. A few roofers were self-employed.

Training, Other Qualifications, and Advancement

Most training authorities recommend completion of a 3-year apprenticeship program as the best way to learn this trade. Some workers, however, acquire roofing skills informally, by working as helpers or handymen, observing or being taught by experienced roofers.

Apprenticeship applicants usually must be 18 to 30 years old; however, exceptions may be made for veterans. A high school education or its equivalent is desirable. Good physical condition and a good sense of balance are important assets. The 3-year apprenticeship program generally consists of a minimum of 1,400 hours of on-the-job training annually, in addition to 144 hours of classroom instruction in subjects such as blueprint reading and mathematics applicable to layout work.

Apprentices usually start at 65 percent of the journeyman rate. They receive increases periodically

and rise to 90 percent of the journeyman rate in the final 6 months of the training period.

Roofers may advance to foreman and to superintendent for a roofing contractor. Also, they may enter business for themselves and hire other roofers.

Employment Outlook

Employment of roofers is expected to increase rapidly through the mid-1980's. In addition to jobs from employment growth, some openings will arise because of the need to replace experienced roofers who retire, die, or stop working for other reasons.

Employment of roofers is expected to increase mainly because of the expected rapid increase in construction activity. New construction and repairs on existing structures will provide most of the work for these craftsmen. Dampproofing and waterproofing, however, are expected to provide an increasing proportion of roofers' work.

Earnings and Working Conditions

Union minimum wage rates for composition roofers in 68 large cities averaged $7.37 an hour in 1972. For slate and tile roofers, the average was $7.22. By comparison, the average for all journeymen in the building trades was $7.69 an hour. Hourly rates for roofers in 14 of these cities, selected to show how wages differ among various areas of the country, appear in the accompanying tabulation.

City	*Hourly rates*	
	Composition	*Slate and tile*
Atlanta	$5.65	$5.90
Boston	8.00	8.00
Cleveland	9.76	9.76
Dallas	6.18	6.33
Detroit	8.27	9.02
Kansas City	7.16	7.16
Milwaukee	7.26	7.41
New Orleans	5.65	5.65
New York City	8.00	8.40
Norfolk	4.10	4.10
Pittsburgh	9.01	9.01
San Diego	6.89	6.89
Spokane	6.60	6.60
Syracuse	7.95	7.95

Roofers' work, like that of other building tradesmen, is sometimes strenuous. It involves a lot of standing, as well as climbing, bending, and squatting. These craftsmen risk injuries from slips or falls from scaffolds or roofs, and may have to work outdoors in all types of weather, particularly when making repairs. Roofing work may be especially hot during the warmer months.

Most roofers are members of the United Slate, Tile and Composition Roofers, Damp and Waterproof Workers Association

Sources of Additional Information

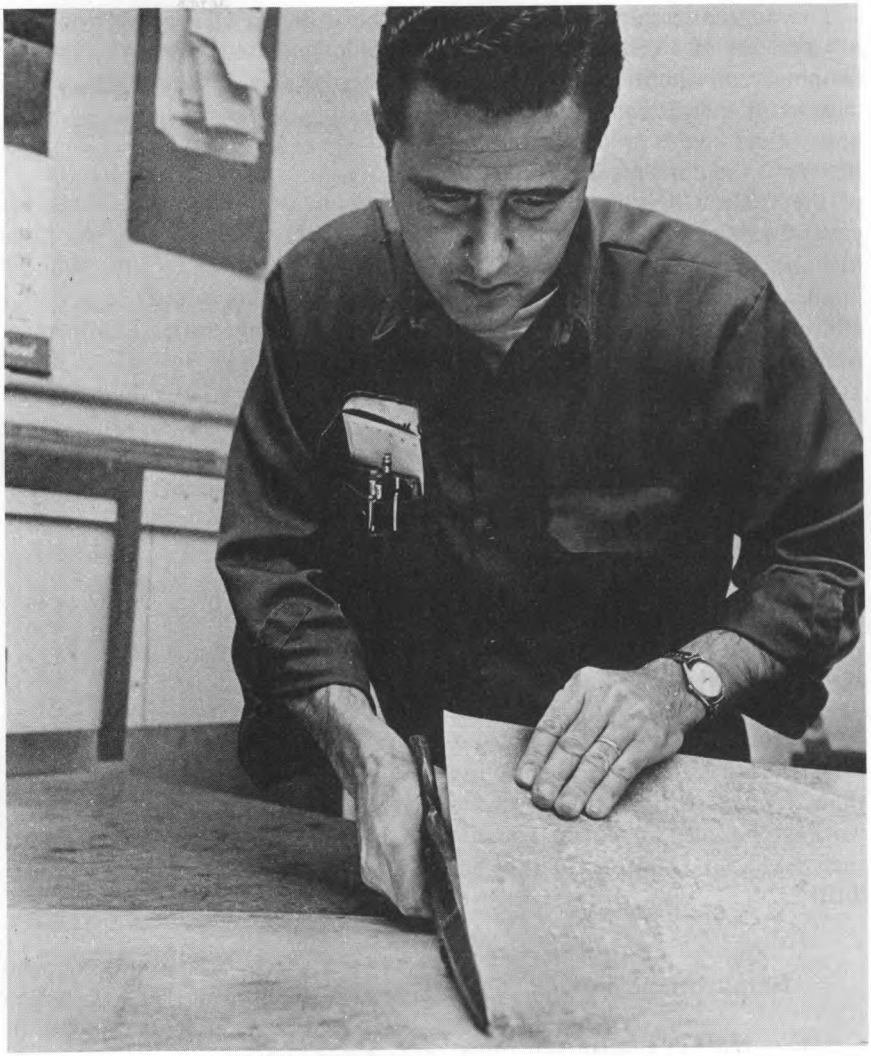
For information about roofing apprenticeships or work opportunities in this trade, contact local roofing contractors; a local of the United Slate, Tile and Composition Roofers, Damp and Waterproof Workers Association; a local joint union-management apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. Local offices of the State employment services may provide information about the Manpower Development and Training Act, apprenticeship, and other training opportunities.

General information about the work of roofers may be obtained from:

National Roofing Contractors Association, 1515 North Harlem Ave., Oak Park, Ill. 60302.

SHEET-METAL WORKERS

(D.O.T. 804.281 and .884)



Nature of the Work

Sheet-metal workers engaged in construction-related work fabricate and install ducts for ventilating, air-conditioning, and heating systems. They fabricate and install many other products from sheet metal, such as roofing, siding, and neon signs. Sheet-metal workers should not be confused with assembly-line factory workers who also make sheet-metal products but can perform only a few operations.

In heating and air conditioning duct work, sheet-metal workers plan the job to determine the size and type of metal needed before cutting it with hand snips, power-driven shears, and other tools. They shape the metal with machines, hammers, and anvils, then weld, bolt, rivet, solder, or cement the seams and joints. Ready-made ducts require little fabrication at the work site. To install ducts, components are fitted together, hangers and braces installed for support, and joints connected and soldered or welded. Some sheet-metal workers specialize in shopwork or on-site installation; others do both.

Places of Employment

Sheet-metal workers—who numbered about 65,000 in 1972—are employed mainly by firms that fabricate and install heating, refrigeration, and air-conditioning equipment, and by contractors engaged in residential, industrial, and commercial building. Many sheet-metal workers are employed by government agencies or businesses that do their own construction and alteration work. Others are self-employed.

In addition to construction-related work, thousands of skilled sheet-metal workers are employed in the railroad, aircraft, and shipbuilding industries. Many others work in small shops that manufacture specialty products, such as custom kitchen equipment for hotels and restaurants. Firms that make blowers, exhausts, electrical equipment, food products machinery, and turbines also employ skilled sheet-metal workers.

Training, Other Qualifications, and Advancement

Most training authorities recommend the completion of a 4-year apprenticeship program as the best way to learn the sheet-metal trade. Some sheet-metal workers, however, have acquired skills by working as helpers or handymen, observing and being taught by experienced craftsmen. Many of these persons take correspondence or trade school courses to gain additional knowledge.

Apprenticeship applicants generally must be 18 to 25 years old, but special consideration may be given for military service. A high school education or its equivalent is required. Good physical condition and mechanical aptitude are necessary.

The apprenticeship program usually consists of 4 years of on-the-job training, in addition to related classroom instruction. On the job, apprentices learn to use the tools, machines, equipment, and materials of the trade. Classroom instruction covers subjects such as drafting, blueprint reading, and mathematics applicable to layout work. In addition, apprentices learn the relationship between sheet-metal work and other building trades.

Sheet-metal apprentices generally start at 45 percent of the journeyman rate and increase periodically until 80 percent of the journeyman rate is reached during the final portion of the training period.

Sheet-metal workers in construction may advance to foreman, superintendent of large projects, or go into business as sheet-metal contractors. Experienced workers in this trade have more job mobility than many other building trades workers because they can transfer their skills to nonconstruction industries.

Employment Outlook

Employment of sheet-metal workers is expected to increase moderately through the mid-1970's. In addition to jobs from employment growth, many openings will arise as experienced sheet-metal workers retire, die, or stop working for other reasons.

The increase in employment of sheet-metal workers is expected mainly because of the anticipated large expansion in residential, commercial, and industrial construction. More of these skilled craftsmen will be needed to install air-conditioning and heating duct work and other sheet-metal products in new houses, stores, offices, and other buildings. Moreover, air-conditioning systems are expected to be installed in a greater number of older buildings.

Earnings and Working Conditions

Union minimum wage rates for sheet-metal workers in 68 large cities averaged $8.09 an hour in 1972, compared with $7.69 an hour for all building trades journeymen. Minimum rates for sheet-metal workers in 14 of these cities, selected to show how wages differ among various areas of the country, appear in the accompanying tabulation.

City	*Hourly rate*
Albuquerque	$ 6.78
Boston	8.43
Buffalo	8.50
Charlotte	5.65
Cincinnati	8.28
Cleveland	9.71
Des Moines	7.50
Houston	6.99
Kansas City	8.45
Pittsburgh	8.48
Sacramento	7.40
San Diego	8.13
Tampa	7.01
Washington, D.C.	8.03

Many sheet-metal workers spend considerable time at the construction site, working either indoors or outdoors. Others work primarily in shops doing fabricating and layout work.

When installing gutters and skylights, they work high above ground. When installing ventilation and air-conditioning systems, they may work in awkward and cramped positions. Sheet-metal workers risk cuts and burns from materials and tools.

A large proportion of sheet-metal workers are members of the Sheet Metal Workers' International Association.

Sources of Additional Information

For more information about sheet-metal apprenticeships or other work opportunities, contact local sheet-metal contractors or heating, refrigeration, or air-conditioning contractors; a local of the Sheet Metal Workers' International Association; a local joint union-management apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service may have information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about sheet-metal workers may be obtained from:

Sheet Metal and Air Conditioning Contractors' National Association, Inc., 1611 North Kent St., Arlington, Va. 22209.

Sheet Metal Workers' International Association, 1000 Connecticut Ave. NW., Washington, D.C. 20036.

STONEMASONS

(D.O.T. 861.781)

Nature of the Work

Stonemasons who build the stone exteriors of structures use two types of stones—natural cut, such as marble, granite, and limestone; and artificial stone made from cement, marble chips, or other masonry materials. Because stone is expensive, these craftsmen work mostly on high-cost buildings, such as offices, hotels, and churches.

Stonemasons often work from a set of drawings in which each stone has been numbered for identification. Helpers locate and bring the pieces needed to the masons.

A derrickman using a hoist lifts large pieces into place. Masons set the stone in mortar and move it into position with a mallet, hammer, or crowbar. They align stones with a plumb line and finish the joints with a pointing trowel. When necessary, they weld or fasten the stone to supports with metal ties or anchors.

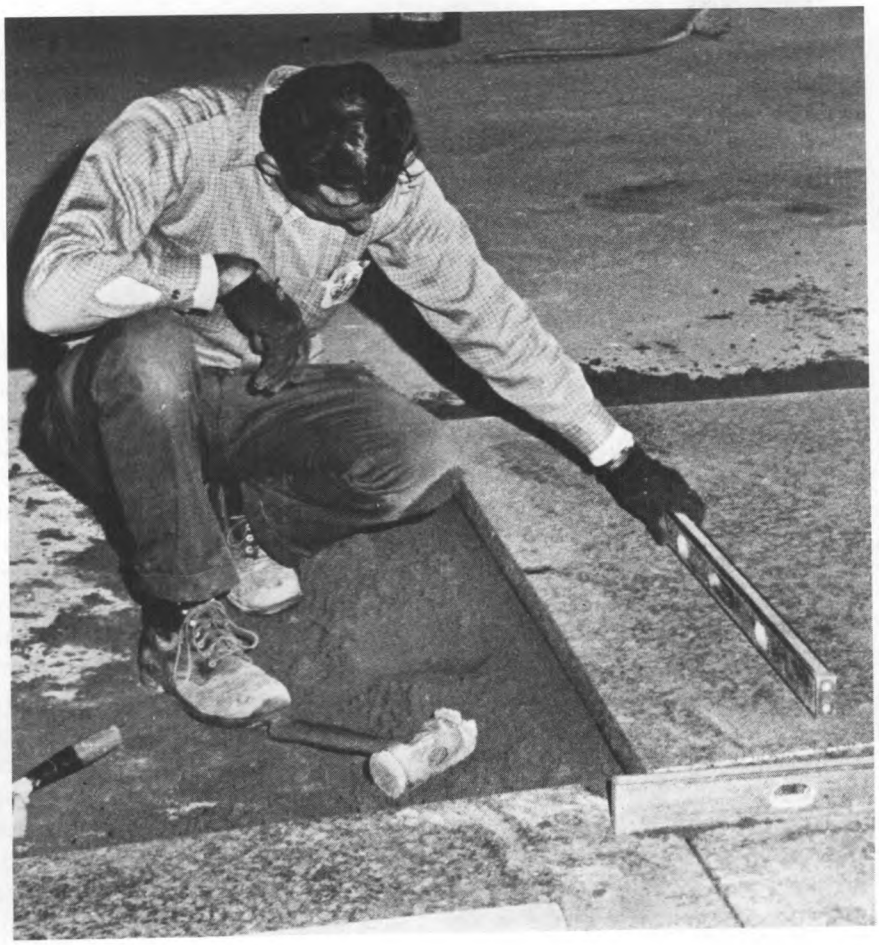
To cut various shapes and sizes, craftsmen find the grain of each piece of stone and use a stonemason's hammer to strike it along a predetermined line. Valuable pieces often are cut with an abrasive saw.

Stonemasons also do veneer work, in which cut stone is applied in various patterns. In one specialized branch of the trade known as alberene stone setting, masons set acid-resistant soap-stone linings for vats, tanks, and floors.

The principal handtools of the stonemason are trowels, heavy hammers, wooden or hard rubber mallets, and chisels. For rapid cutting, pneumatic tools are used. They use special power tools to smooth the surface of large stones.

Places of Employment

Most stonemasons work in large urban areas for stonemasonry and bricklaying contractors and general construction contractors. A few also work for government agencies or business establishments that handle their own construction and alteration work. In areas that have no stonemasons, bricklayers often perform this work.



Training, Other Qualifications, and Advancement

Most training authorities recommend the completion of a 3-year apprenticeship training program in addition to related classroom instruction as the best way to learn this trade. Many masons, however, have picked up the trade by working as helpers, observing, and being taught by experienced masons.

Apprenticeship applicants generally must be 17 to 24 years old. A high school education or its equivalent is desirable. Good physical condition is important because the work can be strenuous.

Stonemasons may advance to jobs as foremen. They also may become cost estimators for stonemasonry contractors. A few start their own contracting business.

Employment Outlook

Employment of stonemasons is expected to have little change through the mid-1980's, despite the anticipated large expansion in construction activity. Stone is being used less frequently because modern architecture emphasizes simple lines, little ornamentation, and large windows. However, a small number of job openings for new workers will arise as experienced stonemasons retire, die, or change occupations.

Earnings and Working Conditions

Union minimum wage rates for stonemasons in 68 large cities averaged $7.87 an hour in 1972, compared with $7.69 for all journeymen in the building trades. Minimum rates for stonemasons in 14 of these cities, selected to show how wages differ among various areas of the country, appear in the accompanying tabulation.

City	Hourly rate
Albuquerque	$ 6.29
Birmingham	6.65
Boston	8.45
Chicago	8.90
Des Moines	7.98
Houston	7.20
Jacksonville	6.65
Knoxville	7.07
Los Angeles	8.00
Phoenix	8.85
Pittsburgh	9.16
Scranton	8.43
Seattle	7.65
Washington, D.C.	8.60

Since most stonemasonry is done outdoors, working hours are often lost because of bad weather. The work is active and sometimes strenuous, as it involves heavy lifting.

A large proportion of stonemasons are members of the Bricklayers, Masons and Plasterers' International Union of America.

Sources of Additional Information

For further information about apprenticeships for stonemasons or other work opportunities in this trade, contact local bricklaying or stonemasonry contractors; a local of the Bricklayers, Masons and Plasterers' International Union of America; a local joint union-management apprenticeship committee; or the nearest office of the State apprenticeship agency or the Bureau of Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service may have information about apprenticeship and other training opportunities.

General information about the work of stonemasons may be obtained from:

Bricklayers, Masons and Plasterers' International Union of America, 815 15th St. NW., Washington, D.C. 20005.

STRUCTURAL-, ORNAMENTAL-, AND REINFORCING-IRON-WORKERS, RIGGERS, AND MACHINE MOVERS

(D.O.T. 801.281, .381, .781, .884; 809.381, .781, .884; and 869.883)

Nature of the Work

Ironworkers erect steel framework and other metal parts in buildings, bridges, and other structures. They also rig heavy construction machinery (prepare it for moving) and deliver the machinery to new sites. In addition, ironworkers make alterations, such as installing steel stairs or adding window guards to buildings, and do repair work, such as replacing metal bridge parts.

Ironworkers comprise four related trades—structural ironworkers, riggers and machine movers, ornamental-ironworkers, and reinforcing-ironworkers (rodmen). Many craftmen are skilled in two or more of these trades.

Structural-ironworkers (D.O.T. 809.381) erect the steel framework of bridges, buildings, and other structures such as storage tanks. They also install floor decking and the doors and frames of bank vaults. In erecting steel framework, they push, pull, or pry steel beams and girders into proper position. Next, they temporarily connect all steel members with bolts, use plumb bobs and levels to align the structure, and then weld or bolt the pieces. In a large building, ironworkers generally specialize in a particular operation, such as welding or bolting.

Riggers and machine movers (D.O.T. 869.883) set up and rig the hoisting equipment used to erect and dismantle structural steel frames. These skilled workers also move heavy construction machinery and equipment. They study the size, shape, and weight of the object to be moved; choose lines and cables to support the load; and select points of attachment that will provide a safe and secure hold on the load. Next, they attach the lifting device to both the hoisting equipment and the item to be moved, and direct the load into position by giving hand signals and other directions to the hoisting machine operator. In many instances, special rigging equipment must be built on the job to move unusually shaped materials and machines. This work requires a knowledge of hoisting equipment and lifting devices.

Ornamental-ironworkers (D.O.T. 809.381) install metal stairways, catwalks, floor gratings, ladders, and window frames. They also install lampposts, fences, and decorative ironwork. In addition, they work with prefabricated aluminum, brass, and bronze items. Examples are recently-developed ornamental building facades which are bolted or welded to a building.

Reinforcing-ironworkers (rodmen) (D.O.T. 801.884) set steel rods or bars in concrete forms to reinforce the concrete. Rodmen place the steel bars on suitable supports in the concrete form and tie the bars together at intersections so that each bar receives its intended structural load. The bars are placed in the form according to blueprints, specifications, or verbal instruction. Rodmen use steel pliers and other tying tools to wire the rods securely in place. Some concrete is reinforced with a coarse mesh made of welded wire (usually 6- by 6-inch grids). When using mesh, rodmen measure the surface to be covered, cut and bend the mesh to the desired shape, and place it over the area to be reinforced. While the concrete crew pours the slab, rodmen use hooked rods to

position the wire mesh in the freshly poured mixture.

Places of Employment

About 95,000 structural- and ornamental-ironworkers were employed in 1972. Thousands of additional workers were employed as riggers, machine movers, and reinforcing-ironworkers.

Most of these craftsmen are employed by general contractors on large building projects, steel-erection contractors, or ornamental-iron contractors. Many are employed by large steel companies or their subsidiaries engaged in the construction of bridges, dams, and large buildings. Some work for government agencies, public utilities, or large industrial establishments that do their own construc- work. A few are self-employed.

Training and Other Qualifications

Most training authorities recommend the completion of a 3-year apprenticeship as the best way to learn these trades. Apprenticeship applicants must be 18 to 30 years old. Good physical condition is required and a high school education or its equivalent is desirable.

The apprenticeship program for ironworkers usually consists of 3 years of on-the-job training, given either by the foreman or an experienced journeyman, and a minimum of 144 hours a year of classroom instruction in subjects such as drafting, blueprint reading, and mathematics applicable to layout work.

Hourly wage rates for apprentices start at 60 percent of the journeyman rate and increase periodically until the journeyman rate is reached at the completion of the apprenticeship. In some localities, the starting rate may be as high as 75 percent of the journeyman rate.

Employment Outlook

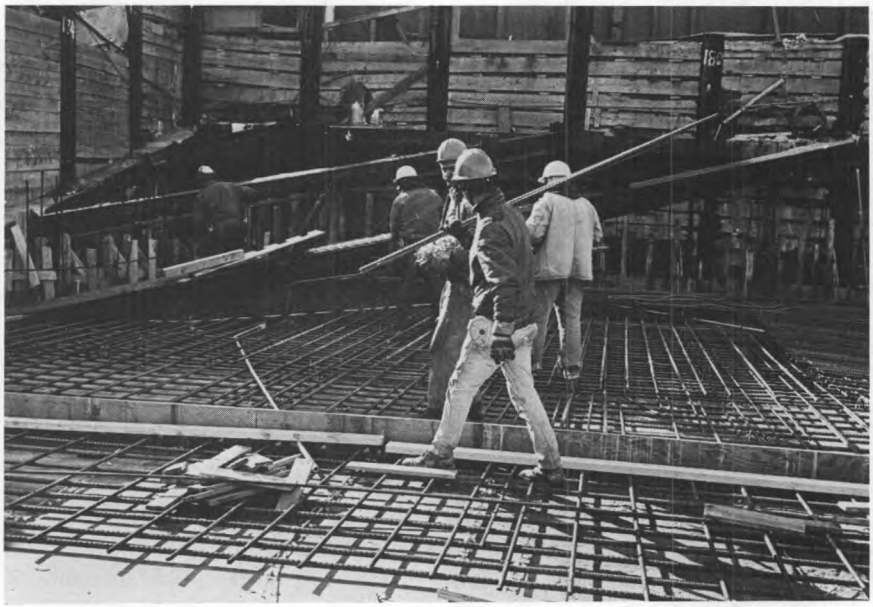
Employment of ironworkers is expected to increase moderately through the mid-1980's. Besides jobs resulting from employment growth, many openings will result from the need to replace experienced journeymen who transfer to other fields of work, retire, or die.

The rise in ironworker employment is expected principally because of the anticipated large increase in construction activity. The growing use of structural steel in buildings will create a need for more structural-ironworkers. Work opportunities for ornamental-ironworkers also will result from the growing popularity of ornamental panels for large buildings, and of metal frames to hold large glass installations. More riggers and machine movers will be needed to handle the increasing amount of heavy construction machinery. The growing demand for prestressed concrete will create additional job opportunities for reinforcing-ironworkers.

Earnings and Working Conditions

Union minimum wage rates for structural-ironworkers and rodmen in 68 large cities averaged $7.79 and $7.73 an hour, respectively in 1972, compared with $7.69 for all building trades journeymen. Average minimum hourly rates for ironworkers and rodmen in 14 of these cities, selected to show how wages differ among various areas, appear in the accompanying tabulation.

City	*Hourly rates*	
	Structural-Ironworkers	*Rodmen*
Atlanta	$6.80	$6.80
Baltimore	7.76	7.76
Boston	7.89	7.89
Chicago	9.21	9.21
Cleveland	9.10	9.10
Denver	6.75	6.75
Detroit	8.00	7.45



Los Angeles	8.38	8.55
Lubbock	5.08	5.08
Minn.-St. Paul ..	7.55	7.55
Philadelphia	8.09	9.03
St. Louis	7.98	7.98
San Diego	8.38	8.34
Tulsa	7.44	7.44

Since materials used in ironworking trades are heavy and bulky, above-average physical strength is necessary. Agility and a good sense of balance also are required in order to work at great heights and on narrow footings. Although many ironworkers risk injury from falls, safety devices such as nets and scaffolding have reduced accident frequency.

Ironwork often involves considerable travel because demand is insufficient to keep local crews constantly employed. Consequently, workers must be imported to handle occasional large construction projects. Large contractors may keep a small crew continually employed by moving them from job to job.

Many workers in these trades are members of the International Association of Bridge, Structural and Ornamental Iron Workers.

Sources of Additional Information

For more information on apprenticeships or other work opportunities, contact local general contractors; a local of the International Association of Bridge, Structural and Ornamental Iron Workers; a local joint union-management apprenticeship committee; or the nearest office of the State apprenticeship agency of the Bureau of Apprenticeship and Training, U.S. Department of Labor. In addition, the local office of the State employment service may have information about the Manpower Development and Training Act, apprenticeship, and other programs that provide training opportunities.

General information about ironworkers may be obtained from:

Associated General Contractors of America, Inc., 1957 E St. NW., Washington, D.C. 20006.